BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
	)	R 2020-019
STANDARDS FOR THE DISPOSAL OF COAL	)	
COMBUSTION RESIDUALS IN SURFACE	)	(Rulemaking – Land)
IMPOUNDMENTS: PROPOSED NEW 35 ILL.	)	
CODE 845	)	

NOTICE OF FILING

To: Service List

PLEASE TAKE NOTICE that I have today electronically filed, with the Office of the Clerk of the Pollution Control Board, **AMEREN'S INDEX OF EXHIBITS AND SECOND HEARING EXHIBITS**, copies of which are herewith served upon you.

Dated: September 28, 2020

Respectfully submitted,
AmerenEnergy Medina Valley Cogen, LLC and Union Electric Company, d/b/a Ameren Missouri.

By /s/Claire A. Manning

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that a true copy of the foregoing documents were electronically filed on September 28, 2020 with the following:

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and that copies were sent via email on the same date to the parties on the service list.

Respectfully submitted,
AmerenEnergy Medina Valley Cogen, LLC and Union Electric Company, d/b/a Ameren Missouri.

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CODE 845	)	

AMEREN'S INDEX OF EXHIBITS

1. Closure Plan for Hutsonville Ponds A, B, C, and Bottom Ash Pond.

2. IEPA Approval Letter of Closure Plan for Hutsonville Ponds A, B, C, and Bottom Ash Pond.

3. Closure Plan for Hutsonville Pond D.

4. IEPA Approval Letter of Closure Plan for Hutsonville Pond D.

5. Closure Plan for Meredosia Fly Ash and Bottom Ash Ponds.

6. IEPA Approval Letter of Closure Plan for Meredosia Fly Ash and Bottom Ash Ponds.

7. Closure Plan for Venice North and South Ash Ponds.

8. IEPA Approval Letter of Closure Plan for Venice North and South Ash Ponds.

9. Construction Quality Assurance Report for Hutsonville Ponds A, B, C, and Bottom Ash Pond.

10. Construction Quality Assurance Report for Hutsonville Pond D.

11. Construction Quality Assurance Report for Meredosia Fly Ash and Bottom Ash Ponds.

12. Construction Quality Assurance Report for Venice North and South Ash Ponds.

13. 2019 Annual Report for Hutsonville Pond A.

14. 2019 Annual Report for Hutsonville Pond D.

15. 2019 Annual Report for Meredosia Power Station.

16. 2019 Annual Report for the Former Venice Power Plant.

17. Liquefication Analysis Report for the Meredosia Fly Ash and Closed Ash Ponds.

18. Elevation Rendering of Meredosia Old Ash Pond.

19. April 12, 2019 Letter from the Illinois Department of Natural Resources to AmerenEnergy Medina Valley Cogen, LLC regarding Meredosia Ash Ponds.

Dated: September 28, 2020

Respectfully submitted,
AmerenEnergy Medina Valley Cogen, LLC and Union Electric Company, d/b/a Ameren Missouri.

By /s/Claire A. Manning

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Exhibit 1

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CLOSURE PLAN:
ASH PONDS A, B, C & BOTTOM ASH POND
HUTSONVILLE POWER STATION
Project J04PT



IEPA-DIVISION OF RECORDS MANAGEMENT
RELEASABLE
FEB 26 2016
REVIEWER: JKS

AmerenEnergy Medina Valley Cogen, L.L.C.

Crawford County, Illinois

September 15, 2014 (Rev 0)

Revised February 23, 2015 (Rev 1)

FEB 26 2015
Div. of Public Water Supplies
Illinois EPA

Prepared by:

Hanson Professional Services

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CLOSURE PLAN:
ASH PONDS A, B, C & BOTTOM ASH POND
HUTSONVILLE POWER STATION
Project J04PT

Closure Plan

Appendix A – Hydrogeologic Site Investigation

Appendix B – Groundwater Monitoring Plan

Appendix C – Groundwater Model Report

Appendix D – Groundwater Management Zone Application

Appendix E – Post-Closure Care Plan

Appendix F – Construction Quality Assurance Plan

Appendix G – Construction Specification

Appendix H – Construction Plans

Appendix I – Hydraulic Calculations

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Illinois



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[redacted]

Ash Ponds Closure

Closure Plan

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

September 15, 2014

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1. Introduction

AmerenEnergy Generating Company, pursuant to Title 35, Ill. Admin. Code, Part 840 [35 IAC 840] (Illinois PCB, 2011), completed closure of the Ash Pond D Coal Combustion Waste (CCW) pond at the Hutsonville Power Station (Site) in January 2013. AmerenEnergy Medina Valley Cogen, L.L.C. (AmerenEnergy Generating Company successor, and hereafter referred to as Ameren), is submitting this Closure Plan for the remaining CCW ponds: Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond. The operation of the remaining ash ponds are regulated under Title 35 Illinois Administrative Code, Part 309 (35 IAC 309), and they will be closed in compliance with the requirements of 35 IAC 620. The proposed Closure Plan for the remaining ash ponds was developed to generally conform with the Ash Pond D site-specific rule 35 IAC 840, and where judged appropriate, elements of the proposed 35 IAC 841 rules, currently under development. Comparison of this closure plan with the elements in 35 IAC 840 and the 35 IAC 841 rulemaking is detailed in Table 1. Concurrently submitted supporting documents are listed in the Reference section of this report.

Upon approval of the Closure Plan by the Illinois Environmental Protection Agency (EPA), Ameren will begin closing these remaining facilities.

1.1 Site Background

The Site is located on the west bank of the Wabash River, and approximately one and one-half miles north of the Village of Hutsonville in Crawford County, Illinois. The Site is located in the South ½ of Section 17, Township 8 North, Range 11 West of the Second Principal Meridian (see Figure 1).

All ash ponds at the Site (see Figure 2) are out-of-service. Ash Pond D, the largest and oldest of the four ash ponds at the Site, was covered and closed during 2011-2012 under the 35 IAC Part 840 rules. The remaining ponds, including Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond, will be closed following approval of this Closure Plan.

1.2 Summary of Regional and Site Geology

The Site geology consists primarily of Wisconsinan Stage fluvial deposits with some Illinoian Stage diamictons overlying Pennsylvanian bedrock. There are various fill materials along with three surficial (unlithified) units identified at the Site, including fine-grained fluvial deposits classified as Cahokia Alluvium, poorly sorted outwash sand and gravels of the Henry Formation, and silty and clayey diamictons of the Glasford Formation. The details of the Site geology are described in the Hydrogeologic Site Investigation (Hanson, 2014 b).

Earthen Fill is present across the majority of the Site, ranging from less than 2 to more than 10 feet (ft.) thick. Fill consists of sandy silts and silty sands, which has been used to elevate depressions and construct berms around the various ash ponds and structures. CCWs were found in ash pond areas. The thickness of CCWs in Ash Pond D ranges from 12 to 31 ft. The thickness of CCWs in the undeveloped area between Ash Ponds A and D, prior to the construction of Ash Ponds B and C, was up to 12 ft., but all CCWs were excavated during construction of Ash Pond B in 2000.

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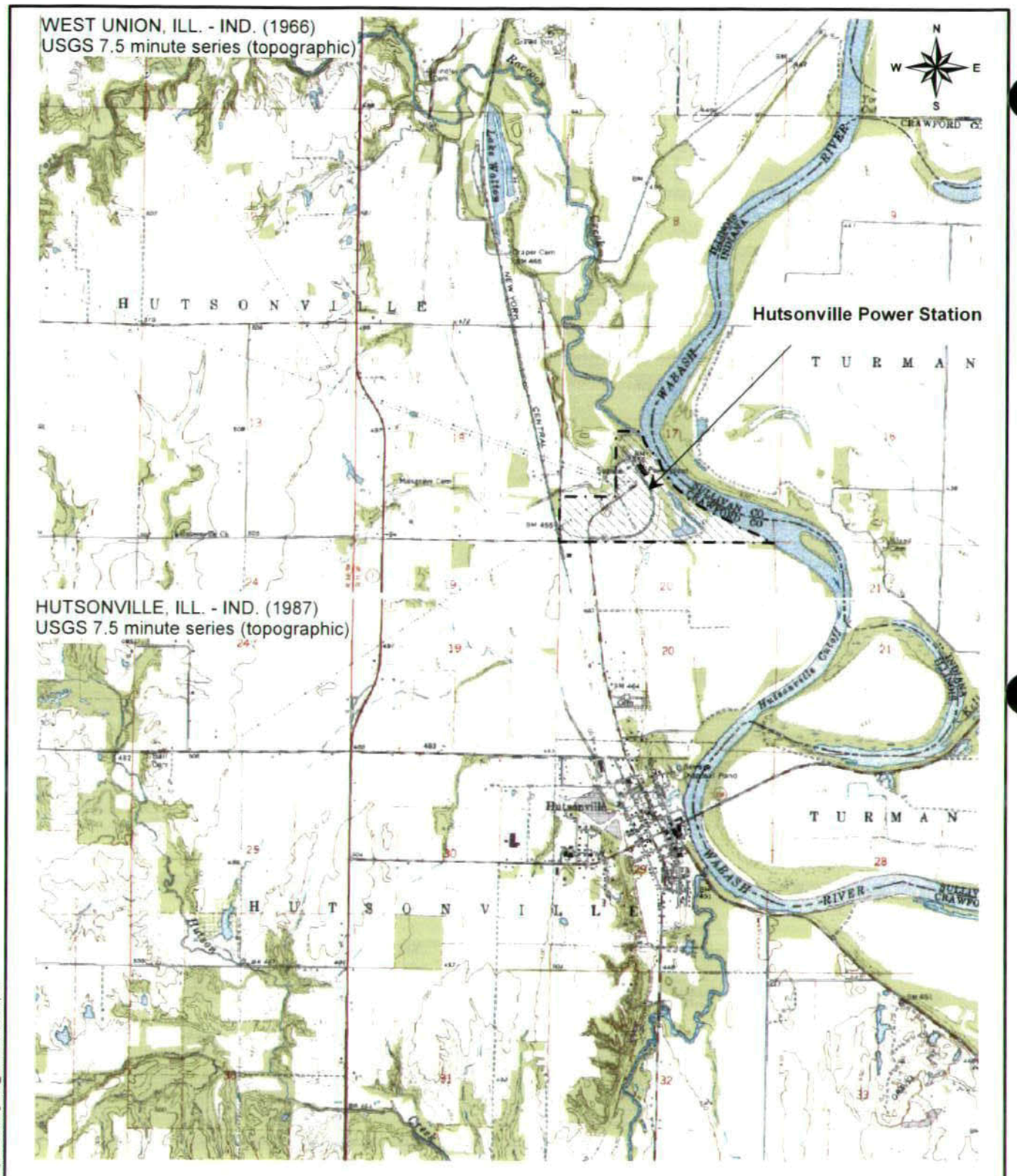
Table 1. Comparison of Closure Plan Requirements - 35 IAC 840.130 versus 35 IAC 841[1]

Part 840	Part 841	Description	Location in this Document
	841.210(b)	Site Map	Figure 2
840.130(b)	841.210(b)	Facility Description	Sections 1.1 and 3
840.130(c)	841.410(b)	[Desc.] Closure Activities to be Performed	Section 4 as summarized from the Project Plans and Specifications
840.130(d)	841.410(c) 841.200	[Desc.] Results of the Hydrogeologic Site Investigation	Section 1.2 as summarized from the Hydrogeologic Site Investigation
840.130(e)	N/A	[Desc.] Groundwater Trend Analysis Methods	N/A
NA	841.410(e) 841.235	[Desc.] Annual Statistical Analysis Methods	Section 7 as summarized from the Groundwater Monitoring Plan
840.130(f)	841.410(a) 841.210(a)	[Plans] for the Groundwater Monitoring System	Section 7 as summarized from the Groundwater Monitoring Plan
840.130(g)	841.410(d) 841.205	[Desc.] Groundwater Monitoring Program	Section 7 as summarized from the Groundwater Monitoring Plan
840.130(h)	841.410(a) 841.210(b)	Identification & Location of Monitoring Wells	Section 6 and Figure 2
840.130(i)	841.410(f) 841.315 841.320	[Plans] for the Groundwater Collection Trench (840); Groundwater Collection System and Discharge System (841)	Section 2.2 (Summary of previously installed Trench installation and operational plans)
840.130(j)	841.410(f) 841.415	[Plans] for the Final Slope Design; Compliance with Stability Criteria	Section 3.1
840.130(k)	841.410(f) 841.420	[Plans] for the Final Cover System	Sections 4.11 and 4.12
840.130(l)	841.410(g)	Estimates of Time to Complete Closure	Sections 4.6 and 8.1
840.130(l)	841.410(g)	Estimate of Time Required for Hydrostatic Equilibrium Beneath Unit, Cost of Closure, and Cost of Post-Closure Care	Section 8.2
840.130(m)	841.410(h)	[Desc.] Groundwater Management Zone	Section 5 as summarized from the Groundwater Management Zone Application
840.130(n)	841.410(i) 841.155	Construction Quality Assurance Program	Section 9 as summarized from the Construction Quality Assurance Plan
840.130(o)	841.410(j) 841.235	Actions Proposed to Mitigate Statistically Significant Increasing Trends	Section 7 as summarized from the Groundwater Monitoring Plan
	841.410(k)	[Desc.] Institutional Controls Prohibiting Potable Uses	Section 5
840.130(p)	841.410(l)	Professional Engineer Signature and Seal	Section 11

[ ] indicates paraphrasing; NA - Not applicable

[1] 35 IAC 841 draft version dated 06/12/2013



EXPLANATION

Property limits (approximate)

SCALE: 1 in. = 1,000 ft.

0 ft. 500 ft. 1,000 ft.

SOURCE: http://www.isgs.uiuc.edu/nsdihome/webdocs/drgs/

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SITE LOCATION MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 1

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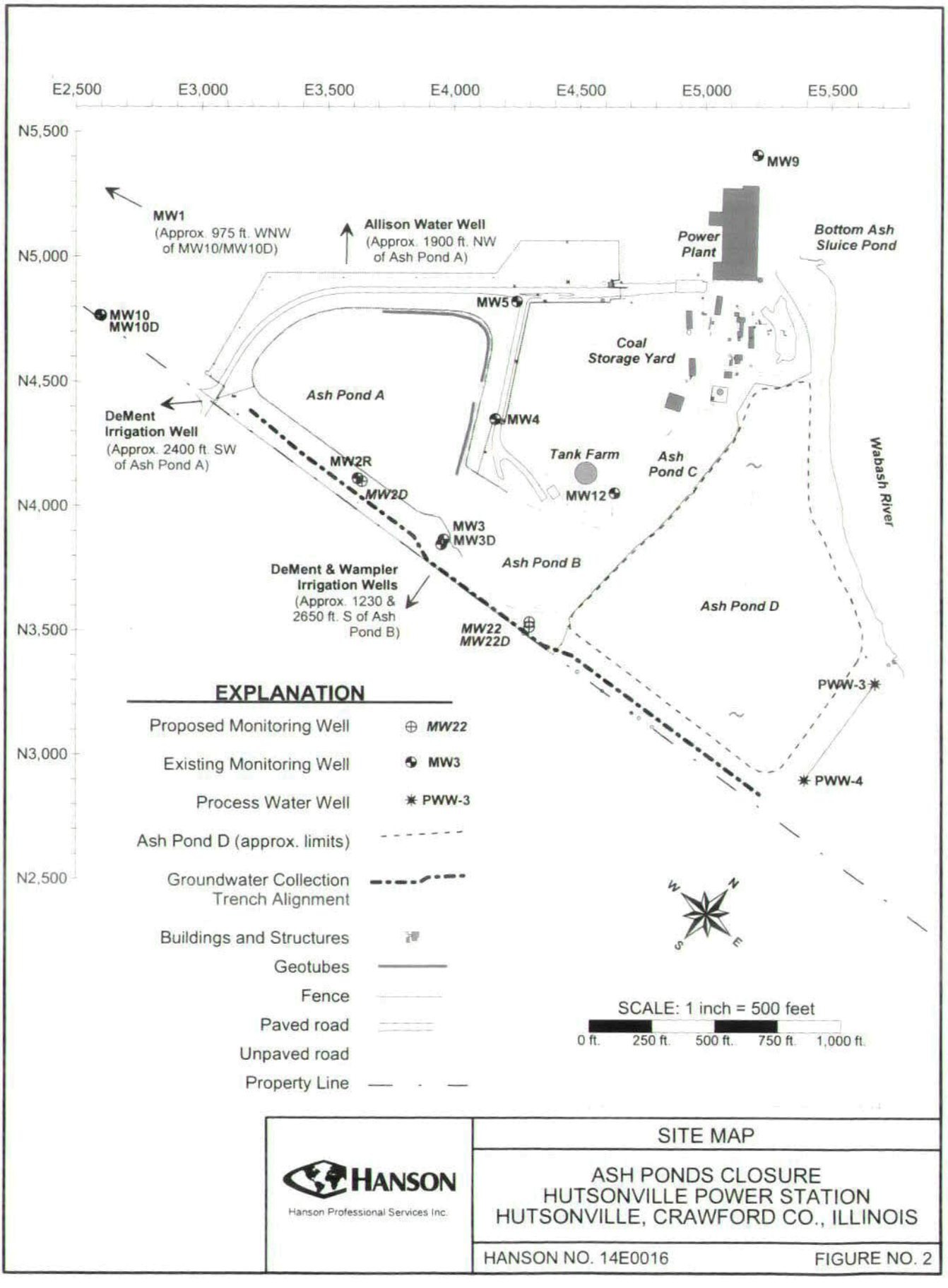

I:\14jobs\14E0016\Admin\14-Reports\GMZ\FIG_2SiteMap_140813.srf

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SITE MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 2

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Two groundwater flow zones are identified at the Site: a shallow groundwater zone and a deep groundwater zone. The shallow groundwater zone consists of sand and gravel with varying thickness, typically 10 to 20 ft., underlain by 15 to more than 30 ft. of the upper, permeable portions of the sandstone. The shallow sand appears to grade to a fine-grained silty clay toward the northern portion of the Site. A thick shale unit underlies the sandstone at an approximate elevation of about 415 to 420 ft. National Geodetic Vertical Datum (NGVD).

The Wabash River valley contains a relatively fine-grained alluvium from land surface to an elevation of about 410 to 415 ft. NGVD, underlain by sand and gravel to an elevation of about 350 ft. The sand and gravel at depth in the Wabash River valley is referred to as the deep groundwater zone.

Groundwater generally flows from west to east towards the Wabash River within the shallow zone and from southwest to northeast, almost perpendicular to the banks of the Wabash River within the deep zone.

1.3 Summary of Groundwater Quality Downgradient of Ash Ponds A, B, and C

Groundwater downgradient of the ash ponds had concentrations of boron, sulfate, iron, manganese, and TDS higher than Class I groundwater quality standards at multiple locations during the period of 2011 through 2013. Boron had the greatest extent of Class I exceedances attributable to coal ash leachate and was used to define the extent of groundwater impacts from Ash Ponds A, B, C and the Bottom Ash Sluice Pond. The extent of impacts attributable to the ash ponds undergoing closure is discussed further in the accompanying modeling report.

Exceedances of Class I groundwater quality standards for the coal ash indicators boron and sulfate were observed in Ash Pond A, B, C monitoring wells MW2, MW3, and MW3D, while wells MW4, MW5, and MW12 did not have boron or sulfate exceedances in 2011 through 2013.

2. Prior Treatment and Control Options

2.1 Description of Ash Pond D Closure

Ash Pond D was formerly the largest and oldest of the four ash ponds at the Site. Ash Pond D was an unlined pond constructed in 1967 – 1968 and was the primary ash management unit until Ash Pond A began operation in 1986. Since then, it was used as a secondary settling pond until 2000 when it was removed from service. Ash Pond D was covered with a 22 acre cap and closed during 2011-2012 under the Title 35, IAC Part 840 rules (Illinois PCB, 2011). Closure activities included placement of a 40-mil thick textured high density polyethylene (HDPE) geomembrane with three foot protective soil cover with a vegetated surface. Surface water management features incorporated into the final cover design included intermediate berms and ditches to direct runoff to rip-rap-lined chutes running off the ash pond to surrounding areas. Details of the closure are provided in the Project Plans and Specifications (Hanson, 2011c).

2.2 Groundwater Collection Trench

A groundwater collection trench (Trench) was installed between the outside south toe of Ash Ponds A, B, and D and the south property line, as shown on Figure 2. Operation of the Trench is anticipated to begin upon approval of the Site's NPDES permit renewal (No. IL0004120) authorizing its use, which was issued for public notice on August 21, 2014. The Trench is designed to intercept groundwater that may migrate to the south from the ash ponds. The Trench is designed to collect groundwater at four separate sumps: a pair in the east portion of the Trench adjacent to Ash Pond D, and a pair in the west

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portion of the Trench adjacent to Ash Pond A. Details are provided in the Ash Pond D Closure Plan (Hanson, 2011a) and Project Plans and Specifications (Hanson, 2011c).

Water captured by the Trench will be pumped from the four sumps to a central catch basin located adjacent to the existing Ash Pond D outlet structure along the mid-east side of the pond, from which it will then discharge to the Wabash River in accordance with the Station's NPDES permit.

3. Description of Ash Ponds

3.1 Ash Pond A

Ash Pond A was operational from 1986 until the plant ceased generation in December 2011 for disposal of CCWs generated at the Site. Fly ash from the operating units was collected by an electrostatic precipitator and sluiced to Ash Pond A. The pond was constructed with an 80 mil HDPE liner. CCWs were sluiced to the pond where solids were permitted to settle out and supernatant liquids were decanted. The pond contains fly ash within an area of approximately 12 acres, with an average ash thickness of 20.4 feet. It is estimated that Ash Pond A currently has 80,667 cubic yards (yd^3) of ash. The ash pond is contained by a 2,400 ft. long perimeter embankment that has an average height variance between 17 ft. on the southwest side, 15 ft. on the east side, and 18 ft. on the north side.

The exterior embankment slopes are approximately 3H:1V along the southwest and east sides and 2H:1V along the north side. Interior embankment slopes are currently 11H:1V, The mean thickness of ash in the pond is approximately 20.4 feet.

The cap will be constructed on a 20H:1V (5%) slope that will intersect the existing exterior embankment slope no higher than the existing ash surface. Soil embankment materials above that point will be removed and utilized for vegetative cover on the final cap.

Analyses of the structural integrity of Ash Pond A in the proposed closed condition, including slope stability, bearing capacity and settlement, have been completed. The critical sections, selected for slope stability analysis of the perimeter berm and the final cover, are shown on Figure 3. A cross-section of the fully constructed critical section and the critical analyzed potential failure surface are included on Figure 4. Analyses of the proposed final configuration of the pond resulted in the following factors of safety (FOS) and induced settlement with regard to the structural stability of the pond.

Table 2. Structural Stability Analysis Results for Ash Pond A

Structural Stability Criteria	Calculated FOS	Required FOS*
Short Term Slope Stability – Exterior Embankment	2.02	1.5
Long Term Slope Stability – Exterior Embankment	2.18	1.5
Seismic Event Slope Stability – Exterior Embankment	1.96	1.3
Short Term Slope Stability – Cover Materials	12.45	1.5
Long Term Slope Stability – Cover Materials	11.70	1.5
Seismic Event Slope Stability – Cover Materials	6.79	1.3
Bearing Capacity	36.9	2.0
Seismic Event Bearing Capacity	36.2	1.5
Maximum Induced Settlement	2.25	N.A.

*The Required FOS is based on Illinois EPA Landfill Requirements, for comparison purposes.

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portion of the Trench adjacent to Ash Pond A. Details are provided in the Ash Pond D Closure Plan (Hanson, 2011a) and Project Plans and Specifications (Hanson, 2011c).

Water captured by the Trench will be pumped from the four sumps to a central catch basin located adjacent to the existing Ash Pond D outlet structure along the mid-east side of the pond, from which it will then discharge to the Wabash River in accordance with the Station's NPDES permit.

3. Description of Ash Ponds

3.1 Ash Pond A

Ash Pond A was operational from 1986 until the plant ceased generation in December 2011 for disposal of CCWs generated at the Site. Fly ash from the operating units was collected by an electrostatic precipitator and sluiced to Ash Pond A. The pond was constructed with an 80 mil HDPE liner. CCWs were sluiced to the pond where solids were permitted to settle out and supernatant liquids were decanted. The pond contains fly ash within an area of approximately 12 acres, with an average ash thickness of 20.4 feet. It is estimated that Ash Pond A currently has 80,667 cubic yards (yd^3) of ash. The ash pond is contained by a 2,400 ft. long perimeter embankment that has an average height variance between 17 ft. on the southwest side, 15 ft. on the east side, and 18 ft. on the north side.

The exterior embankment slopes are approximately 3H:1V along the southwest and east sides and 2H:1V along the north side. Interior embankment slopes are currently 11H:1V, The mean thickness of ash in the pond is approximately 24 feet.

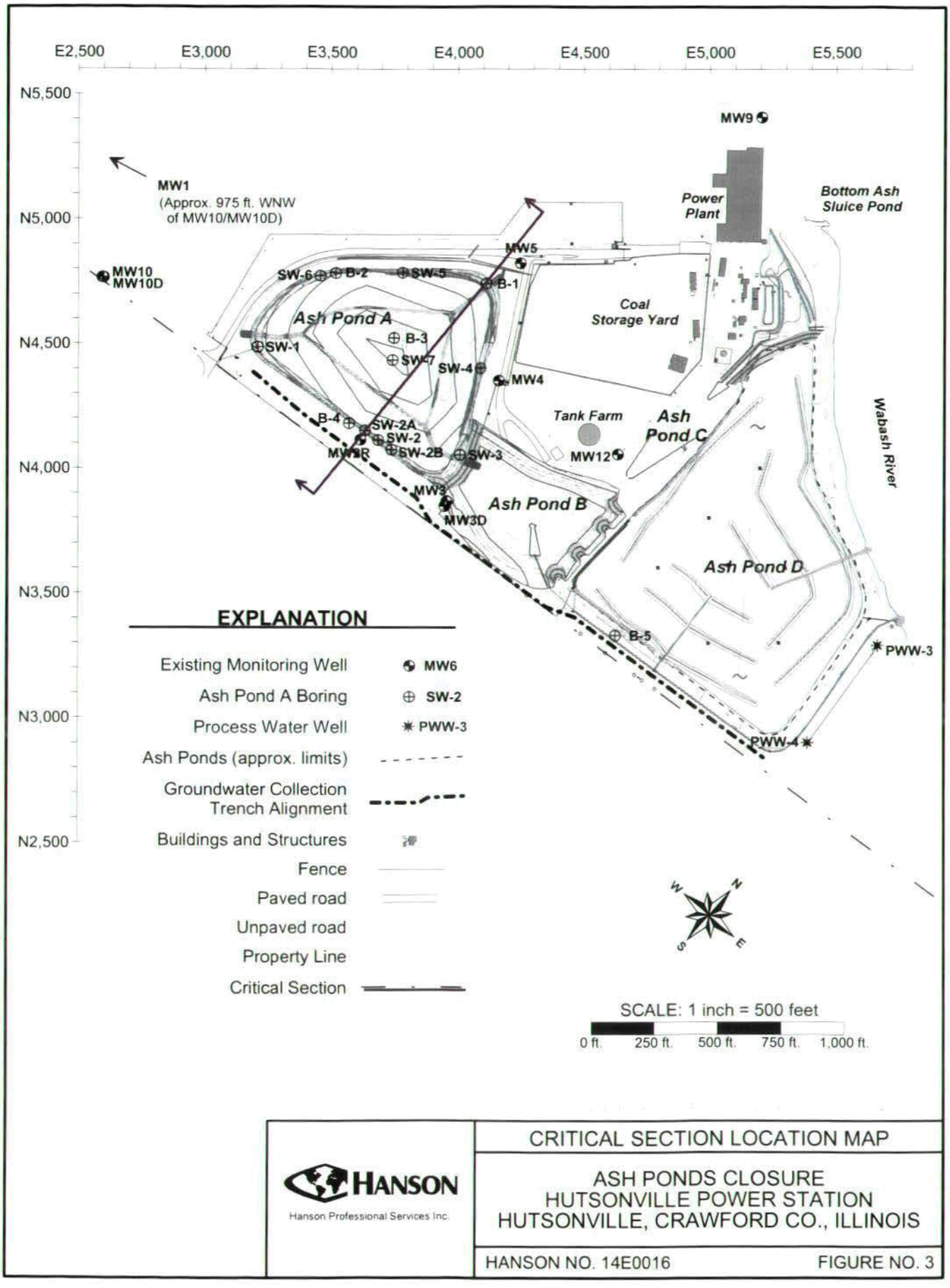
The cap will be constructed on a 20H:1V (5%) slope that will intersect the existing exterior embankment slope no higher than the existing ash surface. Soil embankment materials above that point will be removed and utilized for vegetative cover on the final cap.

Analyses of the structural integrity of Ash Pond A in the proposed closed condition, including slope stability, bearing capacity and settlement, have been completed. The critical sections, selected for slope stability analysis of the perimeter berm and the final cover, are shown on Figure 3. A cross-section of the fully constructed critical section and the critical analyzed potential failure surface are included on Figure 4. Analyses of the proposed final configuration of the pond resulted in the following factors of safety (FOS) and induced settlement with regard to the structural stability of the pond.

Table 2. Structural Stability Analysis Results for Ash Pond A

Structural Stability Criteria	Calculated FOS	Required FOS*
Short Term Slope Stability – Exterior Embankment	2.02	1.5
Long Term Slope Stability – Exterior Embankment	2.18	1.5
Seismic Event Slope Stability – Exterior Embankment	1.96	1.3
Short Term Slope Stability – Cover Materials	12.45	1.5
Long Term Slope Stability – Cover Materials	11.70	1.5
Seismic Event Slope Stability – Cover Materials	6.79	1.3
Bearing Capacity	36.9	2.0
Seismic Event Bearing Capacity	36.2	1.5
Maximum Induced Settlement	2.25	N.A.

*The Required FOS is based on Illinois EPA Landfill Requirements, for comparison purposes.



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CRITICAL SECTION LOCATION MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 3

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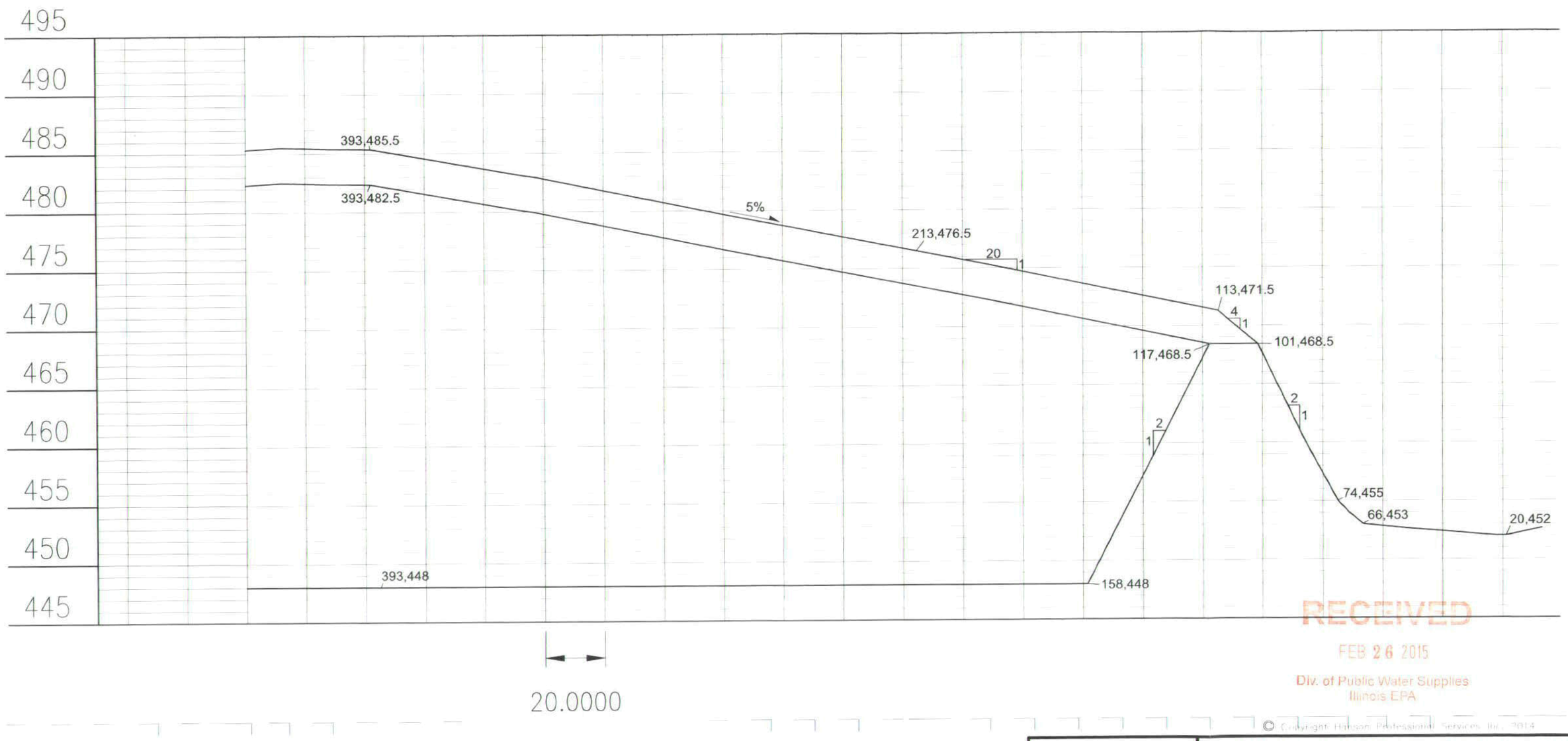
Cross Section at B-1



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CRITICAL EMBANKMENT CROSS SECTION

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE 4

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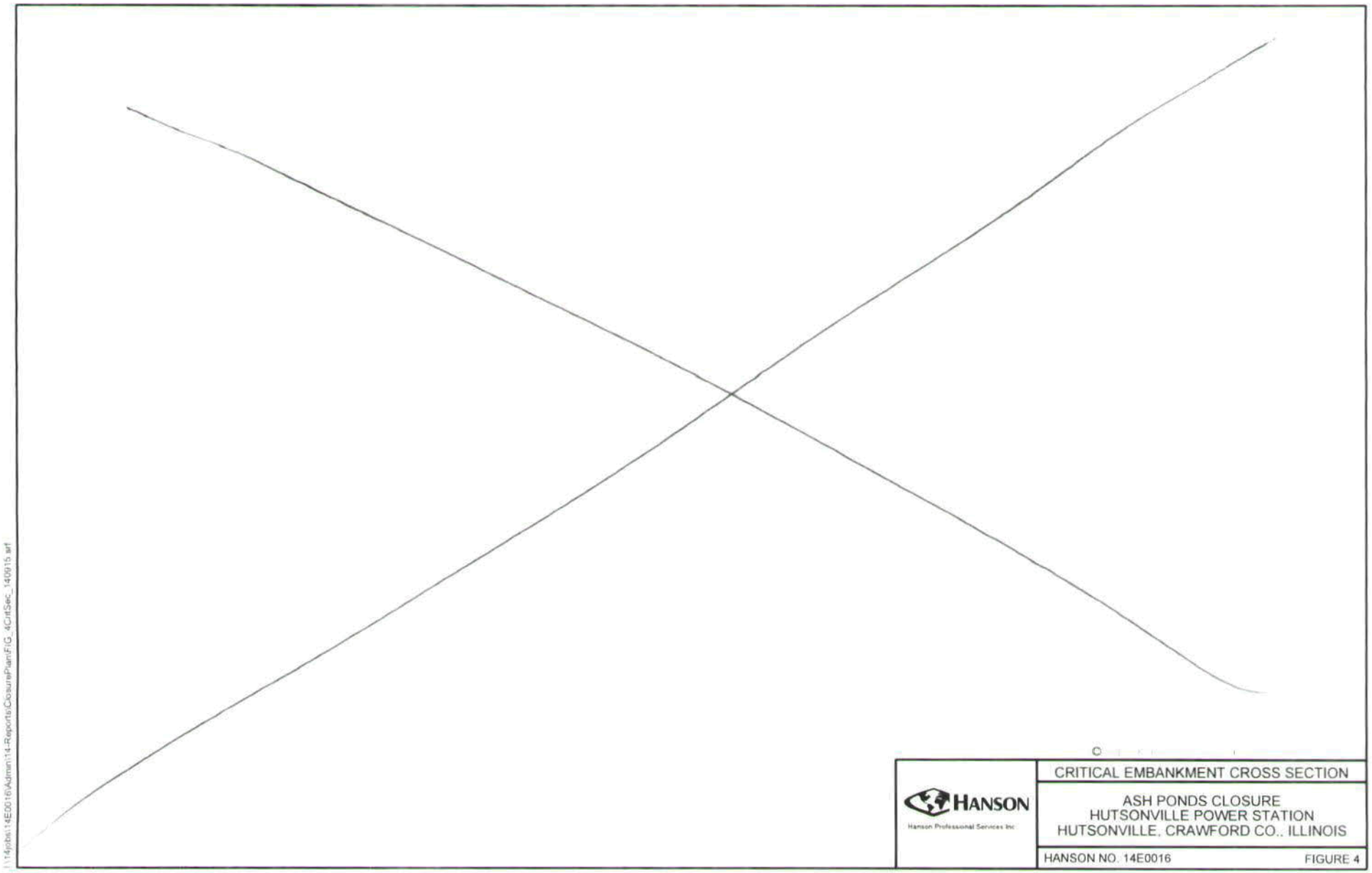

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CRITICAL EMBANKMENT CROSS SECTION

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE 4

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The results of the structural stability analyses indicate adequate slope stability and bearing factors of safety. The slope stability factors of safety above include those from analyses considering seismic events with a 224-year return period, based on United States Geologic Survey mapping. The maximum estimated induced settlement will occur in the middle of the pond area as the ash is graded and the cover system materials are placed, and will not be detrimental to the integrity of the cover system.

3.2 Ash Pond B

Ash Pond B, an HDPE-lined pond, was placed into service in 2000 for disposal of sluiced fly ash and bottom ash, but still receives wastewater and/or storm water for periodic discharge and is permitted under the site's NPDES and Subpart B permits. The ash pond has a surface area of approximately 4.4 acres, with a maximum unit height of 17 feet. It is estimated that Ash Pond B currently has 12,400 yd^3 of ash to an average depth of approximately 1.7 feet. Ash Pond B functioned as a polishing pond, receiving flow via a triplex pump station from Ash Pond C in addition to flow from Ash Pond A before discharging to the Wabash River via NPDES-permitted outfall #002 (IL0000175).

3.3 Ash Pond C

Ash Pond C, an HDPE-lined pond was placed into service from 2000 for disposal of sluiced bottom ash from the Bottom Ash Sluice Pond before discharge to the Wabash River via outfall #002. This pond still receives wastewater and/or storm water for periodic discharge and is permitted under the site's NPDES and Subpart B permits. As discussed above, water from Ash Pond C was discharged to Ash Pond B via a pump station. The ash pond has a surface area of approximately 2 acres, with a maximum unit height of 12 feet. It is estimated that Ash Pond C currently has 10,000 yd^3 of ash to an average depth of approximately 2.9 feet.

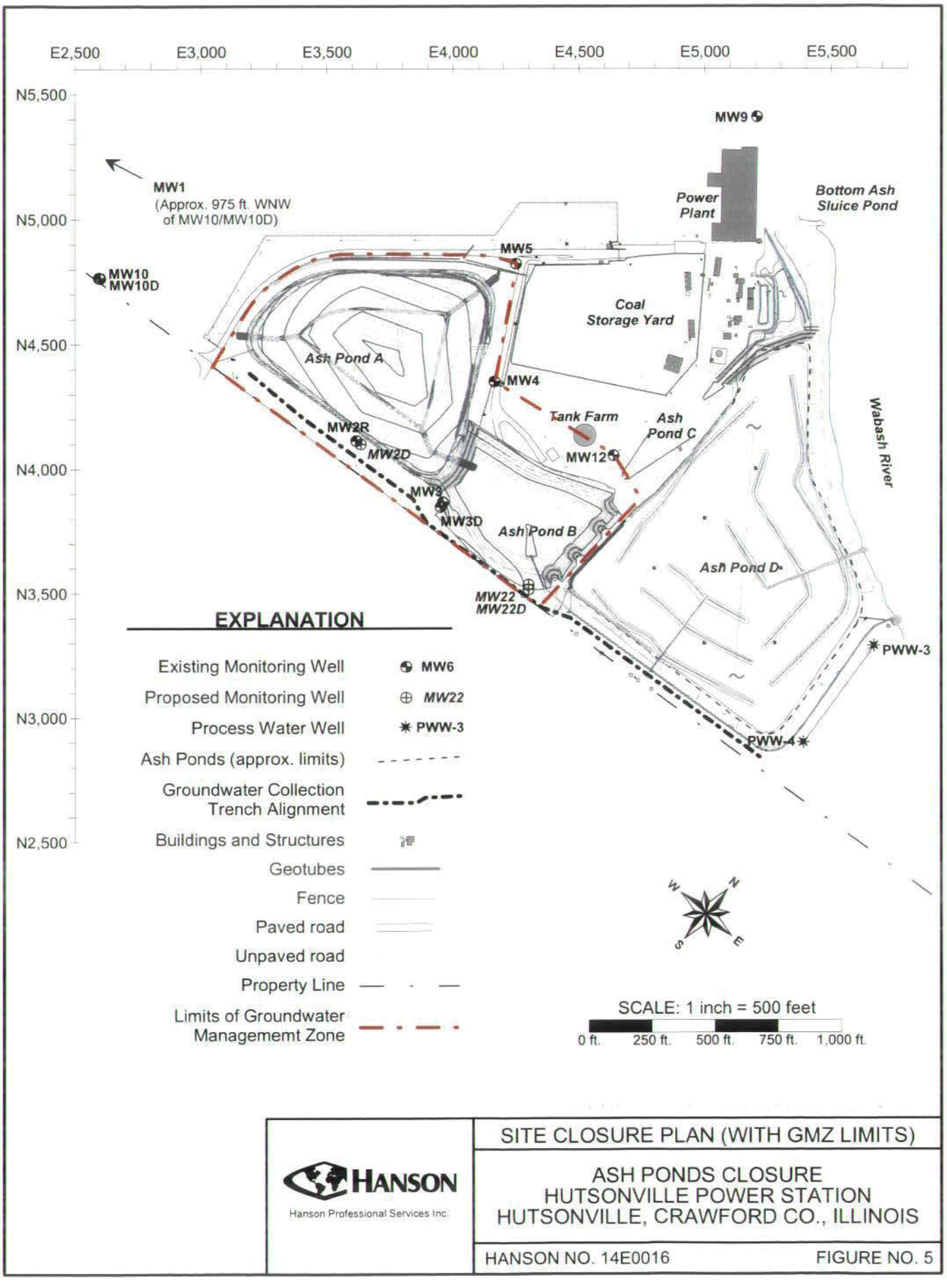
3.4 Bottom Ash Sluice Pond and Coal Yard

The Bottom Ash Sluice Pond was operational from 1969 until the plant ceased generation in December 2011 for disposal and reuse of bottom ash. This pond has a surface area of approximately 1.2 acres, with a maximum unit height of 15 feet. It is estimated that the Bottom Ash Sluice Pond contains 23,142 yd^3 of bottom ash to an estimated depth of 10 to 15 feet. This pond still receives wastewater and/or storm water for periodic discharge and is permitted under the site's NPDES and Subpart B permits.

The coal storage yard encompasses an area of approximately 7.9 acres and contains an average depth of 12 inches of spoils. It is estimated that approximately 12,700 yd^3 of material will be removed.

4. Closure Activities

Closure elements for each of the ash ponds are described below. Closure activities will be conducted in accordance with the Construction Quality Assurance (CQA) Plan prepared for this project that generally conforms with the Ash Pond D site-specific rule at 35 IAC 840, and where judged appropriate, elements of the proposed 35 IAC 841 rules, currently under development. The preliminary designs of the closure elements are shown on Figure 5.



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SITE CLOSURE PLAN (WITH GMZ LIMITS)

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 5

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4.1 Capping of Ash Pond A

Ash Pond A will be the depository for disposal of materials from Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond, which are all being clean-closed. An estimated 1-foot depth of spoils from the Coal Yard will also be removed and relocated to Ash Pond A. Total material that is being moved to Ash Pond A from other areas of the Site is estimated to be approximately 58,000 yd^3. Ash Pond A is the only pond of the four being closed that will have a constructed cap.

4.11 Backfilling and Grading

Ash and fill materials will be graded to establish the final sloped surface of the cap. Base grading of Ash Pond A will require approximately 32,400 yd^3 of material to be cut and 76,400 yd^3 of fill. Ash will be graded to a maximum slope of 20H:1V to promote surface drainage toward the outside of the berm and prevent ponding of runoff. The final ash grading will intersect the existing exterior embankment slope no higher than the existing ash surface, in accordance with the Rules. Soil embankment materials above that point will be removed and utilized for vegetative cover on the final cap. The final cover design will result in a maximum of about 34 feet of re-graded ash near the center of the pond. The final surface of the ash cap will be rolled smooth prior to the placement of the final cover system.

4.12 Final Cover Placement

Final cover components will include approximately 55,400 yd^2 of low permeability geosynthetic membrane cover and approximately 53,600 yd^3 of final protective soil material. See the closure Plans and Specifications completed for this project (Hanson, 2014d).

The low permeability layer will consist of textured high density polyethylene (HDPE) geomembrane which will have a 40-mil minimum nominal thickness. Geomembrane seams will be continuously fusion or extrusion welded to form one continuous membrane covering the entire area of exposed ash. The perimeter edges of the HDPE geomembrane will be finished in an anchor trench excavated in soil materials. This will serve to keep the membrane anchored in place and prevent any lateral migration of surface water into the cap.

The low permeability geomembrane will be covered with a minimum of three feet of soil materials. These soils will be compacted only to the extent required for equipment traffic and construction of overlying drainage structures.

Soils used for the final protective cover will be fertilized, seeded and mulched to facilitate and support a permanent self-sustaining vegetative cover.

Installation of the low permeability geomembrane and the overlying soils will be conducted in accordance with the CQA program. Required records will be maintained on site during construction.

The acceptance report and certification of final cover placement will be submitted to the Illinois EPA and be maintained at the offices of Ameren Environmental Services in St. Louis, Missouri.

4.13 Ash Pond Dewatering

Dewatering of Ash Pond A will take place to the extent necessary to facilitate construction in accordance with this Plan. Since Ash Pond A has an HDPE bottom liner the water level within the pond may be above the surrounding water table.

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4.14 Surface Water Management

Surface water management features have been incorporated into the final cover design, which will be graded to drain surface water at a uniform 5% slope toward the outside berm. The cover drainage is split into three collection areas. Drainage off the western-most third of the cover will collect in a rock chute at the northwest corner, where it is free to discharge toward the northeast using the existing roadside ditch and then out through an existing culvert beneath the north Site access road. Drainage from the eastern-most third of the cover will collect in a similar rock chute at the northeast corner, where it also discharges to the north through the same culvert beneath the Site access road. Drainage from the southern-most third of the cover will collect in a rock chute at the southeast corner, where it will discharge into a storm water retention pond in the area where Ash Pond B is currently located.

4.2 Clean Closure of Ash Pond B

Ash Pond B will be clean-closed and the berms removed to be re-used as cover material for Ash Pond A. Ash removal from Ash Pond B and relocation to Ash Pond A is estimated at approximately 12,500 yd^3. The geomembrane liner at Ash Pond B will be removed and the pond bottom graded to 4-ft. below the pond perimeter. The pond bottom will then be graded to drain to the southeast through a culvert and into the existing paved ditch along the south side of Ash Pond D. Storm water tributary to this pond will be detained for intermediate to large rain events to elevation 446.00 by under sizing the outlet culvert.

4.3 Clean Closure of Ash Pond C and Bottom Ash Sluice Pond

Ash Pond C and the Bottom Ash Sluice Pond will be clean-closed and graded to drain to the northeast through an open cut channel through the original east perimeter berm of Ash Pond D and discharged towards the Wabash River. Ash removal from Ash Pond C and relocation to Ash Pond A is estimated at 10,000 yd^3. The geomembrane liner at Ash Pond C will be removed. An estimated depth of 12 feet of bottom ash over the 1.2 acre area of the Bottom Ash Sluice Pond contains approximately 23,000 yd^3, which will be removed and relocated to Ash Pond A. All ash in these areas will be removed to ensure clean closure of these ponds. Any modifications required at the interface between previously closed Ash Pond D and the Bottom Ash Sluice Pond will be constructed in full compliance with the site-specific (Ash Pond D) closure requirements at 35 IAC 840.126. The required documentation will be submitted to the Illinois EPA upon completion of construction.

4.4 Groundwater Model Simulation of Closure

The groundwater model predicts that groundwater quality after Site closure as the following:

- The proposed closure activities, consisting of excavation, capping, and operation of the completed groundwater trench system, will facilitate compliance of the surrounding groundwater to the Class I groundwater standard.
- Monitoring wells for Ash Ponds A, B, and C are predicted to reach the Class I groundwater standard within 10 years.

4.5 Schedule

Completion of the closure activities is dependent on final approval of this Plan by the Illinois EPA. Assuming approval by December 31, 2014, and dependent on weather, the closure will be completed during the 2015 construction season.

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4.14 Surface Water Management

Surface water management features have been incorporated into the final cover design, which will be graded to drain surface water at a uniform 5% slope toward the outside berm. The cover drainage is split into three collection areas. Drainage off the western-most third of the cover will collect in a rock chute at the northwest corner, where it is free to discharge toward the northeast using the existing roadside ditch and then out through an existing culvert beneath the north Site access road. Drainage from the eastern-most third of the cover will collect in a similar rock chute at the northeast corner, where it also discharges to the north through the same culvert beneath the Site access road. Drainage from the southern-most third of the cover will collect in a rock chute at the southeast corner, where it will discharge into a storm water retention pond in the area where Ash Pond B is currently located.

4.2 Clean Closure of Ash Pond B

Ash Pond B will be clean-closed and the berms removed to be re-used as cover material for Ash Pond A. Ash removal from Ash Pond B and relocation to Ash Pond A is estimated at approximately 12,500 yd^3. The geomembrane liner at Ash Pond B will be removed and the pond bottom graded to 4-ft. below the pond perimeter. The pond bottom will then be graded to drain to the southeast through a culvert and into the existing paved ditch along the south side of Ash Pond D. Storm water tributary to this pond will be detained for intermediate to large rain events to elevation 446.00 by under sizing the outlet culvert.

4.3 Clean Closure of Ash Pond C and Bottom Ash Sluice Pond

Ash Pond C and the Bottom Ash Sluice Pond will be clean-closed and graded to drain to the northeast through an open cut channel through the original east perimeter berm of Ash Pond D and discharged towards the Wabash River. Ash removal from Ash Pond C and relocation to Ash Pond A is estimated at 10,000 yd^3. The geomembrane liner at Ash Pond C will be removed. An estimated 4-foot depth of ash from the Bottom Ash Sluice Pond, or approximately 23,000 yd^3, will be removed and relocated to . Ash Pond A.

4.4 Groundwater Model Simulation of Closure

The groundwater model predicts that groundwater quality after Site closure as the following:

- The proposed closure activities, consisting of excavation, capping, and operation of the completed groundwater trench system, will facilitate compliance of the surrounding groundwater to the Class I groundwater standard.
- Monitoring wells for Ash Ponds A, B, and C are predicted to reach the Class I groundwater standard within 10 years.

4.5 Schedule

Completion of the closure activities is dependent on final approval of this Plan by the Illinois EPA. Assuming approval by December 31, 2014, and dependent on weather, the closure will be completed during the 2015 construction season.

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5. Groundwater Management Zone Application

See the separate Groundwater Management Zone (GMZ) Application (Hanson and NRT, 2014a) that was prepared for this project. Ameren requested establishment of a GMZ pursuant to 35 IAC 620.250(a)(2) as a three-dimensional region containing groundwater being managed to mitigate impairments caused by a release of leachate from Ash Ponds A, B, and C.

The proposed GMZ covers a larger area than the area of impacted groundwater within the Site. The approximate boundary of the proposed GMZ is depicted in Figure 5. The GMZ will extend vertically through the unlithified deposits and sandstone bedrock, with the base of the GMZ coincident with the bottom of the sandstone, which rests on top of the shale bedrock at an approximate elevation of 405 to 410 feet NGVD within the boundaries of the GMZ.

6. Groundwater Monitoring System

See Sections 2 and 3 in the separate Groundwater Monitoring Plan (Hanson, 2014c) that was prepared for this project. A monitoring system maintenance plan is included at the end of Section 2.2 of that report.

Locations of the (potential) 11 monitoring wells to be used for statistical analysis are identified in Table 3 below and are shown on Figure 2.

Table 3. Ash Pond A Groundwater Monitoring System

Well ID	Well Designation	Monitoring Zone	Install Date	Location[2]		Screen Interval
				Easting	Northing	
MW2R	Downgradient	Shallow	6 Apr 12	3617.43	4112.60	446.0-435.2
MW2D[3]	Downgradient	Deep	*proposed*	3612.	4110.	435.0-430.0
MW3	Downgradient	Shallow	9 Feb 84	3952.03	3860.23	450.9-445.9
MW3D	Downgradient	Deep	6 Oct 98	3952.03	3860.23	433.6-438.6
MW4	Downgradient	Shallow	13 Feb 84	4164.06	4350.55	450.8-443.3
MW5	Downgradient	Shallow	13 Feb 84	4249.98	4821.99	453.5-440.5
MW9	Piezometer	Shallow	14 Oct 84	5202.	5408.	448.2-438.2
MW10	Upgradient	Shallow	7 Oct 98	2559.81	4730.48	447.2-442.2
MW10D	Upgradient	Deep	7 Oct 98	2564.72	4729.43	437.6-433.6
MW12	Downgradient	Shallow	8 Oct 98	4637.98	4053.58	448.6-438.6
MW22[3]	Downgradient	Shallow	*proposed*	4300.	3525.	450.0-445.0
MW22D[3]	Downgradient	Deep	*proposed*	4300.	3525.	435.0-430.0

[2] Well locations based on Plant coordinate system.

[3] Proposed monitoring well to be installed upon approval of this Groundwater Monitoring Plan by Illinois EPA. Deep wells (D suffix) may need to be installed due to shallow zone dewatering from collection trench.

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7. Groundwater Monitoring Program

Upon approval of the Groundwater Management Zone Application (Hanson and NRT, 2014a), the groundwater monitoring program will be instituted. The requirements of the Groundwater Monitoring Program are found in the accompanying Groundwater Monitoring Plan (Hanson, 2014c).

The elements of the groundwater monitoring plan include:

1. Groundwater monitoring system with background (upgradient) and compliance (downgradient) monitoring wells identified including construction details/depths.
2. Groundwater monitoring for 7 field and 24 inorganic parameters (Table 4 and Table 5).
3. Quarterly groundwater monitoring frequency.
4. Groundwater sample collection protocol with standard operating procedures.
5. Laboratory analysis by a state-certified laboratory and listing of methods and reporting limits.
6. Quality Assurance Program for field collection of samples and laboratory analysis of samples.
7. Groundwater monitoring system maintenance, including schedule of inspections and methods for inspection of monitoring wells.
8. Data reporting schedule and content of reports.
9. Demonstration of compliance (Section 7.1 below). Statistical methods for evaluating groundwater quality data (Section 7.2 below). Included is a notification schedule with actions to be taken in cases of non-compliance.

Groundwater monitoring can be concluded upon successful completion of post-closure activities and approval of the Illinois EPA. All monitoring data and trend analysis data will be maintained at the offices of Ameren Environmental Services in St. Louis, Missouri, for a minimum of ten years following generation of the data.

7.1 Demonstration of Compliance

Compliance will be based on attainment of groundwater quality that meets the numeric standards for Class I potable resource groundwater as set forth in 35 IAC 620.410. Groundwater quality that does not meet the Class I standard will be considered in compliance when no statistically significant increasing trend can be attributed to the ash ponds at the compliance (GMZ) boundary for four (4) consecutive years, which must be approved by the Illinois EPA. Post-closure groundwater compliance monitoring will continue for a minimum of ten years from the Illinois EPA's approval of this Closure Plan.

Table 4. Field Monitoring Parameters

Parameters[2]
pH[3]
Specific Conductance[3]
Elevation of GW Surface[3]
Depth of Well (bls)[3]
Temperature
Depth to Water (bmp)
Elevation of measuring point

Table 5. Routine Monitoring Parameters

Parameters[2]	Parameters[2]
Antimony, dissolved	Iron[3], dissolved
Arsenic, dissolved	Lead, dissolved
Barium, dissolved	Manganese[3], dissolved
Beryllium, dissolved	Mercury, dissolved
Boron[3], dissolved	Nickel, dissolved
Cadmium, dissolved	Nitrate (as N), dissolved
Chloride, dissolved	Selenium, dissolved
Chromium, dissolved	Silver, dissolved
Cobalt, dissolved	Sulfate[3], dissolved
Copper, dissolved	Total Dissolved Solids (TDS)[3]
Cyanide, total	Thallium, dissolved
Fluoride, dissolved	Vanadium, dissolved
	Zinc, dissolved

7.2 Compliance Determination and Mitigation Requirements

Groundwater Management Zone (GMZ) compliance will be demonstrated by performing an annual trend analysis for each downgradient monitoring well for all of the monitored constituents listed in Table 4 and Table 5. The analysis shall be performed on a minimum of four (4) consecutive samples and use Sen's Estimate of Slope for compliance determination. Generally, if analyses for a parameter show an increasing trend at a down-gradient well, a Mann-Kendall analysis must be performed at a 95% confidence limit to determine whether the increasing trend is statistically significant. If there is a statistically significant increase, then an investigation determining that the statistically significant increasing trend is due to a superseding cause will be performed, and the Illinois EPA will be notified in writing, stating the cause of the increasing trend and the rationale used in its determination.

[2] Routine parameters are reported as dissolved (filtered) concentrations with the exception of the Field Monitoring Parameters and Cyanide, which are taken from total (unfiltered) samples.
[3] Mandatory monitoring parameter under 35 IAC 840.114(a).

If a statistically significant increasing trend continues to be observed over two or more consecutive monitoring periods and there is no superseding cause, a hydrogeologic investigation (and additional site investigation(s), if necessary) must be performed.

Based on the outcome of the additional activities, action must be taken to mitigate the statistically significant increasing trends that are causing, threatening or allowing exceedances of the GMZ groundwater quality standards. Any actions must be proposed as a modification to the post-closure care plan within 180 days after completion of the additional hydrogeologic and/or additional site investigations.

8. Time and Cost Estimates

8.1 Time to Complete Closure

Completion of the closure activities is dependent on weather and final approval of the closure plan and accompanying submittals by the Illinois EPA. However, they are expected to be completed during the 2015 construction season.

8.2 Time to Reach Hydrostatic Equilibrium of Groundwater

The Hydrogeologic Evaluation of Landfill Performance model (HELP Version 3.07) was used to estimate the time for groundwater levels within Ash Pond A to reach hydrostatic equilibrium following completion of the cap. Based on model results for four scenarios with initial moisture contents ranging from zero to 180 inches, the minimum and maximum times for hydraulic head to reach equilibrium ranged from 6 to 8 years. Three of the four scenarios resulted in modeled equilibriums ranging from 61 to 69 inches of head occurring in Year 6 following cap completion.

8.3 Model Predicted Time to Attain Groundwater Quality Standards

The number of years following closure for model predicted boron concentrations (NRT, 2014) in Ash Pond A, B, and C monitoring wells to attain the Class I groundwater standard is approximately 10 years (2025). Predicted boron concentrations will stabilize shortly after the closure plan is implemented in monitoring wells with low concentrations (wells MW5 and MW9), while other wells are predicted to take as long as 40 years to stabilize. Stabilization time is greater than time to comply with Class I groundwater standards at some wells because concentrations continue to decline for a period after the standard is attained.

8.4 Cost of Closure and Post-Closure Care (or Cost of Closure Alternative)

The cost for closure activities related to the closure of Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond, as described in Section 4 of this Closure Plan and as detailed in the Plans and Specifications (Hanson, 2014d), is estimated to be $2,600,000. The cost for post-closure care activities related to the closure of Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice

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2. If there is no superseding cause, and monitoring frequency has been decreased to semi-annual or annual, then sampling must return to a quarterly frequency. If after 4 consecutive quarters no statistically significant increasing trend is observed, then sampling frequency can return to the previous frequency.
3. Notification of statistically significant increasing trends and revision to the sampling frequency must be reported to the Illinois EPA within 30 days of making the determinations.

If a statistically significant increasing trend continues to be observed over two or more consecutive years and there is no superseding cause, a hydrogeologic investigation (and additional site investigation(s), if necessary) must be performed.

Based on the outcome of the additional activities, action must be taken to mitigate the statistically significant increasing trends that are causing, threatening or allowing exceedances of off-site groundwater quality standards. Any actions must be proposed as a modification to the post-closure care plan within 180 days after completion of the additional hydrogeologic and/or additional site investigations.

8. Time and Cost Estimates

8.1 Time to Complete Closure

Completion of the closure activities is dependent on weather and final approval of the closure plan and accompanying submittals by the Illinois EPA. However, they are expected to be completed during the 2015 construction season.

8.2 Time to Reach Hydrostatic Equilibrium of Groundwater

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The number of years following closure for model predicted boron concentrations (NRT, 2014) in Ash Pond A, B, and C monitoring wells to attain the Class I groundwater standard is approximately 10 years (2025). Predicted boron concentrations will stabilize shortly after the closure plan is implemented in monitoring wells with low concentrations (wells MW5 and MW9), while other wells are predicted to take as long as 40 years to stabilize. Stabilization time is greater than time to comply with Class I groundwater standards at some wells because concentrations continue to decline for a period after the standard is attained.

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Pond, as specified in the Post-Closure Care Plan (Hanson, 2014e) completed for this project, is estimated to be $63,000 annually. Total cost for closure and post-closure care under this alternative, which includes capital cost and O&M, is $2,600,000 (closure cost) + $630,000 (10-year post-closure care cost) = $3,230,000 (in 2014 dollars).

For comparison purposes, a clean closure alternative for the Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond at the Site would exceed the $33,000,000 just for the disposal charges (tipping fees) at a permitted disposal facility, and does not include excavation, handling, and transportation to the disposal location. Along with the handling and disposal charges, large volumes of fill could be needed to return the Site to conditions that would promote positive site drainage. Estimated costs are highly dependent on costs associated with disposal of ash in a municipal waste landfill and upon the availability of local fill material. If the material is not suitable for disposal in a solid waste landfill, the disposal cost will be significantly higher than estimated. Due to unfavorable cost and the expected effectiveness of the chosen alternative, this option was not selected.

9. Construction Quality Assurance Program

As previously indicated, see the Construction Quality Assurance (CQA) Plan completed for this project (Hanson, 2014a), which describes the CQA program for the closure of Ash Ponds A, B, C and the Bottom Ash Sluice Pond.

The CQA Plan requires a scheduled program of CQA monitoring, inspection, sampling and testing to verify compliance with project plans and specifications. The goal of the program is to achieve a reasonable degree of certainty that the construction of the facility meets the specified designs.

The elements of the Plan include:

1. Responsibility and authority of project personnel, including: the owner (Ameren); design engineer; CQA personnel, including owner's representative retained as a CQA Officer and a document controller; testing and monitoring firms under the direction of the CQA officer, including the soil/concrete testing lab(s), surveyor, geosynthetics monitor and geosynthetics testing laboratory; and, contractors, suppliers and installers performing their designated portions of the work.
2. Project meetings, including preconstruction meetings, routine progress meetings and as needed, problem or work deficiency meetings.
3. In-progress acceptance of work by the geosynthetic installers and the vegetative cover installers to insure that the geosynthetic is not damaged.
4. Sampling and testing requirements. Prequalification and placement sampling/testing requirements for the various materials and construction activities.
5. Corrective measures. The CQA Officer shall reject and require replacement of all materials for which sampling, testing or inspection show that prequalification requirements are not met. The CQA Officer shall also reject workmanship (and require corrective rework) for which sampling, testing or inspection show that material placement requirements are not met.
6. Documentation of sampling, inspections, and testing, with daily inspection reports and weekly summary reports prepared by the CQA Officer or his designated representative.

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7. Acceptance report prepared by the CQA Officer upon completion of the construction contract and submitted to the Illinois EPA. The acceptance report shall contain the following:
    - Certification by the CQA Officer that the construction has been prepared and constructed in accordance with the engineering design.
    - "As-built" drawings.
    - Weekly summary reports.
8. Construction management activities, including:
    - Procedures for requests for information (RFIs), clarification or interpretation of contract documents by the General Contractor or installer to the CQA Officer.
    - Review procedures of contractor submitted drawings, product data and samples by the CQA Officer in accordance with the requirements of the project specifications so as not to cause delay in project work.
    - Process by which the contractor shall prepare Field Change Order (FCO) requests to the CQA Officer and responsibilities of the CQA Officer for logging FCOs and updating project costs.
9. Procedures for document control and project records, including revisions of the CQA Plan, as necessary, by the CQA Officer, and issuance and maintenance of the CQA Plan and revisions to the CQA Plan by the Document Controller.

10. Licensed Professional Acknowledgement

I hereby affirm that all information and design contained in this Closure Plan is true and accurate to the best of my knowledge and belief in accordance with good engineering practice.

Steve M. Bishoff, P.E.
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703-2886
(217) 788-2450
Registration No. 062-040449

Seal:



Signature: _____ Date: 10-2-2014

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The Hanson 2014 documents, the Hanson/NRT 2014 document and the NRT 2014 document listed above are being submitted concurrently as part of and/or supporting this Closure Plan.

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[redacted]

Ash Ponds Closure

Hydrogeologic Site Investigation

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

September 8, 2014

NATURAL RESOURCE TECHNOLOGY

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1. Introduction

The AmerenEnergy Medina Valley Cogen, L.L.C. Hutsonville Power Station (Site) is situated on the west bank of the Wabash River, and approximately one and one-half miles north of the Village of Hutsonville in Crawford County, Illinois. The Site is located generally in the Southwest ¼ of Section 17, Township 8 North, Range 11 West of the Second Principal Meridian (see Figure 1). The focus of this investigation is for the water treatment devices at the Site known as Ash Pond A, Ash Pond B, Ash Pond C and the Bottom Ash Sluice Pond. Ash Pond D, the largest and oldest of the four ash sluice ponds at the Site, was covered and closed in 2012-13 under the Title 35, Illinois Admin. Code (IAC), Part 840 rules (Illinois PCB, 2011). The layout of the Site and the ash ponds are depicted on Figure 2.

In consultation with the Illinois Environmental Protection Agency (Illinois EPA), Ameren pursued an additional rulemaking before the Illinois Pollution Control Board (IPCB) to provide for sequential corrective actions and/or closure of other Ameren Energy Resources (AER) Company ash ponds. The IPCB issued a stay on AER's proposed rulemaking and in October 2013, Illinois EPA filed a rule of general applicability for coal combustion waste surface impoundments at power generating facilities. It sets forth a process to monitor ash ponds and groundwater, as well as a process for preventive response, corrective action and closure (Illinois PCB, 2013). That rulemaking is continuing.

This Hydrogeologic Site Investigation report generally conforms to 35 IAC 840.110 and the proposed rule at Section 841.200 (when judged appropriate) that is currently under development. This investigation provides information to define the hydrogeology and assess any groundwater impacts associated with the Site, to evaluate a Groundwater Management Zone (GMZ), and to establish a groundwater monitoring system for the Site.

2. Project Background

2.1 Physical Setting

The Site is located at the eastern margin of the Springfield Plain of the Till Plain Section of the Central Lowland (Physiographic) Province (Leighton et al., 1948). The topography consists of generally flat agricultural land with shallow, entrenched drainage.

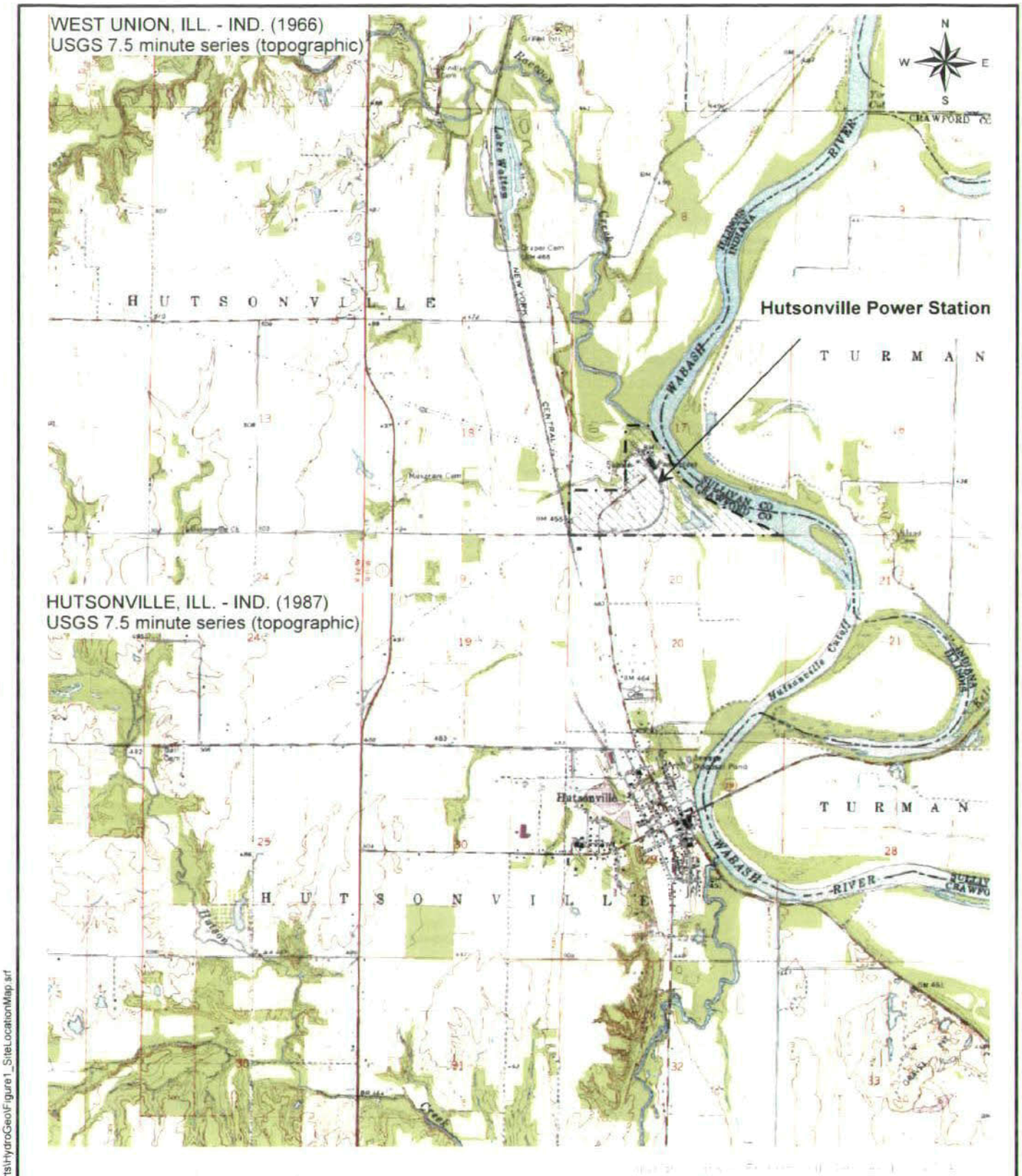
2.2 Geologic Setting

The Site geology consists primarily of Wisconsinan Stage fluvial deposits with some Illinoian Stage diamictons overlying Pennsylvanian bedrock. The surficial (unlithified) materials consist of the Cahokia Formation (fluvial deposits), Henry Formation (glacial outwash deposits), and diamictons of the Glasford Formation (Willman et al., 1975; Hansel & Johnson, 1996).

Regional bedrock is composed of Pennsylvanian Age shale, sandstone, limestone and coal of the Desmoinesian Stage Modesto Formation of the McLeansboro Group (Willman et al., 1975). There are no active geologic structures or faults in the vicinity of the Site (Nelson, 1995).

2.3 Climate Data

Climatic data was obtained from the Indiana State Climate Office (ISCO, 2014). The data was recorded between 1954 and 2014 in Terre Haute, Indiana, which is located approximately 30 miles northeast of the Site. The average values of the data are summarized in Table 1.



EXPLANATION

Property limits (approximate)

SCALE: 1 in. = 1,000 ft.

0 ft. 500 ft. 1,000 ft.

SOURCE
http://www.isgs.uiuc.edu/nsdihome/webdocs/drgs/

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SITE LOCATION MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 1

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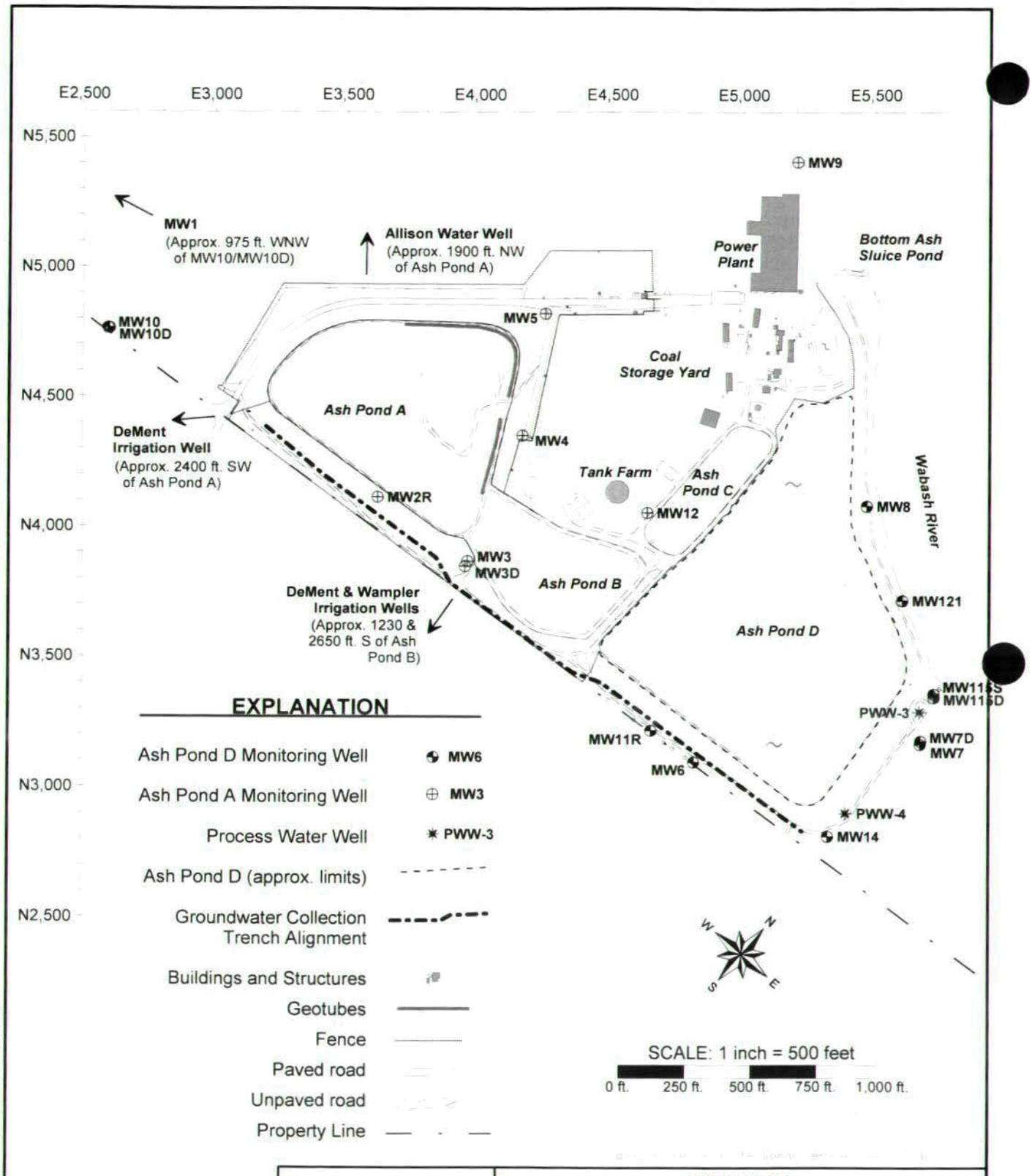

I:\14jobs\14E0016\Admin\14-Reports\HydroGeo\Figure2_SiteMap.srf

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SITE MAP

ASH PONDS CLOSURE
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HANSON NO. 14E0016 FIGURE NO. 2

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Table 1: Average Annual Climate Data for Terre Haute, IN

Avg. Annual Max. Temp.-°F	63.1	Avg. Annual Mean Temp.-°F	52.1
Avg. Annual Min. Temp.-°F	41.7	Avg. Annual Precip.-in.	41.77

SOURCE: http://iclimate.org/data_archive_v3.asp?rdatatype=cn

3. Previous Investigations

Several subsurface investigations previously completed at the Site are summarized below. A map, depicting the location of the various borings and wells, is included in Appendix A. Boring logs for the various field investigations are also included in Appendix A. All borings drilled as part of the various investigations would have been abandoned (sealed) to the standard of the day. Monitoring wells and piezometers installed as part of an investigation but have since been abandoned/sealed are noted at the end of each sub-section and highlighted on the Boring Location Map in Appendix A.

3.1 Hanson 1983

Hanson Professional Services Inc. (Hanson) completed a geotechnical evaluation for a proposed lined ash pond (Ash Pond A) in August 1983, when the power plant was owned by Central Illinois Public Service Company (CIPS). This investigation advanced 4 borings around the proposed Ash Pond A, and one boring near the southwest corner of the existing, unlined ash pond (Ash Pond D). All borings were advanced to bedrock using hollow stem augers, and two borings were cored approximately 10 feet into bedrock.

3.2 Hanson 1984a

A series of monitoring wells were installed in February 1984. These wells (MW1 through MW9) continue to be used at the Site, and are located around Ash Ponds A and D. Samples of the coarse-grained materials above the bedrock were collected during the installation of these wells. MW2 was replaced in 2012 by MW2R due to its proximity to the Groundwater Collection Trench.

3.3 Hanson 1984b

The 1983 geotechnical investigation was augmented during July 1984 to provide additional information for the berm design around Ash Pond A. Six borings to bedrock were planned. During the course of the investigation, boring SW-2 encountered bedrock at a much lower elevation than in other borings (31 feet versus less than 10 feet). Two additional borings were drilled on either side of SW-2 (SW-2A and SW-2B) to determine the extent of the bedrock feature. Based on the borings, Hanson interprets the bedrock feature as an erosional cut, likely caused by post-glacial outwash events.

3.4 STMI 1998

Due to elevated readings of boron and sulfate in several monitoring wells at the Site, Ameren* directed that an extensive environmental assessment be performed by Science & Technology Management Inc. (STMI). The first phase was performed during August 1998, when 23 locations were investigated using direct-push sampling methods. Two temporary piezometers were also installed in Ash Pond A and have since been removed.

* In 1995, CIPS merged with Union Electric of St. Louis, Missouri. Ameren Corporation (Ameren) was incorporated in August 1995 to be the holding company for the two merged utilities.

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The second phase of STMI's investigation was the installation of seven new monitoring wells. One shallow well (MW10) was added to augment the upgradient water quality data. MW11, MW12 and MW13 were added to characterize aquifer properties/groundwater flow and further delineate the extent of impacts that appeared to be associated with the ash ponds. MW3D, MW7D and MW10D (up-gradient well) were added to determine if the sandstone bedrock was a potential pathway for the apparent impacts identified by the shallow monitoring wells. MW13 was sealed shortly after installation to allow construction of the new, lined ash ponds (Ash Pond B and Ash Pond C).

3.5 NRT 2001

Two more wells (MW14 and TW, now called MW121) were installed on the east side of Ash Pond D during October 2001 as part of an investigation completed for Ameren by Natural Resource Technology, Inc. (NRT). These wells were installed to evaluate potential migration pathways to the deep fluvial sands identified in the bedrock valley below the current Wabash River. MW11 was also replaced with MW11R at this time.

3.6 NRT 2004

Seven additional wells were installed to the east and south of Ash Pond D during late-April and early-May of 2004 (TW-115S, TW-115D, and TW-116 through TW-120). These wells were installed to evaluate potential off-site migration pathways in the shallow and the deep fluvial sands.

3.7 Geotechnology 2010

Four borings were advanced and two piezometers were installed near the northeast side of Ash Pond D during June 2010 by Geotechnology, Inc. The data collected during this field investigation was used as part of a global stability evaluation of the perimeter embankment of Ash Pond D.

3.8 Hanson 2011

As part of the activities necessary to implement the closure of Ash Pond D required under the promulgated rules at the Illinois Pollution Control Board [Illinois IPCB, 2011], additional subsurface information was obtained for the final cover and the groundwater collector trench design required by the rulemaking. Four additional borings were advanced on the south-side of the Site to provide additional bedrock elevation and geotechnical data adjacent to Ash Pond D. Two additional borings were drilled in Ash Pond D to evaluate the ash and the subsurface material. A temporary piezometer was installed in the northeast ash pond boring (B11-6) to monitor ash pond water levels before and during the proposed construction activities. B11-6 was removed during Ash Pond D cover construction.

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4. Site Geology

4.1 Stratigraphic Units

Based on information from the Site subsurface investigations summarized above, and published reports, the geology of the Site consists primarily of Wisconsinan Stage fluvial deposits with some Illinoian Stage diamictons overlying Pennsylvanian bedrock. There are various fill materials along with three surficial (unlithified) units identified at the Site (oldest to youngest): silty/clayey diamictons of the Glasford Formation, poorly sorted, outwash sands and gravels of the Henry Formation, and fine-grained fluvial deposits classified as Cahokia Alluvium (Willman et al., 1975; Hansel & Johnson, 1996; Fafalios & Hensel, 1999). Cross sections illustrating the geologic interpretation of the Site are presented in Figure 3, Figure 4, Figure 5, and Figure 6. Site geology was also confirmed using the ISGS ILWATER database and review of nearby water well records (see Appendix A). The Allison (2007) water well log confirms this reports stratigraphic interpretation. Figure 7 depicts the expected Site stratigraphy to a depth of approximately 100 ft.

4.2 Bedrock Deposits

Bedrock at the Site is composed of Pennsylvanian Age rock of the Missourian Series Mattoon Formation of the McLeansboro Group. Two lithologies are present at the Site. To the west, the upper bedrock is composed of sandstone of the Merom Sandstone Member (Willman et al., 1975). Closer to the Wabash River, there is a well incised bedrock valley [depths to bedrock vary from 10-15 feet below ground surface (ft. bgs) in the uplands on the western parts of the Site to over 90 ft. bgs in the southeast corner of the Site (Fafalios & Hensel, 1999)]. In the bedrock valley (below elevation 405 ft.), post-glacial erosion has exposed the lithified silts and clays of an undifferentiated shale[†] of the Mattoon Formation. A bedrock surface contour map based on the information from the site boring and monitoring wells is shown on Figure 8.

4.3 Unlithified Materials

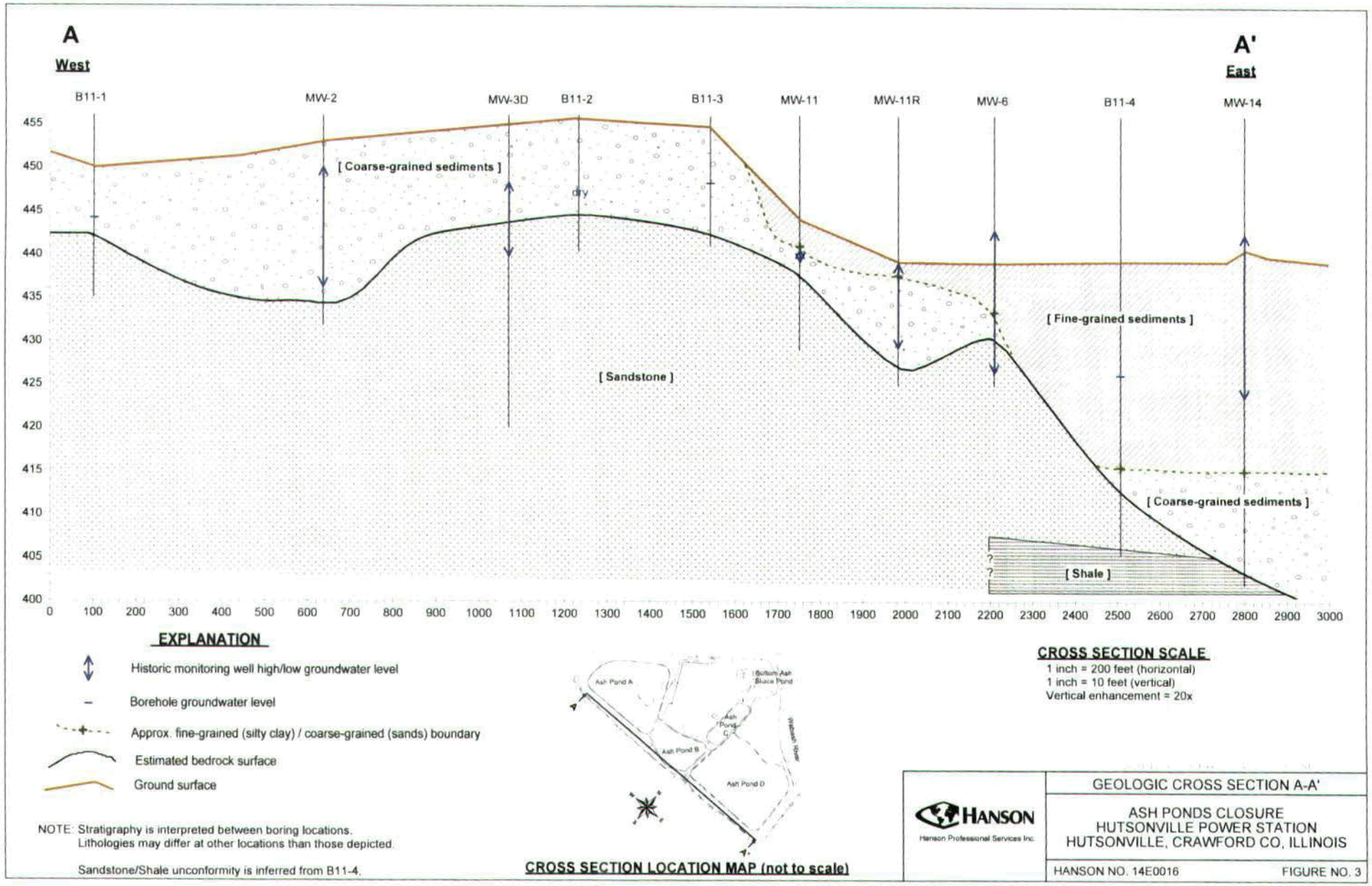
4.3.1 Glasford Formation

Several borings contained silty clay with sand and gravel (e.g., MW2, GP-7, GP-8, GP-13, GP-20, and GP-21). This material is interpreted to be Illinoian Stage diamictons of the Glasford Formation (either undifferentiated or part of the Vandalia Till Member). The spotty presence of the till is likely due to post-glacial erosion. It is generally located in the southern portion of the Site, and can be found in excess of 5 feet thick down to a few inches in thickness.

4.3.2 Henry Formation

The Henry Formation is a Wisconsinan Stage glacial outwash sand and gravel, and is the predominant unit in the upland ash pond areas and deep portions of the Wabash River bedrock valley (Berg & Kempton, 1987). These fluvial deposits can range from a few feet to over 65 feet thick. The Henry Formation was not observed in the northern portion of the Site near the Plant.

[†] The sandstone/shale unconformity has been placed at 405 ft. based on information from B11-4. Other borings (e.g., TW-116, TW-117, etc.) encountered the shale at a deeper elevation, but these borings were located in the Wabash River valley. The contact has been eroded at these locations.


A
West
A'
East
B11-1
MW-2
MW-3D
B11-2
B11-3
MW-11
MW-11R
MW-6
B11-4
MW-14
455
450
445
440
435
430
425
420
415
410
405
400
[Coarse-grained sediments]
dry
[Fine-grained sediments]
[Sandstone]
[Coarse-grained sediments]
[Shale]
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000
EXPLANATION
Historic monitoring well high/low groundwater level
Borehole groundwater level
Approx. fine-grained (silty clay) / coarse-grained (sands) boundary
Estimated bedrock surface
Ground surface
NOTE: Stratigraphy is interpreted between boring locations.
Lithologies may differ at other locations than those depicted.
Sandstone/Shale unconformity is inferred from B11-4.
Ash Pond A
Bottom Ash Sluice Pond
Ash Pond C
Ash Pond B
Ash Pond D
Wabash River
CROSS SECTION LOCATION MAP (not to scale)
CROSS SECTION SCALE
1 inch = 200 feet (horizontal)
1 inch = 10 feet (vertical)
Vertical enhancement = 20x
HANSON
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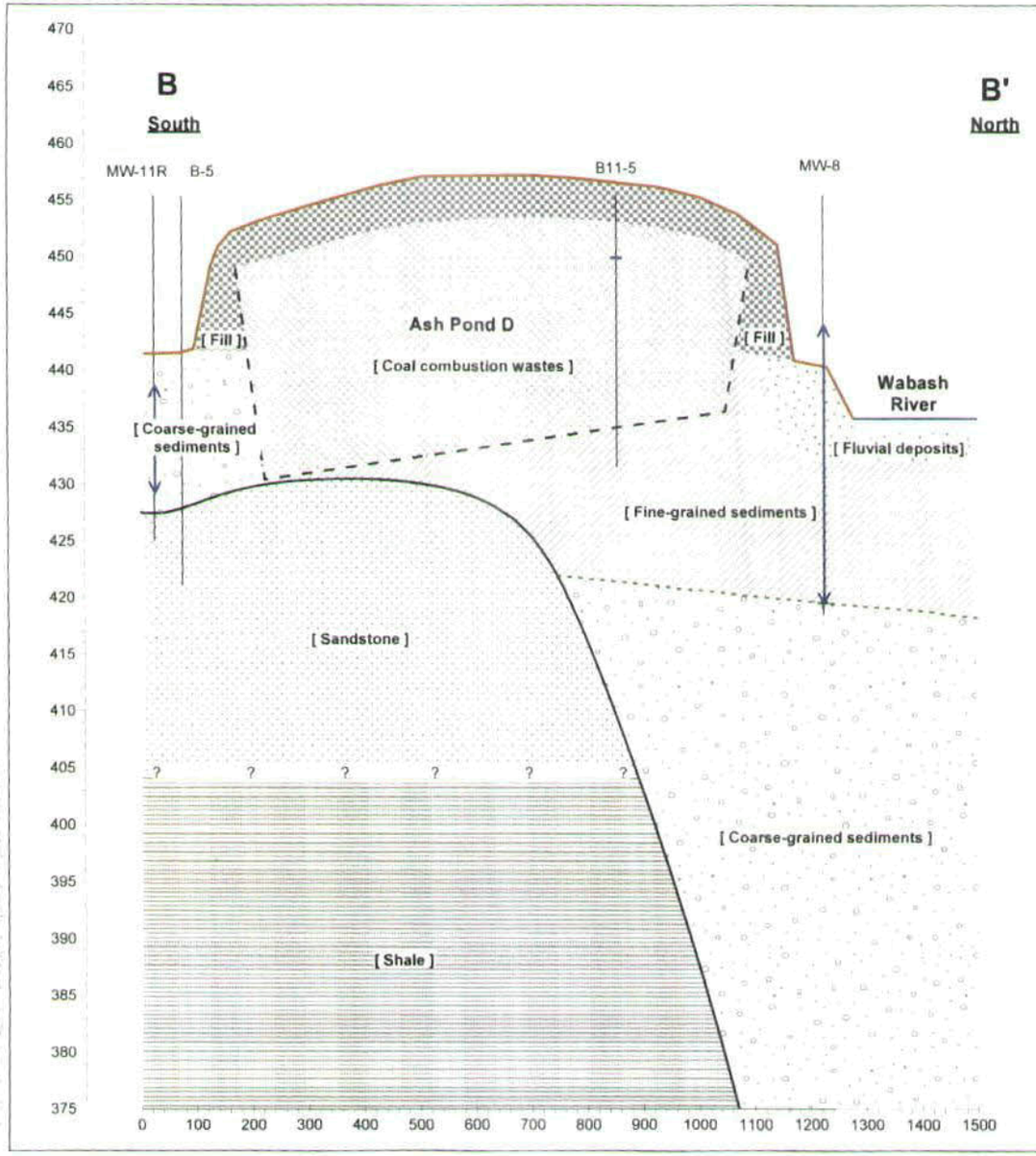
GEOLOGIC CROSS SECTION A-A'
ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO, ILLINOIS
HANSON NO. 14E0016
FIGURE NO. 3



EXPLANATION

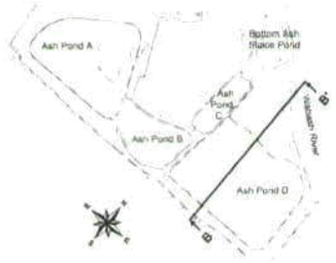
- Historic monitoring well high/low groundwater level
- Borehole groundwater level
- Approx. fine-grained (silty clay) / coarse-grained (sands) boundary
- Estimated bedrock surface
- Base of Ash Pond (estimated from drawings and boring logs)
- Ground surface

NOTE: Stratigraphy is interpreted between boring locations. Lithologies may differ at other locations than those depicted.

Sandstone/Shale unconformity is inferred from B11-4.

CROSS SECTION SCALE

1 inch = 200 feet (horizontal)
1 inch = 10 feet (vertical)
Vertical enhancement = 20x



CROSS SECTION LOCATION MAP (not to scale)

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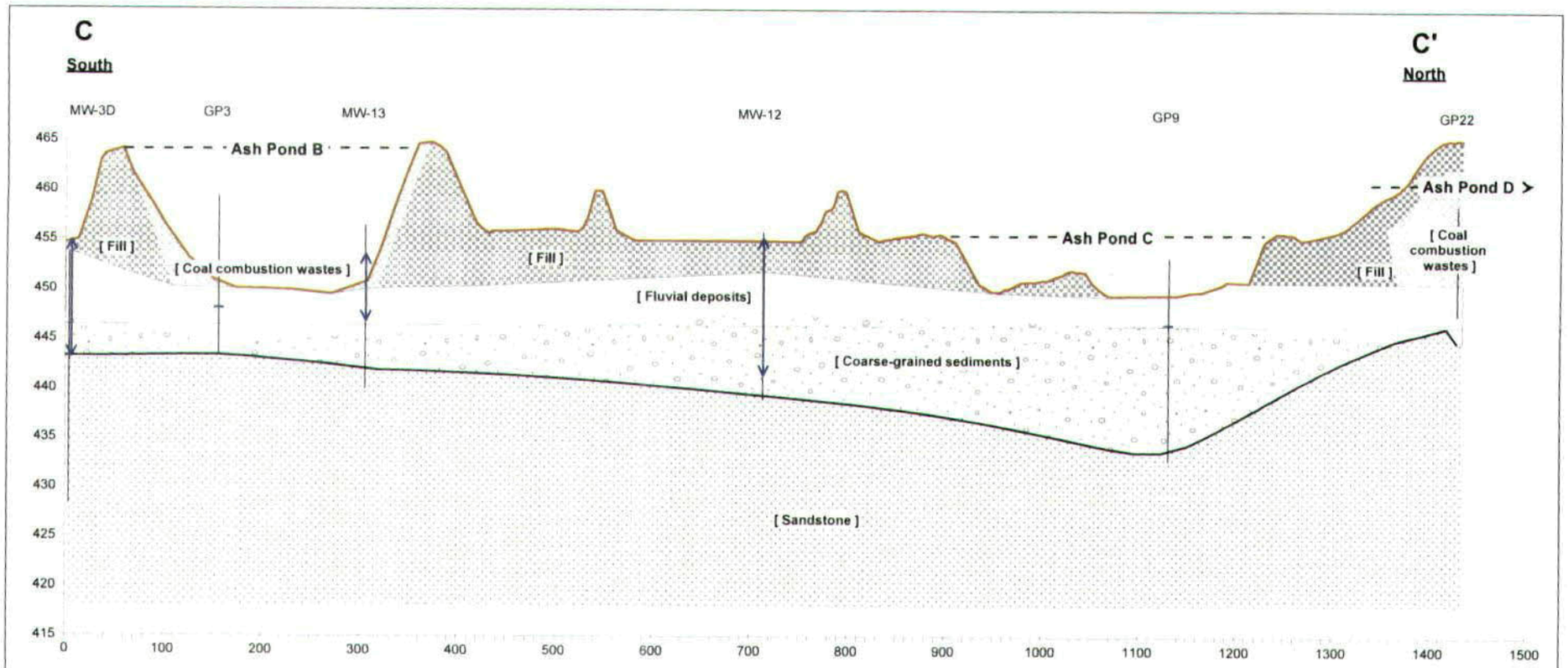
GEOLOGIC CROSS SECTION B-B'

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO, ILLINOIS

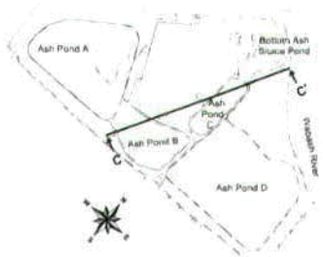
HANSON NO. 14E0016 FIGURE NO. 4



EXPLANATION

- Historic monitoring well high/low groundwater level
- Borehole groundwater level
- Approx. fine-grained (silty clay) / coarse-grained (sands) boundary
- Estimated bedrock surface
- Ground surface

NOTE: Stratigraphy is interpreted between boring locations. Lithologies may differ at other locations than those depicted.



CROSS SECTION LOCATION MAP (not to scale)

CROSS SECTION SCALE
1 inch = 100 feet (horizontal)
1 inch = 10 feet (vertical)
Vertical enhancement = 10x

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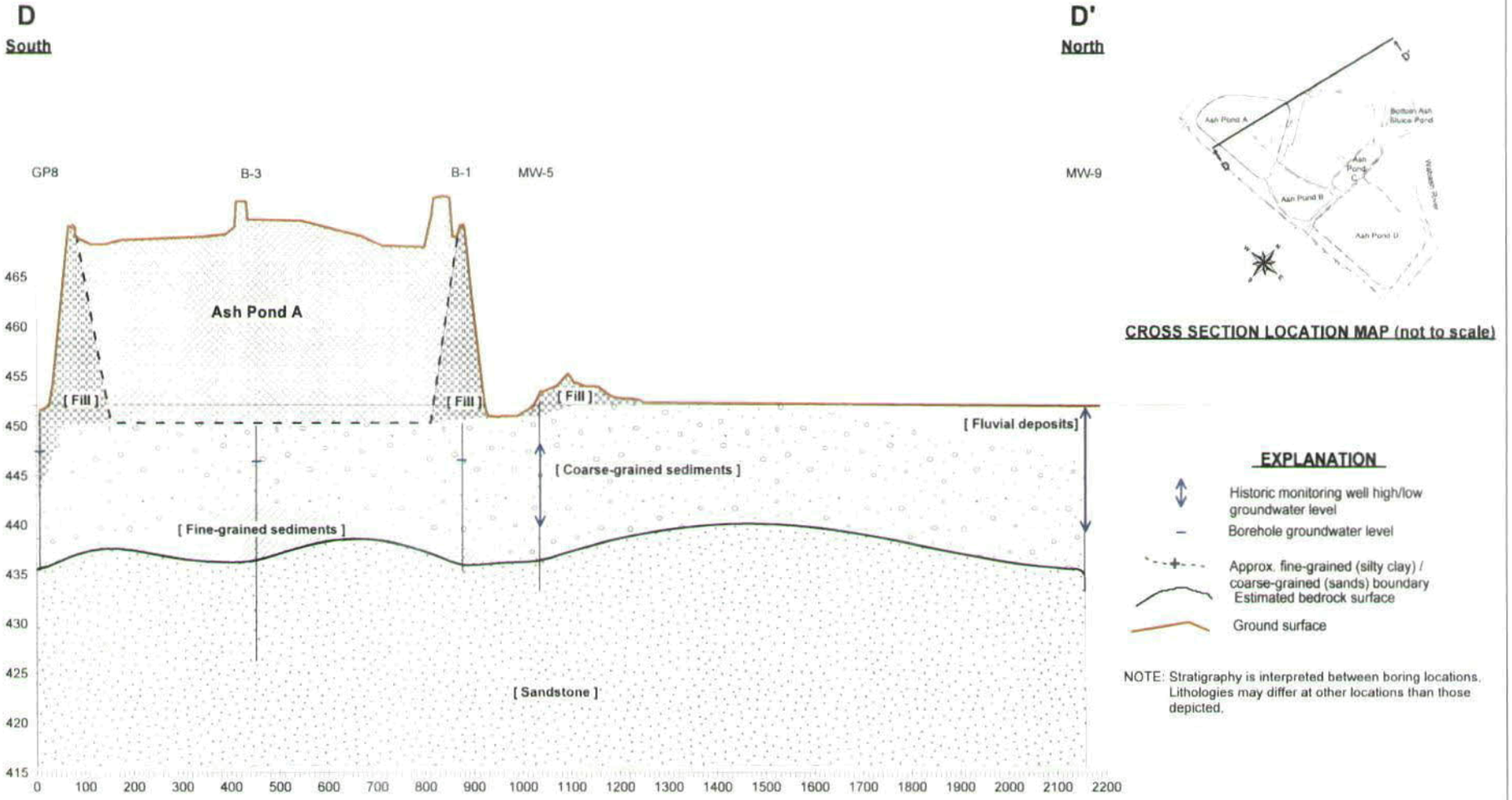
GEOLOGIC CROSS SECTION C-C'

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO, ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 5



CROSS SECTION LOCATION MAP (not to scale)

EXPLANATION

- Historic monitoring well high/low groundwater level
- Borehole groundwater level
- Approx. fine-grained (silty clay) / coarse-grained (sands) boundary
- Estimated bedrock surface
- Ground surface

NOTE: Stratigraphy is interpreted between boring locations. Lithologies may differ at other locations than those depicted.

CROSS SECTION SCALE
1 inch = 200 feet (horizontal)
1 inch = 10 feet (vertical)
Vertical enhancement = 20x

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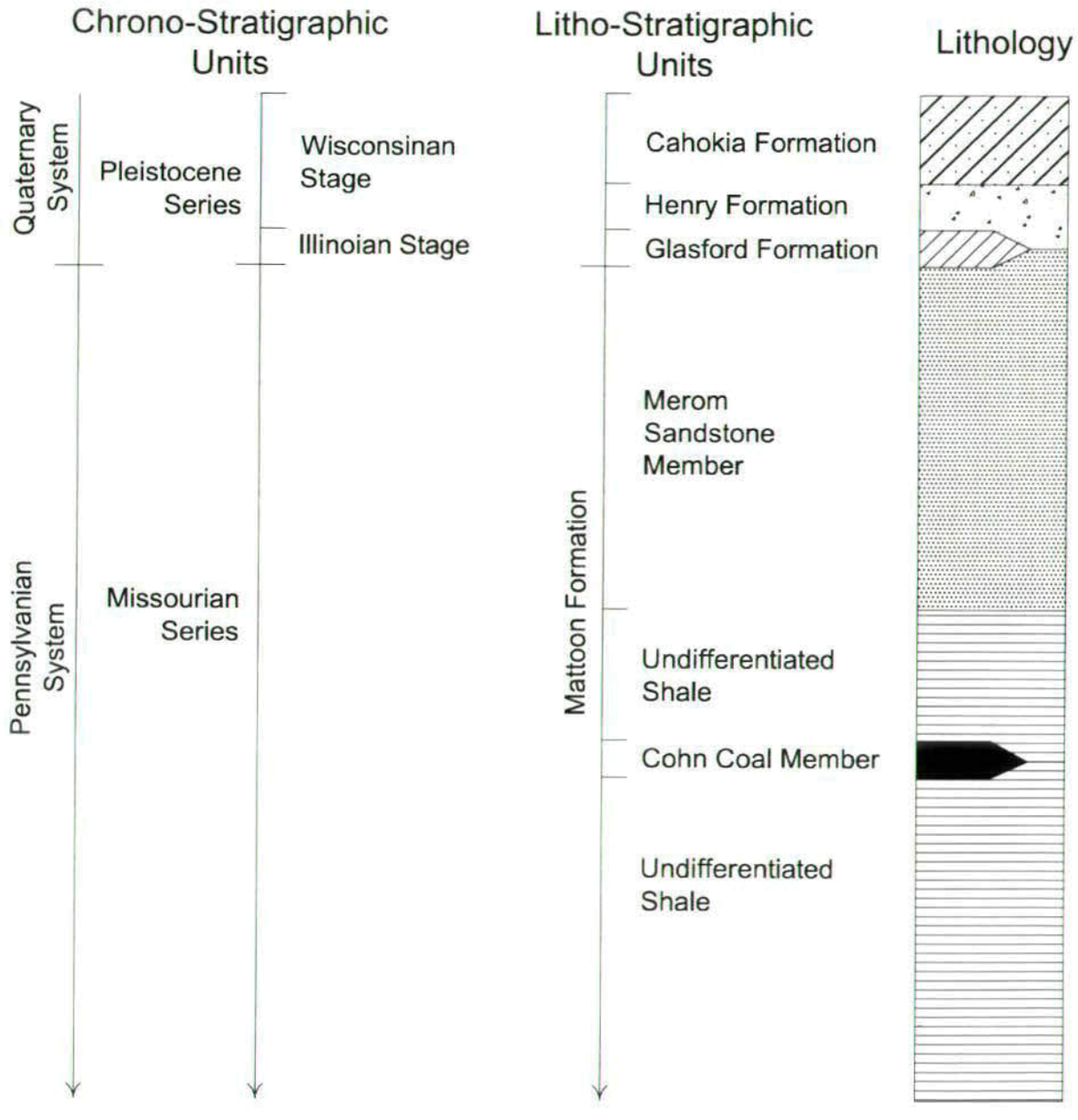
GEOLOGIC CROSS SECTION D-D'

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO, ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 6



after Willman et al., 1975.

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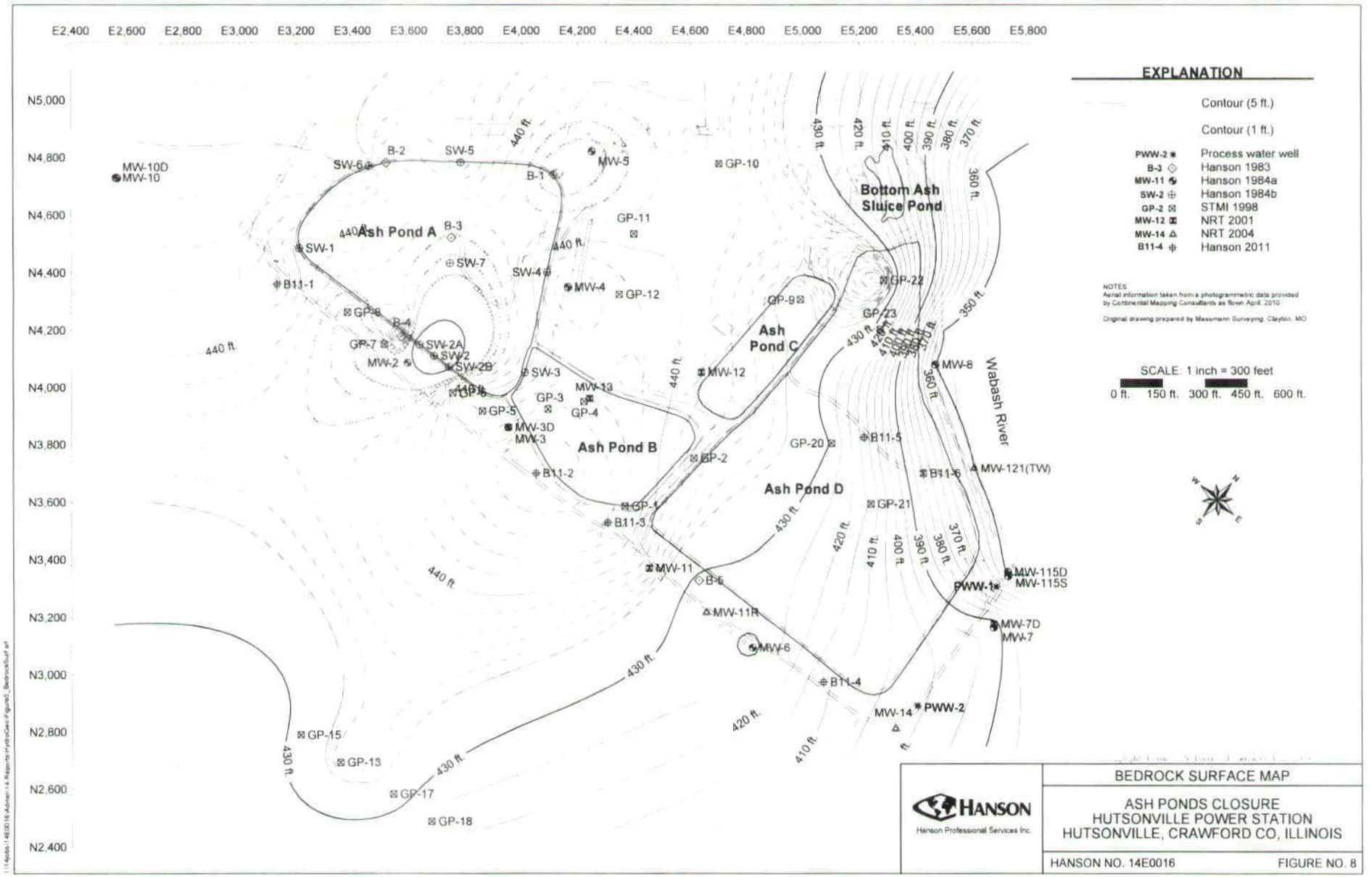
GENERALIZED STRATIGRAPHIC COLUMN

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE 7


E2,400
E2,600
E2,800
E3,000
E3,200
E3,400
E3,600
E3,800
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E4,200
E4,400
E4,600
E4,800
E5,000
E5,200
E5,400
E5,600
E5,800
N5,000
N4,800
N4,600
N4,400
N4,200
N4,000
N3,800
N3,600
N3,400
N3,200
N3,000
N2,800
N2,600
N2,400
Ash Pond A
Ash Pond B
Ash Pond C
Ash Pond D
Bottom Ash Sluice Pond
Wabash River
MW-10D
MW-10
SW-6
B-2
SW-5
B-1
MW-5
GP-10
B-3
SW-1
SW-7
SW-4
MW-4
GP-11
GP-12
B11-1
GP-8
B-4
GP-7
SW-2A
SW-2
SW-2B
MW-2
SW-3
GP-6
GP-5
GP-3
GP-4
MW-13
MW-3D
MW-3
MW-12
GP-9
GP-22
GP-23
MW-8
GP-20
B11-5
B11-6
MW-121(TW)
B11-2
GP-2
GP-1
B11-3
GP-21
MW-11
B-6
MW-11R
MW-115D
MW-115S
PWW-1
MW-7D
MW-7
MW-6
B11-4
MW-14
PWW-2
GP-15
GP-13
GP-17
GP-18
440 ft.
430 ft.
420 ft.
410 ft.
400 ft.
390 ft.
380 ft.
370 ft.
360 ft.
EXPLANATION
Contour (5 ft.)
Contour (1 ft.)
PWW-2 Process water well
B-3 Hanson 1983
MW-11 Hanson 1984a
SW-2 Hanson 1984b
GP-2 STMI 1998
MW-12 NRT 2001
MW-14 NRT 2004
B11-4 Hanson 2011
NOTES
Aerial information taken from a photogrammetric data provided by Continental Mapping Consultants as flown April, 2010.
Original drawing prepared by Massmann Surveying, Clayton, MO
SCALE: 1 inch = 300 feet
0 ft. 150 ft. 300 ft. 450 ft. 600 ft.
HANSON
Hanson Professional Services Inc.
BEDROCK SURFACE MAP
ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO, ILLINOIS
HANSON NO. 14E0016
FIGURE NO. 8

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4.3.3 Cahokia Formation

The Cahokia Formation was derived from post-glacial erosion of the surficial loess and tills and can be found in the flood plains and channels of modern rivers and streams (Berg & Kempton, 1987; Hansel & Johnson, 1996). At the Site, this alluvium is composed of silts, clays and clayey sands with occasional wood and/or shell fragments. Localized lenses or coarser materials (sands) may occur within the alluvium, but these lenses are not laterally extensive. At the Site, the thickness of the alluvial deposits can range from 0 to 15 feet, but can reach 25 feet in the bedrock valley per the NRT report (Fafalios & Hensel, 1999).

4.3.4 Fill Materials

4.3.4a Earthen Fill

Earthen Fill is present across much of the site, and consists of sandy silts and silty sands that were likely created from on-site or nearby excavations. Fill has been used to elevate depressions and construct the berms surrounding the various ash ponds and structures on Site. Where present, the earthen fill can range from less than 2 to over 10 feet thick.

4.3.4b Coal Combustion Wastes

Coal combustion waste (CCW) is a term for several types of materials, typically bottom ash, fly ash and/or flue gas desulfurization (scrubber) sludge. At the Site, the CCW present are bottom and fly ash. CCW is primarily found in the Site's ash ponds. A total of six borings were completed in Ash Pond D (4 direct push borings by STMI and two recent auger borings by Hanson). The thickness of CCW in these borings ranged from about 12 feet (north-end) to 31 feet (center).

CCW is also stored in the lined Ash Pond A and Ash Pond B. Prior to construction of Ash Pond B, the area was the CCW laydown location, and ash in this area could be up to 12 feet thick at times (Fafalios & Hensel, 1999). It is believed that no CCW remains after construction of the liner for Ash Pond B.

5. Site Hydrogeology

5.1 Hydrogeologic Characteristics

Shallow groundwater in the surficial deposits and the upper bedrock are controlled by the Wabash River, a regional groundwater sink or discharge zone. Groundwater elevations have been measured and recorded at the Site since 1984. Groundwater flow beneath the Site discharges toward and is controlled by the Wabash River within the surficial deposits and upper bedrock in the vicinity of the Site.

5.1.1 Hydraulic Conductivity

Fafalios & Hensel (1999) completed an analysis of hydraulic conductivity for eleven monitoring wells at the Site using the Bouwer and Rice (1976; Bouwer, 1989) slug test analysis method. Results of the slug tests range from a minimum of 2.6×10^{-4} cm/sec to a maximum of 4.8×10^{-2} cm/sec (see Table 2). The calculated geometric mean of the hydraulic conductivity of the sediments is 6.5×10^{-3} cm/sec, and the arithmetic mean of the two sandstone bedrock test results is 4.7×10^{-4} cm/sec.

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Table 2. Monitoring Well Slug Test Results

Well ID	Hydraulic Conductivity (in cm/sec)	Geologic Material
MW3	2.7×10^{-2}	Silty sand & gravel
MW3D	5.4×10^{-4}	Sandstone
MW5	8.0×10^{-3}	Silty sand & gravel
MW6	3.2×10^{-2}	Clayey gravel, silty sand & sandstone
MW7	2.6×10^{-4}	Sandy silt, sand & gravel
MW7D	4.8×10^{-2}	Silty sand & gravel
MW9	8.3×10^{-4}	Silt, silty sand & gravel
MW10	6.2×10^{-4}	Silty sand & gravel
MW10D	4.0×10^{-4}	Sandstone
MW12	2.6×10^{-4}	Sand
MW13	1.8×10^{-2}	Clayey sand & gravel

5.1.2 Groundwater Flow Direction/Gradient

Groundwater flow was evaluated as part of the NRT study (Fafalios & Hensel, 1999). The NRT study further subdivided the groundwater regime into two zones, the shallow and deep groundwater zones. The shallow groundwater zone is comprised of the surficial and shallow materials and the upper, permeable portions of the sandstone bedrock. The deep groundwater zone was defined as the alluvium found in the Wabash River valley.

Several potentiometric surface maps were included in the NRT report. Five of the more recent, complete potentiometric data sets (5 shallow and 4 deep groundwater zone plots from 2007, 2010, 2012 and 2013) along with 4 potentiometric surface maps using the NRT data sets (2 shallow and 2 deep groundwater zone plots from November 1998 and April 1999) have been plotted for this report and are included in Appendix B.

Groundwater flow within the shallow zone generally flows from west to east, based on the plotted potentiometric surface data included in Appendix B. Groundwater in the deep zone generally flows from southwest to northeast, almost perpendicular to the banks of the Wabash River. From the maps in Appendix B, gradients were calculated in the vicinity of the Ash Ponds. Values for the shallow groundwater zone ranged from 0.0104 to 0.0183, with an average gradient of 0.0156. Gradients in the deep zone range from 0.0067 to 0.0152, with an average gradient of 0.0114. Table 3 lists the flow direction and gradient values calculated for each plotted monitoring event and monitoring zone presented in Appendix B. Groundwater velocities, based on these gradients, are of the same order of magnitude as described in the NRT report (Fafalios & Hensel 1999).

5.2 Groundwater Classification

Illinois EPA requires that groundwater at regulated sites be classified in accordance with 35 IAC 620.210(a)(4)(B)(ii). The groundwater at the Site has been classified as a Class I: Potable Resource Groundwater. This classification is based on:

1. Groundwater is greater than 10 feet bgs;
2. Hydraulic conductivities can exceed 1×10^{-4} cm/sec; and
3. No criteria are met that would classify groundwater as a Special Resource (Class III) or Other (Class IV) Groundwater.

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Table 3. Flow Direction and Gradients

Monitoring Event	Flow Direction	Gradient	Monitoring Zone
18 Nov 1998	Northeast	0.0106	Shallow
30 Apr 1999	East	0.0104	Shallow
2 July 2007	East	0.0168	Shallow
2 Oct 2007	East	0.0175	Shallow
13 Apr 2010	East	0.0172	Shallow
13 Apr 2012	East	0.0182	Shallow
10 Aug 2013	East	0.0183	Shallow
18 Nov 1998	Northeast	0.0123	Deep
30 Apr 1999	Northeast	0.0067	Deep
2 July 2007	Northeast	0.0116	Deep
2 Oct 2007	Northeast	0.0152	Deep
13 Apr 2010	Northeast	0.0119	Deep
10 Oct 2013	Northeast	0.0106	Deep

5.3 Nearby Groundwater Users

Water well logs for the sections surrounding the Site were previously obtained from the Illinois State Geological Survey and/or Illinois State Water Survey and referenced in the NRT report. The process water wells, PWW-3 and PWW-4[‡], on the Site are located in the Southeast ¼ of Section 17 (depths of 88 and 90 feet bgs, respectively) and just east of Ash Pond D (see Figure 2). The next nearest water supply wells are a trio of irrigation wells, which obtain irrigation water from the coarse-grained sediments located in the bedrock valley. These irrigation wells provide water to the Dement and Wampler farms in Section 20, just south of the Site. A more recent potable water well was installed at the Allison residence, located approximately 1900 ft. northwest of Ash Pond A. These water well records are included in Appendix A.

5.4 Groundwater Quality

Groundwater quality was assessed in NRT's 1999 report (Fafalios & Hensel, 1999), which identified the parameters of concern (POCs): boron, sulfate, iron, manganese, pH and total dissolved solids (TDS), and the wells (MW2, MW3, MW3D, MW6, MW8, MW9, & MW11) with concentrations that exceeded the Class I Potable Resource groundwater standard (35 IAC 620.410). Additional data collected at the Site since 1999 is included in the analysis for this report. The POC data, from 1999 to 2012, is summarized as a series of box-whisker plots in Appendix C. The 1999-2012 monitoring data is overlain by another set of box-whisker plots representing the most recent four quarters of data (July 2013 – June 2014). In general, the 2013-2014 data trend is toward lower median values relative to the older data.[§]

A comparison of Class I standard to the median POC concentrations (1999-2012 data) is presented in Table 4 for the Site monitoring wells. The 16 wells in Table 4 (2 upgradient and 14 downgradient) are the monitoring points that are located to provide early indication of possible impacts by the Ash Ponds, based on the groundwater flow directions and gradients depicted on the potentiometric surface maps in Appendix B, and summarized in Table 3.

[‡] In the previous Hydrogeologic Site Investigation (Hanson, 2011a), PWW-3 and PWW-4 were identified as PWW-1 and PWW-2, respectively. These wells were re-numbered for this report to match the numbering on the ISGS well records located in Appendix A.

[§] The recent (2013-2014) data is limited (typically only 4 data points). As such, the interquartile ranges may be small, misrepresenting any outlier values in the dataset.

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Table 4. Ash Pond Monitoring Wells – Historic Median Concentrations (1999-2012)

Well ID	Boron [1] (2 mg/L)	Sulfate (400 mg/L)	Iron (5 mg/L)	Manganese (0.15 mg/L)	pH (6.5 < x < 9.0)	TDS (1,200 mg/L)
MW1 [4]	0.12	29	0.031	0.057	7.20	278
MW2(R) [2]	***5.10***	340	0.020	0.008	7.32	790
MW3	***3.40***	***1300***	0.020	***0.710***	6.73	***2300***
MW3D	***4.20***	***1700***	0.020	***2.4***	6.10	***2650***
MW4	0.25	67	0.020	0.003	7.20	390
MW5	0.22	47	0.020	0.002	6.93	238
MW6	***16.00***	***499***	0.031	***0.420***	6.84	980
MW7	1.95	270	0.028	0.051	6.90	850
MW7D	0.220	56.75	1.130	***0.620***	7.20	380
MW8	***15.70***	***810***	0.700	***2.5***	6.99	***1600***
MW10 [4]	0.12	26	0.072	0.057	7.03	370
MW10D [4]	0.098	32	0.020	0.009	7.21	270
MW11(R) [2]	***10.75***	***600***	0.020	0.074	6.81	1200
MW14	0.774	180	0.120	***0.525***	6.90	750
MW115S	0.081	33	1.088	***0.749***	7.30	330
MW115D	0.077	37	3.265	***0.517***	7.30	385
MW121	0.090	105	1.479	***0.820***	7.31	340

[1] parameter's name with Class I groundwater standard value below. Median values exceeding the Class I Std. are italic and bold.
[2] data from MW2 / MW2R and MW11 / MW11R may be combined.
[4] upgradient monitoring well.
[3] Ash Pond A Deep Zone monitoring wells not recently sampled.

A similar comparison of median groundwater concentrations to Class I standards are also made in Table 5 for the data from July 2013 through June 2014. The red highlighted median concentrations are those values that exceeded the median values for the long-term concentration presented in Table 4. The limited data for the recent monitoring results (4 quarters) versus the data used to calculate the historic median does slightly skew the data presentation. The percent increase from historic to present median values is generally less than 10% for TDS, Sulfate, and some of the Boron values. The high percent change for the Iron and Manganese median values may be indicative of a change in RedOx (oxidation-reduction) potential in the groundwater as a result of the capping of Ash Pond D. Although the concentrations are increasing, this may actually be a positive sign.

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Table 5. Ash Pond Monitoring Wells – Recent Median Concentrations (2013-14)

Well ID	Boron [1] (2 mg/L)	Sulfate (400 mg/L)	Iron (5 mg/L)	Manganese (0.15 mg/L)	pH (6.5 < x < 9.0)	TDS (1,200 mg/L)
MW1 [4]	0.0158	17.35	0.292	0.040	7.29	218
MW2(R) [2]	***1.76***	111	0.426	0.005	7.28	491
MW3	***4.585***	***1135***	0.698	0.009	6.90	***1745***
MW3D[3]	--	--	--	--	--	--
MW4	0.231	51.65	0.320	0.002	7.30	245
MW5	0.168	25.05	0.271	0.002	7.09	186
MW6	***4.76***	298.5	0.663	0.118	6.96	785
MW7	1.435	245.5	0.683	0.028	6.94	758
MW7D	0.389	58.95	1.208	***0.572***	7.07	415
MW8	***17.05***	***560.5***	1.995	***3.43***	7.77	***1345***
MW10 [4]	0.097	23.2	0.334	0.001	7.07	380
MW10D [4][3]	--	--	--	--	--	--
MW11(R) [2]	***6.805***	***610.5***	0.874	***0.369***	***6.49***	***1210***
MW14	0.832	196.5	0.622	***0.446***	6.92	815
MW115S	0.124	27.05	0.921	***1.285***	7.60	359
MW115D	0.062	31.75	0.802	***0.414***	7.67	320
MW121	0.044	28.05	1.612	***1.275***	7.39	388

[1] parameter's name with Class I groundwater standard value below. Median values exceeding the Class I Std. are italic and bold.
[2] data from MW2 / MW2R and MW11 / MW11R may be combined.
[4] upgradient monitoring well.
[3] Ash Pond A Deep Zone monitoring wells not recently sampled.

5.4.1 Parameters of Concern (POCs)

The following observations have been made for each POC:

Boron – MW2/MW2R, MW3, MW3D, MW6, MW8, and MW11R have concentrations historically above the Class I standard. Recent monitoring indicates that wells along the south property boundary, MW11R, MW6, MW2(R), appear to have improving water quality since the capping of Ash Pond D.

Sulfate – MW3, MW3D, MW8 and MW11R have historically been above the Class I standard, and MW6 had an inter-quartile range that straddle the Class I standard. Sulfate concentrations have displayed improvement in the past 4 quarterly sampling events.

Iron – minimal data available at some wells, but no well has historic concentrations above the Class I standard.

Manganese – minimal data available at some wells. MW1, MW3, MW3D, MW6, MW7D, MW8, MW11R, MW14, MW115D, MW115S, MW117 and MW121 have concentrations historically above the Class I standard. Recent data indicates generally higher Manganese concentration from wells adjacent to the Wabash River (MW7, MW7D, MW8, MW115S, MW115D, and MW121) appear higher than historically observed.

TDS – MW3, MW3D and MW8 are above the Class I standard, and like Sulfate display stable to improving recent concentrations.

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pH – All wells show at least one pH reading below the lower limit Class I standard, but only MW3D shows consistent readings (3rd quartile and below) less than the lower limit Class I standard.

As shown in Appendix C, Table 4, and Table 5, five of the monitoring wells have had readings of the POCs generally trending above the Class I standards. Wells MW3, MW3D, MW6, MW8, and MW11/MW11R have generally shown elevated levels of boron, sulfate, pH and TDS. However, recent monitoring results indicate that water quality appears to be improving at these wells, especially for Boron, Sulfate and TDS. These wells, and the other Ash Pond monitoring wells, will continue to be evaluated as part of the ongoing Ash Pond monitoring activities (Hanson, 2014).

5.4.2 Other Parameters

Several other parameters have had intermittent exceedances of the Class I groundwater standards over the past several years (monitoring for these parameters began in 2011). These parameters are listed in Table 6.

Table 6. Additional Detections Above Class I Standards

Parameter	Well ID	Comment
dissolved Arsenic	MW1, MW115D, MW115S, MW121 & MW7D	Found in upgradient well Concentrations now below Class I limit
total Cyanide	MW1	Found in upgradient well
dissolved Lead	MW115S, MW121, & MW7	Not confirmed the following period
dissolved Nickel	MW7 & MW7D	Not confirmed the following period
dissolved Nitrate	MW6	Only one detect (Fall 2013)
dissolved Thallium	MW1, MW10, MW115D, MW14, MW7 & MW7D	Found in upgradient wells Not confirmed the following period

The six parameters identified in Table 6 are not considered POCs for purposes of this report. Concentration exceedances are either intermittent or have an upgradient (detection) component.

5.5 Hydrostatic Equilibrium of Ash Ponds

An estimate of the time for the groundwater beneath Ash Pond D to reach hydrostatic equilibrium was required by 35 IAC 840.130(l). However, evaluating hydrostatic equilibrium within the HDPE-lined Ash Pond A is not required. Instead, the groundwater flow model used to evaluate conditions associated with the Groundwater Management Zone will be used to evaluate ash pond to groundwater interactions.

6. Summary and Conclusions

The NRT report (Fafalios & Hensel, 1999) presented several conclusions, including:

- Upland hydro-stratigraphy consists of a thin layer of sand-rich material overlying sandstone and siltstone bedrock;
- There are three areas with CCW, the unlined Ash Pond D, the lined Ash Pond A, and the former ash laydown area now located beneath Ash Pond B;

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- Water samples collected during the STMI investigation were high in boron, sulfate, manganese, and TDS in ash leachate, but only manganese concentrations were high in Ash Pond D leachate;
- No evidence of impacts was detected in direct push samples south of the impoundments;
- High iron and nickel were observed in locations where coal was present near the ground surface.

Hanson has reviewed the earlier studies, and based on our analyses concur with the NRT conclusions summarized above. In addition, Hanson has the following supplemental conclusions:

- Boron concentrations above the Class I groundwater standard continue to be observed in the shallow wells immediately downgradient of the Ash Ponds (MW2, MW3, MW3D, MW6, MW8, and MW11R), but recent monitoring results show an improving trend;
- Manganese concentrations above the Class I groundwater standard continue to be observed in the Site monitoring wells (MW1, MW3, MW3D, MW6, MW7D, MW8, MW11R, MW115S, MW115D, and MW121). Fafalios & Hensel (1999) indicated that elevated manganese and nickel may be indicative of coal or coal stockpile impacts. Hanson concurs, and also notes that Manganese has been observed above the Class I standard at upgradient well MW1;
- Recent (2013-2014) Iron (median) concentrations appear to be higher than those observed historically (1999-2012). Hanson believes that this increase is groundwater chemistry-related and not an indication of further impairment.
- Concentrations of the other POCs in the deep monitoring zone (monitoring wells MW7D, MW14, and MW115D) continue to be below Class I standards; and
- Based on the hydrogeologic information summarized in this report, the installed groundwater collector trench required under 35 IAC 840.120, the impermeable cap placed on Ash Pond D, the proposed cap for Ash Pond A, and the clean closure of Ash Pond B, Ash Pond C and the Bottom Ash Sluice Pond provide the best alternative for reducing off-site impacts to groundwater in the vicinity of the Site.

7. Licensed Professional Acknowledgement

The geological work product contained in this document has been prepared under my personal supervision and has been prepared and administered in accordance with the standards of reasonable professional skill and diligence.

Rhonald W. Hasenyager, P.G.
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703-2886
(217) 788-2450
Registration No. 196-000246

Seal:



Expires 3/31/2015

Signature: _____ Date: 2 Sept 2014

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Appendix A

Boring Location Map, Field Boring Logs and Water Well Records

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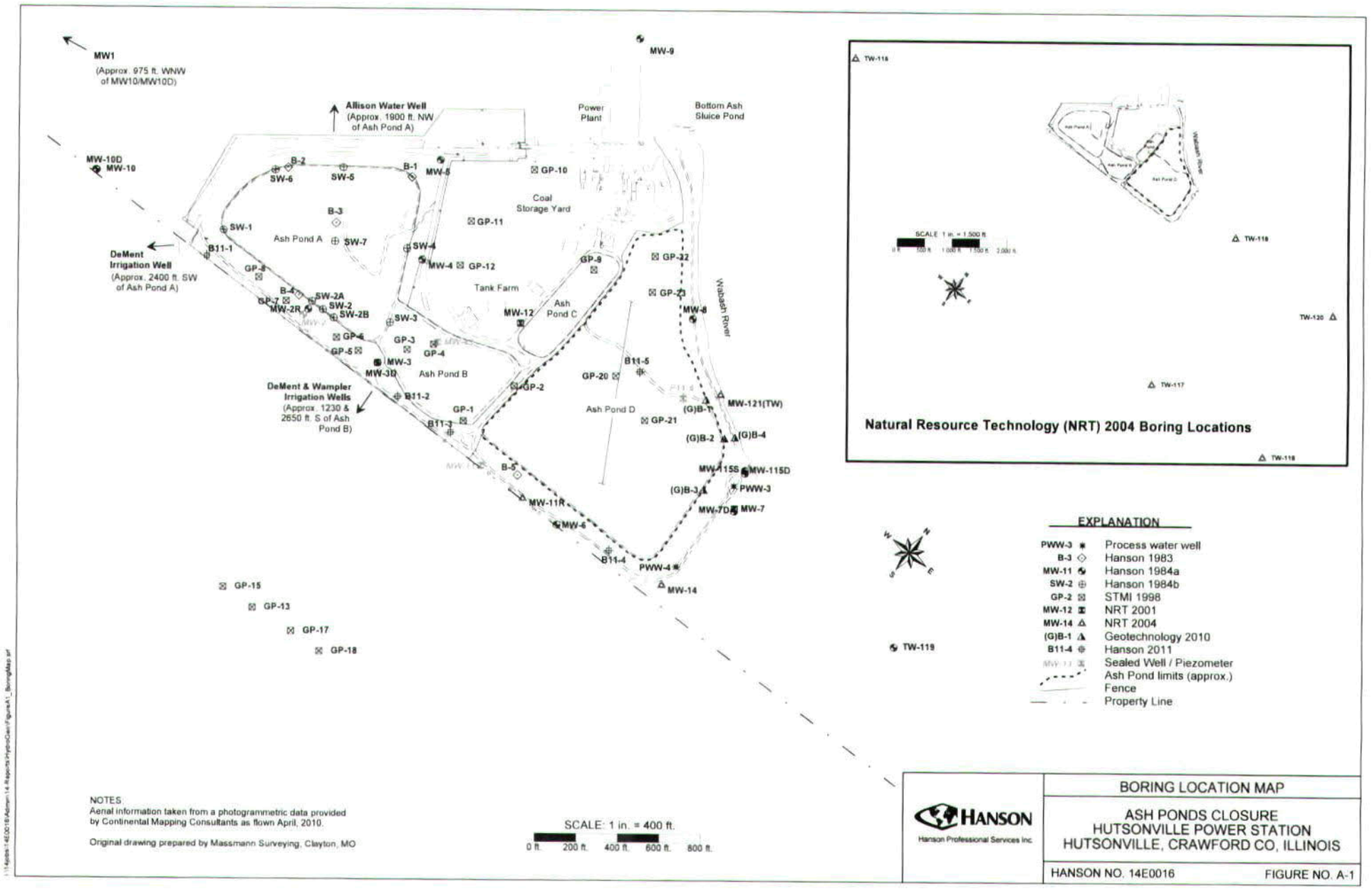
Appendix A-1

Boring Location Map


MW1
(Approx. 975 ft. WNW of MW10/MW10D)
Allison Water Well
(Approx. 1900 ft. NW of Ash Pond A)
Power Plant
Bottom Ash Sluice Pond
MW-9
MW-10D
MW-10
B-2
SW-6
SW-5
B-1
MW-5
GP-10
Coal Storage Yard
B-3
SW-1
Ash Pond A
SW-7
SW-4
GP-11
DeMent Irrigation Well
(Approx. 2400 ft. SW of Ash Pond A)
B11-1
GP-8
MW-4
GP-12
GP-9
GP-22
B-4
SW-2A
SW-2
SW-2B
MW-2R
SW-3
Tank Farm
Ash Pond C
MW-12
GP-23
MW-8
Wabash River
GP-6
GP-5
GP-3
GP-4
MW-3
MW-3D
Ash Pond B
B11-5
GP-20
GP-2
DeMent & Wampler Irrigation Wells
(Approx. 1230 & 2650 ft. S of Ash Pond B)
B11-2
GP-1
B11-3
Ash Pond D
GP-21
MW-121(TW)
(G)B-1
(G)B-2
(G)B-4
B-5
MW-115S
MW-115D
PWW-3
(G)B-3
MW-11R
MW-7D
MW-7
MW-6
B11-4
PWW-4
MW-14
GP-15
GP-13
GP-17
GP-18
TW-119
TW-116
TW-118
TW-120
TW-117
Natural Resource Technology (NRT) 2004 Boring Locations
SCALE 1 in. = 1,500 ft
EXPLANATION
PWW-3 Process water well
B-3 Hanson 1983
MW-11 Hanson 1984a
SW-2 Hanson 1984b
GP-2 STMI 1998
MW-12 NRT 2001
MW-14 NRT 2004
(G)B-1 Geotechnology 2010
B11-4 Hanson 2011
Sealed Well / Piezometer
Ash Pond limits (approx.)
Fence
Property Line
NOTES.
Aerial information taken from a photogrammetric data provided by Continental Mapping Consultants as flown April, 2010.
Original drawing prepared by Massmann Surveying, Clayton, MO
SCALE: 1 in. = 400 ft.
0 ft. 200 ft. 400 ft. 600 ft. 800 ft.
HANSON
Hanson Professional Services Inc.
BORING LOCATION MAP
ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO, ILLINOIS
HANSON NO. 14E0016
FIGURE NO. A-1

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Appendix A-2

Hanson 1983 Boring Logs

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Canonie Construction Co.

Canonie Canonie Test Boring Services

Hamilton Lakes, 500 Park Boulevard, Suite 1212, Itasca, Illinois 60143, 312-773-4877

Job No.	DD-0162
Date	8-9-83
Total Footage	25'6"
Foreman	Steve Berlin
Classification By	Foreman

Client Hanson Engineers — Geographic Location Hutsonville, IL

Boring No. B-1

O.G. EL. — Coordinates

Ground Surface		0'0"
Black TOPSOIL		1'0"
Brown fine SAND with small to medium gravel and some clay.	4-3-5	3'6"
	2-2-3	
Wet brown SAND and small to medium gravel.	3-3-4	
	1-1-2	
	3-3-3	13'0"
Gray silty CLAY with organic material.		
Blue and Black SAND-STONE.	9-12-71	14'8" 15'0"
End of Boring		
Water level is 3'6" below ground surface 1.0 hours after completion.		
Water discovered at 3'6"		

Boring No. B-2

O.G. EL. — Coordinates

Ground Surface		0'0"
Black TOPSOIL.		1'2"
Gray & brown SAND with clay and small to medium gravel.	3-5-7	3'6"
Very dense gray and brown fine SAND with small gravel and clay.	7-23-32	5'6"
Very dense brown SAND with small gravel.	37-70-91	10'0"
Brown SANDSTONE.	100/6"	10'6"
End of Boring		
Water level is 5'6" below ground surface 1/2 hours after completion.		
Water at 8'0"		

A....All borings are plotted to a scale of 1"= 4 ft., using ground surface as a fixed datum.

B....Classifications are made from visual inspection of samples and are our opinion thereof.

C....Water Levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil strata, variations of rainfall, site topography, etc., may cause changes in these levels.

D....Figures in right hand column indicate number of blows required to drive 2" O.D. sampling spoon (6" u.n.o.), using a 140 lb. weight falling 30 inches.

B-157C

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Canonie Construction Co.

Canonie Canonie Test Boring Services

Hamilton Lakes, 500 Park Boulevard, Suite 1212, Itasca, Illinois 60143, 312-773-4877

Job No.	DD-0162
Date	8-9-83
Total Footage	33'0"
Foreman	Steve Berlin
Classification By	Foreman

Client Hanson Engineers — Geographic Location Hutsonville, IL

Boring No. B-3

O.G. El. —

Coordinates —

Ground Surface		0'0"
Black TOPSOIL		1'0"
Gray SAND with small gravel.	2-2-3	3'0"
Brown and gray SAND with trace of clay and small gravel.	3-3-3	
	3-4-7	
Brown and gray silty CLAY with trace of small gravel.	7-12-36	9'6"
Gray clayey SAND with small gravel.	32-35-61	12'6"
Gray & brown SANDSTONE	100/4"	13'6" 14'0"
Gray and brown SAND-STONE. Cored 10'0" Recovered 8'2"	81%	
End of Boring		24'0"

Water level is 5'6" below ground surface 1/2 hour after completion.
Installed Piezometer at 10'0" & 24'0".
Water at 3'6"

Boring No. B-4

O.G. El. —

Coordinates —

Ground Surface		0'0"
Black TOPSOIL		1'0"
Gray SAND and gravel (small)	8-5-4	2'0" 3'0"
Brown and gray sandy CLAY with small to medium gravel.	3-4-3	5'6"
Gray fine SAND with small to medium gravel and clay.	100/6"	8'2"
Brown fine SAND with small gravel and sandstone.	100/5"	9'0"
Gray SANDSTONE.		
End of boring		

Water level is 5'0" below ground surface 1/2 hour after completion.

Water at 3'6"

A....All borings are plotted to a scale of 1"= 4 ft., using ground surface as a fixed datum.

B....Classifications are made from visual inspection of samples and are our opinion thereof.

C....Water Levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil strata, variations of rainfall, site topography, etc., may cause changes in these levels.

D....Figures in right hand column indicate number of blows required to drive 2" O.D. sampling spoon (6" u.n.o.), using a 140 lb. weight falling 30 inches.

B-157C

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Canonie Construction Co.

Canonie Canonie Test Boring Services

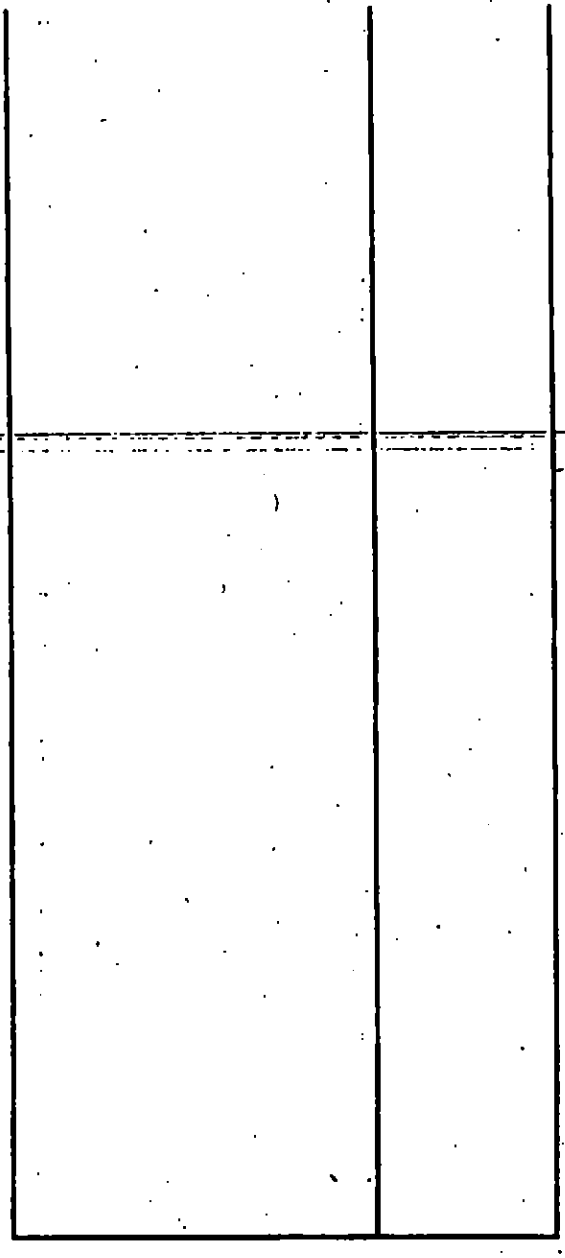
Hamilton Lakes, 500 Park Boulevard, Suite 1212, Itasca, Illinois 60143, 312-773-4877

Job No.	DD-0162
Date	8-9-83
Total Footage	20'0"
Foreman	Steve Berlin
Classification By	Foreman

Client Hanson Engineers, Geographic Location Hutsonville, IL

Boring No. B-5	O.G. EL.	Boring No.	O.G. EL.
Coordinates		Coordinates	

Ground Surface		0'0"
Black TOPSOIL with black coal.		1'0"
Brown silty CLAY with fine sand and small to medium gravel.	7-7-7	3'0"
Brown SAND with small gravel.	4-4-5	5'6"
Brown SAND with small to medium gravel.	1-1-2	
	1-2-2	11'0"
Brown SANDSTONE Cored 9'0" Recovered 7'3"	81%	20'0"
End of Boring Water level is 5'6" below ground surface 1/2 hour after completion. Water at 5'6"		



A....All borings are plotted to a scale of 1"=..4..... ft., using ..ground..surface.. as a fixed datum.

B....Classifications are made from visual inspection of samples and are our opinion thereof.

C....Water Levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil strata, variations of rainfall, site topography, etc., may cause changes in these levels.

D....Figures in right hand column indicate number of blows required to drive 2" O.D. sampling spoon (6" u.n.o.), using a 140 lb. weight falling 30 inches.

B-167C

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OPERATOR CMP MRH

DATE 8-23-83

JOB NO. 8353045

[redacted] ENGINEERS

LABORATORY SOIL TEST DATA

PROJECT NAME AND LOCATION
Flyash Pond
Hutsonville Power Station
Central Illinois Public Service Co

BOR.	SAMP.	DEPTH	ELEV.	N	STRENGTH TESTS Qu	M	P	W	γ_w	γ_D	SPECIAL TESTS	SAMPLE DESCRIPTION
	Ground Surface Elev = 450.7											
1	1	2'-6"	448.2	8				6				Brn. si. f. sa.
	2	5'-0"	445.7	5				17				" " " - c. sa. / pebs.
	3	7'-6"	443.2	7				18				" " " - " " / "
	4	10'-0"	440.7	3				23				" " " - " " / "
	5	12'-6"	438.2	6				12				" " " - " " / "
	6	15'-0"	435.7	83			3.0	18				Gr. " cl. (tr. c. sa. sm. pebs.)
	Ground Surface Elev = 450.6											
2	1	2'-6"	448.1	12			4.5+	12				Brn. cl. si. / sa. c. sa. & sm. pebs.
	2	5'-0"	445.6	55				15				Yel. brn. si. f. sa (tr. cl.)
	3	7'-6"	443.1	61				13				" " " " " (" ")
	4	10'-0"	440.6	50/2"				16				" " " " " (" ")
	Ground Surface Elev = 450.0											
3	1	2'-6"	447.5	5				10				Brn cl. si / sa. c. sand
	2	5'-0"	445.0	6				20				Brn. gray mottled f-c. sand
	3	7'-6"	442.5	11				22				" " f-c. sand w/ some clay.
	4	10'-0"	440.0	48			2.2	17				Yel. brn. si. cl / sa. c. sa. & pebs
	5	12'-6"	437.5	96			4.5+	23				Mix. colored v. f. sa. cl. si.
	6	15'-0"	435.0	24"				19				Brn. gr. si. f. sa.
	Ground Surface Elev = 458.8											
4	1	2'-6"	447.3	9				8				Brn. v. f. sa. si. (tr. cl. / sa. c. sa. & pebs.)
	2	5'-0"	445.8	7			1.5	17				" gr. cl. f-c. sa.
	3	7'-6"	443.3	89/6"				12				" f. sa. si. & si. f. sa.
	4	10'-0"	441.8	50/3"				12				" gr. si. f. sa.

SHEET 1 OF 8

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OPERATOR _____

DATE 8-23-83

JOB NO. 8353045

HANSON ENGINEERS

LABORATORY SOIL TEST DATA

PROJECT NAME AND LOCATION
Flyash Pond
Hutsonville Power Station
Central Illinois Public Service Co.

BOR.	SAMP.	DEPTH	ELEV.	N	STRENGTH TESTS QU	M	P	W	γ_w	γ_D	SPECIAL TESTS	SAMPLE DESCRIPTION
	Ground Surface Elev -441.0											
S	1	2'-6"	438.5	M			4.5+	23				Brn f. sa. sl. cl.
	2	5'-0"	436.0	9				9				" cl. f-m sa. / sa. sl.
	3	7'-6"	433.5	3				21				" f-m. sa. / sa c. sa.
	4	10'-0"	431.0	4				21				" " - " "
	5	12'-6"	428.5	19/4				19				" " - " "

SHEET 2 OF 2

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Appendix A-3

Hanson 1984a Boring Logs

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CENTRAL ILLINOIS DRILLING COMPANY
1909 OAKWOOD AVE.
BLOOMINGTON, ILLINOIS 61701
(309) 662-8968

LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-1
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-14-84 — COMPLETED 2-14-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
456.5		0.0	30						
455.6	See #A	0.9							
453.4	Lt. brn. sandy silt, wf. clay, occas. f-c sand, occas. f. gravel roots moist-v. moist	3.1		1-2-3	1	ss	18"	1.0 2.4	
	Lt. br. m-c sand, wf. occas. f-m gravel tr. silt		5	6-5-7	2	ss	17	--	
450.1	wet	6.4							
448.4	Lt. brn. sandstone moist	8.1		6-54-40/2"	3	ss	14	2.2	
447.4	Lt.-gray sandstone	9.1		65-35/1"	4	ss	7	--	WATER 2-14-84
	END OF BORING 9.1'		10						DD 6.0 8:30am BAR 7.0 8:55am AAR-- WL 6.5 9:05am
									F-c gravel 5.9'-6
			15						Screen 9.0'-4.0' 2" PVC Pipe 4.0'- Gravel 9.1'-3.0' Bentonite 3.0'-1. Plug 1.5'-surface
									Water level 4.0 9 am 2-1 8
									#A Blk. clayey si wf. tr. f. sand, occas. organ fibers torso moist

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CENTRAL ILLINOIS DRILLING COMPANY
1909 OAKWOOD AVE.
BLOOMINGTON, ILLINOIS 61701
(309) 662-5968

LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-2
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-10-84 — COMPLETED 2-10-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
453.3		0.0	30						
452.9	See #A	0.4							
451.2	Brn. silty sand fill v. moist	2.1		8-8-6	1	ss	18"	2.4	
	Brn. m-c sand, wf. m-c gravel tr. silt v. moist		5	7-5-3	2	ss	17	--	
				3-3-3	3	ss	16	--	WATER 2-10-84 DD 8.0 8:00am BAR 11.0 10:30a AAR --- WL 7.0 2:10pm
444.9		8.4							
	Brn.-gray m-c sand, wf. m. gravel wet		10	3-4-7	4	ss	14	--	
				8-7-9	5	ss	17	--	Screen 18.0-5.0 2"PVC pipe 5.0' 3.0' surface Gravel 21.5'-18 Bentonite 4.0'- Plug 2.0'-surf.
439.8		14.1							
	Brn.-gray m-c sand, wf. f-m gravel wet		15	6-8-10	6	ss	17	--	#A Blk. coal refuse 4" wf. occas. silt fil wet
436.0		17.3		10-13-13	7	ss	17	--	
	Gray silty clay, wf. tr. f. sand, occas. f. gravel till moist		20	5-10-13	8	ss	18	4.2	

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-2
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION Per PLan
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-10-84 — COMPLETED 2-10-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
953.3		0.0	30						
431.8		21.5		5-7-11	9	SS	18"	4.0	
	END OF BORING 21.5'								

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BLOOMINGTON, ILLINOIS 61701
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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-3
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-9-84 — COMPLETED 2-9-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.			NOTES
452.1		0.0	30							
451.7	See #A	0.4								
				4-6-8	1	ss	14"	--		
	Rust brn. silty sand, fill v. moist		5	4-3-4	2	ss	16	--		
445.8	Brn. f-c gravel, wf. m-c sand, occas. sandstone wet	6.3		8-19-11	3	ss	18	--		WATER 1-9-84 DD 5.5' 2:30pm BAR 6.0' 2:45pm AAR WL 5.0' 4:45pm
444.5	F-m sand v. moist	7.6								
443.2	See #B	8.9		15-85/5"	4	ss	17	--		
442.7	END OF BORING 9.4'	9.4	10							
			15							

#A Blk. coal refuse, 4" cind wf. silt fill v. moist

#B Brn. sandstc wf. f-m sand we

Screen 9.4'-4.
2"PVC Pipe 4.4
3.5
Gravel 9.4'-4.
Bentonite 4.0'
2.5'
Plug 1.5'-surf
Grout 2.5'-1.5
4"standpipe 3.
3.9' st

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-4
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-13-84 — COMPLETED 2-13-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
454.4		0.0	30						
	Blk. asphalt 1.0"								
453.1	F-m gravel 1.0", brn, clayey silt wf. f-m gravel pavement materials moist	1.3		5-5-7	1	ss	16"	--	
451.3	Blk. silt, wf. f-c gravel fill moist	3.1							
	Brn. silty sand, wf. occas. f-m gravel moist		5	4-3-3	2	ss	18	0.9	
448.5		5.9							
	Br. f-m sand wf. silt v. moist			3-3-4	3	ss	18	--	WATER 2-13-84
446.2		8.2							DD 8.0 9:45am
	Br. f-m gravel, wf. c-m sand, silt wet		10	3-3-3	4	ss	17	0.6	BAR 8.0 10:30am AAR --- WL 7.5 11:45am
443.5		10.9							
	Lt.-br. sandstone			23-77/5"	5	ss	11	--	Screen 12.5'-5.(
441.0		13.4		100/4"	6	ss	4	4.5t	2"PVC Pipe 5.0'-3.0' Gravel 13.4'-4.(Bentonite 4.0'-2.0'
	END OF BORING 13.4'		15						Plug 2.0'-surfa(

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1909 OAKWOOD AVE.
BLOOMINGTON, ILLINOIS 61701
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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-5
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-13-84 — COMPLETED 2-13-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
952.3		0.0	30						
951.1	1" coal refuse, brn. clayey silt, wf. f-c gravel occas. organic fibers fill moist	1.2							
				4-5-5	1	ss	14"	--	
949.2	See #A	3.1							
	Brn. f. sand, wf. occas. c. sand, f. gravel moist v. moist								WATER 2-13-84
			5	3-2-4	2	ss	17	0.4	DD 8.0 2:50pm
946.4		5.9							BAR 11.0 3:50pm
	Br. f-m sand, wf/ c sand								AAR -------
				9-3-4	3	ss	18	0.6	WL 6.5' 5:45pm
	wet								
943.9		8.4							Old metal draina
									pipe 1.0' west c
	Brn. m-c sand, wf. f-c gravel occas. blk.		10	3-4-4	4	ss	18	0.9	boring running
941.7	coal refuse mottling	10.6						1.6	from road to sta
									tion
	Brn.-gray m-c sand, wf. f-m gravel								
				0-3-3	5	ss	16	--	Screen 18.0'-5.0
	wet								2" PVC pipe 5.0'
									3.0' stick u
									Gravel 18.0'-4.0
									Bentonite 4.0'-2
									Backfilled 19.2'
			15	5-6-1	6	ss	12	--	18.0' wf. grave
									Plug 2.0'-surf-c
936.1		16.2							1-4" standpipe
935.4	Brn.-gray sandstone, wf f-c gravel occas. m-c	16.9		16-15-	7A	ss	12	--	#A Brn. gray sil
	sand v. moist			----27	7B	ss	6	--	m-c sand, wf.
	Gray sandstone								f-c gravel, occ
									white rock fill
933.1		19.2		30-70/ 2"	8	ss	8	4.5t	wet
	END OF BORING 19.2'		20						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. m-6
PROJECT NAME HUTSONVILLE POWER STSTION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-9-84 — COMPLETED 2-9-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
438.9		0.0	30						
437.7	Brn. clayey silt wf. tr. f-m sand, occas. organic fibers moist	1.2							
	Brn. clayey silt, wf. f-m sand, occas. f gravel moist			1-2-4	1	SS	13"	1.2	
435.5		3.4							
	Gray-brn. silty clay, wf. tr. f. sand, occas. f. gravel moist								WATER 2-9-84
433.3		5.6	5	3-4-5	2	SS	16	--	DD 8.0 9:20am
	Brn. f-c gravel wf. clay, c. sand moist			8-8---	3A	SS	12	--	BAR 9.0 10:3
431.6		7.3		----15	3B	SS	6	--	AAR ----
431.0	Br. sand, tr. sandstone	7.9							WL 6.0 1:00pm
430.5	Br. f-m sand wet	8.4							
	Lt. br. sandstone, wf. f. sand		10	80-20/1"	4	SS	7	--	Screen 11.4'-5.0
427.5		11.4		100/4.	5	SS	4.5	--	2" PVC pipe 5.0'. 5.0' stick
	END OF BORING 11.4'								Gravel 11.4'-4.0
			15						Bentonite 4.0'-2
									Plug 2.0'-surfac
			20						Standpipe 3.0'-5

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1909 OAKWOOD AVE.
BLOOMINGTON, ILLINOIS 61701
(309) 662-5968

LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-7
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-8-84 — COMPLETED 2-8-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS PT.	NO.	TYPE	RECOV.	QP	NOTES
437.9		0.0	30						
436.5	Br. clayey silt, wf. tr. f. sand, occas. organic fibers moist	1.4							
	Br. clayey silt, sand, wf. occas. blk. stn-			3-2-7	1	ss	17"	--	
434.0	dens fill moist	3.9							
	Lt. brn.-brn. sandy silt, wf. clay		5	2-3-4	2	ss	14	--	
429.8	moist	8.1		3-3-5	3	ss	16	1.7	WATER 2-8-84
	Brn. sandy silt, wf. tr. clay		10	2-2-3	4	ss	14	1.2	DD 11.5 11:45am BAR 11.5 3:00pm AAR ---- WL 11.5 5:15pm
	very moist			0-0-3	5	ss	15	1.3	Screen 25.0'-15 2" PVC pipe 15. 5.0' stick up Gravel 25.0'-14 Bentonite 14.0' 12.0' Plug 2.0'-surfa Bentonite-clay- 12.0'-2.0' Standpipe 3.0'- 5.1' stick-
425.0		12.9							
	Brn. silt, wf. f. sand								
	very moist-wet		15	2-2-4	6	ss	16	1.7	
420.3		17.6		2-2-3	7	ss	18	1.4	
			20	0-1-3	8	ss	17	1.2	

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BLOOMINGTON, ILLINOIS 61701
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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-7
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-8-84 — COMPLETED 2-8-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
437.9		0.0	30						
416.5	Brn. sandy silt wf. lenses, f. sand wet	21.4							
414.5	Brn. f. sand wet	23.4							
412.9	Brn. f-c gravel, wf. m-c sand, tr. silt wet	25.0		7-7-9	9	ss	12"	--	
	END OF BORING 25.0'								

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-8
PROJECT NAME HUTSONVILLE POWER PLANT — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-7-84 — COMPLETED 2-7-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
429.9		0.0	30						
428.7	Brn. clayey silt, wf. tr. f. sand, occas. organic fibers moist	1.3							
426.3	Brn. silty sand	3.1		2-5-7	1	ss	18"	1.6	
	Brn. silty sand, wf. tr. f. sand moist		5	2-3-5	2	ss	17	1.4	
421.0		8.4		3-5-5	3	ss	18	3.2	WATER 2-7-83
	Brn. clayey silt, wf. tr. f. sand moist		10	2-3-3	4	ss	18	1.8	DD 13.0 11:45am HAR 19.0 3:45pm AAR ------ WL 12.0 8:30am 2-8-84
418.5		10.9							
	Brn. gray clayey silt, wf. tr. f. sand, sm. gray silt pockets moist			2-2-2	5	ss	18	1.2	Screen 21.5'-16 Gravel 21.5'-15 Bentonite 15.5'-13.5'
			15	2-2-3	6	ss	18	1.7	Clay & Bentonit 13.5'-4.0' 2" PVC pipe 16. 4.9' stick up Bentonite cemen grout 4.0'-2.0'
412.0		17.4		1-2-2	7	ss	18	1.2	Plug 2.0'-surfa Standpipe 3.0'-
419.6	Brn. sandy silt, wf. occas. f. sand lens wet very moist	19.8	20	0-1-2	8	ss	18	1.2	Baled well at 5:15pm 2-9-84 11.0' water lev

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LOG OF BORING

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CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-8
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-7-84 — COMPLETED 2-8-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
439.9		0.0	30						
417.9	Br. silty sand wet	21.5		0-0-0	9	SS	18"	1.1	
	END OF BORING 21.5'								

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. M-9
PROJECT NAME HUTSONVILLE POWER STATION — CONTRACT NO.
LOCATION 33.0' E. OF STAKE
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 2-14-84 — COMPLETED 2-14-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
452.0		0.0	30						
451.2	See #A	0.8							
450.7	See #B	1.3							
448.6	Brn. silty sand, wf. coal refuse, occas. f-c gravel - fill moist	3.4		5-10-10	1	ss	18"	2.3	#A Brn. silty f-c sand, wf. coal
446.1	Brn. sandy silt, wf. f-m gravel concrete fill moist	5.9	5	4-19-18	2	ss	14	--	refuse, 5.0" sil wf. f. sand, occ organic fibers fill wet
443.9	Brn. sandy silt, wf. ash coal refuse, tr. clay fill moist	8.1		2-1-2	3	ss	16	2.2	#B Brn. f-m sa wf. silt fill moist
441.4	Gray sandy silt, wf. occas. f. gravel wet	10.6	10	2-2-1	4	ss	10	1.0	Water 2-14-84 DD 8.0 1:15pm BAR 17.0 2:30pm AAR --- WL 9.0 4:15pm
438.6	Brn. f. sand saturated	13.4		0-1-1	5	ss	8	--	Concrete fragme 3.5'-4.0'
436.5	Gray clayey silt, wf f. sand, occas. f. gravel	15.5	15	0-3-3	6	ss	14	2.3	Cobbles, concre 2.6'-3.0. Screen 18.5'-8.
435.6	Br. m-c. sand, wf. f-c gravel wet	16.4							2" PVC pipe 8.5 3.0 stick up
433.2	Brn. sandstone	18.8		18-72-22/1"	7	ss	13	4.5	Gravel 18.0'-8. Bentonite 8.0'- Cement Grout 6. 4.
	END OF BORING 18.8'		20	100/3"	8	ss	0	--	Plug 2.0'-surfa Standpipe

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HANSON ENGINEERS INCORPORATED

MONITORING WELLS

M-1

ELEVATION 456.5

PIPE & SCREEN

7' pipe	459.5 - 452.5
5' screen	452.5 - 447.5

BACKFILL MATERIALS

concrete grout collar	456.5 - 455.0
bentonite seal	455.0 - 453.5
1/8" gravel pack	453.5 - 447.4

M-2

ELEVATION 453.3

PIPE & SCREEN

8' pipe	456.3 - 448.3
13' screen	448.3 - 435.3

BACKFILL MATERIALS

concrete grout collar	453.3 - 451.3
bentonite seal	451.3 - 449.3
1/8" gravel pack	449.3 - 431.8

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Directors: Walter E. Hanson, Leo J. Dondanville, Jr., John M. Healy, John P. Hine, Richard W. Miller, Donald D. Oglesby, Eugene R. Wilkinson

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HANSON ENGINEERS INCORPORATED

MONITORING WELLS

M-3

ELEVATION 452.1

PIPE & SCREEN

7.9' pipe	455.6 - 447.7
5' screen	447.7 - 442.7

BACKFILL MATERIALS

concrete grout collar	452.1 - 450.1
bentonite seal	450.1 - 448.1
1/8" gravel pack	442.7 - 448.1

M-4

ELEVATION 454.4

PIPE & SCREEN

8' pipe	457.4 - 449.4
7.5' screen	449.4 - 441.9

BACKFILL MATERIALS

concrete grout collar	454.4 - 452.4
bentonite seal	452.4 - 450.4
1/8" gravel pack	450.4 - 441.0

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HANSON ENGINEERS INCORPORATED

MONITORING WELLS

M-5

ELEVATION 452.3

PIPE & SCREEN

8' pipe	455.3 - 447.3
13' screen	447.3 - 434.3

BACKFILL MATERIALS

concrete grout collar	452.3 - 450.3
bentonite seal	450.3 - 448.3
1/8" gravel pack	448.3 - 433.1

M-6

ELEVATION 438,9

PIPE & SCREEN

10' pipe	443.9 - 433.9
6.4' screen	433.9 - 427.5

BACKFILL MATERIALS

concrete grout collar	438.9 - 436.9
bentonite seal	436.9 - 434.9
1/8" gravel pack	434.9 - 427.5

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HANSON ENGINEERS INCORPORATED

MONITORING WELLS

M-7

ELEVATION 437.9

PIPE & SCREEN

20'	pipe	442.9 - 422.9
10'	screen	422.9 - 412.9

BACKFILL MATERIALS

concrete grout collar	437.9 - 435.9
bentonite & auger cutting	435.9 - 425.9
bentonite seal	425.9 - 423.9
1/8" gravel pack	423.9 - 412.9

M-8

ELEVATION 439.4

PIPE & SCREEN

21.4'	pipe	444.3 - 422.9
5.0'	screen	422.9 - 417.9

BACKFILL MATERIALS

concrete grout collar	439.4 - 437.4
bentonite & auger cutting	437.4 - 425.9
bentonite seal	425.9 - 423.9
1/8" gravel pack	423.9 - 417.9

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HANSON ENGINEERS INCORPORATED

MONITORING WELLS

M-9

ELEVATION 452.0

PIPE & SCREEN

11.5'	pipe	455.0 - 443.5
10'	screen	443.5 - 433.5

BACKFILL MATERIALS

concrete grout collar	452 - 450
bentonite, cement & sand	450 - 446
bentonite seal	446 - 444
1/8" gravel pack	444 - 433.2

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Appendix A-4

Hanson 1984b Boring Logs

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-I
PROJECT NAME PROPOSED FLYASH DISPOSAL POND — CONTRACT NO.
LOCATION 0 + 80 CENTERLINE
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-24-84 — COMPLETED 7-24-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	Brn. silty f. sand, wf. occas. organic fibers fill dry	1.1							
	Gray-brn. sandy silt wf. occas. f. gravel fill moist	3.3		3-4-4	1	ss	13"	4.5+	
	Gray-brn. f-c silty sand wf. f-c gravel fill very moist	4.9	5	3-3-4	2	ss	17	2.0	WATER 7-24-84 DD 4.0 10:2[illegible] BAR surface [illegible] 3:45pm AAR 3.5 3:55pm
	Brn. f. sand wf. sandstone moist	5.6		21-33-67/3/1/2	3	ss	16	4.5+	
	Lt. brn. brn. silty f. sand, wf. tr. sandstone occas. mica specks	8.2							
	Blue gray f. sand, wf. tr. silt, tr. sandstone, occas. brn. mottling wet	10.8	10	45-18-82/4/1/2	4	ss	17	--	Packer pressure test ran at 9.0 & below within HSA & core hole wf. nitrogen & water. To meas permeability 11 16.5. Packer permeability te in 2nd 5' core hole 16.5-21.5.
	Gray sandstone moist			100/4/1/2	5	ss	5"	--	
		15.3	15		6	NX	59/1/2	4.5+	
	Gray sandstone, wf. blk. coal seams								
			20						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-1
PROJECT NAME PROPOSED FLYASH DISPOSAL POND CONTRACT NO.
LOCATION PER PLAN
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"/NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-24-84 COMPLETED 7-24-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	moist	21.5		------	7	NX	60"	4.5+	
	END OF BORING 21.5'								
			25						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-2
PROJECT NAME PROPOSED FLYASH DISPOSAL POND CONTRACT NO.
LOCATION PER PLAN
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"/NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-24-84 COMPLETED 7-25-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	Blk. sandy cinders fill moist	0.8							
	Brn. silty sand, wf. f-m gravel, occas. blue gray silty sand pockets fill moist	2.4		3-3-2	1	ss	15"	2.5	
	Reddish brn. silty f-c sand, wf. f-m gravel fill moist	5.6	5	4-3-3	2	ss	18	--	WATER 7-24-84 & 7-25-84
	Brn. m-c sand, wf. occas. f. gravel wet			1-2-2	3	ss	17	--	DD 6.5 4:20pm BAR 6.0 8:20am AAR 6.0 8:45am
			10	1-1-2	4	ss	17	--	
		13.1		3-4-5	5	ss	16	--	
	Brn. f-m sand, wf. occas. f. gravel wet	15.4	15	5-7-10	6	ss	18	--	
	Brn. m-c sand, wf. f-m gravel wet	17.5		5-10-14	7	ss	17	--	
	Gray silty clay, wf. tr. f. sand, occas. f. gravel, wood,		20	8-11-20	8	ss	18	4.5+	

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-2
PROJECT NAME PROPOSED FLYASH DISPOSAL POND — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-24-84 — COMPLETED 7-24-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES SLOWS FT.	NO.	TYPE	RECOV.	GP	NOTES
		0.0	30						
	branches till mcist			6-10-13	9	ss	18"	4.5+	
	~~Blue gray sandstone~~ wf. f. sand moist	24.6 25.5	25	2-11-20	10	ss	18	4.5+	
	Blue gray f-m sand, wf. occas. f. gravel, tr. sandstone, silt wet			7-7-10	11	ss	18	--	Clay wf. c gravel 33.5-33.8
			30	8-11-16	12	ss	18	--	
	~~Olive brn. sandstone~~ moist	31.0 31.9							
	Blk. gray cemented gravel moist	34.1							
	White dk. gray limestone moist	36.0	35	-----	13	NX	55	--	
	END OF BORING 36.0'								

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-2A
PROJECT NAME PROPOSED FLYASH DISPOSAL POND CONTRACT NO.
LOCATION 50.0' W. OF SW-2
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"/NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-25-84 COMPLETED 7-25-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP		NOTES
		0.0	30							
	Blk. f. sand, wf. cinders f-m gravel, gray silt, organic fibers fill	0.9								
	Brn. f. sand, wf. occas. f. gravel, tr. silt fill moist	3.1								
	Brn. silty f. sand, wf. occas. f-m gravel fill moist	5.0	5							WATER 7-25-84 DD 6.0 8:55am BAR 6.0 10:00am AAR 6.0 10:10am
	Brn. f-c sand, wf. f-m gravel wet	13.5	10							Coal seam 32.0-32.1
	Brn. f-c sand, occas. f. gravel wet	17.2	15							
	Gray silty clay, wf. tr. f. sand, occas. f. gravel		20							

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS
PROJECT NAME PROPOSED FLYASH DISPOSAL POND — BORING NO. SW-2A
LOCATION 50.0' W. OF SW-2 — CONTRACT NO.
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-25-84 — COMPLETED 7-25-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
	till moist	0.0	30						
		21.6							
	Gray silty clay, wf. sandstone, tr. shale occas. wood								
			25	------	1	NX	30"	--	
	moist								
		27.4							
	Gray sandstone wf. occas. blk. coal seams								
	moist								
			30	------	2	NX	59	--	
		31.3							
	Wh. limestone wf. cemented gravel, tr. coal seams moist	32.1							
	END OF BORING 32.1'								
			35						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-2B
PROJECT NAME PROPOSED FLYASH DISPOSAL POND — CONTRACT NO.
LOCATION 50.0' E. OF SW-2
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-25-84 — COMPLETED 7-25-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP		NOTES
		0.0	30							
	Blk. silty sand, wf. cinders occas. f. gravel, organic fibers fill dry	1.7								
	Brn. silty f. sand, wf. occas. f. gravel fill moist	3.5								
	Reddish brn. f. sand, wf. f. gravel fill moist	5.6	5							
	Brn. m-c sand, wf. f-m gravel wet		10							WATER 7-25-84 DD 6.0 10:25am BAR 6.0 11:20am AAR 6.0 11:50am Sm. cobbles 15.3-15.7
		15.7	15							
	Gray silty clay, wf. tr. f. sand, occas. f. gravel		20							

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-2B
PROJECT NAME PROPOSED FLYASH DISPOSAL POND CONTRACT NO.
LOCATION 50.0' E. OF SW-2
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"?NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-25-84 COMPLETED 7-25-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	till moist	23.5							
	Blue-gray sandstone wf. occas. brn. mottling wood wet	26.2	25						
	Gray sandstone wf. blk. coal seams moist	27.8							
	Gray brn. sandstone moist	29.4							
	Gray sandstone wf. blk. coal seamsw moist	31.5	30	-----	1	NX	59"	--	
	END OF BORING 31.5'								
			35						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-3
PROJECT NAME PROPOSED FLYASH DISPOSAL POND — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-25-84 — COMPLETED 7-25-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	Lt. brn. f. sand dry	0.8							
	Reddish brn. f. sand wf. occas. f. gravel dry	3.1		3-4-3	1	ss	18"	--	
	Reddish brn. silty f. sand very moist	2.4	5	3-4-5	2	ss	18	--	WATER 7-25-84 DD 5.5 11:45am HAR 6.5 2:45pm AAR 6.5 3:05pm
				2-3-4	3	ss	18	--	
	Brn. m-c sand, wf. f-m gravel wet	10.6	10	2-2-2	4	ss	17	--	Water loss 13.6-18.6
	Brn. f. sand, wf. occas. f. gravel wet	13.3		3-4-8	5	ss	12	--	
	Tan lt. gray sandstone moist	15.6	15						
	Brn. sandstone moist	18.6		-----	6	NX	60	--	
	Tan & brn. sandstone		20						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-3
PROJECT NAME PROPOSED FLYASH DISPOSAL POND CONTRACT NO.
LOCATION PER PLAN
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"/NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-25-84 COMPLETED 7-25-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.			NOTES
		0.0	30							
	moist	23.6		-----	7	NX	60"	--		
			25							
	END OF BORING 23.6'									

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-4
PROJECT NAME PROPOSED FLY ASH DISPOSAL POND — CONTRACT NO.
LOCATION +16 + 00
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-25-84 — COMPLETED 7-25-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QD	NOTES
		0.0	30						
	Lt. brn. f. sand, wf. silt fill dry	1.4							
	Reddish brn. silty sand, wf. occas. f. gravel			4-3-3	1	ss	17"	1.5	
	fill moist								
		4.3							
	Lt. brn. brn. sandy silt wet	5.6	5	2-2-2	2	ss	18	--	
	Brn. m-c sand wet	7.9		3-3-4	3	ss	18	--	WATER 7-25-84 DD 4.0 3:25pm BAR 3.0 5:45pm AAR 4.5 7:20pm
	Brn. f-m gravel, wf. m-c sand wet	9.7							
	Lt. reddish sandstone moist	10.9	10	1-2-25	4	ss	17	--	Permeability pac pressure test ra at 13.5' wf. wat & nitrogen in rock core hole
	Lt. brn. sandstone moist			100/3"	5	ss	3	--	
			15	-----	6	NX	56	--	
		17.9		-----	7	NX	40	--	
	Gray sandstone wf. blk. coal seams moist	19.6	20						
	END OF BORING 19.6'								

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CENTRAL ILLINOIS DRILLING COMPANY
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BLOOMINGTON, ILLINOIS 61701
(309) 662-5968

LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-5
PROJECT NAME PROPOSED FLYASH DISPOSAL POND — CONTRACT NO.
LOCATION 8 ± 50 PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8" /NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-26-84 — COMPLETED 7-26-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	Lt. brn. silty sand, wf. organic fibers fill dry	1.8							
	Brn. f-m gravel, wf. f-c sand, tr. silt fill dry	3.6		5-7-7	1	ss	17"	--	
	Reddsih brn. m-c sand, wf. occas. f. gravel tr. silt fill	5.5	5	5-4-7	2	ss	18	--	
	Gray brn. m-c sand, wf. occas. f. gravel wet	6.9							WATER 7-26-84 DD 6.0 7:40am HAR 2.0 10:20am AAR 2.5 10:25am
	Reddish lt. brn. sandstone moist	9.1		3-11-53	3	ss	18	--	
	Gray sandstone wf. blk. coal bands moist	9.8	10	-----	4	NX	9	--	Permeability packer pressure test ran at 9.5' wf. water & nitrogen in 1st rock core hole. Also permeability test at 12.8' in 2nd core hole
	Gray sandstone wf. occas. blk. coal seams moist			-----	5	NX	58	--	
			15						
				-----	6	NX	62	--	
		18.5							
	END OF BORING 18.5'		20						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-6
PROJECT NAME PROPOSED FLY ASH DISPOSAL POND CONTRACT NO.
LOCATION 8 + 50 PER PLAN
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"/NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-26-84 COMPLETED 7-26-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP	NOTES
		0.0	30						
	Brn. sand, silt wf. gas. organic fibers fill	9.8							
	Tan brn. silty clay, vf. f-c sand, f-m gravel			3-3-5	1	ss	18"	2.5	
	fill very moist	4.9	5	3-5-8	2	ss	17	0.5	
	Brn. sandstone moist	5.9							
	Reddish brn. sandstone moist	8.1		25-45-55/4"	3	ss	16	--	Water 7-26-84
	Lt. brn. sandstone moist	11.5	10	24-30-48	4	ss	18	--	DD 4.0 10:35am BAR 6.0 1:00pm AAR 5.5 1:15pm Bag Sampled #1 0.5-1.0 #2 1.0-2.0
	Reddish brn. sandstone tr. coal seams moist	13.2		-----	5	NX	49	--	
	Gray sandstone wf. occas. coal seams	14.0							
	END OF BORING 14.0		15						
			20						

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS — BORING NO. SW-7
PROJECT NAME PROPSED FLY ASH DISPOSAL POND — CONTRACT NO.
LOCATION PER PLAN
DATUM — HAMMER WT. 140# — HAMMER DROP 30" — HOLE DIA. 8"/NX
SURFACE ELEV. — CORE DIA. — CASING
DATE STARTED 7-26-84 — COMPLETED 7-26-84 — DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP		NOTES
		0.0	30							
	Brn. sandy silt fill moist	1.5								
	Lt. brn. silty f. sand moist fill	3.4								
	Reddish brn. silty f-m sand, occas. f. gravel wet		5							
			10							WATER 7-26-84 DD 3.5 1:20pm BAR 1.5 3:35pm AAR 3.0 3:45pm
	Gray silty clay, wf. tr. f. sand, occas. f. gravel till moist	12.3 / 13.6								
	Gray sandstone wf. blk. coal seams moist	15.7	15	-----	1	NX	59"	--		Bag Sampled 0.5-1.0
	Gray sandstone wf. tr. blk. coal seams		20							3 soft rock layers 17.5-22.5 Ran permeability packer pressure test at 18.5' in 2nd rock core run 17.5-22.5

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LOG OF BORING

CONTRACTED WITH HANSON ENGINEERS BORING NO. SW-7
PROJECT NAME PROPOSED FLY ASH DISPOSAL POND CONTRACT NO.
LOCATION PER PLAN
DATUM HAMMER WT. 140# HAMMER DROP 30" HOLE DIA. 8"/NX
SURFACE ELEV. CORE DIA. CASING
DATE STARTED 7-26-84 COMPLETED 7-26-84 DRILLING METHOD HSA

ELEV.	DESCRIPTION	STRATA DEPTH	DEPTH SCALE	SAMPLES BLOWS FT.	NO.	TYPE	RECOV.	QP		NOTES
		0.0	30							
	moist	22.5		-----	2	NX	60"	--		
	END OF BORING 22.5'									
			25							

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Appendix A-5

STMI 1998 Boring Logs

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-1	8/25/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/25/98	16.8 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
17.3 Feet	2.2 Inches	459.8 Feet	Geoprobe	3585.650
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	4366.050

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na		100		Coal Ash	ASH, silty texture, trace coal fragments, dark gray, moist (Fill)		Geoprobe boring, no well installed
	na	5	100		SP	SAND, well sorted/rounded, medium-grained, quartz, trace silt, trace coarse subangular sand of non-quartz lithology, light brown, moist (Fill)		
	na	10	100		CL	SILTY CLAY, roots in top 1 foot, trace to little coarse sand to fine subangular gravel, olive gray to brown, moist		
	na		75		SM	SILTY SAND, fine- to medium-grained, trace fine gravel, dark gray, moist		
	na	15	100		SC	CLAYEY SAND, fine- to medium-grained, trace fine gravel, light gray, saturated		insufficient water, no sample collected
		20				END OF BORING - 17.3 feet (bedrock)		
		25						
		30						

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Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-2	8/25/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/25/98	9 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
20.0 Feet	2.2 Inches	457.3 Feet	Geoprobe	3753.193
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	4610.447

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	87.5		Coal Ash	ASH, silty texture, trace cinder gravel, olive to dark gray, moist (Fill)		Geoprobe boring, no well installed
		5			SP	SAND, well sorted/rounded, medium-grained, quartz, light brown, moist, with little gravel, mottled olive gray & light brown below 3.5 ft. (Fill)		
	na		100			ASH, silty texture, trace coal fragments and cinder gravel, coarsens below 12 ft., saturated below 9 ft. (Fill)		
	na	10	100		Coal Ash			
	na		100					
		15			Coal Ash	ASH & SAND, coarse sand-size ash granules, coarse-grained quartz sand, trace cinder pebbles (1/2-1"), black, saturated (Fill)		
	na		100		SW-GW	CLAYEY SAND & GRAVEL, poorly sorted/subrounded, fine- to coarse-grained sand, fine-grained gravel, yellow orange, moist		Groundwater sample collected from 15-19 ft. bgs.
		20				END OF BORING - 20.0 feet (Bedrock)		
		25						
		30						

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Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-3	8/25/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/25/98	11 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
16.0 Feet	2.2 Inches	459.3 Feet	Geoprobe	3924.268
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	4092.856

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	5	100		SM	SILTY SAND, fine-grained, yellow orange, damp (Fill)		
						ASH, silty texture, olive gray, wet below 3 ft. (Fill)		Geoprobe boring, no well installed
					Coal Ash			
	na		100		SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, light brown, moist (Fill)		
					Coal	COAL, sand/gravel size, black, damp (Fill)		
	na	10	100		SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, light brown, saturated below 11 ft.		
	na	15	100		SW-GW	SAND & GRAVEL, poorly sorted, fine- to medium-grained, quartz sand, fine-grained subangular gravel, light brown, saturated		Groundwater sample collected from 12-16 ft. bgs.
		20				END OF BORING - 16.0 feet (Bedrock)		
		25						
		30						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03		GP-4	8/25/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		8/25/98	10 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
17.0 Feet	2.2 Inches	459.4 Feet	Geoprobe	3950.707
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	4220.706

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	88.8		SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, little ash cinder gravel 0-1 ft, light brown, moist (Fill)		Geoprobe boring, no well installed
	na	5	81.2		SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, dark brown 5.5-7 ft (old ground surface), light brown below, saturated below 10 ft.		
	na	10	87.5					
	na	15	56.2		SW-GW	CLAYEY SAND & GRAVEL, poorly sorted, fine- to coarse-grained sand, fine-grained subangular gravel, light brown, saturated		Groundwater sample collected from 12-16 ft. bgs.
	na		100			END OF BORING - 17.0 feet (Bedrock)		
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-5	8/26/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	6 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
11.25 Feet	2.2 Inches	453.2 Feet	Geoprobe	3917.782
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3858.831

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na		100		SM	SILTY SAND, silty topsoil with grass 0-1/2 ft, piece of concrete, 1-in coal-rich layer at 1.75 ft, brown, moist (Fill)		Geoprobe boring, no well installed
						SAND, well sorted/rounded, fine- to medium-grained, quartz, trace to little coarse subangular to subround sand, light brown, saturated below 6 ft.		
	na	5	100		SP			
	na	10	100		SW-GW	SILTY SAND & GRAVEL, poorly sorted, medium- to coarse-grained subrounded sand, fine-grained subangular to subround gravel, light gray, saturated		Groundwater sample collected from 7-11 ft. bgs.
						END OF BORING - 11.25 feet (Bedrock)		
		15						
		20						
		25						
		30						

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Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-6	8/26/98	1
Driller	**Logged by:**	**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	6 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
10.5 Feet	2.2 Inches	453.0 Feet	Geoprobe	3981.359
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3754.280

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	62.5		SM	SILTY SAND, fine- to medium-grained, silty topsoil with grass 0-1/2 ft, little gravel, little coal fragments 2-2.25 ft, glass fragements, dark brown, moist (Fill)		Geoprobe boring, no well installed
					SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, light brown, moist		
	na	5	100		SW	SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, light brown, saturated below 6 ft.		
	na		100					Groundwater sample collected from 6-10 ft. bgs.
		10				END OF BORING - 10.5 feet (Bedrock)		
		15						
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-7	8/26/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
18.0 Feet	2.2 Inches	452.0 Feet	Geoprobe	4151.460
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3511.572

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na		75		SM	SILTY SAND, fine- to medium-grained, silty topsoil with grass 0-1/2 ft, little gravel, dark brown, moist (Fill)		Geoprobe boring, no well installed
					SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, light brown, moist		
	na	5	50			SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, light brown, saturated below 4 ft.		
	na	10	100		SW			Groundwater sample collected from 6-10 ft. bgs.
	na	15	100					
	na		100		ML	CLAYEY SILT, very stiff to hard, nonplastic, trace angular to subangular coarse sand to fine gravel, olive gray, moist		
		20				SANDSTONE, fine-grained, quartz, friable, light green END OF BORING - 18.0 feet (Bedrock)		
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-8	8/26/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	Est. 4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
16.0 Feet	2.2 Inches	451.3 Feet	Geoprobe	4262.600
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	2-ft split-spoon	3380.239

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	100		SM	SILTY SAND, fine- to medium-grained, silty topsoil with grass 0-3/4 ft, little gravel, dark brown, moist (Fill)		Geoprobe boring, no well installed
					ML	CLAYEY SILT, plant stem fragments and trace coal particles at top, black, moist (topsoil)		
	na	5	100		CL	SILTY CLAY, stiff, medium plasticity, fine vertical roots, little to some medium to coarse sand, trace subangular fine gravel, mottled light brown & gray, moist, estimated water level at 4 ft.		
	na	10	100		SW	SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, light brown, saturated		No groundwater sample collected; geology boring only
	na	15	100		CL	SILTY CLAY, stiff, medium plasticity, sandstone pebble, light to greenish gray, moist		
						END OF BORING - 16.0 feet (Bedrock)		
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-9	8/26/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	7 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
21.0 Feet	2.2 Inches	453.4 Feet	Geoprobe	4306.991
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	4990.027

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	50		ML	SILT, vegetated with grass, brown, dry (Topsoil)		
					SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, trace coal fragments at top, trace coarse sand, light brown, moist		Geoprobe boring, no well installed
	na	5	58.2					
	na	10	100			SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, pale brown, saturated		Groundwater sample collected from 8-12 ft. bgs.
	na	15	100		SW			
	na	20	100					
	na		100			END OF BORING - 21.0 feet (Bedrock)		
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-10	8/26/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	6 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
14.25 Feet	2.2 Inches	453.8 Feet	Geoprobe	4778.861

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	4-ft Macro-Core	4700.947

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	100		Coal	COAL, sand/gravel size, black, damp (Fill)		Geoprobe boring, no well installed
	na	5	75		SP	SAND, well sorted/rounded, fine-grained, quartz, some silt 2.5-3.5 ft, light brown, saturated below 6 ft.		
	na	10	50		SW	SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, grade to well sorted medium to coarse sand below 13 ft, light brown, saturated		Groundwater sample collected from 8-12 ft. bgs.
	na	15	100			END OF BORING - 14.25 feet (Bedrock)		
		20						
		25						
		30						

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Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-11	8/26/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/26/98	5 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
13.0 Feet	2.2 Inches	452.5 Feet	Geoprobe	4534.018
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	4388.798

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	87.5		Coal	COAL, sand/gravel size, black, damp (Fill)		Geoprobe boring, no well installed
					SM	SILTY SAND, fine- to medium-grained, quartz, trace coarse-grained, light brown, moist (Fill)		
		5			SP	SAND, well sorted/rounded, fine- to medium-grained, quartz, light brown, saturated below 5 ft.		
	na		68.8		SW	SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, light brown, saturated		
	na	10	100					Groundwater sample collected from 6-10 ft. bgs.
	na		100					
						END OF BORING - 13.0 feet (Bedrock)		
		15						
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-12	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
9.5 Feet	2.2 Inches	450.8 Feet	Geoprobe	4324.544

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	4-ft Macro-Core	4346.394

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	62.5		Coal	COAL, silty texture, soft, black, wet (coal pile runoff sediment)		
						SAND, well sorted/rounded, quartz, fine- to medium-grained grading to coarse-grained below 8 ft, light brown, saturated and pale brown below 4 ft.		Geoprobe boring, no well installed
	na	5	50		SP			Groundwater sample collected from 5-9 ft. bgs.
	na		100					
		10				END OF BORING - 9.5 feet (Bedrock)		
		15						
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-13	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
10.0 Feet	2.2 Inches	447.0 Feet	Geoprobe	2693.143
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3353.985

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na		50		ML	SILT, sandy, clayey, trace to little gravel, vegetated with farm crops, brown, moist (Topsoil)		Geoprobe boring, no well installed
	na	5	62.5		SP	SAND, poorly sorted, fine- to coarse-grained, subangular to subround, trace to little gravel, light brown, saturated		
	na		100		ML	CLAYEY SILT, very stiff to hard, nonplastic, trace root/stem fragments, trace angular to subangular coarse sand to fine gravel, greenish to olive gray, moist		Groundwater sample collected from 5-9 ft. bgs.
		10				END OF BORING - 10.0 feet (Bedrock)		
		15						
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-14	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	Est. 10 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
40.0 Feet	2.2 inches	439.9 Feet	Geoprobe	1104.830

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	4-ft Macro-Core	5752.447

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	87.5			CLAYEY SILT, increasing clay content with depth from trace near surface, medium plasticity, stiff above 10 ft to soft below, brown, saturated below ~10 ft		Geoprobe boring, no well installed
	na	5	87.5					
	na	10	100		ML			
	na	15	100					
	na	20	100					
						Drove sampler point to 40 ft. Noted increased resistance to penetration at ~25 ft and ~30 ft, but no soil recovery using 2-ft discrete sampler at 28-28 ft.		
	na	25	0					Partial groundwater sample (~50% volume) collected from 28-32 ft. bgs.
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-15	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	Est. 4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
18.0 Feet	2.2 Inches	449.8 Feet	Geoprobe	2790.223
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3212.610

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0–5	ns		ML/SM	TOPSOIL/SAND/SILT materials similar to GP-13.		Geoprobe boring, no well installed. Groundwater sample collected from 8-12 ft. bgs.
		5–10						
		10–15			ML/CL	CLAY/SILT materials similar to GP-13, based on increased resistance to penetration.		
		15–20				END OF BORING - 18.0 feet (Bedrock)		
		20–25						
		25–30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-16	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	Est. 4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
28.0 Feet	2.2 Inches	453.7 Feet	Geoprobe	2886.789
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3064.602

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	5, 10, 15, 20, 25, 30	ns		ML/SM	TOPSOIL/SAND/SILT materials similar to GP-13.		Geoprobe boring, no well installed. Groundwater sample collected from 8-12 ft. bgs.
					ML/CL	CLAY/SILT materials similar to GP-13, based on increased resistance to penetration.		
						END OF BORING - 28.0 feet (Bedrock)		

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-17	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	Est. 4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
12.0 Feet	2.2 Inches	445.6 Feet	Geoprobe	2582.997
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	3541.335

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	5	na		ML/SM	TOPSOIL/SAND/SILT materials similar to GP-13.		Geoprobe boring, no well installed. Groundwater sample collected from 4-8 ft. bgs.
		10			ML/CL	CLAY/SILT materials similar to GP-13, based on increased resistance to penetration.		
						END OF BORING - 12.0 feet (Bedrock)		
		15						
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-18	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	Est. 4 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
23.75 Feet	2.2 Inches	446.0 Feet	Geoprobe	2488.262

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	4-ft Macro-Core	3677.480

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	no	5, 10, 15, 20, 25, 30	ns		ML/SM	TOPSOIL/SAND/SILT materials similar to GP-13.		Geoprobe boring, no well installed. Groundwater sample collected from 8-12 ft. bgs.
					ML/CL	CLAY/SILT material similar to GP-13, based on increased resistance to penetration.		
						END OF BORING - 23.75 feet (Bedrock)		

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-19	8/27/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/27/98	Est. 10 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
40.0 Feet	2.2 Inches	Feet	Geoprobe	

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	not sampled	

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	5, 10, 15, 20, 25, 30	ns		ML/CL	CLAY/SILT materials similar to GP-14. Increased resistance to penetration at ~18 ft. Attempted groundwater sample collection at 20-24 ft and 28-32 ft., but no yield. END OF BORING - 32.0 feet		Geoprobe boring, no well installed. No groundwater samples; insuffient yield.

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-20	8/28/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/28/98	3 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
21.0 Feet	2.2 Inches	450.7 Feet	Geoprobe	3805.064

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	4-ft Macro-Core	5099.419

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na		100			ASH, silty texture, soft, dark gray, ~3/4-ft layer of cinder gravel at 9 ft, saturated below 3 ft (Fill)		Geoprobe boring, no well installed
	na	5	100					
	na	10	100		Coal Ash			
	na	15	50					
	na		100					Groundwater sample collected from 17-21 ft. bgs.
	na	20	100		CL	SILTY CLAY, trace coarse sand, trace fine subangular to subround gravel, stiff, medium plasticity, mottled yellow orange & light gray, moist END OF BORING - 21.0 feet (Bedrock)		
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-21	8/28/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/28/98	3 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
36.5 Feet	2.2 Inches	450.7 Feet	Geoprobe	3593.599
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	5239.017

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	5	100			ASH, silty texture, soft, dark gray,saturated below 3 ft (Fill)		Geoprobe boring, no well installed
	na		50					
	na	10	0		Coal Ash			
	na		0					
	na	15	0					Groundwater sample collected from 18-22 ft. bgs.
	na	20	50					
	na	25	50		CL	SILTY CLAY, stiff, medium plasticity, brown, moist		
		30			CL	SILTY CLAY (estimated based on resistance to penetration)		
						END OF BORING - 36.5 feet (Bedrock)		

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-22	8/28/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/28/98	>11.5 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
11.5 Feet	2.2 inches	458.7 Feet	Geoprobe	4373.353
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	5285.420

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0	81.2		ML	SANDY SILT, fine sand, vegetated with grass, brown, moist (Topsoil)		Geoprobe boring, no well installed
	na	5	100		Coal Ash	ASH, silty to very fine-grained texture, trace fine cinder gravel, coarsens below 8 ft, dark gray, moist with wet interval 6-7 ft (Fill)		
	na	10	100		Coal Ash	ASH, coarse sand to fine gravel size, some silt, several 1/4-5/8" pyrite pebbles		No groundwater sample collected; no water in sampler.
		15				END OF BORING - 11.5 feet (Bedrock)		
		20						
		25						
		30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	GP-23	8/28/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	8/28/98	7 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
34.0 Feet	2.2 Inches	460.7 Feet	Geoprobe	4203.035
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	4-ft Macro-Core	5272.661

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na		93.8		SM	SILTY SAND, fine-grained, quartz, trace to little clay, fine sand, vegetated with grass, yellow orange, moist (Fill) ASH, silty to very fine-grained texture, trace cinder gravel up to 1/2", coarsens below 13.5 ft, dark gray, wet below 7 ft (Fill)		Geoprobe boring, no well installed
	na	5	100		Coal Ash			
	na	10	100					
	na	15	100		Coal Ash	ASH, coarse sand to fine gravel size, some silt		
	na		100					Groundwater sample collected from 18-22 ft. bgs.
	na	20	100		CL	SILTY CLAY, stiff, medium plasticity, dark olive green, moist ASH (same as 13.5-19.8 ft). Increased resistance to penetration at 31 ft.		
		25			Coal Ash			Jammed liner in Macro-Core sampler; used 1-in I.D. by 2-ft, piston-tip discrete sampler to collect soil sample near bedrock surface.
		30						
	na		100		SP	SILTY SAND, well sorted/rounded, fine-grained, quartz, yellow orange to light brown, saturated. Top 2-3" were light olive green, indicating proximity of ash bottom. END OF BORING - 34.0 feet (Bedrock)		

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	LP-1	8/28/98	1

Driller	Logged by:	End Date	Depth to Water
STMI	Steve Mueller/STMI	8/28/98	0.25 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
7.3 Feet	2.37 Inches	465.9 Feet	Hand-driven	4405.098
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
na	na	na	not sampled	3961.179

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	0–5	na		Coal Ash	ASH, silty to very fine-grained texture, wet below 0.25 ft (Fill)		Temporary well-point with filter sock installed, leachate sample collected from 3.3-7.3 ft.
		5–10				END OF BORING - 7.3 feet		Removed well point 8/28/98
		10–15						
		15–20						
		20–25						
		25–30						

Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville Plant 249.03	LP-2	8/28/98	1

Driller	Logged by:	End Date	Depth to Water
STMI	Steve Mueller/STMI	8/28/98	0.25 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
8.0 Feet	2.37 Inches	466.24 Feet	Hand-driven	4502.022

Well Depth	Well Diameter	TOC Elev.	Sample Method	Easting
na	na	na	not sampled	3815.305

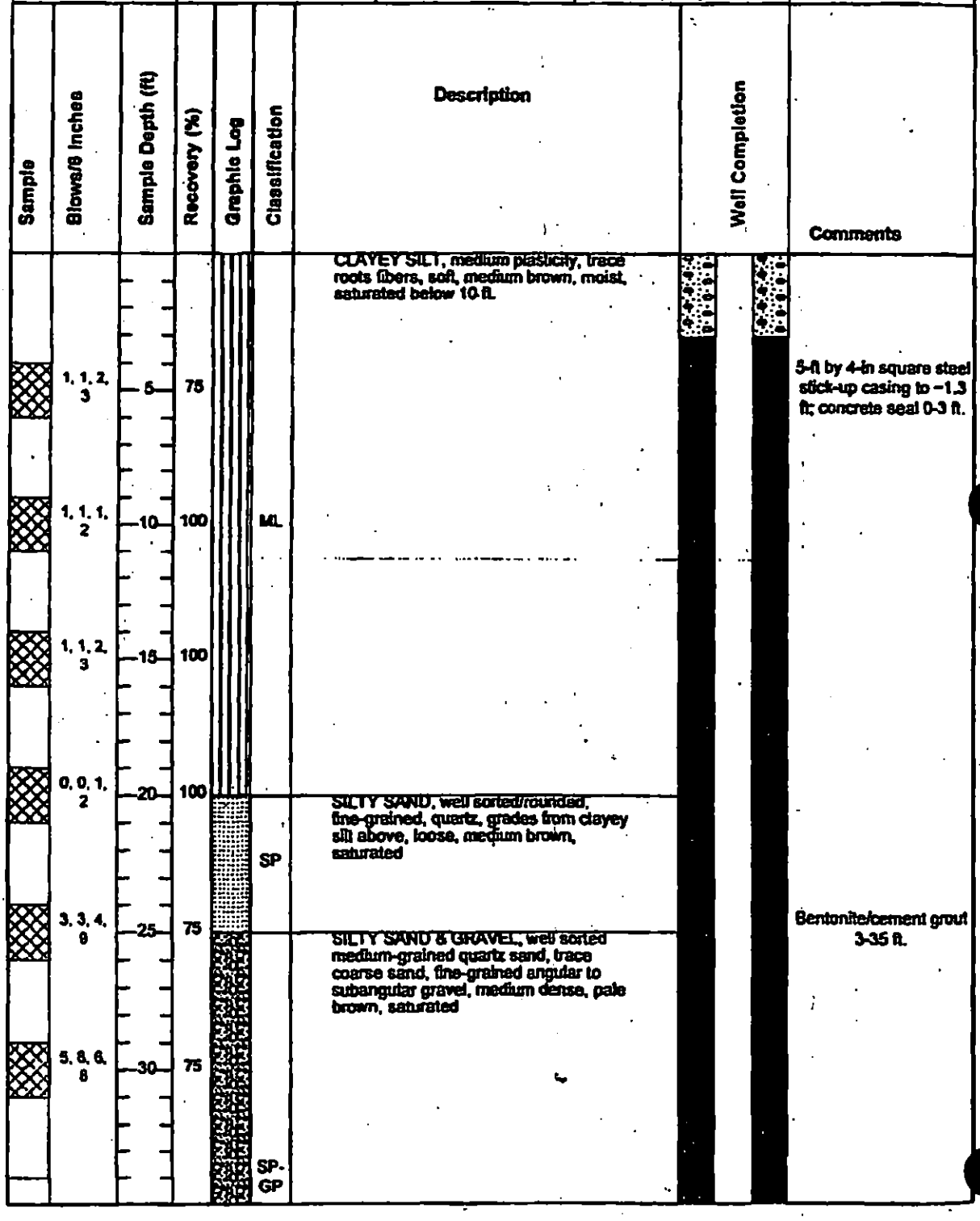
Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	na	5	na		Coal Ash	ASH, silty to very fine-grained texture, wet below 0.25 ft (Fill)		Temporary well-point with filter sock installed, leachate sample collected from 4.0-8.0 ft.
		10				END OF BORING - 8.0 feet		
		15						
		20						Removed well point 8/28/98.
		25						
		30						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-3D	10/6/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/6/98	~6 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
25.5 Feet	8" Inches	453.7 Feet	HSA/air-rotary	3860.230
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
25.1 Feet	2-in I.D.	455.28 Feet	2-ft. split-spoon	3952.034

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	1, 2, 3, 6		75		ML	SANDY SILT, little fine-grained gravel, trace coal fragments, medium stiff, dark brown, moist (topsoil)		5-ft by 4-in square steel stick-up casing to ~1.8 ft; concrete seal 0-3 ft.
	4, 4, 6, 4		88			SAND, well sorted/rounded, fine-grained, quartz, loose, light brown, to medium brown, saturated below 6 ft		
	1, 2, 3, 5	5	75		SP			
	2, 2, 2, 10		63					
	2, 2, 3, 5		50		SW-GW	SILTY SAND & GRAVEL, poorly sorted, medium-grained sand, fine-grained subangular to subround gravel, loose, light gray, saturated		Bentonite/cement grout 3-16 ft; 1/4-in bentonite chips 16-17 ft.
		10				SANDSTONE, fine-grained, quartz		
		15			Ss			Sch. 40 PVC casing flush-threaded to 0.01-in factory-slotted PVC screen 20.1-25.1 ft; #7 fine silica sand 17-18 ft; #5 silica sand pack 18-25.5 ft.
		20						
		25				END OF BORING - 25.5 feet		* 4-in diam. borehole drilled 16-25.5 ft using air-hammer.
		30						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-7D	10/5/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/5/98	~10 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
45.0 Feet	8 inches	437.5 Feet	HSA	3175.915
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
44.3 Feet	2-in I.D.	438.45 Feet	2-ft split-spoon	5676.110



Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-7D	10/5/98	2
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/5/98	~10 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
45.0 Feet	8 Inches	437.5 Feet	HSA	3175.915
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
44.3 Feet	2-in I.D.	438.45 Feet	2-ft. split-spoon	5676.110

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	sand heave	40	0					Sch. 40 PVC casing flush-threaded to 0.01-in factory-slotted PVC screen 39.3-44.3 ft; #7 fine silica sand 35-38 ft; #5 silica sand pack 38-45 ft.
	sand heave		0					
	16, 25, 7, 11	45	75		ML	CLAYEY SILT, medium plasticity, trace sand, stiff, brown, moist END OF BORING - 45 feet		
		50						
		55						
		60						
		65						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-10	10/7/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/7/98	~2.5 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
11 Feet	8 Inches	452.9 Feet	HSA	4730:478
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
10.7 Feet	2-in I.D.	454.23 Feet	2-ft. split-spoon	2559.807

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	1, 2, 2, 2		50		ML	CLAYEY SILT, vegetated with grass, soft, dark brown to black, moist (topsoil)		5-ft by 4-in square steel stick-up casing to ~1.5 ft.
	1, 2, 2, 6		50		SP	SILTY SAND, well sorted/rounded, fine-grained, quartz, loose, yellowish orange with dark orange lamina (2-3 mm), saturated below ~2.5 ft		
	1, 2, 6, 25	5	100					Bentonite/cement grout 0-3 ft; 1/4-in bentonite chips 3-4 ft.
	5, 20, 25, 50		63		SP	SILTY SAND, well sorted/rounded, fine-grained, quartz, laminated, dense, light gray to rust colored, predominantly light gray below 7.5 ft, saturated (weathered bedrock)		Sch. 40 PVC casing flush-threaded to 0.01 factory-slotted PVC screen 5.7-10.7 ft; #5 silica sand pack 4-11 ft.
					Ss	SANDSTONE, fine-grained, quartz		
		10				END OF BORING - 11 feet		
		15						
		20						
		25						
		30						

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Project Name/No.	Boring No.	Start Date	Page
AmerenCIPS - Hutsonville 249-3	MW-10D	10/7/98	1

Driller	Logged by:	End Date	Depth to Water
AEC, Indianapolis, IN	Steve Mueller/STMI	10/7/98	~2.5 Feet

Boring Depth	Boring Diameter	Surface Elevation	Drill Method	Northing
21.5 Feet	8 Inches	452.9 Feet	HSA	4729.427
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
21.3 Feet	2-in I.D.	454.65 Feet	see MW-10 log	2564.715

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
					ML	CLAYEY SILT*, vegetated with grass, soft, dark brown to black, moist (topsoil)		5-ft by 4-in square steel stick-up casing to ~2.0 ft.
			see MW-10		SP	SILTY SAND*, well sorted/rounded, fine-grained, quartz, loose, yellowish orange with dark orange lamina (2-3 mm), saturated below ~2.5 ft		Bentonite/cement grout 0-13 ft; 1/4-in bentonite chips 13-14 ft.
		5			SP	SILTY SAND*, well sorted/rounded, fine-grained, quartz, laminated, dense, light gray to rust colored, predominantly light gray below 7.5 ft, saturated (weathered bedrock)		
		10			Ss	SANDSTONE, fine-grained, quartz, becomes medium-grained, trace gravel clasts, increasingly well cemented/hard (very difficult to auger) below 20 ft.		Sch. 40 PVC casing flush-threaded to 0.01-in factory-slotted PVC screen 16.3-21.3 ft; #7 silica sand 14-15 ft; #5 silica sand pack 15-21.5 ft.
		15	drill cuts					
	50 (1")	20	1"			END OF BORING ~21.5 feet		* based on MW-10 boring log
		25						
		30						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-11	10/6/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/7/98	~6 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
15.0 Feet	8 Inches	443.8 Feet	HSA	3371.329
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
14.5 Feet	2-in I.D.	445.45 Feet	2-ft. split-spoon	4451.486

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	1, 2, 3, 4	0	63		ML	SANDY SILT, little fine-grained gravel, trace coal fragments, medium stiff, medium brown, moist (topsoil)		5-ft by 4-in square steel stick-up casing to ~2.0 ft.
	1, 2, 6, 8		63		SM	SILTY SAND, medium- to coarse-grained, quartz, loose, light brown, moist		
	3, 5, 25, 50	5	75		SW-GW	SILTY SAND & GRAVEL, poorly sorted, dense, light brown, saturated		Bentonite/cement grout 0-3 ft; 1/4-in bentonite chips 3-4 ft.
						SANDSTONE		
		10			Ss			Sch. 40 PVC casing flush-threaded to 0.01-in factory-slotted PVC screen 4.5-14.5 ft; #5 silica sand pack 4-15 ft.
		15				END OF BORING - 15 feet		
		20						
		25						
		30						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-12	10/8/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/8/98	~12 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
17 Feet	8 inches	455.5 Feet	HSA	4053.583
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
16.9 Feet	2-in I.D.	456.74 Feet	2-ft split-spoon	4637.976

Sample	Blows/6 inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	1, 1, 1, 1		63		ML	SANDY SILT, little clay, soft, dark brown, moist (topsoil)		5-ft by 4-in square steel stick-up casing to ~1.5 ft.
					Coal Ash	ASH, silty texture, soft, olive gray, moist		
	2, 3, 10, 8		100		GM	SILTY SAND & GRAVEL, poorly sorted, medium dense, light brown, moist (fill)		
	1, 1, 2, 3	5	63		SP	SAND, well sorted/rounded, fine-grained, quartz, loose, light brown, moist		
	2, 2, 4, 3		75					
	1, 2, 3, 2		50			SAND, poorly sorted, fine- to coarse-grained, subangular to subround, quartz, trace fine gravel, loose, light brown, saturated below ~12 ft		Bentonite/cement grout 0-3.5 ft; 1/4-in bentonite chips 3.5-5 ft.
	1, 1, 1, 2	10	75		SW			
	1, 2, 2, 3		75					Sch. 40 PVC casing flush-threaded to 0.01-in factory-slotted PVC screen 6.9-16.9 ft; #7 fine silica sand 5-6 ft; #5 silica sand pack 6-17 ft.
	2, 3, 3, 4	15	100					
	10, 10, 35, 50		60		ML	SILT, stiff, light brown, moist		
						END OF BORING - 17 feet (bedrock)		
		20						
		25						
		30						

Project Name/No.		Boring No.	Start Date	Page
AmerenCIPS - Hutsonville	249-3	MW-13	10/6/98	1
Driller	**Logged by:**		**End Date**	**Depth to Water**
AEC, Indianapolis, IN	Steve Mueller/STMI		10/6/98	~7 Feet
Boring Depth	**Boring Diameter**	**Surface Elevation**	**Drill Method**	**Northing**
16.5 Feet	8 Inches	458.4 Feet	HSA	3961.759
Well Depth	**Well Diameter**	**TOC Elev.**	**Sample Method**	**Easting**
16.0 Feet	2-in I.D.	458.03 Feet	2-ft. split-spoon	4241.200

Sample	Blows/6 Inches	Sample Depth (ft)	Recovery (%)	Graphic Log	Classification	Description	Well Completion	Comments
	1, 2, 3, 5		25		SM	SILTY SAND, with gravel, loose, dark brown, moist (topsoil)		5-ft by 4-in square steel stick-up casing to ~2.0 ft; concrete 0-3 ft.
		5			SP	SAND*, well sorted/rounded, fine- to medium-grained, quartz, light brown, saturated below ~9 ft. * based on drill cuttings and geologic log for geoprobe GP-4		Bentonite/cement grout 3-6.3 ft; 1/4-in bentonite chips 6.3-7 ft.
		10						
	1, 2, 2, 2		50		SW-GW	CLAYEY SAND & GRAVEL, poorly sorted, fine- to coarse-grained sand, fine-grained subangular gravel, loose, light brown, saturated		Sch. 40 PVC casing flush-threaded to 0.01-in factory-slotted PVC screen 8-14 ft; #7 fine silica sand 7-8 ft; #5 silica sand pack 8-16.5 ft.
		15			Ss	SANDSTONE		
						END OF BORING - 16.5 feet		
		20						
		25						Unslotted casing/sediment sump 14-16 ft.
		30						

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Appendix A-6

NRT 2001 Boring Logs

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Natural Resource Technology, Inc.
Standard Soil Boring Log

SOIL BORING LOG INFORMATION
Form - General Use Rev. 8-2000

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
EREN Energy Generating - Hutsonville Power Plant		KH-BR

Boring Drilled By (Firm name and name of crew chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
Boart Longyear Randy Radke	10/03/01	10/03/01	HSA

Facility Well No.	Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	440.820 Feet MSL	8.25 Inches

Boring Location			Lat	Local Grid Location (if applicable)
State Plane	3217.083	Feet N	Long	☐N ☐E ☐S ☐W
	4854.729	Feet E		

County		Civil Town/City/ or Village
Crawford		Hutsonville

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
KH-BR 0-2	18	2 3 4 6	0	0'-6' FILL, gray with orange mottling, coarse sand with clay, dry friable										
KH-BR 2.5-4.5	18	3 4 6 8	2	grades to sand with gravel, coarse	FILL									
KH-BR 5-7	20	3 4 4 5	4	6'-8' SAND, orange, poorly graded, coarse	SP									
KH-BR 7.5-9.5	14	2 3 4 3	6	8'-10' SAND with GRAVEL, brown, poorly graded, rounded, fine gravel/coarse sand	SP									
KH-BR 10-12	18	2 2 3 2	8	10'-11'6" SAND, poorly graded, medium to coarse	SP									
KH-BR 12.5-14.5	20	2 3 3 3	10	11'6"-15' SAND with GRAVEL, brown, poorly graded, rounded, fine gravel/coarse sand	SP									
KH-BR 15-17	3	50/3	12	EOB @ 15' Auger Refusal										
			14											
			16											
			18											
			20											
			22											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature] Firm: Natural Resource Technology, Inc.

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Natural Resource Technology, Inc.
Standard Soil Boring Log

SOIL BORING LOG INFORMATION
Form – General Use Rev. 8-2000

Facility/Project Name: *AMEREN Energy Generating – Hutsonville Power Plant*	License/Permit/Monitoring Number	Boring Number: *MW-14*	
Boring Drilled By (Firm name and name of crew chief): *Boart Longyear*, *Randy Radke*	Date Drilling Started: *10/03/01*	Date Drilling Completed: *10/03/01*	Drilling Method: *HSA*
Facility Well No. / Unique Well No. / Common Well Name	Final Static Water Level: *Feet MSL*	Surface Elevation: *440.930 Feet MSL*	Borehole Diameter: *8.25 Inches*
Boring Location State Plane: *2811.508* Feet N, *5325.781* Feet E	Lat / Long	Local Grid Location (if applicable): ☐ N ☐ E ☐ S ☐ W	
County: *Crawford*		Civil Town/City/ or Village: *Hutsonville*	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–2	0'-7'6" SILT, brown (10YR 4/3), moist, non-plastic	ML									
MW-14 2.5-4.5	18	2 3 2 3	4											
MW-14 5-7	16	1 1 2 2	6											
MW-14 7.5-9.5	18	1 2 1 2	8	7'6"-12'6" SILT with SAND, brown (10YR 4/3), low plasticity, moist	ML									
MW-14 10-12	24	1 1 1 1	10–12	yellowish brown (10YR 5/4), increase plasticity to medium										
MW-14 12.5-14.5	16	1 1 1 2	14	12'6"-18'6" LEAN CLAY, brown (7.5YR 4/2), 10-15% gray/orange mottling, medium plasticity	CL									
MW-14 15-17	22	1 1 1 1	16											
MW-14 17.5-19.5	18	1 1 1 1	18											
MW-14 20-22	16	1 1 1 1	20–22	18'6"-20' SAND with SILT, wet, non-plastic	SM									
MW-14 22.5-24.5	20	2 2 2 3		23'6"-24' SAND seam, medium	SP									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
[signature]	Natural Resource Technology, Inc.

ng – Hallsville Power Plant — MW-14 cont. — Page 2 of 2

Sample Num. and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
	20		26	24'-26' SAND with SILT, as above	SM									
MW-14 25-27	18	12 23		26'-38' SAND with GRAVEL, coarse sand, platy fine gravel, poorly graded										
MW-14 27.5-29.5	18	23 34	28	gravel becomes rounded	SP									
MW-14 30-32	20	33 45	30											
			32	4" LEAN CLAY with Gravel seam, gray (5Y 5/1), rounded, fine, 2-7% shell fragments	CL									
MW-14 32.5-34.5	18	33 55	34		SP									
			36											
			38		SP									Advance Hydropunch discrete water sampler
			40	EOB @ 38'										Drillers note: sand and gravel as above
			42											
			44											
			46											
			48											
			50											
			52											
			54											
			56											
			58											
			60											
			62											

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Natural Resource Technology, Inc.
Standard Soil Boring Log

SOIL BORING LOG INFORMATION
Form - General Use Rev. 8-2000

Facility/Project Name AMEREN Energy Generating - Hutsonville Power Plant		**License/Permit/Monitoring Number**	**Boring Number** TW
Boring Drilled By (Firm name and name of crew chief) Scott Longyear Randy Radke	**Date Drilling Started** 10/02/01	**Date Drilling Completed** 10/02/01	**Drilling Method** HSA
Facility Well No. / **Unique Well No.** / **Common Well Name**	**Final Static Water Level** Feet MSL	**Surface Elevation** 437.814 Feet MSL	**Borehole Diameter** 8.25 inches
Boring Location State Plane: 3717.203 Feet N, 5808.471 Feet E	**Lat** **Long**	**Local Grid Location** (If applicable) ☐ N ☐ E ☐ S ☐ W	
County Crawford		**Civil Town/City/or Village** Hutsonville	

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	0'-6'8" SILT with SAND, very dark brown (10YR 2/2), grades from topsoil, trace organics throughout	ML									
TW 2.5-4.5	20	2 2 3 3	2											
TW 5-7	18	2 1 2 4	4											
TW 7.5-9.5	18	1 1 1 2	6	6'8"-23' LEAN CLAY, brown (10YR 4/3), medium plasticity, moist										
TW 10-12	20	1 1 1 1	8	weak red (2.5Y 5/3), trace orange mottling										
TW 12.5-14.5	18	1 1 1 1	10											
TW 15-17	18	1 1 1 1	12	trace horizontal fracture, wet										
TW 17.5-19.5	20	W24	14		CL									
TW 20-22	24	W24	16	5-10% fine sand										
TW 22.5-24.5	10	W24	18											
			20	very dark gray (2.5Y 3/1), trace wood and white shell fragments										
			22											
				23'-25'6" SAND, very dark gray (2.5Y 3/1),	SP									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature | **Firm** Natural Resource Technology, Inc.

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ng – Hudsonville Power Plant TW cont.

Sample Num and Type	Sample Length Att'd & Recovered (In)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
	10	WH		medium, loose, wet	SP									
TW 25-27	18	2 2 2 2	26	25'6"-26' LEAN CLAY, as above	CL									
				26'-27'6" SAND with GRAVEL, poorly graded, coarse sand, fine gravel, rounded	SP									
TW 27.5-29.5	20	3 5 9 10	28	27'6"-31' SAND, gray/black and white, poorly graded, medium to coarse, increased coarseness with depth	SP									
TW 30-32	20	4 6 8 8	30											
			32	31'-32'6" SAND and GRAVEL, coarse sand, poorly graded, fine gravel, rounded	SP									
TW 32.5-34.5	12	11 11		32'6"-39'6" SAND, gray, poorly graded, medium to coarse, 5-15% gravel										
TW 35-37	24	2 2 3 4	34		SP									
TW 37.5-39.5	24	3 6 8 10	36											
			38											
			40	EOB @ 39'6"										
			42											
			44											
			46											
			48											
			50											
			52											
			54											
			56											
			58											
			60											
			62											

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Appendix A-7

NRT 2004 Boring Logs

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Natural Resource Technology

N R T

SOIL BORING LOG

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Ameren Hutsonville Power Station Drilling		TW-115s

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Steve Boart Longyear	5/1/2004	5/1/2004	hollow stem auger

Unique Well No.	Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		TW-115s	Feet MSL	438.4 Feet MSL	8.3 inches

Local Grid Origin ☒ (estimated) ☐ or Boring Location ☐ — Local Grid Location ☒ N ☒ E

State Plane N, E S/C/N — Lat ° ' " — Long ° ' " — 598046.72 Feet ☐ S 1176886.34 Feet ☐ W

1/4 of 1/4 of Section T R

Facility ID	County	State	Civil Town/City/ or Village
			Hutsonville

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
			0	0-36' Drilled without sampling-see log TW-115d for complete description.			CL				
			5				SC				
			10								
			15				CH				
			20								
			25				CL				
			30				GP				
			35				SW				
							SW				
				END OF BORING AT 36' Well set at 35'							

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Paula Richardson

Firm: Natural Resource Technology, Inc.
23713 W. Paul Road, Unit D, Pewaukee, WI 53072

Tel: (262) 523-9000
Fax: (262) 523-9001

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Natural Resource Technology

SOIL BORING LOG

Facility/Project Name: Ameren Hutsonville Power Station Drilling		License/Permit/Monitoring Number		Boring Number: TW-115d	
Boring Drilled By: Name of crew chief (first, last) and Firm: Steve Boart Longyear		Date Drilling Started: 4/29/2004	Date Drilling Completed: 5/1/2004	Drilling Method: hsa, core	
Unique Well No.	Well ID No.	Common Well Name: TW-115d	Final Static Water Level: Feet MSL	Surface Elevation: 438.4 Feet MSL	Borehole Diameter: 8.3 inches
Local Grid Origin: ☒ (estimated: ☐) or Boring Location ☐	State Plane: N, E S/C/N	Lat ___ Long ___	Local Grid Location: ☒ N 1098052.56 Feet ☐ S ☒ E 1176882.3 Feet ☐ W		
1/4 of 1/4 of Section T R					
Facility ID	County	State	Civil Town/City/ or Village: Hutsonville		

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
1 SS	24 12			0'-3.5' SANDY CLAY, very dark greyish brown (10 YR 3/2), very fine sand, moist			CL				
2	24 24										
3 SS	24 24		5	3.5'-6' CLAYEY SAND mottled grey-brown to tan, very fine sand, moist			SC				
4 SS	24 24			6'-22' FAT CLAY, brown (10 YR 4/3), soft, plastic, moist			CH				
5 SS	24 24										
6 SS	24 4		10								
7 SS	24 24			wet at 13'							
8 SS	24 24		15								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Paula Richardson | Firm: Natural Resource Technology, Inc. | 21713 W. Paul Road, Unit D, Pewaukee, WI 53072 | Tel: (262) 523-9000 Fax: (262) 523-9001

Template: NRT BORING LOG - Project: 1139 LOGS.GPJ

Natural Resource Technology

Boring Number TW-115D Page 2 of 5

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
9 SS	24 24			6'-22' FAT CLAY, brown (10 YR 4/3), soft, plastic, moist at 16' color change to olive grey (5Y 5/2)			CH				
10 SS	24 24										
11 SS	24 24		20	at 19.8' 2" sand seam, very fine sand 20'-22' trace very fine sand							
12 SS	24 24			22'-22.9' SANDY CLAY			CL				
13 SS	24 0			22.9'-32' POORLY GRADED GRAVEL WITH SAND, olive grey (5Y 5/2), rounded, very fine to fine sand			GP				
14 SS	24 8		25								
15 SS	24 7										
16 SS	24 4		30								
17 SS	24 5			32'-33' WELL GRADED SAND fine to coarse, trace rounded gravel			SW				
18 SS	24 14			33'-36' WELL GRADED SAND WITH GRAVEL, very fine to coarse sand, fine to medium gravel, rounded			SW				
19 SS	24 8		35	36'-39' POORLY GRADED SAND very fine to medium, trace gravel, rounded			SP				
20 SS	24 14										
21 SS	24 11		40	39'-40' WELL GRADED SAND WITH GRAVEL, fine to coarse gravel and sand			SW GW				

Natural Resource Technology

N R T

Boring Number TW-115d Page 3 of 5

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tests
22 SS	24 12			40'-42' WELL GRADED GRAVEL WITH SAND, fine to coarse sand, fine to coarse gravel, rounded			GW				
23 SS	24 12		45	42'-58' WELL GRADED SAND fine to coarse sand, trace gravel, rounded 2" gravelly sand seam, fine to coarse gravel at 44'							
24 SS	24 13										
25 SS	24 14										
26	24 13		50				SW				
27 SS	24 16										
28 SS	24 15		55								
29 SS	24 9										
30 SS	24 3			58'-70' WELL GRADED GRAVEL WITH SAND, fine to coarse sand, fine to coarse gravel, rounded							
31 SS	24 7		60								
32 SS	24 24						GW				
33 SS	24 12		65								
34 SS	24 4										

Natural Resource Technology

N R T

Boring Number TW-115D Page 4 of 5

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tes
35 SS	24 0			58'-70' WELL GRADED GRAVEL, WITH SAND, fine to coarse sand, fine to coarse gravel, rounded			GW				
36 SS	24 6		70	70'-74' WELL GRADED SAND fine to coarse			SW				
37 SS	24 4										
38 SS	24 0			74'-88' Logged from cuttings WELL GRADED GRAVEL WITH SAND fine to coarse sand, fine to coarse gravel -							Gravel starts coming up in cuttings.
39 SS	24 0		75								
40 SS	24 0										
41 SS	24 0		80				GW				
42 SS	24 0										
43 SS	24 0										
44 SS	24 0		85								
45 SS	24 12			88'-90' WELL GRADED SAND very fine to medium			SW				
46 CORE	180		90	90'-105' SHALE grey-blue, friable, moist			SHALE				

TSD 000108

Natural Resource Technology

N · R T

Boring Number TW-115d Page 5 of 5

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
			95	90'-105' SHALE, grey-blue, friable, moist			SHALE				
			100								
			105	END OF BORING AT 105' Well set at 87'							

TSD 000109

Natural Resource Technology

N · R · T

SOIL BORING LOG

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Ameren Hutsonville Power Station Drilling		TW-116

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Steve Boart Longyear	4/26/2004	4/28/2004	hsa, core

Unique Well No.	Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		TW-116	Feet MSL	437.5 Feet MSL	8.3 inches

Local Grid Origin ☒ (estimated: ☐) or Boring Location ☐ — State Plane N, E S/C/N — Lat ___ ° ___ ' ___ " — Long ___ ° ___ ' ___ " — Local Grid Location ☒ N ☒ E — 1/4 of 1/4 of Section , T R — 854034.1384 Feet ☐ S 1175442.33 Feet ☐ W

Facility ID	County	State	Civil Town/City/ or Village
			Hutsonville

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
1 SS	24 24			0'-3.5' SILT, very dark greyish brown (10 YR 3/2), rootlets to 6", firm, slightly moist			ML				
2 SS	24 12										
3 SS	24 24			3.5'-4.8' SILTY CLAY, very dark greyish brown, firm, slightly moist			CL/ML				
4 SS	24 24		5	4.8'-16' FAT CLAY, dark yellowish brown (10YR 4/4), soft, moist							
5 SS	24 24										
6 SS	24 24		10				CH				
7 SS	24 24										
8 SS	24 24			at 14' very moist							
			15								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Paula Richardson — Firm: Natural Resource Technology, Inc. — 23713 W. Paul Road, Unit D, Pewaukee, WI 53072 — Tel: (262) 523-9000 — Fax: (262) 523-9001

Template: NRT BORING LOG - Project: LOGS.GPJ

Natural Resource Technology

N R T

Boring Number TW-116 Page 2 of 4

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tes
9 SS	24 24			16'-20.5' SANDY LEAN CLAY olive brown (2.5 Y 4/3), very fine sand, soft, wet			CL				
10 SS	24 24		20	color change to dark grey (2.5 Y 4/1) 20.5'-26.5' CLAYEY SAND dark grey, very fine sand, wet			SC				
11 SS	24 24		25	26.5'-30' CLAYEY GRAVEL fine gravel, few shell fragments, wet			GC				
12 SS	24 18		30	30'-60' WELL GRADED SAND olive brown (2.5 Y 4/4), fine to coarse, subangular to rounded, wet			SW				
13 SS	24 12		35								
14 SS	24 0		40								

Natural Resource Technology

N R T

Boring Number TW-116 Page 3 of 4

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
				30'-60' WELL GRADED SAND olive brown (2.5 Y 4/4), fine to coarse, subangular to rounded, wet							
15 SS	24 10		45								
16 SS	24 12		50				SW				
17 SS	24 6		55								
18 SS	24 2		60	60'-79' SHALE, grey-blue, slightly moist, friable			SHALE				
19 CORE	180		65								

Natural Resource Technology

Boring Number TW-116 Page 4 of 4

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
			70	60'-79' SHALE grey-blue, slightly moist, friable			SHALE				
			75								
				coal seam at 79', bit plugged-no water circulation for coring			COAL				
				END OF BORING AT 79.2' Well set at 30'							

TSD 000113

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Natural Resource Technology

N R T

SOIL BORING LOG

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Ameren Hutsonville Power Station Drilling		TW-117

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Steve Boart Longyear	4/28/2004	4/29/2004	hollow stem auger

Unique Well No.	Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		TW-117	Feet MSL	435.0 Feet MSL	8.3 inches

Local Grid Origin ☒ (estimated: ☐) or Boring Location ☐
State Plane N, E S/C/N
1/4 of 1/4 of Section T R
Lat ° ' "
Long ° ' "
Local Grid Location ☒ N ☒ E
895267.78 Feet ☐ S 1179053.33 Feet ☐ W

Facility ID	County	State	Civil Town/City/ or Village
			Hutsonville

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
1 SS	24 12			0'-6' SANDY LEAN CLAY dark olive brown (2.5 Y 3/3), very fine sand, slightly moist							
2 SS	24 24						CL				
3 SS	24 0		5								
4 SS	24 24			6'-7.8' FAT CLAY, dark olive brown, high toughness and plasticity, moist			CH				
5 SS	24 10			7.8'-25' POORLY GRADED SAND dark yellowish brown (10 YR 4/4), very fine, wet							
6 SS	24 12		10				SP				
7 SS	24 10		15								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Paula Richardson

Firm: Natural Resource Technology, Inc.
23713 W. Paul Road, Unit D, Pewaukee, WI 53072
Tel: (262) 523-9000
Fax: (262) 523-9001

Template: NRT BORING LOG - Project: 1325 LOGS.GPJ

Natural Resource Technology

Boring Number TW-117 Page 2 of 4

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
				7.8'-25' POORLY GRADED SAND dark yellowish brown (10 YR 4/4), very fine, wet trace shell fragments at 16'			SP				
8 SS	24 0		20								
9 SS	24 8		25	25'-26' WELL GRADED SAND fine to medium, coarsens downward			SW				
				26'-35' WELL GRADED GRAVEL, trace sand and shell fragments, rounded			GW				
10 SS	24 4		30	grey clay in shoe of split spoon							
11 SS	24 6		35	35'-60' WELL GRADED SAND fine to coarse			SW				
12 SS	24 5		40								

Natural Resource Technology

N R T

Boring Number TW-117 Page 3 of 4

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tests
				35'-60' WELL GRADED SAND fine to coarse							
13 SS	24 14		45								
14 SS	24 17		50				SW				
15 SS	24 0		55								
16 SS	24 0		60	60'-75' Logged from drill cuttings POORLY GRADED GRAVEL, coarse, rounded			GP				Went to larger sample interval due to drilling conditions.
			65								

TSD 000116

Natural Resource Technology

N R T

Boring Number TW-117 Page 4 of 4

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tes
			70	60'-75' Logged from drill cuttings POORLY GRADED GRAVEL, coarse, rounded			GP				
17	24 0		75	75'-90' Logged from drill cuttings WELL GRADED SAND WITH GRAVEL							No samples attempted after 77 feet due to drilling conditions.
			80				SW				
			85								
18 SS	6 2		90	90'-90.5' SHALE			SHALE				
				END OF BORING AT 90.5' Well set at 20'							

TSD 000117

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Natural Resource Technology

N R T

SOIL BORING LOG

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Ameren Hutsonville Power Station Drilling		TW-118

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Steve Boart Longyear	5/4/2004	5/4/2004	hollow stem auger

Unique Well No.	Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		TW-118	Feet MSL	437.0 Feet MSL	8.3 inches

Local Grid Origin ☒ (estimated: ☐) or Boring Location ☐ — Lat ___ ° ___ ' ___ " — Local Grid Location ☒ N ☒ E

State Plane ___ N, ___ E S/C/N — Long ___ ° ___ ' ___ " — 1091090.86 Feet ☐ S 1179978.73 Feet ☐ W

1/4 of ___ 1/4 of Section ___, T ___ R ___

Facility ID	County	State	Civil Town/City/ or Village
			Hutsonville

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
1 SS	24 24			0'-3' SILT, brown (7.5 YR 4/2)							
2 SS	24 24						ML				
				3'-5' dark reddish grey (5 YR 4/2), trace sand wet at 4'							
3 SS	24 24		5								
				5'-6' WELL GRADED SAND light reddish brown (5 YR 6/3), medium to fine			SW				
4 SS	24 24			6'-7.5' SILT, brown (7.5 YR 4/2)			ML				
5 SS	24 18			7.5'-10' POORLY GRADED SAND WITH SILT			SP-SM				
6 SS	24 24		10	10'-26' POORLY GRADED SAND brown (7.5 YR 5/2), medium grained							
7 SS	24 24						SP				
8 SS	24 16		15								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Paula Richardson — Firm: Natural Resource Technology, Inc. — 23713 W. Paul Road, Unit D, Pewaukee, WI 53072 — Tel: (262) 523-9000 — Fax: (262) 523-9001

Template: NRT BORING LOG - Project: 1171 LOGS.GPJ

TSD 000118

Natural Resource Technology

N R . T

Boring Number TW-118 Page 2 of 2

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tes
9 SS	24 12		20	10'-26' POORLY GRADED SAND brown (7.5 YR 5/2), medium grained			SP				
10 SS	24 12		25	@ 22' coarse sand with few gravel							
				END OF BORING AT 26' Well set at 25'							

TSD 000119

Natural Resource Technology

SOIL BORING LOG

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Ameren Hutsonville Power Station Drilling		TW-119

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Steve Boart Longyear	5/1/2004	5/3/2004	hsa, core

Unique Well No.	Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		TW-119	Feet MSL	435.4 Feet MSL	8.3 inches

Local Grid Origin ☒ (estimated: ☐) or Boring Location. ☐ State Plane N, E S/C/N — Lat ___ Long ___ — Local Grid Location ☒ N ☒ E 1396030.54 Feet ☐ S 1181339.05 Feet ☐ W

1/4 of 1/4 of Section , T R

Facility ID	County	State	Civil Town/City/ or Village
			Hutsonville

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tests
1 SS	24 18			0'-4' SILTY CLAY, very dark greyish brown (10 YR 3/2), firm, moist							
2 SS	24 20			color change to dark greyish brown (2.5 Y 4/2)			CL/ML				
3 SS	24 24		5	4'-11.7' FAT CLAY, dark greyish brown, soft, moist							
4 SS	24 21			at 6' very moist							
5 SS	24 24			at 9' wet			CH				
6 SS	24 24		10								
7 SS	24 16			11.7'-41' POORLY GRADED SAND mottled orange brown and grey brown, very fine, wet at 12' color change to dark yellowish brown (10 YR 4/4)			SP				
			15								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Print Name	Firm	Tel: (262) 523-9000
Paula Richardson	Paula Richardson	Natural Resource Technology, Inc. 23713 W. Paul Road, Unit D, Pewaukee, WI 53072	Fax: (262) 523-9001

Template: NRT BORING LOG - Project: 1333 LOGS.GPJ

Natural Resource Technology

N R T

Boring Number TW-119 Page 2 of 5

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U.S.C.S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tests
				11.7'-41' POORLY GRADED SAND mottled orange brown and grey brown, very fine, wet							
8 SS	24 6		20								
9 SS	24 0		25				SP				
10 SS	24 11		30	very fine to medium sand							
11 SS	24 12		35	very fine to fine sand							
12 SS	24 22		40								

TSD 000121

Natural Resource Technology

N R T

Boring Number TW-119 Page 3 of 5

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tests
			45	41'-45' WELL GRADED SAND very fine to coarse, trace rounded gravel			SW				
13 SS	24 17			45'-60' POORLY GRADED SAND very fine to medium							
14 SS	24 12		50				SP				
15 SS	24 0		55								
16 SS	24 0		60	60'-80' Logged by drill cuttings WELL GRADED SAND WITH GRAVEL to WELL GRADED GRAVEL WITH SAND			SW				Gravel starts coming up in cuttings.
17 SS	24 0		65								

Natural Resource Technology

N R T

Boring Number TW-119 Page 4 of 5

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	ROD/ Comments/ Lab Tests
				60'-80' Logged by drill cuttings WELL GRADED SAND WITH GRAVEL to WELL GRADED GRAVEL WITH SAND							
18 SS	24 0		70								
							SW				
19 SS	24 0		75								
20 CORE	84 24		80	80'-100' SHALE, grey to black, laminated, poorly lithified, no circulation of drilling water							
			85								
21 CORE	72 30										
			90								

Natural Resource Technology

N R T

Boring Number TW-119 Page 5 of 5

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	USCS Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Tests
22. CORE	84 54		95	80'-100' SHALE, grey to black, laminated, poorly lithified, no circulation of drilling water							
			100	END OF BORING AT 100' Well set at 20'							

TSD 000124

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Natural Resource Technology
N R T

SOIL BORING LOG

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Ameren Hutsonville Power Station Drilling		TW-120

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Steve Boart Longyear	5/3/2004	5/4/2004	hollow stem auger

Unique Well No.	Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		TW-120	Feet MSL	446.8 Feet MSL	8.3 inches

Local Grid Origin ☒ (estimated: ☐) or Boring Location ☐
State Plane N, E S/C/N
1/4 of 1/4 of Section , T R
Lat ° ' "
Long ° ' "
Local Grid Location ☒ N ☒ E
[illegible]614.91 Feet ☐ S1180157.14 Feet ☐ W

Facility ID	County	State	Civil Town/City/ or Village
			Hutsonville

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
1 SS	24 17			0'-0.5' TOPSOIL							
				0.5'-14' POORLY GRADED SAND brownish yellow (10 YR 6/6), medium							
2 SS	24 15										
3 SS	24 15		5								
							SP				
4 SS	24 17										
			10	color change to reddish yellow (7.5 YR 6/6), moist							
5 SS	24 10		15	14'-36' POORLY GRADED SAND WITH GRAVEL, reddish yellow, medium sand, rounded gravel, moist			SP				

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Paula Richardson
Firm: Natural Resource Technology, Inc.
23713 W. Paul Road, Unit D, Pewaukee, WI 53072
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Template: NRT BORING LOG - Project: 1325 LOGS.GPJ

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Natural Resource Technology

N R T

Boring Number TW-120 Page 2 of 2

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth From Surface (feet)	Soil/Rock Description And Geologic Origin For Each Major Unit	Hand Pen (tsf)	Field Moisture Condition	U S C S Symbol	Graphic Log	PID/FID (ppm)	Well Diagram	RQD/ Comments/ Lab Test
				14'-36' POORLY GRADED SAND WITH GRAVEL, reddish yellow, medium sand, rounded gravel, moist							
6 SS	24 24		20	wet at 19'							
7 SS	24 24		25				SP				
8 SS	24 24		30								
9 SS	24 24		35	34'-36' coarse sand							
				END OF BORING AT 36' Well set at 35'							

Electronic Filing: Received, Clerk's Office 09/28/2020

Appendix A-8

Geotechnology 2010 Boring Logs

Surface Elevation: 451.5 Datum msl | Completion Date: 6/23/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	FILL: brown and gray, silty clay, trace gravel and sand		3-5-7	SS1
			3-3-5	SS2
5			3-4-7	SS3
			3-4-5	SS4
10				
	Stiff to very soft, brown, silty CLAY - CL		3-6-5	SS5
15				
			1-2-3	SS6
20				
			0-0-0	SS7
25				
	Very loose, brown, clayey SAND - SC		0-0-1	SS8
30				
	Very loose, brown, fine SAND, trace gravel - SP		0-1-1	SS9
35				
			0-1-1	SS10

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150 02 - HUTSONVILLE.GPJ GTINC 0638301.GPJ 12/13/16

GROUNDWATER DATA

ENCOUNTERED AT 23.5 FEET ▼

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM
WASHBORING FROM 40 FEET
MVU DRILLER BGF LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, East Zone. N: 898198.177' E: 1176545.269'

Drawn by: KA	Checked by: SAL	App'vd. by: DAW
Date: 6/29/10	Date: 1/3/11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Hutsonville Power Station
Hutsonville, Illinois

LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 451.5 | Completion Date: 6/23/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Very loose, brown, fine SAND, trace gravel - SP *(continued)*			
	Dense, brown, fine SAND with gravel - SP			
45			9-14-14	SS11
			15-20-20	SS12
50	Boring terminated at 50 feet.			
55				
60				
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ⊢ ● ⊣ LL

10 20 30 40 50

GROUNDWATER DATA

ENCOUNTERED AT 23.5 FEET ▽

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM 40 FEET

MVU DRILLER BGF LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, East Zone. N: 898196.177' E: 1176545.269'

Drawn by: KA	Checked by: SK	App'vd by: DMF
Date: 6/29/10	Date: 1/3/11	Date: 1/4/11

GEOTECHNOLOGY INC

FROM THE GROUND UP

Hutsonville Power Station
Hutsonville, Illinois

CONTINUATION OF LOG OF BORING: B-1

Project No. J017150.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.02 - HUTSONVILLE.GPJ GTINC 0638301.GPJ 12/13/10

Surface Elevation: 452.5 Datum msl | Completion Date: 6/24/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: brown and gray, silty clay			
			3-8-8	SS1
			3-6-7	SS2
5	some sand			
			106	ST3
			101	ST4
10				
			2-5-8	SS5
15	Very stiff, gray CLAY - (CH)			
			108	ST6
			85	ST7
20				
	Very soft to soft, brown and gray, silty CLAY - CL			
			0-0-0	SS8
25				
			1-1-2	SS9
30				
	with sand			
			0-0-1	SS10
35	Boring terminated at 35 feet.			

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

64 >>

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150 02 - HUTSONVILLE.GPJ GTINC 0630301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM
WASHBORING FROM __ FEET
MVU DRILLER BGF LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, East Zone. N: 898098.106' E: 1176717.207'

Drawn by: KA	Checked by: SAC	App'vd. by: DAW
Date: 8/29/10	Date: 1/3/11	Date: 1/14/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Hutsonville Power Station
Hutsonville, Illinois

LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 452.3 | Completion Date: 6/24/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: gray, silty clay, trace gravel and sand		4-6-7	SS1
			3-4-7	SS2
5			2-3-4	SS3
			3-3-3	SS4
10				
			2-5-8	SS5
15				
	Medium stiff to soft, gray, silty CLAY - (CL)		2-3-4	SS6
20				
			92	ST7
25				
			0-2-2	SS8
30				
	Very loose, brown, clayey SAND - SP		0-1-1	SS9
35				
	Very loose, brown, fine SAND - SP		0-2-2	SS10

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.02 - HUTSONVILLE.GPJ GTINC 0636301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER __ HOLLOW STEM
WASHBORING FROM 25 FEET
MVU DRILLER BGF LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, East Zone. N: 897808.736' E: 1176769.952'

Drawn by: KA	Checked by: SAC	App'vd. by DAW
Date: 6/28/10	Date: 1/3/11	Date 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Hutsonville Power Station
Hutsonville, Illinois

LOG OF BORING: B-3

Project No. J017150.01

Surface Elevation: 452.3 Datum msl | Completion Date: 6/24/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
45	Very loose, brown, fine SAND - SP *(continued)*		3-2-2	SS11
50	Medium dense to dense, brown, gravelly SAND - SP		7-10-9	SS12
55			10-15-17	SS13
60			10-12-14	SS14
	Boring terminated at 60 feet.			
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.02 - HUTSONVILLE.GPJ GTINC 0535501.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER __ HOLLOW STEM
WASHBORING FROM 25 FEET
MVU DRILLER BGF LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, East Zone. N: 897908.736' E: 1176769.952'

Drawn by: KA	Checked by: JMZ	App'vd. by: JMZ
Date: 6/29/10	Date: 1/3/11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Hutsonville Power Station
Hutsonville, Illinois

CONTINUATION OF LOG OF BORING: B-3

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 437 | Completion Date: 9/14/10 | Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: gray, silty clay and rock fragments		20-19-12	SS1
	Medium stiff, gray, silty CLAY - CL		2-3-3	SS2
5	Soft, gray CLAY - (CH)		86	ST3
			93	ST4
	Very soft to soft, brown and gray, silty CLAY - CL		0-0-0	SS5
15			95	ST6
			90	ST7
20				
	Very soft, gray, sandy CLAY - CL		0-0-1	SS8
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - TV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

62 >>

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150 02 - HUTSONVILLE.GPJ GTINC 0638301.GPJ 12/17/10

GROUNDWATER DATA

ENCOUNTERED AT 16 FEET ▽

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER AMS LOGGER
CME 55TRK DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: [illegible]	App'vd. by: DAV
Date: 9/17/10	Date: 1/3/11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Hutsonville Power Station
Hutsonville, Illinois

LOG OF BORING: B-4

Project No. J017150.01

BORING LOG: TERMS AND SYMBOLS

GENERAL NOTES

1. *Information on each boring log is a compilation of subsurface conditions based on soil or rock classifications obtained from the field as well as from laboratory testing of samples. The strata lines on the logs may be approximate or the transition between the strata may be gradual rather than distinct. Water level measurements refer only to those ob - served at the times and places indicated, and may vary with time, geologic condition or construction activity.*
2. *Relative composition and Unified Soil Classification designations are based on visual estimates and are approximate only. If laboratory tests were performed to classify the soil, the unified designation is show in parenthesis.*
3. *Value given in Unit Dry Weight/SPT Column is either a unit dry weight in pounds per cubic foot, if adjacent to a ST sample designation, or blows per 6-inch increment if adjacent to a SS sample designation.*

ABBREVIATIONS

UU/2	*Shear Strength from Unconsolidated – Undrained Triaxial Test (ASTM D2850)*
QU/2	*Shear Strength from Unconfined Compression Test (ASTM D2166)*
SV	*Shear Strength from Field Vane (ASTM D2573)*
PL	*Plastic Limit (ASTM D4318)*
LL	*Liquid Limit (ASTM D4318)*

LEGEND

CS	Continuous Sampler
GB	Grab Sample Taken From Auger Cuttings Or Wash Water Return
NX 100/42	NX Rock Core with Percent Recovery/R.Q.D. Given In Adjacent Column
PST	Three Inch Diameter Piston Tube Sample
SS	Split Spoon Sample (Standard Penetration Test)
ST	Three Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
SV	Field Vane Test

SPLIT – BARREL SAMPLER DRIVING RECORD

Blow Per Foot (N-Value)	Description
25	25 blows drove sampler 12 inches after initial 6 inches of seating.
75/10"	75 blows drove sampler 10 inches after initial 6 inches of seating.
50/3"	50 blows drove sampler 3 inches during initial 6 inch seating interval.

NOTES:
1. *To avoid damage to sampling tools, driving is limited to 50 blows during any six inch interval.*
2. *N-Value (Blow Count) is the standard penetration resistance based on the total number of blows, using a 140-lb hammer with 30-inch free fall, required to drive a split spoon the last two of three, 6-inch drive increments. (Example: 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4/7/9 in Unit Dry Weight – SPT column.*

RELATIVE COMPOSITION

Trace	*0-10 %*
With/Some	*11-35 %*
Soil modifier such	*> 35 %*

As silty, clayey, sandy, etc.

DENSITY OF GRANULAR SOILS

Descriptive Term:	N—Value
Very Loose	*0 - 4*
Loose	*5 - 10*
Medium Dense	*11 - 30*
Dense	*31 - 50*
Very Dense	*> 50*

STRENGTH OF COHESIVE SOILS

Consistency	Undrained Shear Strength Tons Per Sq. Ft.	Field Test	Approximate N-Value Range
Very Soft	*less than 0.12*	*Thumb will penetrate soil more than 1"*	*0 - 1*
Soft	*13 to 0.25*	*Thumb will penetrate soil about 1"*	*2 - 4*
Medium Stiff	*0.26 to 0.50*	*Thumb will penetrate soil about ¼"*	*5 – 8*
Stiff	*0.51 to 1.00*	*Thumb hardly indents soil*	*9 – 15*
Very Stiff	*1.01 to 2.00*	*Thumb will not indent soil, but readily indented with thumbnail*	*16 – 30*
Hard	*greater than 2.00*	*Thumbnail will not indent soil*	*> 30*

SOIL GRAIN SIZE

U.S. STANDARD SIEVE

12"	3"	¾"	4	10	40	200	
BOULDERS	COBBLES	GRAVEL		SAND			SILT / CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
300	76.2	19.1	4.76	2.00	0.42	0.074	0.002

SOIL GRAIN SIZE IN MILLIMETERS

SOIL STRUCTURE

Calcareous *– Having appreciable quantities of carbonate.*

Fissured *– Containing shrinkage or relief cracks, often filled with sand or silt; usually more or less vertical.*

Slickensided *– Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along those planes.*

Layer *– Inclusion greater than 3 inches thick.*

Seam *– Inclusion 1/8 inch to 3 inches thick extending through the sample*

Parting *– Inclusion less than 1/8 inch thick.*

Pocket *– Inclusion of material of different texture that is smaller than the diameter of the sample.*

Interlayered *– Soil samples composed of alternating layers of different soil types.*

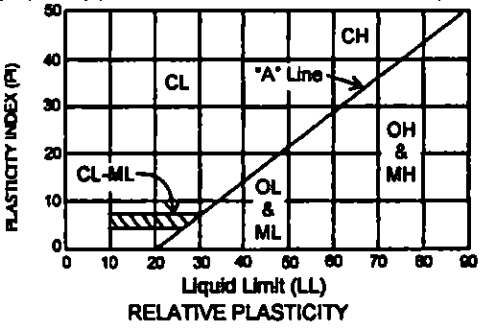
Intermixed *– Soil samples composed of pockets of different soil types and a layered or laminated structure is not evident.*

Laminated *– Soil sample composed of alternating partings or seams of different soil type.*

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL	DESCRIPTION
Coarse-Grained Soils (More than 50% Larger than No 200 Sieve Size)	Gravel and Gravelly Soils	Clean Gravels Little or no Fines	GW	Well-Graded Gravel, Gravel-Sand Mixture
			GP	Poorly –Graded Gravel, Gravel-Sand Mixture
		Gravels with Appreciable Fines	GM	Silty Gravel, Gravel-Sand-Silt Mixture
			GC	Clayey-Gravel, Gravel-Sand-Clay Mixture
	Sand and Sandy Soils	Clean Sands Little or no Fines	SW	Well-Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sands with Appreciable Fines	SM	Silty Sand, Sand-Silt Mixture
			SC	Clayey Sand, Sand-Clay Mixture
Fine-Grained Soils (More than 50% Smaller than No 200 Sieve Size)	Silts and Clays	Liquid Limit Less Than 50	ML	Silt, Clayey Silt, Silty or Clayey Very Fine Sand, Slight Plasticity
			CL	Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity
			OL	Organic Silts, or Silty Clays of Low Plasticity
	Silts and Clays	Liquid Limit More Than 50	MH	Silt, Fine Sandy or Silt Soil with High Plasticity
			CH	Clay, High Plasticity
			OH	Organic Clay of Medium to High Plasticity
	Highly Organic Soils		PT	Peat, Humus, Swamp Soil

PLASTICITY CHART



RELATIVE PLASTICITY

Nonplastic	Cannot Roll Into Ball
Trace Plasticity	Barely Roll Into Ball
Medium Plastic	Can be Rolled Into Ball
Highly Plastic	No Rupture by Kneading

VISUAL DESCRIPTION CRITERIA*

TABLE 1: CRITERIA FOR DESCRIBING ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

TABLE 2: CRITERIA FOR DESCRIBING PARTICLE SHAPE

Description	Criteria
Flat	Particles with width/thickness X3
Elongated	Particles with length/width X3
Flat and Elongated	Particles meet criteria for both flat and elongated

TABLE 3: CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below the water table

TABLE 4: CRITERIA FOR DESCRIBING REACTION WITH HCL

Description	Criteria
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming rapidly

TABLE 6: CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

TABLE 8: CRITERIA FOR DESCRIBING DRY STRENGTH

Description	Criteria
None	The dry specimen crumbles into powder with mere pressure of handling
Low	The dry specimen crumbles into powder with some finger pressure
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure
High	The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface.
Very High	The dry specimen cannot be broken between the thumb and a hard surface

TABLE 9: CRITERIA FOR DESCRIBING DILATANCY

Description	Criteria
None	No visible change in the specimen
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

TABLE 10: CRITERIA FOR DESCRIBING TOUGHNESS

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness

TABLE 12: IDENTIFICATION OF INORGANIC FINE-GRAINED SOILS FROM MANUAL TESTS

Soil Symbol	Dry Strength	Dilatancy	Toughness
ML	None to low	Slow to rapid	Low or thread cannot be formed
CL	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
CH	High to very high	none	High

*NOTES: 1. Tables adapted from ASTM D2488 "Description and Identification of Soils" (Visual-Manual Procedure)
2. Tables 5, 7 and 11 incorporated into other information on this plate.

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Appendix A-9

Hanson 2011 Boring Logs

FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/06/2011
Finish: 04/06/2011
WEATHER: Sunny,mild (60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼" Hollow Stem Auger w/ Split Spoon
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-1
Well ID: n/a
Surface Elev: 450.5 ft. MSL
Completion: 14.7 ft. BGS
Station: 4,360.00N
3,130.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = 4.00 - during drilling
▼ = 6.30 - 13:45 (6 Apr 11)
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24 92%	SS	3-3 3-2 N=6	17		2.20	0	Very dark grayish brown (10YR3/2), moist, soft, silty, fine- to very coarse-grained, SAND with trace gravel.		450	
1B				17		1.30					
							2	Yellowish brown (10YR5/4), moist, soft, clayey, fine- to very coarse-grained SAND with trace gravel.		448	
2A	19/24 79%	SS	1-2 2-4 N=4	19							
							▼ 4	Yellowish brown (10YR5/4), wet, loose, very fine- to coarse-grained SAND with slight trace gravel.		446	
3A	18/24 75%	SS	1-2 4-9 N=6	16							
							▼ 6	Yellowish brown (10YR5/8), very moist, dense, silty, very fine- to fine-grained SAND with slight trace clay. Bedding laminations present.		444	
4A	22/23 96%	SS	15-35 34-50/5" N=69	11							
4B				12				Black (10YR2/1), moist, very hard, SILTSTONE.			
5A	8/8 100%	SS	14-50/2"	15		2.50	8	Yellowish brown (10YR5/8), moist, very hard, silty, very fine- to fine-grained SANDSTONE.		442	
5B				13				Very pale brown (10YR8/2), moist, very hard, silty, very fine- to fine-grained SANDSTONE.			
								Yellowish brown (10YR5/6), moist, very hard, silty, very fine- to fine-grained SANDSTONE.			
6A	5/5 100%	SS	50/5"	13		3.50	10	Black (10YR2/1), moist, very hard, SILTSTONE		440	
								Gray (10YR6/1), moist, very hard, silty, very fine- to fine-grained SANDSTONE.			
7A	9/9 100%	SS	15-50/3"	16		1.40	12	Brown (10YR5/3), wet, hard, silty, very fine- to fine-grained, weathered SANDSTONE.		438	
7B				16		3.80					
								Gray (10YR6/1), moist, very hard, silty, very fine- to fine-grained SANDSTONE.			
8A	6/8 75%	SS	45-50/2"	13			14			436	

End of Boring = 14.7 ft. BGS

NOTE(S): Borehole abandoned with auger cuttings.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/06/2011
Finish: 04/06/2011
WEATHER: Sunny,mild (60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼" Hollow Stem Auger w/ Split Spoon

FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-2
Well ID: n/a
Surface Elev: 456.0 ft. MSL
Completion: 15.4 ft. BGS
Station: 3,700.00N
4,050.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = Dry - dry during drilling
▼ = Dry - dry @14:20 (6 Apr 11)
▽ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD					2			454	
							4			452	
	0/60 0%	BD					6			450	
							8	Yellowish brown (10YR5/6), moist, loose, silty, very fine- to medium-grained SAND with slight trace gravel. *Description logged from auger cuttings.*		448	
							10			446	
	0/60 0%	BD					12			444	
							14			442	
4A	5/5 100%	SS	50/5"	16				Yellowish brown (10YR5/8, wet, hard, silty, very fine- to medium-grained SANDSTONE with laminated bedding.			
								End of Boring = 15.4 ft. BGS			

NOTE(S): Borehole abandoned with auger cuttings.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/06/2011
Finish: 04/06/2011
WEATHER: Sunny,mild (60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼" Hollow Stem Auger w/ Split Spoon
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-3
Well ID: n/a
Surface Elev: 455.0 ft. MSL
Completion: 15.4 ft. BGS
Station: 3,530.00N
4,305.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ = 7.60 - 14:55 (6 Apr 11)
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD					2	Black (10YR2/1), moist, loose, silty very fine- to medium-grained SAND with slight trace gravel. *Description logged from auger cuttings.*		454	
	0/60 0%	BD					4			452	
							6			450	
							▼ 8	Yellowish brown (10YR5/6), moist, loose, silty, very fine- to fine-grained SAND with slight trace gravel. *Description logged from auger cuttings.*		448	
3A	6/9 67%	SS	37-50/5"	17			▼ 10			446	
	0/51 0%	BD					12	Yellowish brown (10YR5/6), moist, dense, silty, very fine- to fine-grained, weathered SANDSTONE		444	
							14			442	
5A	5/5 100%	SS	50/5"	14				Yellowish brown (10YR5/6), wet, hard, silty, very fine- to medium-grained SANDSTONE with laminated bedding.		440	
								End of Boring = 15.4 ft. BGS			

NOTE(S): Borehole abandoned with auger cuttings.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/06/2011
Finish: 04/06/2011
WEATHER: Sunny,mild (60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼ Hollow Stem Auger w/ Split Spoon and Shelby tubes
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-4
Well ID: n/a
Surface Elev: 440.8 ft. MSL
Completion: 35.4 ft. BGS
Station: 2,975.00N
5,070.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = 16.00 - during drilling
▼ = 14.90 - 17:35 (6 Apr 11)
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	SS	1-2 3-3 N=5	21		0.97 SP	0	Very dark grayish brown (10YR3/2), moist, soft, very silty CLAY with trace sand.		440	
							2	Dark brown (10YR3/3) with 10% dark yellowish brown (10YR4/4) mottles, moist, soft, very silty CLAY with trace sand.		438	
2A	20/24 83%	SS	1-2 2-2 N=4	36		0.73 B	4	Dark grayish brown (10YR4/2), moist, soft, very silty CLAY with trace sand.		436	
3-1											
3-2	12/24 50%	SH									
3-3							6	Dark grayish brown (10YR4/2), moist, soft, silty CLAY with slight trace sand.		434	
4A	19/24 79%	SS	3-3 3-4 N=6	32		1.36 B					
5A	24/24 100%	SS	1-2 3-4 N=5	31		1.24 B	8	Dark yellowish brown (10YR4/4), moist, soft, silty CLAY with slight trace sand.		432	
6A	22/24 92%	SS	1-2 3-4 N=5	48			10	Dark yellowish brown (10YR4/4), wet, very soft, silty CLAY with slight trace sand.		430	
6B				31		1.65 BSh	12	Dark yellowish brown (10YR4/4), moist, soft, silty CLAY with trace sand.		428	
7A	22/24 92%	SS	4-5 4-4 N=9	31		1.16 BSh					
8A	20/24 83%	SS	2-3 3-3 N=6	33		1.24 BSh	14 ▼	Dark yellowish brown (10YR4/4) with 10% gray (10YR6/1) mottles, moist, soft, silty CLAY with slight trace sand.		426	
9A	24/24 100%	SS	4-5 6-4 N=11	48			16 ▼	Dark yellowish brown (10YR4/4), wet, very soft, silty CLAY with trace sand.		424	
9B				35		1.03 BSh	18	Dark yellowish brown (10YR4/4) with 10% gray (10YR6/1) mottles, moist, soft, silty CLAY with trace sand.		422	
10-1											
10-2	9/24 38%	SH					20				

NOTE(S): Borehole abandoned with high-solids bentonite grout placed by tremie near borehole bottom.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/06/2011
Finish: 04/06/2011
WEATHER: Sunny,mild (60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼ Hollow Stem Auger w/ Split Spoon and Shelby tubes
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-4
Well ID: n/a
Surface Elev: 440.8 ft. MSL
Completion: 35.4 ft. BGS
Station: 2,975.00N
5,070.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = 16.00 - during drilling
▼ = 14.90 - 17:35 (6 Apr 11)
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	SS	woh-woh woh-woh	31		0.23 B	22	Yellowish brown (10YR5/4), very moist, very soft, SILT with some clay and trace sand.		420	
12A	22/24 92%	SS	woh-woh 1-1	30		0.44 B	24	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, very moist, very soft, SILT with some clay and trace sand.		418	
13A				44							
13B	17/24 71%	SS	1-5 6-11 N=11	12			26	Yellowish brown (10YR5/4), wet, loose, very fine- to very coarse-grained SAND with trace gravel.		416	
14A	19/24 79%	SS	11-16 18-22 N=34	10						414	
15A	18/24 75%	SS	10-30 24-15 N=54	8			28			412	
16A	8/24 33%	SS	4-6 8-6 N=14	28			30	Gray (10YR5/1), wet, medium dense, SILT with trace very fine-grained sand.		410	
								Black (10YR2/1), moist, hard, layered, COAL and weathered SHALE.			
17A	17/17 100%	SS	10-33 50/5"	15			32	Gray (10YR5/1), wet, dense, silty, very fine- to very coarse-grained, weathered SANDSTONE.		408	
18A	17/17 100%	SS	20-42 50/5"	15		5.99 Sh	34	Gray (10YR5/1), moist, hard, SHALE.		406	
								End of Boring = 35.4 ft. BGS			

NOTE(S): Borehole abandoned with high-solids bentonite grout placed by tremie near borehole bottom.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

Electronic Filing: Received, Clerk's Office 09/28/2020

FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/06/2011
Finish: 04/06/2011
WEATHER: Sunny, warm (70's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼" Hollow Stem Auger w/ Split Spoon
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-5
Well ID: n/a
Surface Elev: 452.5 ft. MSL
Completion: 22.0 ft. BGS
Station: 3,825.00N
5,215.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = 3.00 - during drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	SS	1-2 11-12 N=13				2			452	
2A	18/24 75%	SS	6-6 4-4 N=10				4			450	
3A	20/24 83%	SS	2-2 1-1 N=3				6			448	
4A	24/24 100%	SS	1-1 1-1 N=2				8			446	
5A	24/24 100%	SS	woh-woh 2-1				10	Black (10YR2/1) very moist to wet, ASH and yellowish red (5YR5/6) CINDERS. *Found layered or mixed.*		444	
6A	15/24 63%	SS	woh-woh woh-1				12			442	
7A	17/24 71%	SS	2-1 3-4 N=4				14			440	
8A	18/24 75%	SS	1-0 1-0 N=1				16			438	
9A	24/24 100%	SS	1-0 0-0 N=0				18			436	
10A	20/24 83%	SS	woh-woh 2-5				20	Gray (10YR5/1), moist, stiff, silty CLAY with slight trace sand.		434	
11A	12/24 50%	SS	3-3 4-5 N=7				22	End of Boring = 21.0 ft. BGS		432	

NOTE(S): Borehole abandoned with bentonite chips (bottom 1 ft.) and auger cuttings to surface.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

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FIELD BORING LOG

HANSON

CLIENT: Ameren Corp.
Site: Hutsonville Power Station
Location: 15142 East 1900 Ave, Hutsonville, IL 62433
Project: 10E0035
DATES: Start: 04/07/2011
Finish: 04/07/2011
WEATHER: Sunny, warm (70's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 3¼" Hollow Stem Auger w/ Split Spoon
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: B11-6
Well ID: P11-6
Surface Elev: 453.00 ft. MSL
Completion: 24.00 ft. BGS
Station: 3,700.00N
5,425.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: West Union, ILL. - IND.
Township: Hutsonville
Section 17, Tier 8N.; Range 11W.

WATER LEVEL INFORMATION:
▼ = 3.50 - during drilling
▼ = 3.50 - 19:30 (7 Apr 11)
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	SS	2-6 21-29 N=27				0			452	
2A	24/24 100%	SS	12-19 17-23 N=36				2			450	
3A	24/24 100%	SS	11-14 16-12 N=30				4			448	
4A	24/24 100%	SS	26-13 25-15 N=38				6			446	
5A	20/24 83%	SS	3-6 8-8 N=14				8			444	
6A	24/24 100%	SS	4-6 7-8 N=13				10	Black (10YR2/1) very moist to wet, ASH and yellowish red (5YR5/6) CINDERS. *Found layered or mixed.*		442	
7A	24/24 100%	SS	8-14 10-12 N=24				12			440	
8A	22/24 92%	SS	7-8 8-9 N=16				14			438	
9A	22/24 92%	SS	7-7 8-9 N=15				16			436	
10A	22/24 92%	SS	22-9 9-7 N=18				18			434	
11A 11B	16/24 67%	SS	11-7 3-4 N=10				20			432	
12A	16/24 67%	SS	1-2 2-2 N=4				22	Yellowish brown (10YR5/4) with 10% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with slight trace sand.		430	
							24	End of Boring = 24.0 ft. BGS			

NOTE(S): Piezometer P11-6 installed in borehole.
Coordinates (northing & easting) and elevation were estimated from topographic map pending field survey.

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Appendix A-10

Illinois State Geological Survey Water Well Records

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ILLINOIS STATE GEOLOGICAL SURVEY

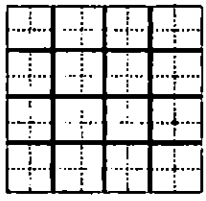
Water Well	Top	Bottom
brown clay,very soft	0	20
gray clay very soft	20	25
crs sand & gravel w/bldr @ 40'(wtr brg)	25	54
gravel w/boulders very loose(wtr brg)	54	75
medium/fine sand very loose (wtr brg)	75	90
bedrock at	90	90
Total Depth		90

Casing: 42" from -1' to 30'
26" from -1' to 57'
Screen: 30' of 26" diameter 6 slot
Water from sand & gravel at 25' to 87'.
Static level 18' below casing top which is 2' above GL
Pumping level 24' when pumping at 825 gpm for 3 hours

Remarks: see logbook for further location info
Driller's Log filed
Sample set # 60350 (0' - 85') Received: June 1, 1976
Owner Address:
Location source: Location from permit

Permit Date: May 18, 1976 **Permit #:** 47367

COMPANY owner
FARM C.I.P.S.-Hutsonville Unit
DATE DRILLED May 25, 1976 **NO.** 3
ELEVATION 440TM **COUNTY NO.** 29913
LOCATION 350'S line, 1630'E line of SE
LATITUDE 39.129678 **LONGITUDE** -87.654686
COUNTY Crawford **API** 120332991300 **17 - 8N - 11W**



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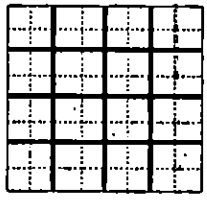
ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
cinders, sand & clay	0	5
med to soft clay	5	22
soft gray clay	22	26
f-med s, gvl & bld	26	88
Total Depth		89

Casing: 26" .375 WALL from 0' to 57'
42" .375 WALL from -22' to 30'
Screen: 30' of 26" diameter .5 slot
Grout: CEMENT from 5 to 30.
Size hole below casing: 42"
Water from alluvial at 25' to 97'.
Static level 15' below casing top which is 0' above GL
Pumping level 22' when pumping at 826 gpm for 5 hours
Permanent pump installed at 60'
on , with a capacity of 600 gpm
Driller's Log filed
Owner Address: Hutsonville Power Generator St Hutsonville, IL
Location source: Location from permit

Permit Date: August 26, 1983 **Permit #:** 109053

COMPANY Ruester, John T.
FARM Central Il Public Serv.Co.
DATE DRILLED October 28, 1983 **NO.** 4
ELEVATION 440GL **COUNTY NO.** 33867
LOCATION 350'S line, 150'W line of SE SW SE
LATITUDE 39.129677 **LONGITUDE** -87.654832
COUNTY Crawford **API** 120333386700 **17 - 8N - 11W**



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Illinois EPA FOIA Exemption Reference Sheet

SID: 28161

Agency ID:
Media File Type: WATER
Bureau ID: W0330100003
Site Name: Ameren Energy Generating Co
Site Address1:
Site Address2: 14281 E 1900th Ave
Site City: Hutsonville State: IL Zip:

This record has been determined to be partially or wholly exempt from public disclosure

Exemption Type:

Redaction

Exempt Doc #: 11 **Document Date:** 2 /26/2015 **Staff:** JKS

Document Description: CLOSURE PLAN

Category ID: 06L **Category Description:** GROUNDWATER CLOSURE **Exempt Type:** Redaction

Permit ID: **Date of Determination:** 2 /26/2016

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ILLINOIS STATE GEOLOGICAL SURVEY

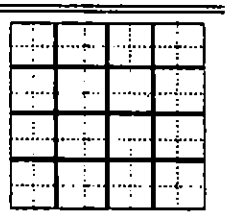
Irrigation Well	Top	Bottom
SS #66941 (0'-65')	0	0
top soil	0	1
fine brown sand	1	13
coarse brown sand	13	45
gravel & sand	45	64
Total Depth		64

Casing: 16" PVC WC SCH 80 from 2' to 64'
Screen: 30' of 16" diameter .12 slot
Grout: BENTONITE from 0 to 0.
Water from sand & gravel at 0' to 0'.

Sample set # 66941 (0' - 65') Received: June 2, 1989
Owner Address: [redacted]
Location source: Location from permit

Permit Date: February 10, 1989 Permit #: 139628

COMPANY Erwin, Harold E.
FARM [redacted]
DATE DRILLED March 24, 1989 NO.
ELEVATION 0 COUNTY NO. 35196
LOCATION NW NW NW
LATITUDE 39.12778 LONGITUDE -87.665637
COUNTY Crawford API 120333519600 20 - 8N - 11W



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ILLINOIS STATE GEOLOGICAL SURVEY

Irrigation Well	Top	Bottom
topsoil	0	3
silty dark clay	3	20
gray clay	20	25
coarse gray sand with fine-med gravel	25	66
gray clay at	66	66
Total Depth		66

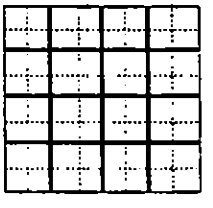
Casing: 12" SCH 40 PVC from 0' to 32'
Screen: 3' of 12" diameter .06 slot
Grout: BENTONITE from 0 to 25.

Water from sand & gravel at 25' to 66'.
Static level 11' below casing top which is 1' above GL
Pumping level 0' when pumping at 1000 gpm for 0 hours

Owner Address: [redacted]
Address of well:
Hutsonville, IL
Add'l loc. info: FALSE
S of CIPS Power Plant
Location source: Location from permit

Permit Date: January 15, 1997 **Permit #:** 033-1-9

COMPANY Hacker, Tim
FARM [redacted]
DATE DRILLED January 29, 1998 **NO.** 1
ELEVATION 0 **COUNTY NO.** 36667
LOCATION NE NE NW
LATITUDE 39.127799 **LONGITUDE** -87.658791
COUNTY Crawford **API** 120333666700 **20 - 8N - 11W**



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ILLINOIS STATE GEOLOGICAL SURVEY

Irrigation Well	Top	Bottom
dark clay	0	2
sand & gravel	2	47
coarse sand	47	61
Total Depth		61

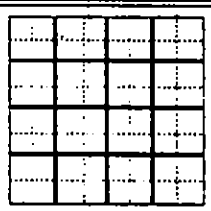
Casing: 16" PVC SCH 40 from -1' to 31'
16" PVC SAWED SCREEN from 31' to 61'
Screen: 30' of 16" diameter 32 slot
Grout: BENSEAL from 3 to 20.
Grout: GRAVEL PACK from 20 to 61.

Static level 9' below casing top which is 1' above GL

Owner Address: [redacted]
Location source: Location from permit

Permit Date: June 7, 2002 Permit #:

COMPANY Speth, James
FARM [redacted]
DATE DRILLED June 12, 2002 NO.
ELEVATION 0 COUNTY NO. 36898
LOCATION NE NE NW
LATITUDE 39.127799 LONGITUDE -87.658791
COUNTY Crawford API 120333689800 20 - 8N - 11W



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ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
sandy clay	0	5
sand & gravel	5	8
gray hardpan	8	15
gray sandstone	15	51
gry shale	51	64
coal	64	68
gray shale	68	90
Total Depth		90

Casing: 5" PVC SDR 21 from -2' to 90'

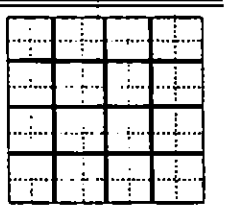
Grout: BENTONITE from 0 to 30.

Water from sandstone at 15' to 51'.
Static level 11' below casing top which is 2' above GL
Pumping level 85' when pumping at gpm for 5 hours
Permanent pump installed at 85'
on December 24, 2007, with a capacity of 10 gpm

Owner Address: [redacted]
Address of well: same as above
Location source: Location from permit

Permit Date: December 17, 2007 Permit #: 033-7-0

COMPANY Van Gilder, Richard E.
FARM [redacted]
DATE DRILLED December 20, 2007 NO.
ELEVATION COUNTY NO. 37411
LOCATION NE NE SE
LATITUDE 39.135033 LONGITUDE -87.66725
COUNTY Crawford API 120333741100 18 - 8N - 11W



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Monitoring Well Logs, Construction Details and Abandonment Form Proposed in Closure Plan

Note Received Date



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Print Form

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

PDF FILLABLE/SAVABLE

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Illinois Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party) Am eren Energy Medina Valley Gogen, LLC

2. Well Location: Well Site Address Hutsonville Power Station City Hutsonville Zip 62433

Lot # N/A Land I.D.# N/A County Crawford Township 08 N

Range 11 W Section 17 Quarter of the NW Quarter of the SW Quarter SW

GPS: North Degrees 39.131 Minutes Seconds West Degrees 87.65[illegible] Minutes Seconds

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.1) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled 1984 4. Drilling Permit Number (and date, if known N/A

5. Type of Well Monitoring 6. Total Depth (ft.) 9.0 Diameter (in.) 2

7. Formation clear of obstruction Yes

8. Details of Plugging (bentonite, neat cement or other materials)

Filled with	3/8" Granular Bentonite	From (ft.)	0	to (ft.) 9.0
Kind of plug		From (ft.)		to (ft.)
Filled with		From (ft.)		to (ft.)
Kind of plug		From (ft.)		to (ft.)
Filled with		From (ft.)		to (ft.)
Kind of plug		From (ft.)		to (ft.)

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9. CASING RECORD Upper 2 feet of casing removed Yes 10. Date well was sealed 10/25/15

11. Licensed water well driller or other person approved by the Department performing well sealing

Name Skinner Limited, Inc. / Todd Skinner Complete License Number 092-008242

Address P.O. Box 297 City Hindsboro State Illinois Zip Code 61930

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631

Questions regarding the completion of this form should be directed to the local health department or the Illinois Department of Public Health 217-782-5830, TTY (for hearing impaired only) 800-547-0466.

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Skinner Limited
Total Drilling Services

101W. 6th Str P.O. Box 297 *Hindsboro, Ill 61930*

Project / Permit No. Hutsonville Power Station
County Crawford – 15142 E 1900 Av. Hutsonville, IL
Section 17 Twnship 08 N Range 11 W (NW/SW/SW)
Project Monitor Well Well/Boring# MW-22S
Elevation 449.74 Location 39.128921 / 87.658641
Driller T. Skinner Helper J. Stovall

Client Ameren Energy Medina Cogen, LLC
Date 10/14/15 Weather Sunny / 80°
Depth to water _____ @ _____ hrs.
Depth to water _____ @ _____ hrs.
Method of Backfill 2" ø Ground water monitor well installed & Completed to IDPH code

Sample Data					Strata		
No.	Type	Rec.	N-Count	PPR	Change	Soil Description	Well Data
						(Blind drilling w/ 4¼" ID HSA 0'-13.7')	
						(See MW-22D Boring log 0'-13.7')	
						13.70' BGL E.O.B.	

5.0
10.0
15.0

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Illinois Environmental Protection Agency — **Well Completion Report**

Site Number: Permit #2005-EO-3689 County: Crawford

Site Name: Hutsonville Power Station, Hutsonville, IL Well #: MW-22S

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 128' 921" Longitude: 87° 658' 641" Borehole #: MW-22S

Surveyed by: Massman Surveying IL Registration #: ____

Drilling Contractor: Skinner Limited, Inc. Driller: Todd Skinner

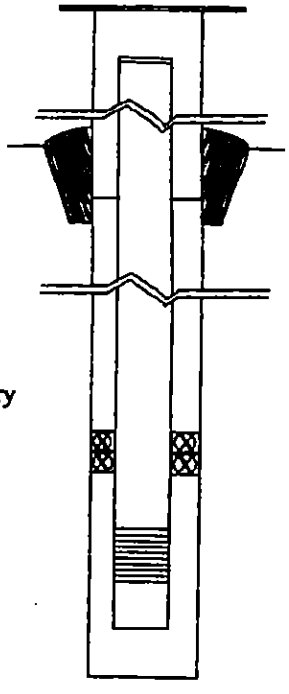
Consulting Firm: Geotechnology Geologist: ____

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): N/A

Logged By: Todd Skinner / Skinner Limited, Inc. Date Started: 10/14/15 Date Finished: 10/14/15

Report Form Completed By: Todd Skinner / Skinner Limited, Inc. Date: 10/24/15

ANNULAR SPACE DETAILS



Type of Surface Seal: Gravel mix Concrete

Type of Annular Sealant: 3/8" Granular Bentonite

Installation Method: Free Drop

Setting Time: 2.0hrs

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Free Drop

Setting Time: 1.0hrs

Type of Sand Pack: Unimun

Grain Size: 20/40 (Sieve Size)

Installation Method: Free Drop

Type of Backfill Material: ____ (if applicable)

Installation Method: ____

Elevations (MSL)*	Depths (BGS)	(.01ft.)
452.33	2.59	Top of Protective Casing
452.03	2.29	Top of Riser Pipe
449.74	0.00	Ground Surface
446.64	3.10	Top of Annular Sealant
____	____	Static Water Level (After Completion)
446.24	3.50	Top of Seal
443.85	5.89	Top of Sand Pack
441.85	7.89	Top of Screen
437.17	12.57	Bottom of Screen
436.58	13.16	Bottom of Well
436.04	13.7	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.0"
ID of Riser Pipe (inches)	2"
Protective Casing Length (feet)	5.0'
Riser Pipe Length (feet)	10.05'
Bottom of Screen to End Cap (feet)	0.5'
Screen Length (1st slot to last slot) (feet)	4.68'
Total Length of Casing (feet)	15.45'
Screen Slot Size **	0.01"

**Hand-Slotted Well Screens are Unacceptable

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Skinner Limited
Total Drilling Services

101 W. 6th Str P.O. Box 297 *Hinsboro, Ill 61930*

Project / Permit No. Hutsonville Power Station
County Crawford - 15428 1900 Av., Hutsonville, IL
Section 17 Twnship 08N Range 11W (NW/SW/SW)
Project Monitor Well Well/Boring# MW-22D
Elevation 449.63 Location 39.131239 / 87.658620
Driller T. Skinner Helper J. Stovall

Client Ameren Energy Medina Green, LLC
Date 10/14/15 Weather Sunny / 80°
Depth to water _____ @ _____ hrs.
Depth to water _____ @ _____ hrs.
Method of Backfill 2" ø Ground water monitor well installed & Completed to IDPH code

Sample Data					Strata		
No.	Type	Rec.	N-Count	PPR	Change	Soil Description	Well Data
			5	N/A	0.5	Clay - Brown, moist, Stiff, tr Sand	
1	SPT	26"/36"	6				
			8			Sand - Brown-Dk Brown, moist, Dense, Some Clay, trace Gravel	
			10				
			18				
			23		3.0	3.0	
			9	N/A		V. Silty Clay - Mottled Brown, moist, Stiff, w/Sand, little Gravel	
2	SPT	21"/24"	9				
			4				
			4		5.0	5'	
			6	N/A		Sand - Brown & Gray, moist, Dense, Fine-med Grain	
3	SPT	30"/36"	7				
			11				
			22				
			25				
			35		8.0		
4	SPT	8"	55	N/A			
			60-2"		9'		
5	SPT	8"	53	N/A		Sandstone - (Decomposed) - Brown, soft, micaceous	
			60-2"		10.0		
				N/A			
6	CME C/S	12"/60"	N/A				
					13'		
						Sandstone - Weathered, Brown, Soft, V. moist, micaceous	
					15.0		
7	SPT	4"	60-6"	N/A	15.5		
8	CME C/S	12"/42"	N/A	N/A			
					19.0		
9	SPT	6"	60-6"	N/A			
					20.0		
10	SPT	6"	60-6"	N/A			
					21.0	21'	

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Illinois EPA

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Skinner Limited
Total Drilling Services

101 W. 6th Str P.O. Box 297 *Hindsboro, Ill 61930*

Project / Permit No. Hutsonville Power Station
County Crawford - 15142 E 1900 Av., Hutsonville, IL
Section 17 Twnship 08N Range 11W (NW/SW/SW)
Project Monitor Well Well/Boring# MW-22D
Elevation 449.63 Location 39.181259 / 87.658620
Driller T. Skinner Helper J. Stovall

Client Ameren Energy Medina Valley, LLC
Date 10/14/15 Weather Sunny / 80°
Depth to water _____ @ _____ hrs.
Depth to water _____ @ _____ hrs.
Method of Backfill 2" ø Ground water monitor well installed & completed to IDPH code

Sample Data					Strata	Soil Description	Well Data
No.	Type	Rec.	N-Count	PPR	Change		
						(See Page 1 of 2)	
					21'		
11	SPT	6"	60-6"	N/A		Sandstone - Gray, Soft, Fine grain, weathered, micaceous	
12	SPT	6"	60-6"	N/A			
13	SPT	4"	60-4"	N/A	23.5 25.5	E.O.B.	

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Illinois Environmental Protection Agency **Well Completion Report**

Site Number: Permit #2005-EO-3689 County: Crawford

Site Name: Hutsonville Power Station, Hutsonville, IL Well #: MW-22D

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 131' 239" Longitude: 87° 658' 620" Borehole #: MW-22D

Surveyed by: Massman Surveying IL Registration #: ____

Drilling Contractor: Skinner Limited, Inc. Driller: Todd Skinner

Consulting Firm: Geotechnology Geologist: ____

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): N/A

Logged By: Todd Skinner / Skinner Limited, Inc. Date Started: 10/14/15 Date Finished: 10/14/15

Report Form Completed By: Todd Skinner / Skinner Limited, Inc. Date: 10/24/15

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ANNULAR SPACE DETAILS

Type of Surface Seal: Gravel mix Concrete

Type of Annular Sealant: 3/8" Granular Bentoite

Installation Method: Free Drop

Setting Time: 2.0hrs

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Free Drop

Setting Time: 1.0hrs

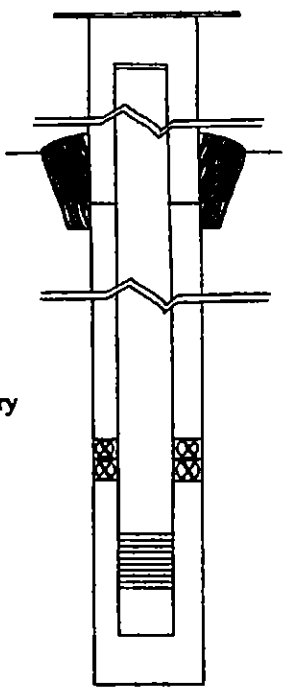
Type of Sand Pack: Unimun

Grain Size: 20/40 (Sieve Size)

Installation Method: Free Drop

Type of Backfill Material: ____ (if applicable)

Installation Method: ____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
452.23	2.60	Top of Protective Casing
451.93	2.30	Top of Riser Pipe
449.63	0.00	Ground Surface
446.43	3.20	Top of Annular Sealant
____	____	Static Water Level (After Completion)
436.13	13.50	Top of Seal
433.70	15.93	Top of Sand Pack
431.70	17.93	Top of Screen
427.02	22.61	Bottom of Screen
426.43	23.20	Bottom of Well
426.13	23.5	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.0"
ID of Riser Pipe (inches)	2"
Protective Casing Length (feet)	5.0'
Riser Pipe Length (feet)	20.10
Bottom of Screen to End Cap (feet)	0.50'
Screen Length (1st slot to last slot) (feet)	4.68'
Total Length of Casing (feet)	25.50
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

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Skinner Limited
Total Drilling Services

101 W. 6th Str P.O. Box 297 — Hindsboro, Ill 61930

Project / Permit No. Hutsonville Power Station
County Crawford - 15142E 1900 Av., Hutsonville, IL
Section 17 Twnship 08N Range 11W (SW/SW/SW)
Project Monitor Well Well/Boring# MW-2D
Elevation 453.31 Location 39.129002 / 87.661812
Driller T. Skinner Helper J. Stovall

Client Ameren Energy Medina Gogen, LLC
Date 10/14/15 Weather Sunny / 80°
Depth to water _____ @ _____ hrs.
Depth to water _____ @ _____ hrs.
Method of Backfill 2" ø Ground water monitor well installed & Completed to IDPH code

Sample Data					Strata	Soil Description	Well Data
No.	Type	Rec.	N-Count	PPR	Change		
						(Blind drilling w/4 ¼" ID HSA 0'-18')	
						(See MW-2R Boring logs 0'-18')	
					18.0		
			8	N/A		Sandy Clay - Gray, moist, Stiff, some Silt to Gravel	
1	SPT	24"/24"	5				
			9				
			10		20.0		
			4	N/A			
2	SPT	24"/24"	5				
			9				
			10		22.0		
			6	N/A		Clayey Sand - Mottled Gray, wet, fine grain, to Gravel	
3	SPT	24"/24"	10				
			10				
			11		24.0' E.O.B.		

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Illinois Environmental Protection Agency — **Well Completion Report**

Site Number: Permit #2005-EO-3689 County: Crawford

Site Name: Hutsonville Power Station, Hutsonville, IL Well #: MW-2D

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 129' 002" Longitude: 87° 661' 812" Borehole #: MW-2D

Surveyed by: Massman Surveying IL Registration #: ____

Drilling Contractor: Skinner Limited, Inc. Driller: Todd Skinner

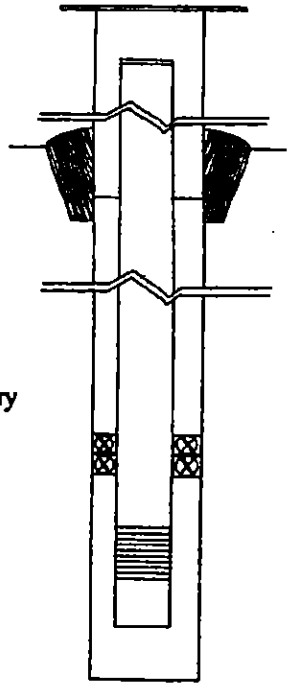
Consulting Firm: Geotechnology Geologist: ____

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): N/A

Logged By: Todd Skinner / Skinner Limited, Inc. Date Started: 10/14/15 Date Finished: 10/14/15

Report Form Completed By: Todd Skinner / Skinner Limited, Inc. Date: 10/24/15

ANNULAR SPACE DETAILS



Type of Surface Seal: Gravel mix Concrete

Type of Annular Sealant: 3/8" Granular Bentonite

Installation Method: Free Drop

Setting Time: 2.0hrs

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Free Drop

Setting Time: 1.0hrs

Type of Sand Pack: Unimin

Grain Size: 20/40 (Sieve Size)

Installation Method: Free Drop

Type of Backfill Material: ____ (if applicable)

Installation Method: ____

	Elevations (MSL)*	Depths (BGS)	(.01ft.)
Top of Protective Casing	456.17	2.86	
Top of Riser Pipe	455.92	2.61	
Ground Surface	453.31	0.00	
Top of Annular Sealant	450.00	3.31	
Static Water Level (After Completion)	____	____	
Top of Seal	439.31	14.0	
Top of Sand Pack	437.08	16.23	
Top of Screen	435.08	18.23	
Bottom of Screen	430.40	22.91	
Bottom of Well	429.81	23.5	
Bottom of Borehole	429.31	24.0	

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.0"
ID of Riser Pipe (inches)	2.0"
Protective Casing Length (feet)	5.0'
Riser Pipe Length (feet)	20.10'
Bottom of Screen to End Cap (feet)	0.5'
Screen Length (1st slot to last slot) (feet)	4.68'
Total Length of Casing (feet)	26.11'
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Well Completion Form (revised 02/06/02)

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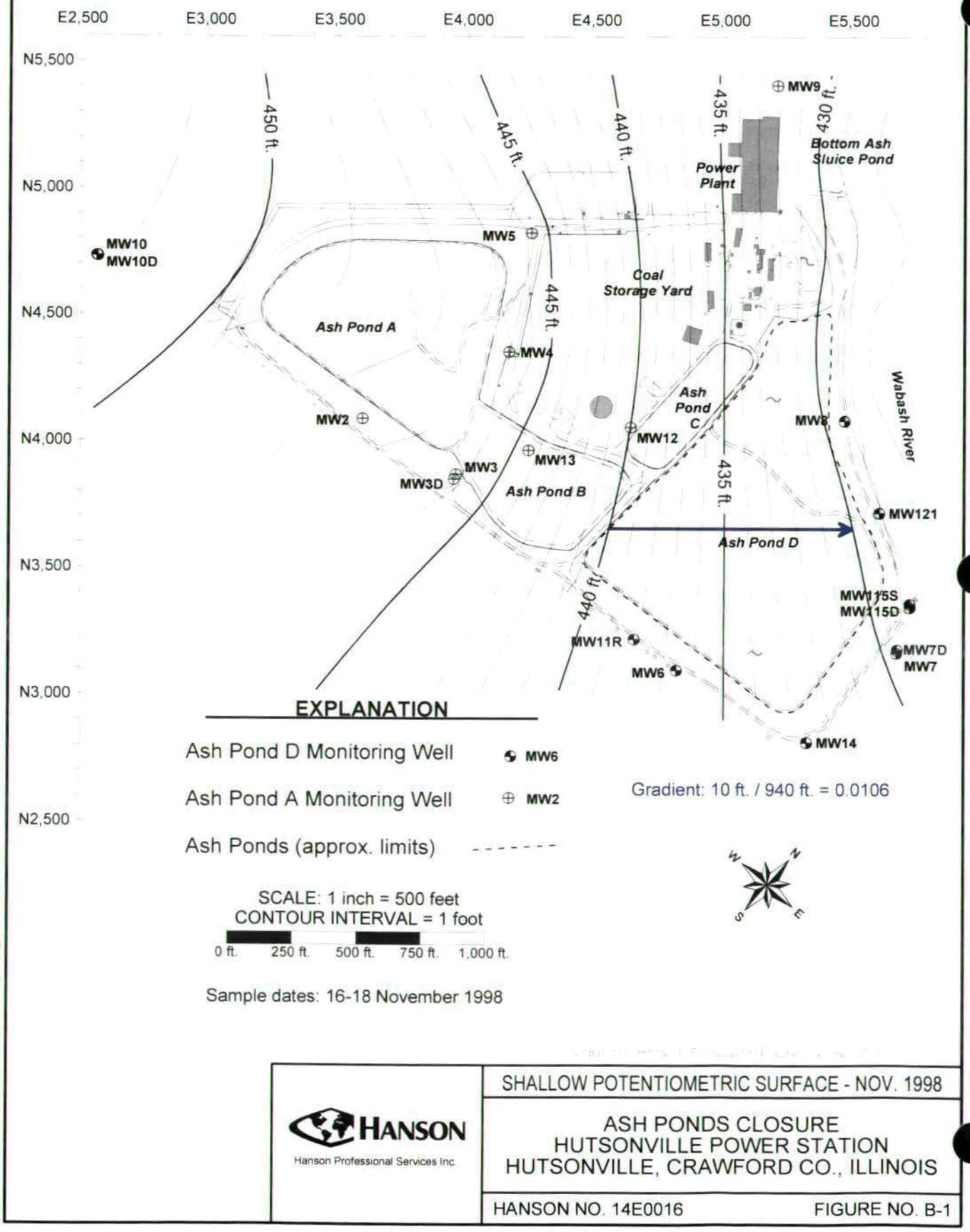
Appendix B

Potentiometric Surface Maps



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SHALLOW POTENTIOMETRIC SURFACE - NOV. 1998

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-1

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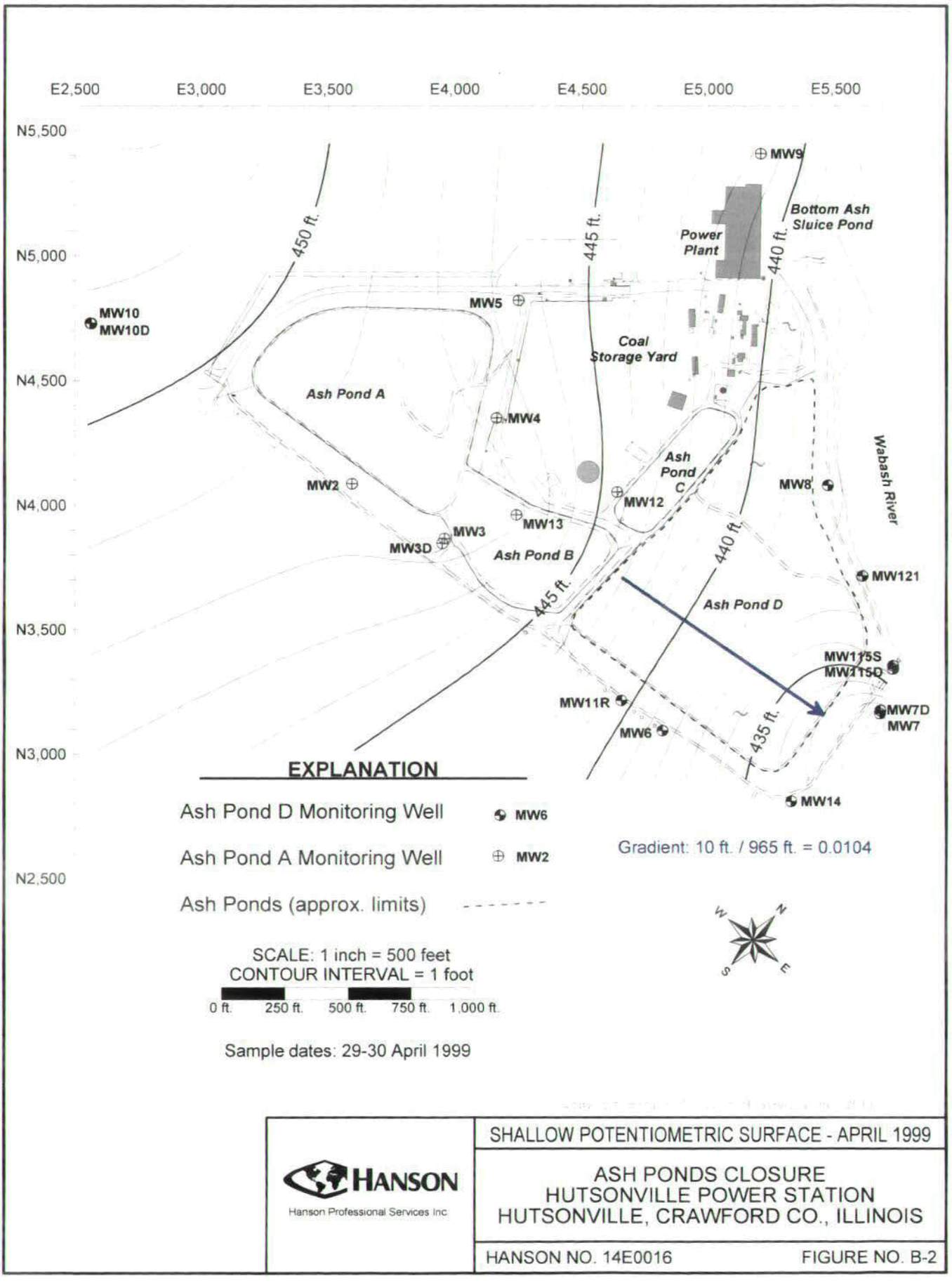

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Hanson Professional Services Inc.

SHALLOW POTENTIOMETRIC SURFACE - APRIL 1999

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-2

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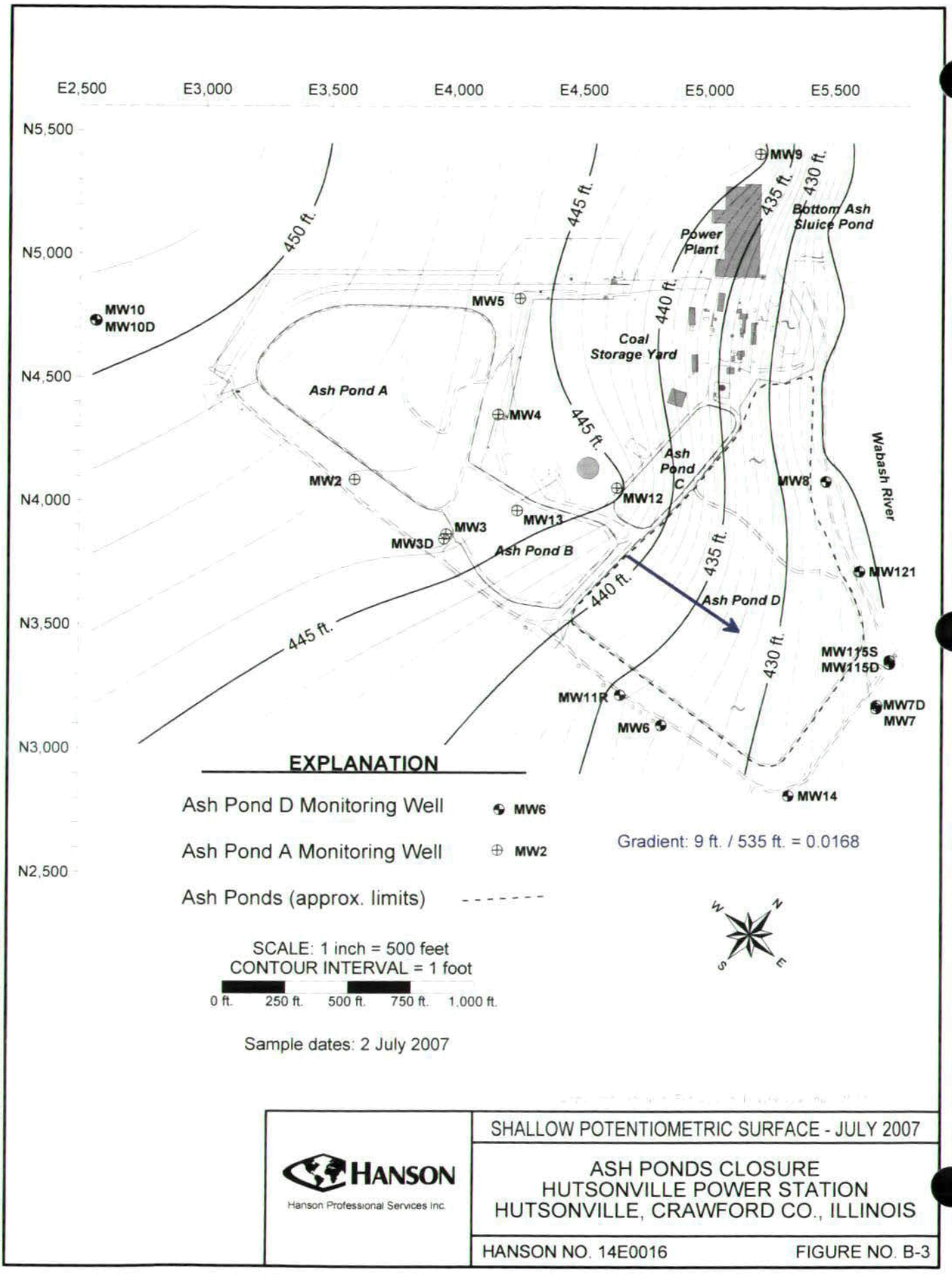

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SHALLOW POTENTIOMETRIC SURFACE - JULY 2007

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-3

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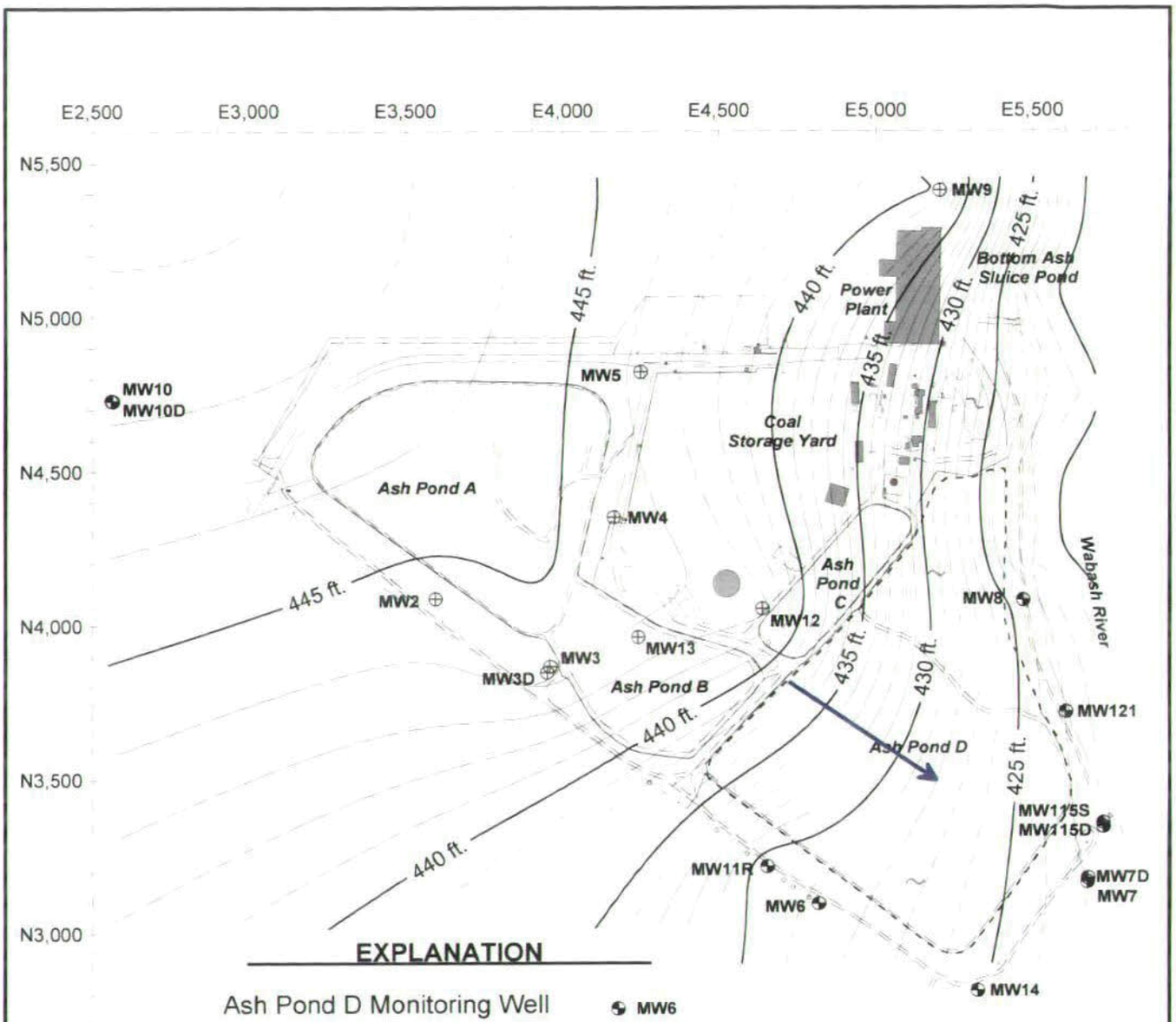

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SHALLOW POTENTIOMETRIC SURFACE - OCT. 2007

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-4

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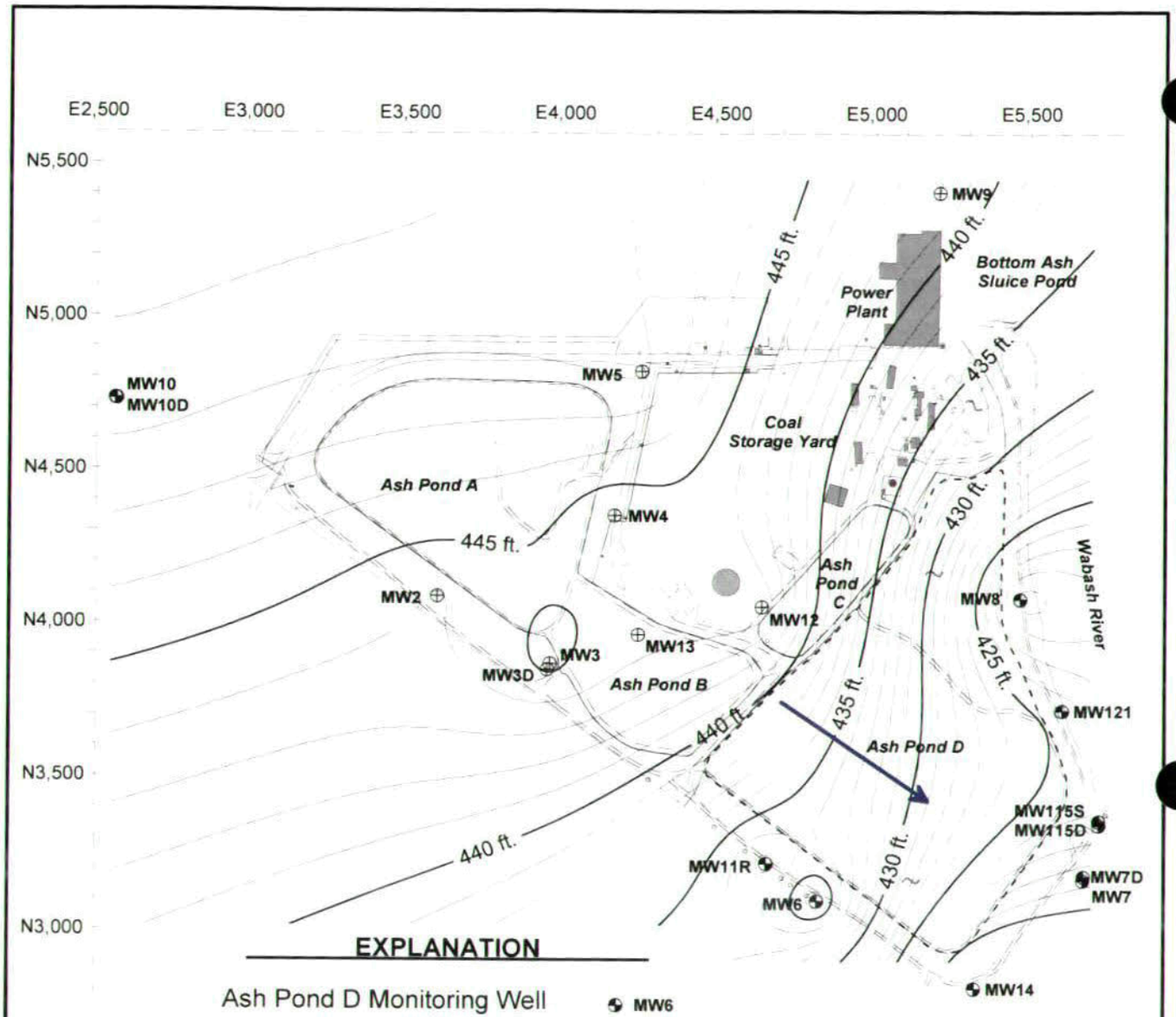

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SHALLOW POTENTIOMETRIC SURFACE - APR. 2010

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-5

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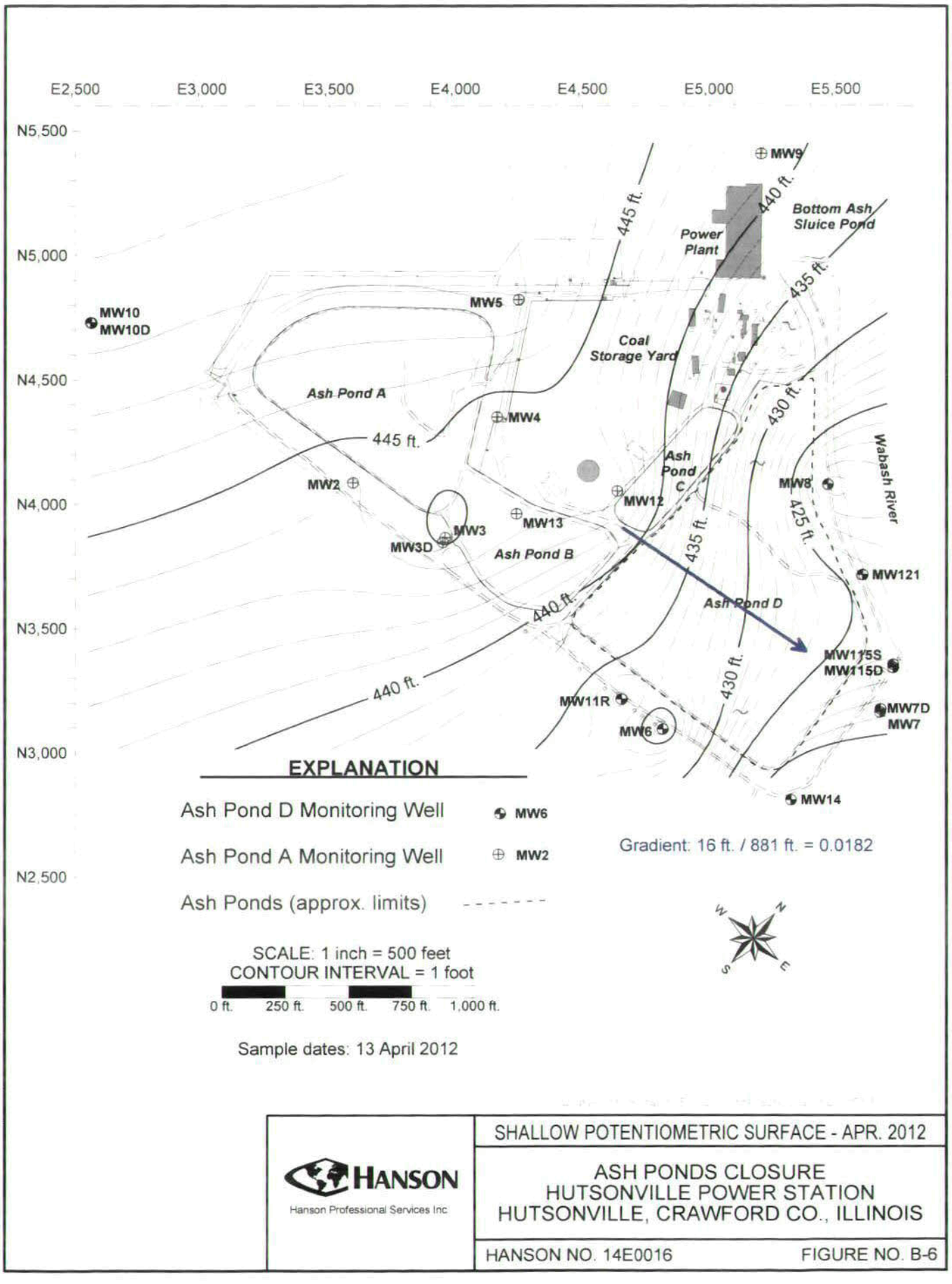

HANSON
Hanson Professional Services Inc

SHALLOW POTENTIOMETRIC SURFACE - APR. 2012

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-6

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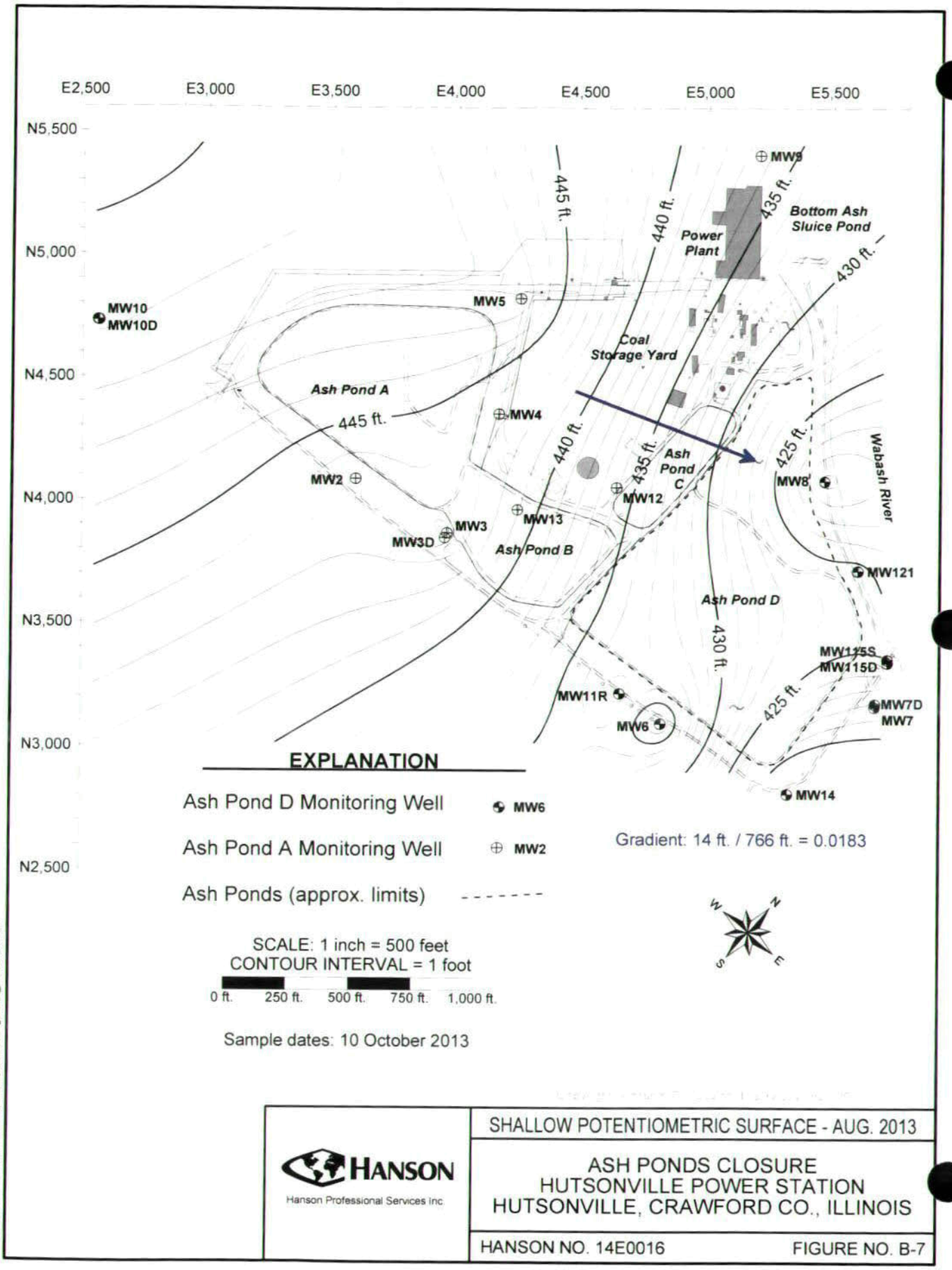

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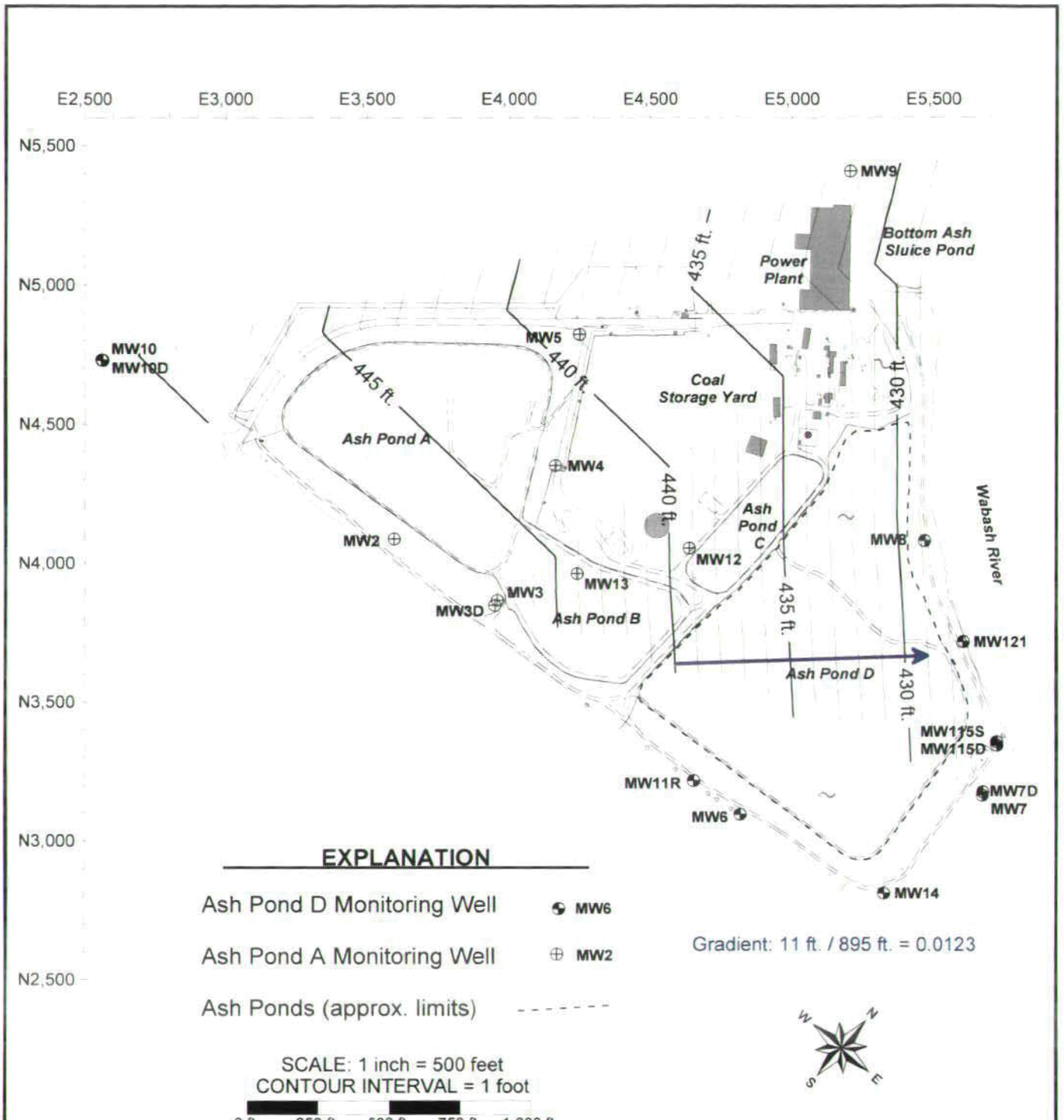
SHALLOW POTENTIOMETRIC SURFACE - AUG. 2013

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-7

201



Sample dates: 16-18 November 1998

NOTE: Potentiometric surfaces created with 3 or fewer data points use Triangulation. This method constrains the surface to the limits of the data points and does not extrapolate the surface beyond these limits.

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DEEP POTENTIOMETRIC SURFACE - NOV. 1998

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-8

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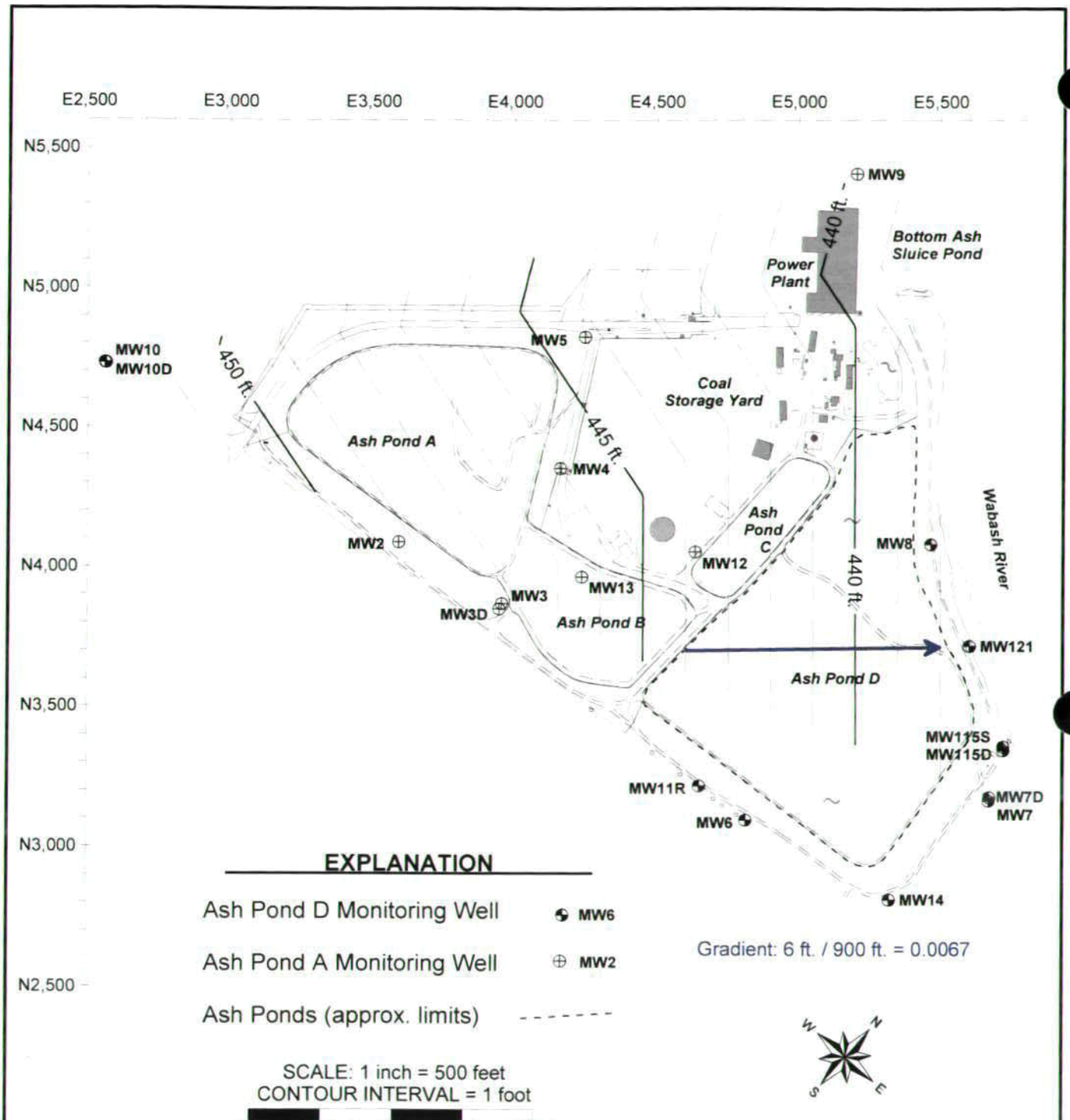

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DEEP POTENTIOMETRIC SURFACE - APRIL 1999

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-9

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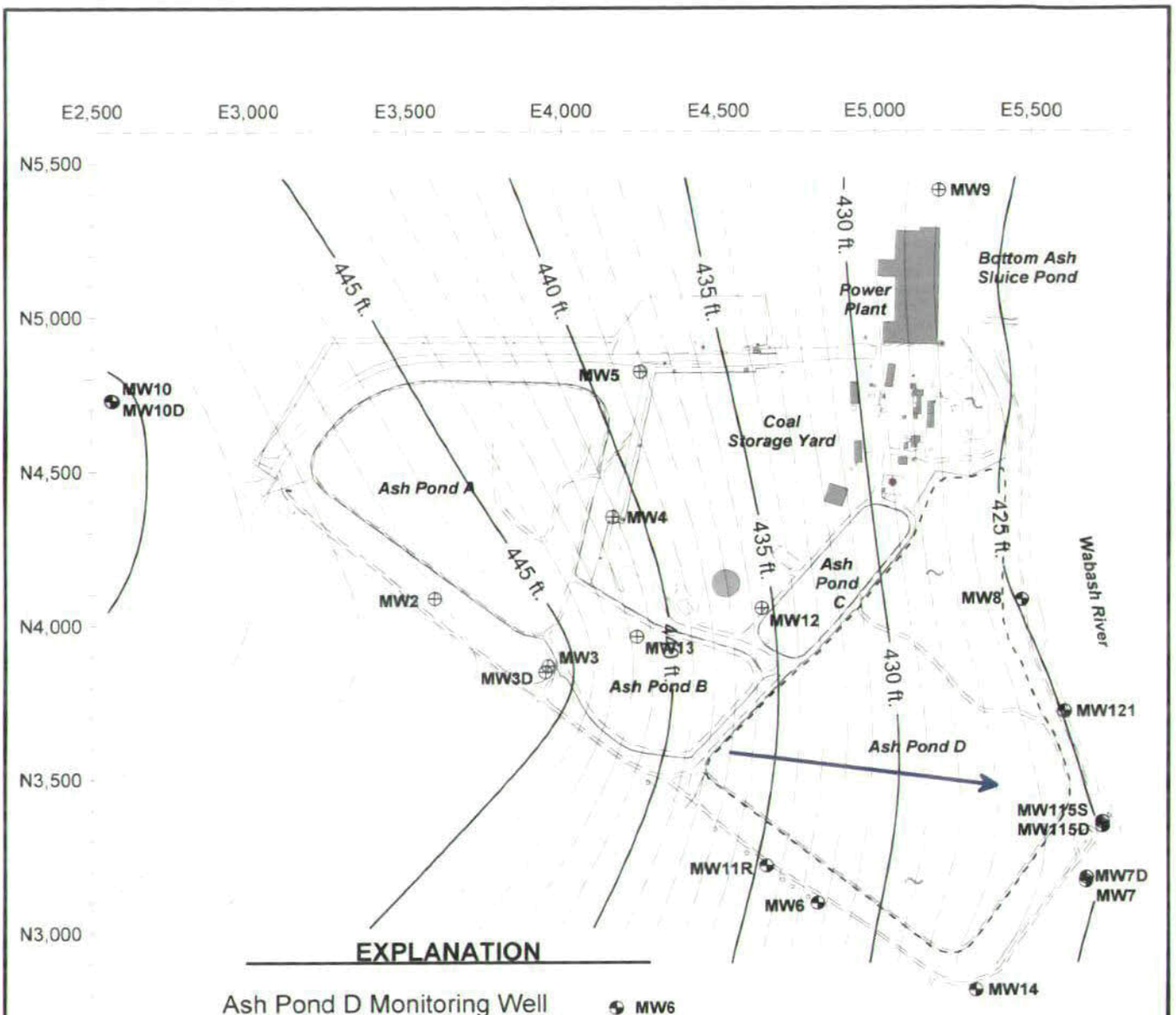

HANSON
Hanson Professional Services Inc

DEEP POTENTIOMETRIC SURFACE - JULY 2007

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-10

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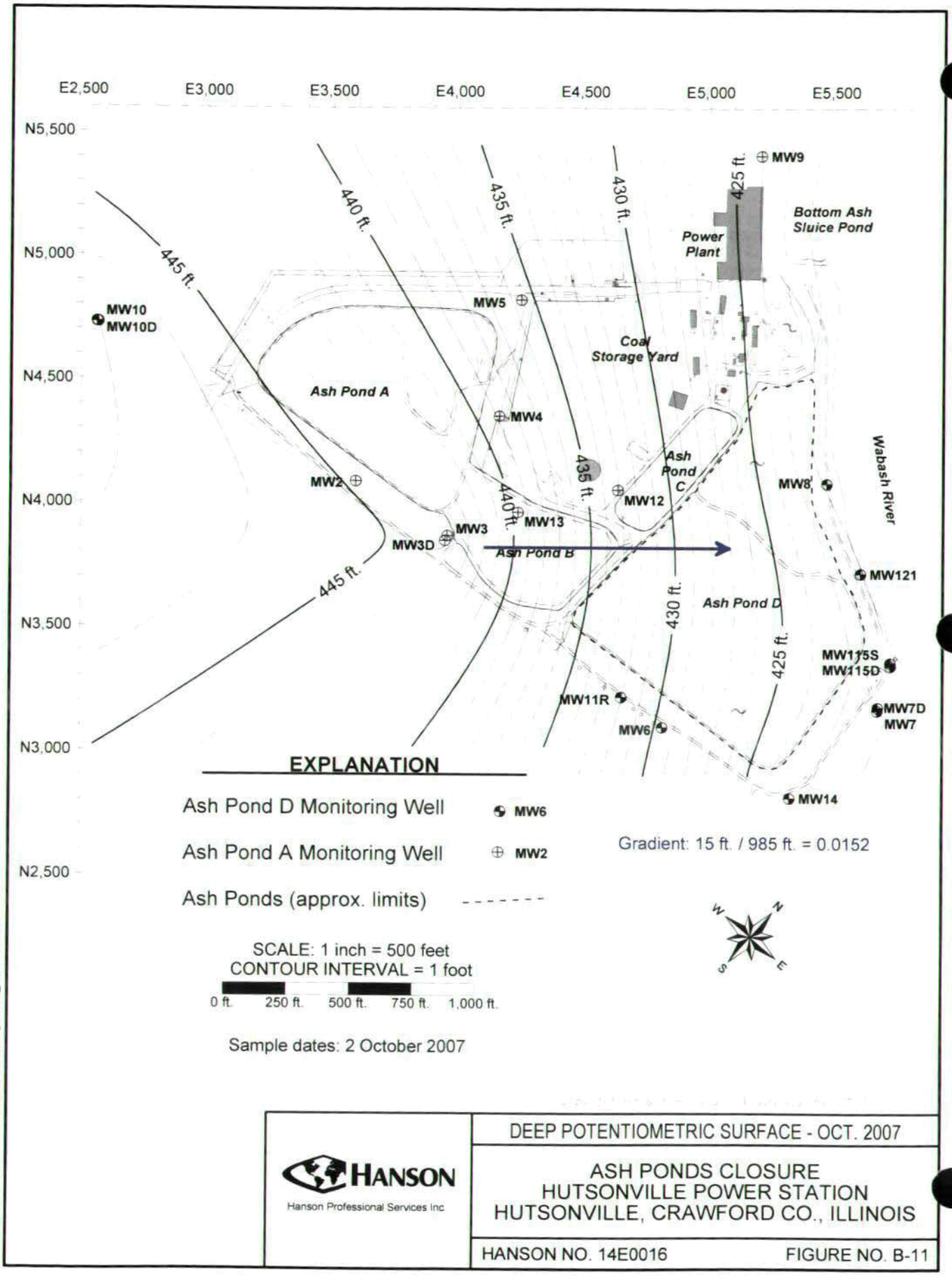

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DEEP POTENTIOMETRIC SURFACE - OCT. 2007

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-11

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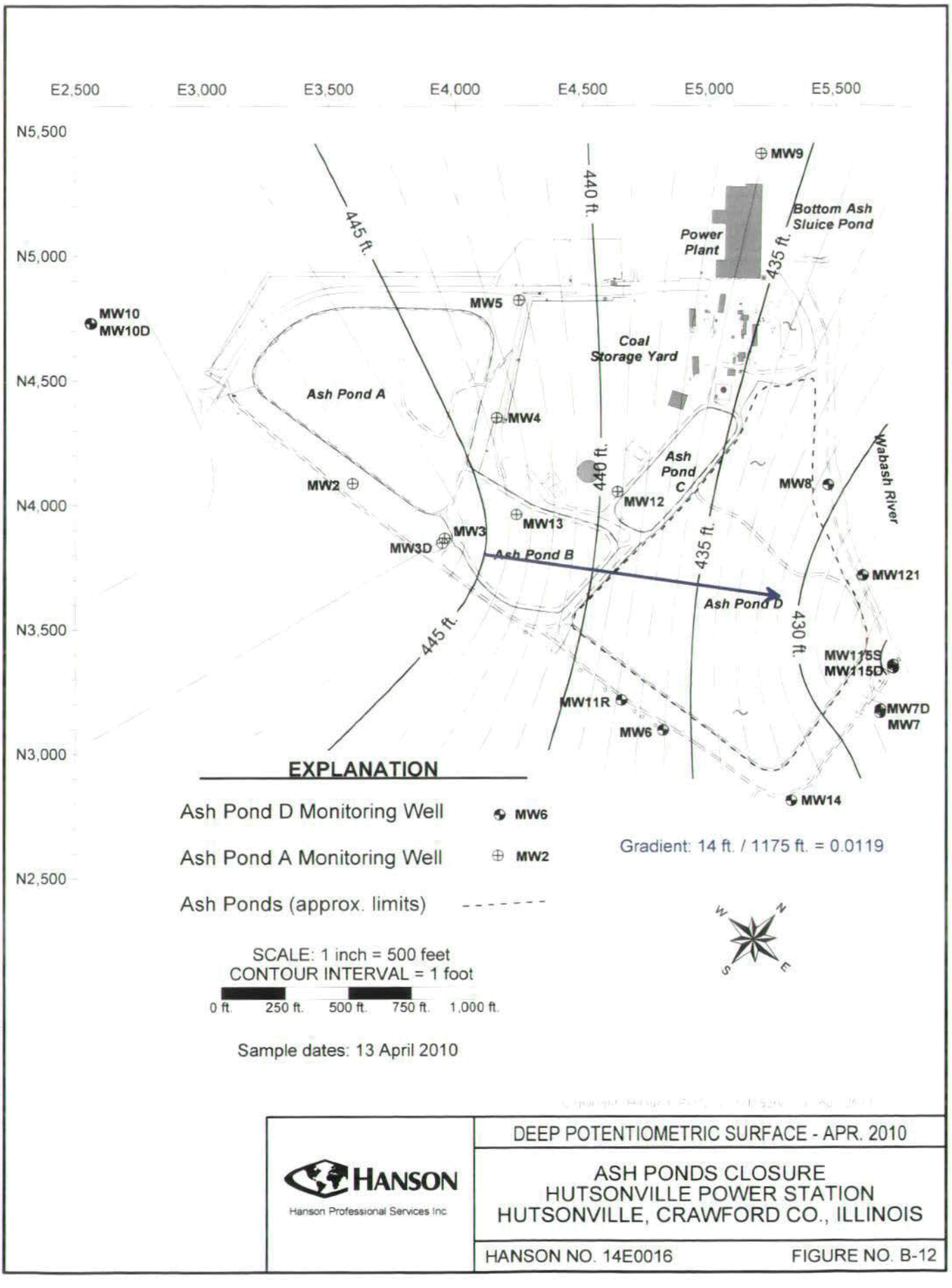

HANSON
Hanson Professional Services Inc.

DEEP POTENTIOMETRIC SURFACE - APR. 2010

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-12

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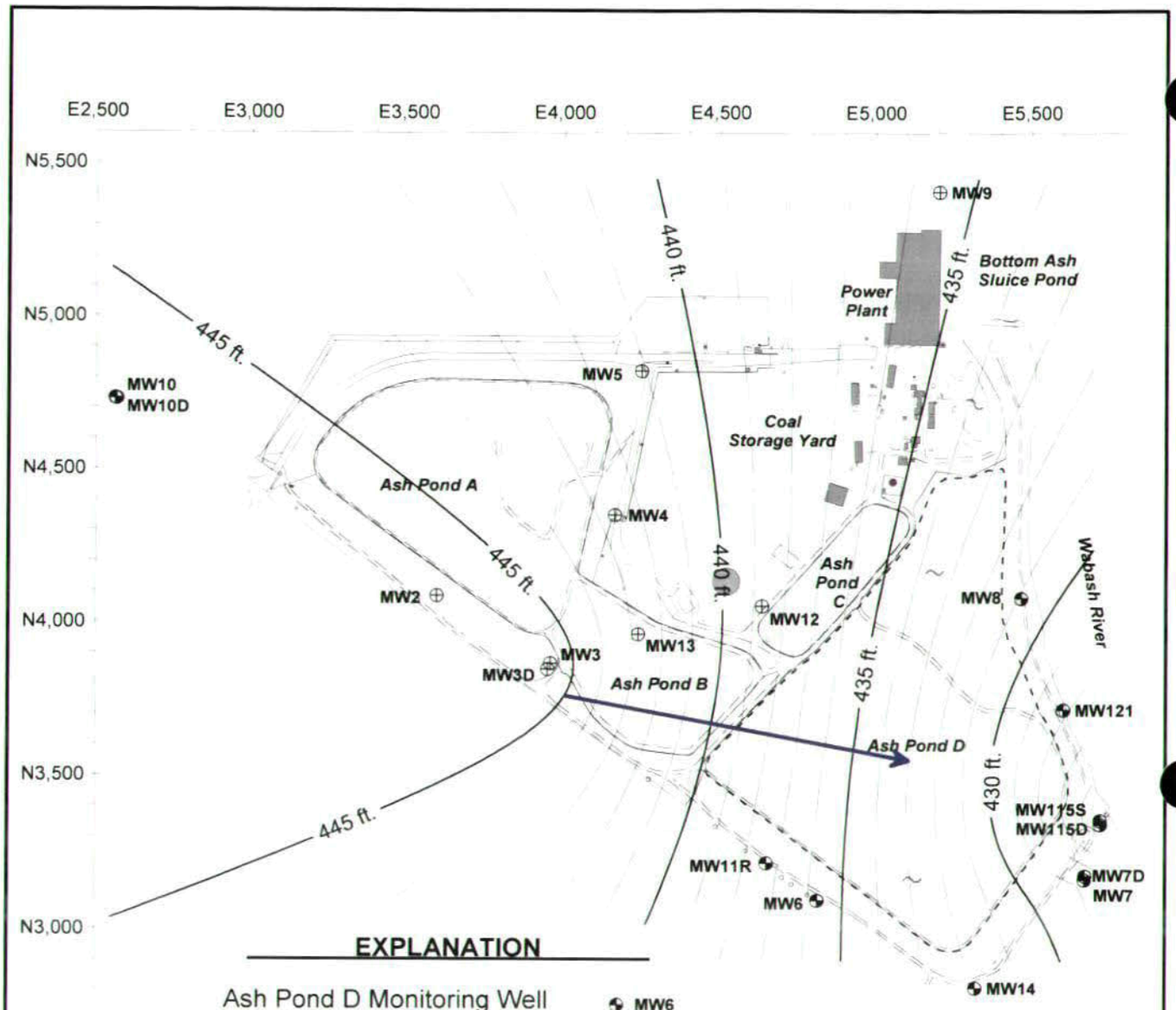

HANSON
Hanson Professional Services Inc

DEEP POTENTIOMETRIC SURFACE - OCT. 2013

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. B-13

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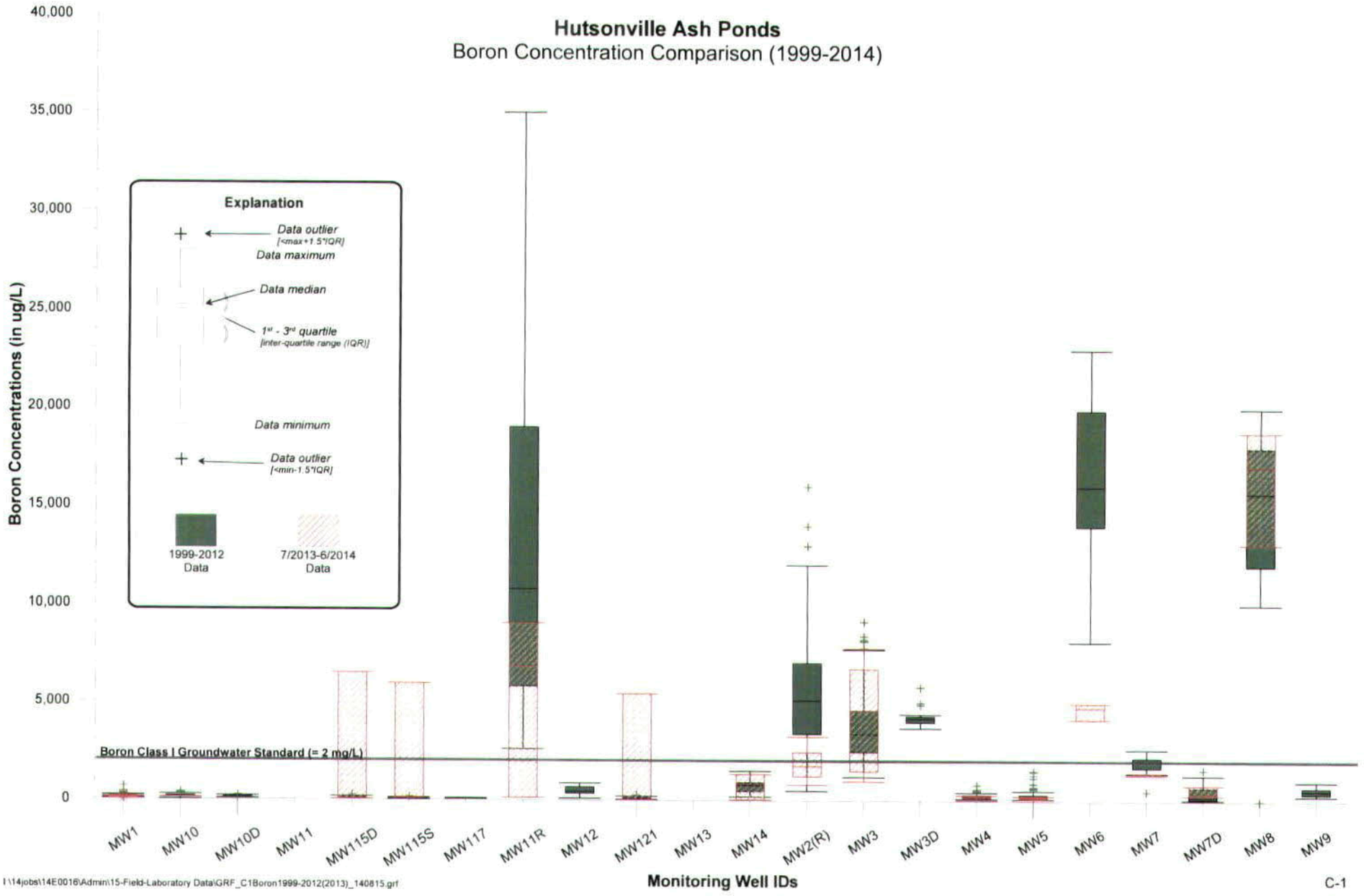
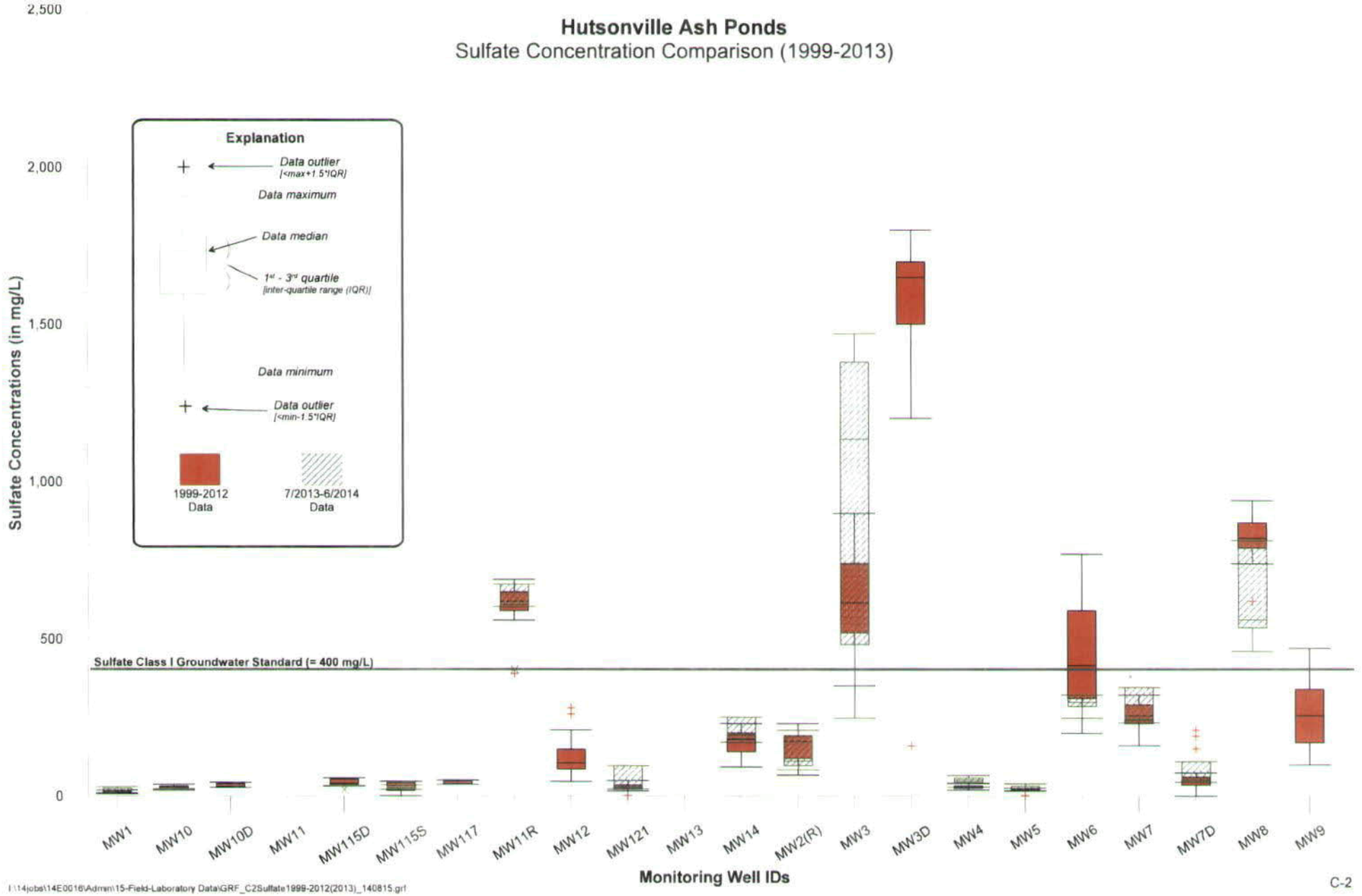
Appendix C

Groundwater Quality Information




Hutsonville Ash Ponds
Boron Concentration Comparison (1999-2014)
Explanation
Data outlier [<max+1.5*IQR]
Data maximum
Data median
1st - 3rd quartile [inter-quartile range (IQR)]
Data minimum
Data outlier [<min-1.5*IQR]
1999-2012 Data
7/2013-6/2014 Data
Boron Concentrations (in ug/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Boron Class I Groundwater Standard (= 2 mg/L)
MW1
MW10
MW10D
MW11
MW115D
MW115S
MW117
MW11R
MW12
MW121
MW13
MW14
MW2(R)
MW3
MW3D
MW4
MW5
MW6
MW7
MW7D
MW8
MW9
Monitoring Well IDs
I:\14jobs\14E0016\Admin\15-Field-Laboratory Data\GRF_C1Boron1999-2012(2013)_140815.grf
C-1


Hutsonville Ash Ponds
Sulfate Concentration Comparison (1999-2013)
Explanation
Data outlier [<max+1.5*IQR]
Data maximum
Data median
1st - 3rd quartile
[inter-quartile range (IQR)]
Data minimum
Data outlier [<min-1.5*IQR]
1999-2012 Data
7/2013-6/2014 Data
Sulfate Concentrations (in mg/L)
2,500
2,000
1,500
1,000
500
0
Sulfate Class I Groundwater Standard (= 400 mg/L)
MW1
MW10
MW10D
MW11
MW115D
MW115S
MW117
MW11R
MW12
MW121
MW13
MW14
MW2(R)
MW3
MW3D
MW4
MW5
MW6
MW7
MW7D
MW8
MW9
Monitoring Well IDs
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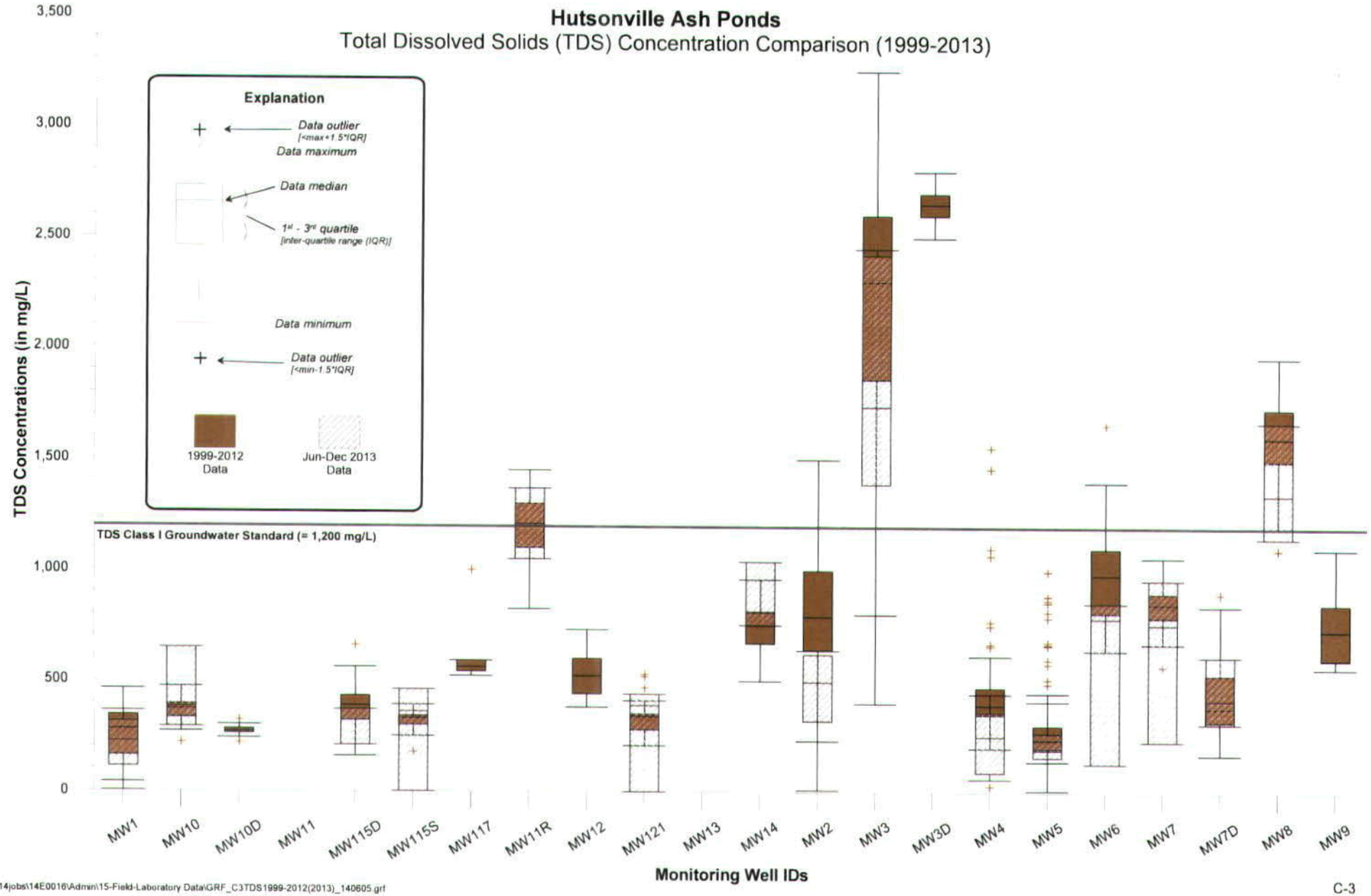
Hutsonville Ash Ponds
Total Dissolved Solids (TDS) Concentration Comparison (1999-2013)
Explanation
Data outlier [<max+1.5*IQR]
Data maximum
Data median
1st - 3rd quartile
[inter-quartile range (IQR)]
Data minimum
Data outlier [<min-1.5*IQR]
1999-2012 Data
Jun-Dec 2013 Data
TDS Class I Groundwater Standard (= 1,200 mg/L)
TDS Concentrations (in mg/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
MW1
MW10
MW10D
MW11
MW115D
MW115S
MW117
MW11R
MW12
MW121
MW13
MW14
MW2
MW3
MW3D
MW4
MW5
MW6
MW7
MW7D
MW8
MW9
Monitoring Well IDs
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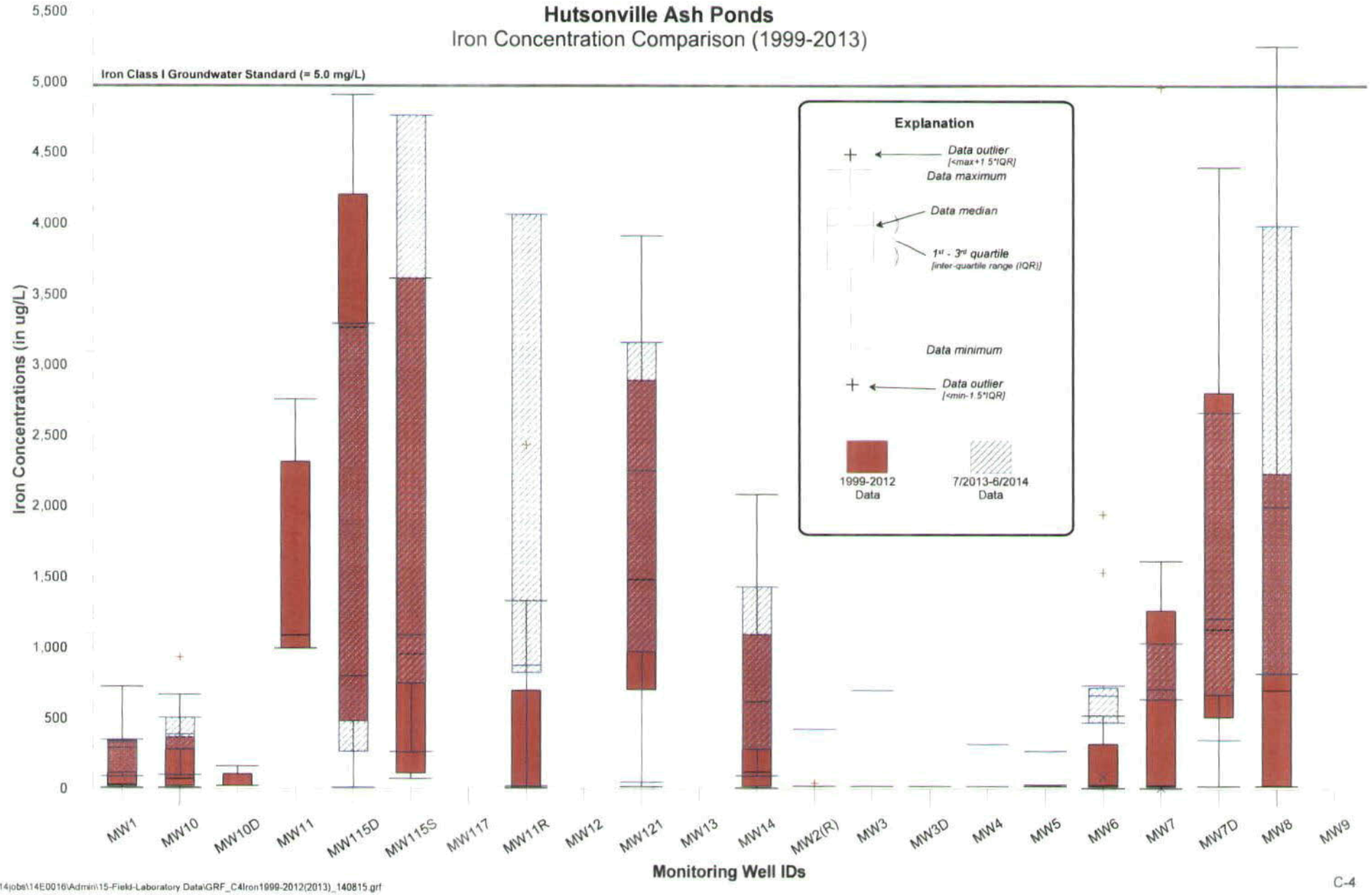

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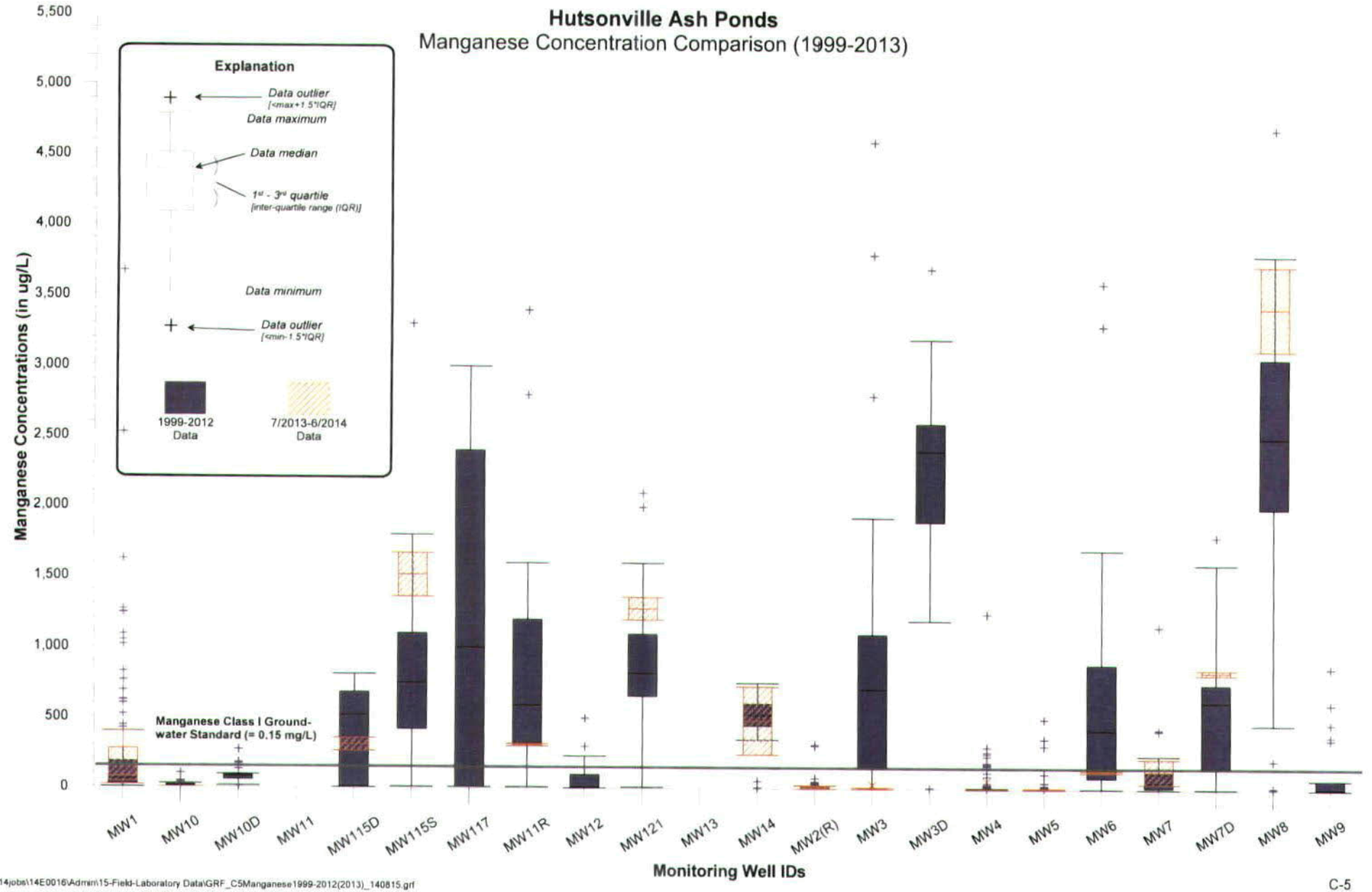

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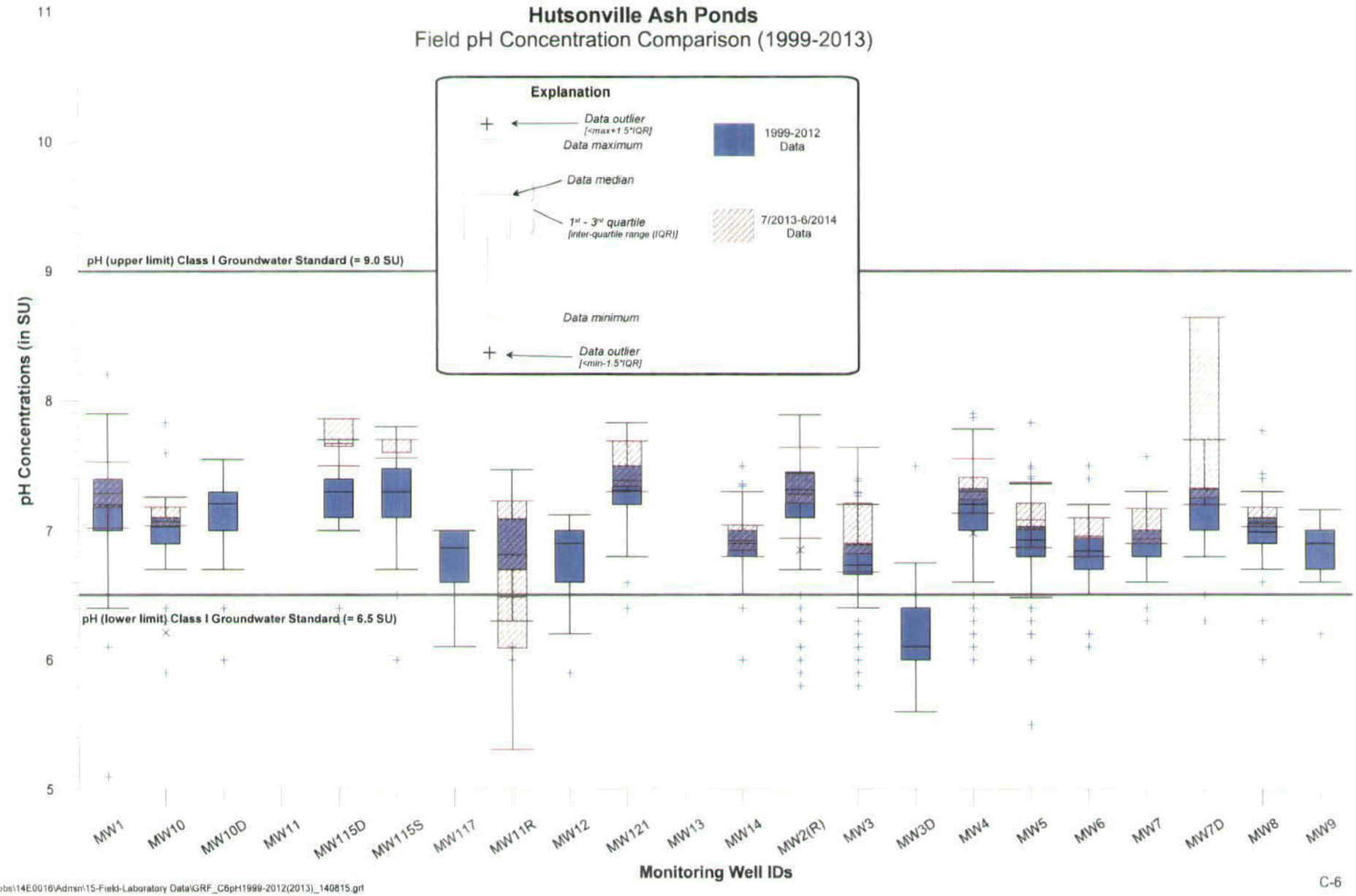

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Ash Ponds Closure

Groundwater Monitoring Plan

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

September 15, 2014

NATURAL RESOURCE TECHNOLOGY

HANSON
Engineering | Planning | Allied Services

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4.2 Statistical Analysis Results 8

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1. Introduction

The following monitoring program is provided for the AmerenEnergy Medina Valley Cogen, L.L.C. Hutsonville Power Station's Ash Ponds (Site) closure for the purpose of evaluating the performance of the ash pond closure activities, including the Ash Pond D groundwater collection trench required by rule at Title 35, Illinois Administrative Code, Part 840, [35 IAC 840], the pond cover system(s) generally conforming to the existing 35 IAC 840 or, where appropriate, the proposed 35 IAC 841 design criteria, and the Groundwater Management Zone (GMZ), proposed for the Site, under 35 IAC 620.250. The program shall monitor groundwater to evaluate closure and post-closure groundwater quality trends and determine compliance with the applicable standards.

2. Groundwater Monitoring Program

The groundwater monitoring program design basis includes the geology and hydrogeology information presented in the Hydrogeologic Site Investigation. This Monitoring Plan (Plan) outlines groundwater monitoring and sampling procedures; the parameters to be evaluated and analytical methods; and assessment of groundwater quality data. This Plan does not modify or supplant the existing monitoring program required under the Ash Pond System Operating Permit (Permit No. 2005-EO-3689 or its successors) and will not go into effect until the approval of the Closure and Post-Closure Care Plans that this document supports.

2.1 Monitoring Locations

Groundwater samples will be obtained from a set of previously installed groundwater monitoring wells, plus any additional monitoring wells as described in Section 3. Monitoring wells have a well identification number with a "MW" identifier (monitoring well) followed by a 1-, 2-, or 3-place alpha-numeric designation (e.g., MW2, MW7D, etc.). Monitoring wells that were installed to replace previously installed wells are identified with an "R" in the designation (e.g. MW11R).

The monitoring program follows 35 IAC 620 Subpart E by satisfying the following standards for the monitoring system:

1. The monitoring wells are sufficiently located to represent the quality of groundwater at the compliance point(s).
2. The monitoring wells are located within the stratigraphic unit(s) that may serve as potential contaminant migration pathways.
3. And, the groundwater monitoring wells are secure.

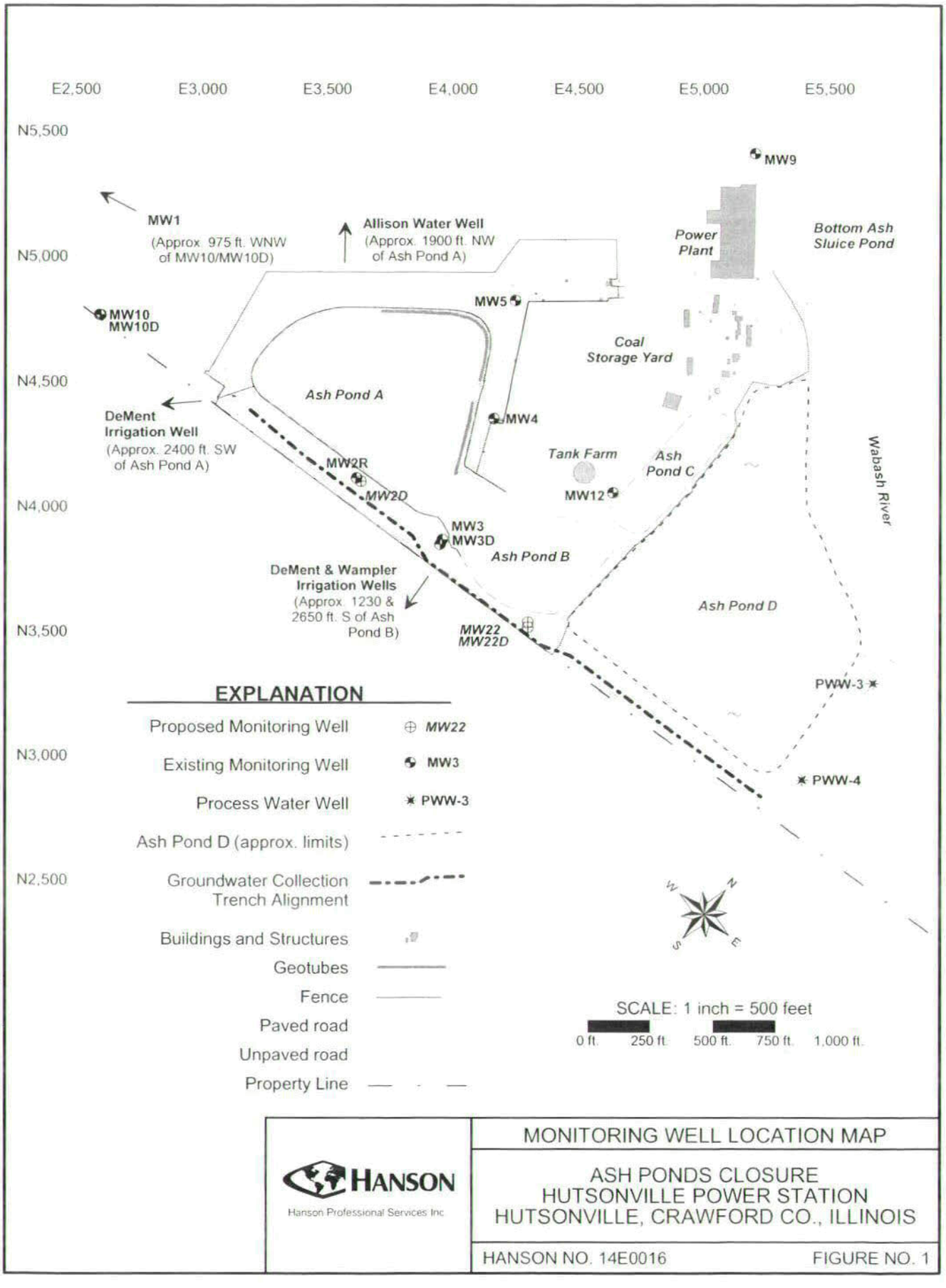
2.2 Monitoring Well Installation and Abandonment

Figure 1 depicts the locations of the current monitoring wells at the Site.

Table 1 lists the monitoring wells, identification numbers, and locations of the wells that will be used for closure and post-closure activities at the Site.

The existing groundwater monitoring wells were generally constructed in accordance with:

1. Illinois Department of Public Health (IDPH) standards as cited in 77 IAC 920.170;
2. Regulatory standards as cited in 35 IAC 620.505(a); and
3. Chapter 6 – Monitoring Well Design and Construction, RCRA Groundwater Monitoring Technical Enforcement Guidance Document, U.S. EPA, November 1992.



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MONITORING WELL LOCATION MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 1

I:\14jobs\14E0016\Admin\14-Reports\HydroGeo\FIG_1WellMap_140813.srf

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As-built diagrams for the groundwater monitoring wells are included in the Technical Source Documents (TSDs)[1]. The monitoring wells were constructed to yield groundwater samples that represent the quality of groundwater within the geologic formation(s) monitored at the site.

Each existing monitoring well shall be maintained so representative groundwater samples may be collected. Items to observe during routine monitoring include; check concrete pad/seal for cracks, integrity of the protective casing, casing lock, seal of well cap, and integrity of the well riser (cracks, bends, etc.). In the event a monitoring well is damaged, the well shall be repaired or replaced in accordance with regulatory requirements.

Table 1. Hutsonville Ash Pond A Groundwater Monitoring System

Monitoring Well ID	Monitoring Well Designation	Monitoring Zone	Install Date	Location[2]		Screen Interval
				Easting	Northing	
MW2R	Downgradient	Shallow	6 Apr 12	3617.43	4112.60	446.0-435.2
MW2D[3]	Downgradient	Deep	*proposed*	3612.	4110.	435.0-430.0
MW3	Downgradient	Shallow	9 Feb 84	3952.03	3860.23	450.9-445.9
MW3D	Downgradient	Deep	6 Oct 98	3952.03	3860.23	433.6-438.6
MW4	Downgradient	Shallow	13 Feb 84	4164.06	4350.55	450.8-443.3
MW5	Downgradient	Shallow	13 Feb 84	4249.98	4821.99	453.5-440.5
MW9	Piezometer	Shallow	14 Oct 84	5202.	5408.	448.2-438.2
MW10	Upgradient	Shallow	7 Oct 98	2559.81	4730.48	447.2-442.2
MW10D	Upgradient	Deep	7 Oct 98	2564.72	4729.43	437.6-433.6
MW12	Downgradient	Shallow	8 Oct 98	4637.98	4053.58	448.6-438.6
MW22[3]	Downgradient	Shallow	*proposed*	4300.	3525.	450.0-445.0
MW-2D[3]	Downgradient	Deep	*proposed*	4300.	3525.	435.0-430.0

[2] Monitoring Well locations based on Plant coordinate system.

[3] Proposed monitoring well to be installed upon approval of this Groundwater Monitoring Plan by Illinois EPA. Deep wells (D suffix) may need to be installed due to shallow zone dewatering from collection trench.

3. Modifications to the Monitoring Well Network

Ash Pond A must currently monitor groundwater as part of Permit No. 2005-EO-3689. This monitoring requires the monthly testing of MW1 through MW5, with the annual reporting of results to the Illinois Environmental Protection Agency (EPA). Per the terms of this permit, additional monitoring wells MW6 through MW9 are required to remain operational, although monitoring is not required. A number of additional wells have been installed as part of prior investigations and associated with the site-specific rulemaking authorizing the in-place closure of Ash Pond D (Illinois PCB, 2011). As described below, three of these monitoring wells will be used in conjunction with this Monitoring Plan.

As part of the Site closure activities, the following recommendations to the monitoring well network are being made as part of this application:

[1] Available at: http://www.ipcb.state.il.us/documents/dsweb/Get/Document-65177 in Chapter 6 of the Rulemaking Technical Support Documents.

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- MW1 shall be removed upon renewal and/or termination of Permit No. 2005-EO-3689. Closure and post-closure use of this well is unnecessary, because it is too distant (975 ft. from Ash Pond A) for an effective upgradient well and MW10 and MW10D are better positioned for upgradient water quality determination.
- MW9 shall be retained as a piezometer upon completion of the monitoring requirements of Permit No. 2005-EO-3689, and will be used to collect water elevation data only.
- MW10D upgradient deep zone (sandstone) well. This well shall be monitored if the groundwater collection trench causes any of the shallow zone wells (i.e., MW2R, MW3, etc.) to go dry.
- MW2D downgradient deep (sandstone) well. This well shall be installed if the groundwater collection trench causes MW2R to go dry and upon approval of this Plan.
- MW3D downgradient deep (sandstone) well. This well shall be monitored if the groundwater collection trench causes MW3 to go dry.
- MW22 Compliance monitoring well location for GMZ monitoring. This well will be added to the shallow zone monitoring system after approval of this Plan.
- MW22D This monitoring well will be added to the monitoring system only if the groundwater collection trench dewaters the shallow zone and after approval of this Plan.

4. Groundwater Quality Characterization

4.1 Statistical Evaluation of Background Groundwater Data

The groundwater quality data for samples, collected from the monitoring wells installed for the Site, collected from upgradient monitoring well MW10 was evaluated using the Electric Power Research Institute (EPRI) computer database and analysis program, MANAGES™ (Version 3.2). Three US EPA documents were principally used as a guide for the statistical evaluation of the groundwater data: Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities – Interim Final Guidance (US EPA, 1989), Statistical Analysis of Ground-Water Monitoring at RCRA Facilities – Addendum to Interim Final Guidance (US EPA, 1992), and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance, (US EPA, 2009).

Establishing the tolerance interval(s) for the groundwater constituents was accomplished by using either a parametric or non-parametric procedure based on the percentage of non-detects in the data sets and the distribution of the sample population (see Statistical Methodology in Appendix A). If the statistical data for a constituent had less than 50 percent non-detects and was normally or log-normally distributed, a parametric procedure was used. If the data was not normally or log-normally distributed or had more than 50 percent non-detects, a non-parametric procedure was used. Figure A-1 is a flow chart which illustrates the processes followed to determine the appropriate statistical procedure used for each constituent based on its statistical characteristics. The results of the statistical analyses for the groundwater are located in Appendix B.

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4.2 Statistical Analysis Results

The results of the statistical analyses for the Site groundwater, completed in accordance with the methodology presented in Appendix A, are presented in Appendix B, and are summarized in Table A-1. For each parameter, the pages of the output file in Appendix B identify the statistical methods used to determine the upper tolerance interval, the percentage of non-detects, the lower tolerance interval (two-tail tests only), and the type of data distribution.

Results of the background water quality evaluation indicate that background groundwater sample results at MW1 (24 monthly or 8 quarterly samples from January 2012 through December 2013) and MW10 (8 quarterly samples from 1st Quarter 2012 through 4th Quarter 2013) contributed to the background water quality values calculated as part of this study and presented in Table 2.

Table 2. Shallow Zone Background Groundwater Quality Values

Parameter	Units	Concentration	Parameter	Units	Concentration
Antimony, dissolved	mg/L	0.010	Lead, dissolved	mg/L	0.010
Arsenic, dissolved	mg/L	0.012	Manganese, dissolved	mg/L	0.395
Barium, dissolved	mg/L	0.028	Mercury, dissolved	mg/L	0.0007
Beryllium, dissolved	mg/L	0.010	Nickel, dissolved	mg/L	0.009
Boron, dissolved	mg/L	0.190	Nitrate (as N), dissolved	mg/L	3.87
Cadmium, dissolved	mg/L	0.010	pH (lower interval)	SU	6.21
Chloride, dissolved	mg/L	83.670	pH (upper interval)	SU	7.870
Chromium, dissolved	mg/L	0.012	Selenium, dissolved	mg/L	0.011
Cobalt, dissolved	mg/L	0.010	Silver, dissolved	mg/L	0.010
Copper, dissolved	mg/L	0.009	Sulfate, dissolved	mg/L	67.37
Cyanide, total	mg/L	0.360	Thallium, dissolved	mg/L	0.007
Fluoride, dissolved	mg/L	0.262	Total Dissolved Solids (TDS)	mg/L	568.57
Iron, dissolved	mg/L	1.109	Zinc, dissolved	mg/L	0.025

5. Groundwater Monitoring/Sampling

5.1 Sampling Schedule

Sampling for routine analysis shall be conducted in a manner similar to the existing Hutsonville "site-specific" rules found at 35 IAC 840.114(a) to provide some consistency between the Ash Pond D and Ash Pond A monitoring programs. The schedule for quarterly groundwater monitoring is listed in Table 3, and is based on the quarterly submittal requirements for Illinois EPA Bureau of Water National Pollutant Discharge Elimination System (NPDES) permits:

Table 3. Quarterly Groundwater Monitoring Schedule

Sampling Quarter	Report Due Date	Sampling List
January - March (1)	May 31	Field & Routine
April - June (2)	August 31	Field & Routine
July - September (3)	November 30	Field & Routine
October - December (4)	February 28	Field & Routine

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5.2 Parameter List

Routine sample collection will be conducted quarterly on the schedule outlined above, for the constituents listed in Table 4 and Table 5 [per 35 IAC 620.410(a) and 410(e), excluding Radium-226 and Radium-228].

Groundwater monitoring can be concluded upon successful completion of Groundwater Management Zone requirements (35 IAC 620.250) and approval of the Illinois EPA.

Table 4. Field Monitoring Parameters

Parameters[1]
pH[2]
Specific Conductance[2]
Elevation of GW Surface[2]
Depth of Well (bls)[2]
Temperature
Depth to Water (bmp)
Elevation of measuring point

Table 5. Routine Monitoring Parameters

Parameters[1]	Parameters[1]
Antimony, dissolved	Iron[2], dissolved
Arsenic, dissolved	Lead, dissolved
Barium, dissolved	Manganese[2], dissolved
Beryllium, dissolved	Mercury, dissolved
Boron[2], dissolved	Nickel, dissolved
Cadmium, dissolved	Nitrate (as N), dissolved
Chloride, dissolved	Selenium, dissolved
Chromium, dissolved	Silver, dissolved
Cobalt, dissolved	Sulfate[2], dissolved
Copper, dissolved	Total Dissolved Solids (TDS)[2]
Cyanide, total	Thallium, dissolved
Fluoride, dissolved	Vanadium, dissolved
	Zinc, dissolved

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5.3 Monitoring/Sampling Procedure

Groundwater samples shall be collected following the procedures presented in Appendix C, or equivalent methods developed by Ameren or its contractors.

[1] Routine parameters are reported as dissolved (filtered) concentrations with the exception of the Field Monitoring Parameters and Cyanide, which are taken from total (unfiltered) samples.
[2] Mandatory monitoring parameter under 35 IAC 840.114(a).

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5.2 Parameter List

Routine sample collection will be conducted quarterly on the schedule outlined above, for the constituents listed in Table 4 and Table 5 [per 35 IAC 620.410(a) and 410(d), excluding Radium-226 and Radium-228].

Ameren may seek future reductions in the monitoring frequency and/or monitored parameters, consistent with criteria in the final 841 regulations, if approved, and found applicable to the closure of these ponds. Furthermore, groundwater monitoring can be concluded upon successful completion of Groundwater Management Zone requirements (35 IAC 620.250) and approval of the Illinois EPA.

Table 4. Field Monitoring Parameters

Parameters[1]	STORET
pH[2]	00400
Specific Conductance[2]	00094
Elevation of GW Surface[2]	71993
Depth of Well (bls)[2]	72008
Temperature	00011
Depth to Water (bmp)	72109
Elevation of measuring point	72110

Table 5. Routine Monitoring Parameters

Parameters[1]	STORET	Parameters[1]	STORET
Antimony, dissolved	01095	Iron[2], dissolved	01046
Arsenic, dissolved	01000	Lead, dissolved	01049
Barium, dissolved	01005	Manganese[2], dissolved	01056
Beryllium, dissolved	01010	Mercury, dissolved	71890
Boron[2], dissolved	01020	Nickel, dissolved	01065
Cadmium, dissolved	01025	Nitrate (as N), dissolved	00618
Chloride, dissolved	00941	Selenium, dissolved	01145
Chromium, dissolved	01030	Silver, dissolved	01075
Cobalt, dissolved	01035	Sulfate[2], dissolved	00946
Copper, dissolved	01040	Total Dissolved Solids (TDS)[2]	70300
Cyanide, total	00720	Thallium, dissolved	01057
Fluoride, dissolved	00950	Zinc, dissolved	01090

5.3 Monitoring/Sampling Procedure

Groundwater samples shall be collected following the procedures presented in Appendix C, or equivalent methods developed by Ameren or its contractors.

[1] Routine parameters are reported as dissolved (filtered) concentrations with the exception of the Field Monitoring Parameters and Cyanide, which are taken from total (unfiltered) samples.
[2] Mandatory monitoring parameter under 35 IAC 840.114(a).

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6. Analysis of Site Groundwater Monitoring Samples

6.1 Laboratory Analysis

Laboratory analysis and testing methods shall be in general accordance with those listed in the U.S. EPA publication Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA/530/SW-846, 3rd Edition – Update V, amended October 2013 (U.S. EPA, 2013) or as superseded by future editions. The specific testing method used for analysis shall have Practical Quantitation Limit (PQL) values that are capable of determining if regulatory and/or site groundwater standards are exceeded. [For example, 35 IAC Part 724, Appendix I lists three methods and PQLs for Chromium. Methods 7190, Method 6010, and Method 7191 have QPLs of 500 ppb; 70 ppb; and 10 ppb, respectively. Since 35 IAC 620.410 sets the groundwater standard for Chromium at 100 ppb, the method with the highest PQL that can meet or exceed this standard would be Method 6010.] Specific testing methods shall be referenced in the Laboratory Analysis Report.

Other references (unless superseded) for testing methods may include:

1. Test Method: The Determination of Inorganic Anions in Water by Ion Chromatography – Method 300.0, EPA 600/4-84-017, Revision 2.1, August 1993.
2. Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79/020, 3rd Edition, March 1983.
3. Methods for the Determination of Inorganic Substances in Environmental Samples, EPA 600/R-93/100, August 1993.
4. Methods for the Determination of Metals in Environmental Samples, EPA 600/4-91/010, June 1991.
5. Methods for the Determination of Metals in Environmental Samples; Supplement I, EPA 600/R-94/111, May 1994.
6. Standard Methods for Determination of Organic and Inorganic Compounds in Drinking Water: Volume 1; US EPA, EPA 815/R-00/014, August 2000.

Quality Assurance/Quality Control (QA/QC) programs may vary from laboratory to laboratory, but will contain the same general methodologies. The QA/QC programs are implemented: to evaluate the accuracy and precision of analytical data in order to establish the quality of the data; to provide an indication of the need for corrective actions, when comparison with existing regulatory or program criteria or data trends shows that activities must be changed or monitored to a different degree; and to determine the effect of corrective actions (U.S. EPA SW-846, 2013).

Methodologies used by the laboratory to ensure representative analytical results may vary. Some methodologies that may be used are:

1. Calibration checks, used to enhance instrument reliability. Instrumental calibration curves will be generated in a manner consistent with the instrument and method utilized. Calibration verification shall be conducted on a regular basis;
2. Laboratory control samples and/or quality control check standards that have been spiked with analytes may be used to monitor the performance of the method;

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3. Matrix spike/matrix spike duplicate analyses are samples in which solutions of specific aliquots are added to a sample matrix prior to sample extraction/digestion and analysis. Samples are split into duplicates, spiked and analyzed. Percent recoveries and relative percent differences are calculated for each of the analyses detected;
4. Replicate samples shall be routinely analyzed to check the precision of the instrumentation and/or methodology employed for all analytical methods; and
5. Where applicable, method blanks are prepared and analyzed each day or sample batch to ensure that the system is free of contamination.

The QA/QC program at the laboratory should generally follow the requirements outlined in the U.S. EPA publication Test Methods for Evaluation Solid Waste, Physical/Chemical Methods, EPA/530/SW-846, 3rd Edition –Update V, amended January 2013 (U.S. EPA, 2013) and which may be periodically revised in the future. However, other published QA/QC methods may be utilized as part of laboratory policy provided the QA/QC methodologies generally follow those numerated above.

7. Site Monitoring Program Evaluation

7.1 Groundwater Quality Standards

Pursuant to 35 IAC 620.450(a), the on-site groundwater quality shall be the greater of either the actual monitoring result, or the Class I Potable Resource Groundwater standard [35 IAC 620.410] prior to the completion of the post-closure care period. If upon completion of the post-closure care period the observed concentrations in the site groundwater still exceed a Class I standard, the on-site standard can be adjusted provided criteria are addressed to the satisfaction of the Illinois EPA:

7.2 Demonstration of Compliance

Compliance will be evaluated against the appropriate groundwater standard included in Section 7.1 , above. On-site groundwater shall be considered to be in compliance when no statistically significant increasing trend can be attributable to Ash Pond A at the compliance boundary and with Illinois EPA concurrence.

7.2.1 Compliance Determination

Groundwater Management Zone (GMZ) compliance will be demonstrated by performing an annual trend analysis for each downgradient monitoring well for all of the monitored constituents listed in Table 4 and Table 5. The analysis shall be performed on a minimum of four (4) consecutive samples and use Sen's Estimate of Slope for compliance determination. Generally, if analyses for a parameter show an increasing trend at a down-gradient well, a Mann-Kendall analysis must be performed at a 95% confidence limit to determine whether the increasing trend is statistically significant. If there is a statistically significant increase, then an investigation determining that the statistically significant increasing trend is due to a superseding cause will be performed, and the Illinois EPA will be notified in writing, stating the cause of the increasing trend and the rationale used in its determination.

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If a statistically significant increasing trend continues to be observed over two or more consecutive years and there is no superseding cause, a hydrogeologic investigation (and additional site investigation(s), if necessary) must be performed.

Based on the outcome of the additional activities, action must be taken to mitigate the statistically significant increasing trends that are causing, threatening or allowing exceedances of off-site groundwater quality standards. Any actions must be proposed as a modification to the post-closure care plan within 180 days after completion of the additional hydrogeologic and/or additional site investigations.

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Appendix A

Statistical Methodology



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A.1 Statistical Methodology

A.1.1 Introduction

The purpose of the statistical calculations documented in this appendix is to determine the maximum background concentrations likely to occur upgradient of the Hutsonville ash ponds. High predicted background concentrations relative to the Class I groundwater quality standards may suggest that downgradient concentrations for those parameters are due to a background source.

The statistical analysis procedures used here are consistent with procedures described in the document: 2009 Unified Guidance. "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities—Unified Guidance," March 2009, EPA 530/R-09-2007 (USEPA, 2009).

A.1.2 Compliance Data Operations - Limit Calculations

The range of potential background concentrations was statistically determined using parametric and non-parametric tolerance intervals. Tolerance intervals were chosen rather than prediction intervals because a tolerance interval makes no assumption about the future number of samples, while a prediction interval assumes a finite, and known, future number of samples.

The flow diagram (Figure A-1) outlines the logic flow for calculation of limits. Background values were calculated using parametric tolerance intervals for normally distributed data, and non-parametric tolerance intervals for data with no underlying distribution or with non-detect frequencies greater than 50 percent. Parametric tolerance intervals were calculated at a 95 percent coverage rate and a Type I individual comparison error level of 0.01 (i.e., false positive rate). Parameters with 100 percent non-detects were handled with the upper tolerance limit being set to the last Reporting Limit (RL).

A.1.3 Statistical Data Evaluation and Results

The input dataset (Appendix A.1) for background calculations were evaluated for the quarterly data from monitoring wells MW1 and MW10, collected from 2012 through 2013, for the inorganic parameters listed in 35 IAC 620.410(a) and excluding radium-226, radium-228, and perchlorate. All water quality data were stored, prepared, and statistically analyzed using MANAGES™ Version 3.2.39 software (EPRI, November 2010).

A statistical summary of the background water quality data from MW1 and MW10 is provided in Appendix B, and includes the mean, median, minimum, maximum, standard deviation, Sen Slope trend, normality determination, and percent non-detects for the background dataset. The statistical analysis procedure inputs and results are also provided in Appendix B.

Calculated background values for the tested inorganic constituents and pH are listed in Table A-1 along with the percentage of non-detected parameters, normal or lognormal distribution, test methodology, and confidence level.

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Figure A-1. Statistical Analysis Flowchart

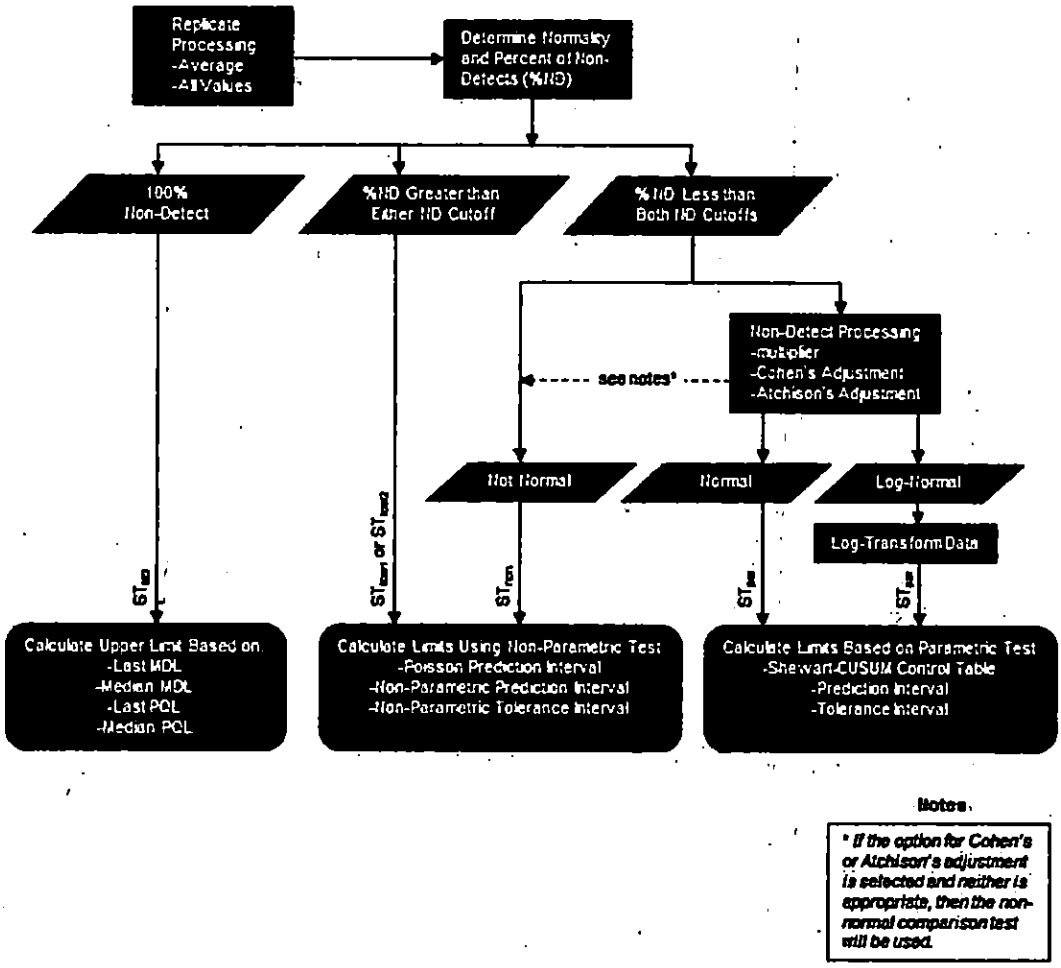

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Table A-1. Tolerance Limits for Background Monitoring Wells MW1 and MW10

Parameter (Units)	Count of Background Results	% Non-Detects	Normal/ Lognormal	Test[1]	Confidence Level	Upper Limit	Lower Limit
Ag, diss, (mg/L)	16	100.00	No/No	STmdl	N/A	0.010	
As, diss, (mg/L)	16	87.50	No/No	STlow1	55.99	0.012	
Ba, diss, (mg/L)	16	0.00	Yes/Yes	STpar	99.00	0.028	
Be, diss, (mg/L)	16	100.00	No/No	STmdl	N/A	0.010	
B, diss, (mg/L)	32	6.25	Yes/No	STpar	99.00	0.190	
Cd, diss, (mg/L)	16	100.00	No/No	STmdl	N/A	0.010	
Cl, diss, (mg/L)	16	0.00	Yes/Yes	STpar	99.00	83.67	
CN, total, (mg/L)	16	62.50	No/No	STlow1	55.99	0.360	
Co, diss, (mg/L)	16	100.00	No/No	STmdl	N/A	0.010	
Cu, diss, (mg/L)	16	68.75	No/No	STlow1	55.99	0.009	
Cr, diss, (mg/L)	16	81.25	No/Yes	STlow1	55.99	0.012	
F, diss, (mg/L)	16	12.50	Yes/Yes	STpar	99.00	0.262	
Hg, diss, (mg/L)	16	81.25	No/No	STlow1	55.99	0.0007	
Fe, diss, (mg/L)	16	0.00	Yes/Yes	STpar	99.00	1.109	
Mn, diss, (mg/L)	32	28.13	No/No	STnon	80.63	0.395	
Ni, diss, (mg/L)	16	81.25	Yes/Yes	STlow1	55.99	0.009	
NO3, diss, (mg/L)	16	37.50	No/Yes	STpar	99.00	3.870	
Pb, diss, (mg/L)	16	100.00	No/No	STmdl	N/A	0.010	
pH (field), (SU)	32	0.00	No/No	STnon	80.63	7.830	6.210
Sb, diss, (mg/L)	16	100.00	No/No	STmdl	N/A	0.010	
Se, diss, (mg/L)	16	87.50	No/No	STlow1	55.99	0.011	
SO_4, diss, (mg/L)	32	0.00	No/Yes	STpar	99.00	67.37	
TDS, (mg/L)	32	0.00	Yes/No	STpar	99.00	568.57	
Tl, diss, (mg/L)	16	87.50	Yes/No	STlow1	55.99	0.007	
Zn, diss, (mg/L)	16	37.50	Yes/Yes	STpar	99.00	0.025	

[1] Key to Tests
STmdl = Comparison method if all background results are non-detect = Last MDL
STpar = Parametric Tolerance Interval on background
STlow1 = Non-Parametric Tolerance Interval on background (ND Frequency > 50%)
STnon = Non-Parametric Tolerance Interval on background

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Appendix B

Groundwater Statistical Calculations

HANSON

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Appendix B

Groundwater Statistical Calculations

HANSON

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Hutsonville Ash Impoundment
Analysis Results by Parameter (column), Location (row), and Date (row)

Date Range: 01/01/2012 to 12/05/2013

Well Id	Date Sampled	Lab Id	Ag, diss, mg/L	As, diss, mg/L	B, diss, ug/L	Ba, diss, mg/L	Be, diss, mg/L	Cd, diss, mg/L
MW1	01/30/2012	AC23054	<0.0070	<0.007	23.000	0.015	<0.007	<0.002
	02/16/2012	AC23950			118.000			
	03/15/2012	AC25361			106.000			
	04/13/2012	AC26846	<0.0070	<0.007	100.000	0.020	<0.007	<0.002
	05/10/2012	AC28222			101.000			
	06/11/2012	AC29901			114.000			
	07/09/2012	AC31693	<0.0070	<0.007	131.000	0.019	<0.007	<0.002
	08/23/2012	AC34284			147.000			
	09/21/2012	AC35462			140.000			
	10/18/2012	AC36007	<0.0070	<0.007	137.000	0.014	<0.007	<0.002
	11/12/2012	AC36299			128.000			
	12/17/2012	2120463-01			125.000			
	01/07/2013	3010190-01	<0.0002	0.012	120.000	0.025	<0.003	<0.012
	02/18/2013	3020305-01			87.000			
	03/08/2013	3030534-01			71.000			
	04/29/2013	3040851-01			91.000			
	05/20/2013	3040515-01	<0.0010	<0.001	106.000	0.015	<0.001	<0.001
	06/17/2013	3060597-01			74.000			
	07/12/2013	3070549-01			<2.000			
	08/26/2013	3080791-01	<0.0010	0.001	80.000	0.011	<0.001	<0.001
	09/20/2013	3090526-01			133.000			
	10/10/2013	3100520-01	<0.0100	<0.010	81.000	0.020	<0.010	<0.010
	11/22/2013	3110189-01			85.000			
	12/05/2013				71.000			
MW10	01/30/2012	AC23055	<0.0070	<0.007	<20.000	0.018	<0.007	<0.002
	04/13/2012	AC26855	<0.0070	<0.007	143.000	0.015	<0.007	<0.002
	07/09/2012	AC31702	<0.0070	<0.007	143.000	0.018	<0.007	<0.002
	10/18/2012	AC36016	<0.0070	<0.007	119.000	0.014	<0.007	<0.002
	01/07/2013	3010190-10	<0.0002	0.010	113.000	0.013	<0.003	<0.012
	05/20/2013	3040515-10	<0.0010	<0.001	66.000	0.018	<0.001	<0.001
	08/26/2013	3080791-10	<0.0100	<0.010	94.000	0.017	<0.010	<0.010
	10/10/2013	3100520-10	<0.0100	<0.010	84.000	0.022	<0.010	<0.010

Hutsonville Ash Impoundment
Analysis Results by Parameter (column), Location (row), and Date (row)

Date Range: 01/01/2012 to 12/05/2013

Well Id	Date Sampled	Lab Id	Cl, diss, mg/L	CN, total, mg/L	Co, diss, mg/L	Cr, diss, mg/L	Cu, diss, ug/L	F, diss, mg/L
MW1	01/30/2012	AC23054	2.740	0.013	<0.007	<0.002	2.000	0.176
	04/13/2012	AC26846	3.350	<0.001	<0.007	<0.002	2.000	0.077
	07/09/2012	AC31693	5.090	<0.001	<0.007	0.011	9.000	0.073
	10/18/2012	AC36007	8.080	<0.001	<0.007	<0.002	<1.000	0.061
	01/07/2013	3010190-01	4.700	0.010	<0.003	<0.004	<1.000	0.078
	05/20/2013	3040515-01	1.840	0.360	<0.001	<0.001	<1.000	0.083
	08/26/2013	3080791-01	1.510	<0.003	<0.001	<0.001	<1.000	0.068
	10/10/2013	3100520-01	2.130	<0.003	<0.010	<0.001	<10.000	0.094
MW10	01/30/2012	AC23055	66.400	0.013	<0.007	0.004	2.000	0.224
	04/13/2012	AC26855	33.100	<0.001	<0.007	0.012	1.000	<0.200
	07/09/2012	AC31702	22.900	0.005	<0.007	<0.002	<1.000	<0.200
	10/18/2012	AC36016	22.700	<0.001	<0.007	<0.002	<1.000	0.152
	01/07/2013	3010190-10	20.100	0.010	<0.003	<0.004	<1.000	0.166
	05/20/2013	3040515-10	38.900	<0.003	<0.001	<0.001	<1.000	0.154
	08/26/2013	3080791-10	49.000	<0.003	<0.010	<0.010	<10.000	0.132
	10/10/2013	3100520-10	48.000	<0.003	<0.010	<0.001	<10.000	0.148

Hutsonville Ash Impoundment
Analysis Results by Parameter (column), Location (row), and Date (row)

Date Range: 01/01/2012 to 12/05/2013

Well Id	Date Sampled	Lab Id	Fe, diss, ug/L	Hg, diss, mg/L	Mn, diss, mg/L	Ni, diss, mg/L	NO3, diss, mg/L	Pb, diss, mg/L
MW1	01/30/2012	AC23054	416.000	<0.00020	0.022	<0.007	0.320	<0.001
	02/16/2012	AC23950			0.017			
	03/15/2012	AC25361			0.054			
	04/13/2012	AC26846	724.000	0.00070	0.099	<0.007	0.079	<0.001
	05/10/2012	AC28222			0.045			
	06/11/2012	AC29901			0.018			
	07/09/2012	AC31693	342.000	0.00040	<0.007	<0.007	0.583	<0.001
	08/23/2012	AC34284			0.000			
	09/21/2012	AC35462			0.017			
	10/18/2012	AC36007	582.000	<0.00020	0.012	0.007	1.030	<0.001
	11/12/2012	AC36299			0.015			
	12/17/2012	2120463-01			0.026			
	01/07/2013	3010190-01	349.000	0.00020	0.033	<0.004	1.090	<0.003
	02/18/2013	3020305-01			<0.005			
	03/08/2013	3030534-01			0.003			
	04/29/2013	3040851-01			0.011			
	05/20/2013	3040515-01	89.000	<0.00020	0.094	<0.001	<0.050	<0.001
	06/17/2013	3060597-01			0.105			
	07/12/2013	3070549-01			0.273			
	08/26/2013	3080791-01	331.000	<0.00020	0.105	0.002	0.185	<0.001
	09/20/2013	3090526-01			0.395			
	10/10/2013	3100520-01	323.000	<0.00200	0.042	<0.010	0.126	<0.010
	11/22/2013	3110189-01			0.037			
	12/05/2013				0.015			
MW10	01/30/2012	AC23055	575.000	<0.00020	<0.007	0.009	0.301	<0.001
	04/13/2012	AC26855	932.000	<0.00020	<0.007	<0.007	<0.250	<0.001
	07/09/2012	AC31702	366.000	<0.00020	0.009	<0.007	<0.250	<0.001
	10/18/2012	AC36016	667.000	<0.00020	<0.007	<0.007	0.204	<0.001
	01/07/2013	3010190-10	242.000	<0.00020	<0.005	<0.004	0.188	<0.003
	05/20/2013	3040515-10	99.000	<0.00020	0.001	<0.001	<0.100	<0.001
	08/26/2013	3080791-10	387.000	<0.00200	<0.010	<0.010	<0.200	<0.010
	10/10/2013	3100520-10	504.000	<0.00200	<0.010	<0.010	<0.200	<0.010

Hutsonville Ash Impoundment
Analysis Results by Parameter (column), Location (row), and Date (row)

Date Range: 01/01/2012 to 12/05/2013

Well Id	Date Sampled	Lab Id	pH (field), SU	Sb, diss, mg/L	Se, diss, mg/L	SO4, diss, mg/L	TDS, mg/L	Tl, diss, mg/L
MW1	01/30/2012	AC23054	7.790	<0.007	<0.007	28.700	210.000	<0.007
	02/16/2012	AC23950	7.800			26.000	210.000	
	03/15/2012	AC25361	7.600			24.100	430.000	
	04/13/2012	AC26846	7.270	<0.007	<0.007	21.500	460.000	<0.007
	05/10/2012	AC28222	7.200			25.200	370.000	
	06/11/2012	AC29901	7.160			26.700	150.000	
	07/09/2012	AC31693	7.310	<0.007	<0.007	46.200	420.000	<0.007
	08/23/2012	AC34284	7.300			53.300	420.000	
	09/21/2012	AC35462	7.100			51.300	40.000	
	10/18/2012	AC36007	7.220	<0.007	<0.007	46.500	320.000	<0.007
	11/12/2012	AC36299	7.100			37.200	320.000	
	12/17/2012	2120463-01	7.100			37.400	200.000	
	01/07/2013	3010190-01	7.200	<0.005	<0.023	30.500	480.000	0.006
	02/18/2013	3020305-01	7.080			38.700	196.000	
	03/08/2013	3030534-01	7.200			31.400	184.000	
	04/29/2013	3040851-01	7.600			17.900	195.000	
	05/20/2013	3040515-01	7.360	<0.001	<0.001	21.500	222.000	<0.001
	06/17/2013	3060597-01	7.270			17.200	337.000	
	07/12/2013	3070549-01				10.400	228.000	
		3080791-01	7.310					
	08/26/2013	3080791-01	7.180	<0.001	<0.001	13.800	310.000	<0.001
	09/20/2013	3080791-01	7.070					
		3090526-01				16.300	270.000	
	10/10/2013	3100520-01	7.130	<0.010	<0.010	18.800	360.000	<0.010
	11/22/2013	3110189-01	7.230			11.600	290.000	
	12/05/2013		7.290			13.500	50.000	
MW10	01/30/2012	AC23055	7.830	<0.007	<0.007	21.400	370.000	<0.007
	04/13/2012	AC26855	7.260	<0.007	<0.007	21.900	390.000	0.007
	07/09/2012	AC31702	7.060	<0.007	<0.007	17.000	310.000	<0.007
	10/18/2012	AC36016	7.090	<0.007	<0.007	20.900	220.000	<0.007
	01/07/2013	3010190-10	7.210	<0.005	<0.023	22.200	376.000	<0.003
	05/20/2013	3040515-10	7.020	<0.001	0.011	23.400	333.000	<0.001
	08/26/2013	3080791-10	6.210	<0.010	<0.010	22.900	380.000	<0.010
	10/10/2013	3100520-10	7.040	<0.010	0.011	23.500	380.000	<0.010

Hutsonville Ash Impoundment
Analysis Results by Parameter (column), Location (row), and Date (row)

Date Range: 01/01/2012 to 12/05/2013

Well Id	Date Sampled	Lab Id	Zn, diss, mg/L
MW1	01/30/2012	AC23054	0.014
	04/13/2012	AC26846	0.017
	07/09/2012	AC31693	<0.007
	10/18/2012	AC36007	0.008
	01/07/2013	3010190-01	0.017
	05/20/2013	3040515-01	0.007
	08/26/2013	3080791-01	0.006
	10/10/2013	3100520-01	<0.010
MW10	01/30/2012	AC23055	0.009
	04/13/2012	AC26855	0.011
	07/09/2012	AC31702	<0.007
	10/18/2012	AC36016	<0.007
	01/07/2013	3010190-10	0.019
	05/20/2013	3040515-10	0.008
	08/26/2013	3080791-10	<0.010
	10/10/2013	3100520-10	<0.010

Hutsonville Ash Impoundment
Statistical Summary for Multiple Locations

User Supplied Information

Date Range: 01/01/2012 to 12/05/2013 **Option for LT Pts:** x 0.5
Locations: MW1,MW10
Location **Type** **Class**
MW1 **Upper Zone** **Background**

Parameter	Units	Count	Mean	Median	Maximum	Minimum	Std Dev	Sen Slope Units/yr	Normal / Log Normal	% of Non-Detects
Ag, diss	mg/L	8	0.0025	0.0035	0.0050	0.0001	0.0019	0.00	Yes / No	100.00
As, diss	mg/L	8	0.004	0.004	0.012	0.001	0.004	0.00	No / Yes	75.00
B, diss	ug/L	24	98.750	103.500	147.000	1.000	35.458	-22.52	Yes / No	4.17
Ba, diss	mg/L	8	0.017	0.017	0.025	0.011	0.004	0.00	Yes / Yes	0.00
Be, diss	mg/L	8	0.003	0.004	0.005	0.001	0.002	0.00	Yes / No	100.00
Cd, diss	mg/L	8	0.002	0.001	0.006	0.001	0.002	0.00	No / No	100.00
CN, total	mg/L	8	0.048	0.002	0.360	0.001	0.126	0.00	No / Yes	62.50
Co, diss	mg/L	8	0.003	0.004	0.005	0.001	0.002	0.00	Yes / No	100.00
Cr, diss	mg/L	8	0.002	0.001	0.011	0.001	0.004	0.00	No / No	87.50
Cu, diss	ug/L	8	2.500	1.250	9.000	0.500	3.047	0.00	No / No	62.50
F, diss	mg/L	8	0.089	0.078	0.176	0.061	0.037	0.00	No / No	0.00
Fe, diss	ug/L	8	394.500	345.500	724.000	89.000	189.545	-119.61	Yes / Yes	0.00
Hg, diss	mg/L	8	0.00034	0.00015	0.00100	0.00010	0.00034	0.00	No / No	62.50
Mn, diss	mg/L	24	0.060	0.024	0.395	0.000	0.092	0.00	No / No	8.33
Ni, diss	mg/L	8	0.003	0.004	0.007	0.001	0.002	0.00	Yes / Yes	75.00
NO3, diss	mg/L	8	0.430	0.253	1.090	0.025	0.426	-0.07	Yes / Yes	12.50
Pb, diss	mg/L	8	0.001	0.001	0.005	0.001	0.002	0.00	No / No	100.00
pH (field)	SU	24	7.286	7.225	7.800	7.070	0.208	-0.09	No / No	0.00
Sb, diss	mg/L	8	0.003	0.004	0.005	0.001	0.002	0.00	Yes / No	100.00
Se, diss	mg/L	8	0.004	0.004	0.012	0.001	0.003	0.00	No / Yes	100.00
SO4, diss	mg/L	24	27.738	25.600	53.300	10.400	12.691	-10.68	Yes / Yes	0.00
TDS	mg/L	24	278.000	280.000	480.000	40.000	119.640	-29.22	Yes / No	0.00
Tl, diss	mg/L	8	0.003	0.004	0.006	0.001	0.002	0.00	Yes / No	87.50
Zn, diss	mg/L	8	0.010	0.008	0.017	0.004	0.005	-0.01	Yes / Yes	25.00

Shapiro-Wilk Normality test performed at 0.05 significance level.

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Hutsonville Ash Impoundment
Statistical Summary for Multiple Locations

User Supplied Information

Date Range: 01/01/2012 to 12/05/2013 **Option for LT Pts:** x 0.5
Locations: MW1,MW10
Location **Type** **Class**
MW10 **Upper Zone** **Background**

Parameter	Units	Count	Mean	Median	Maximum	Minimum	Std Dev	Sen Slope Units/yr	Normal / Log Normal	% of Non-Detects
Ag, diss	mg/L	8	0.0031	0.0035	0.0050	0.0001	0.0018	0.00	No / No	100.00
As, diss	mg/L	8	0.004	0.004	0.010	0.001	0.003	0.00	Yes / No	87.50
B, diss	ug/L	8	96.500	103.500	143.000	10.000	44.204	-35.81	Yes / No	12.50
Ba, diss	mg/L	8	0.017	0.018	0.022	0.013	0.003	0.00	Yes / Yes	0.00
Be, diss	mg/L	8	0.003	0.004	0.005	0.001	0.002	0.00	Yes / No	100.00
Cd, diss	mg/L	8	0.003	0.001	0.006	0.001	0.002	0.00	No / No	100.00
CN, total	mg/L	8	0.004	0.002	0.013	0.001	0.005	0.00	No / Yes	62.50
Co, diss	mg/L	8	0.003	0.004	0.005	0.001	0.002	0.00	Yes / No	100.00
Cr, diss	mg/L	8	0.003	0.002	0.012	0.001	0.004	0.00	No / Yes	75.00
Cu, diss	ug/L	8	1.875	0.750	5.000	0.500	1.996	0.00	No / No	75.00
F, diss	mg/L	8	0.147	0.150	0.224	0.100	0.040	0.00	Yes / Yes	25.00
Fe, diss	ug/L	8	471.500	445.500	932.000	99.000	259.600	-248.85	Yes / Yes	0.00
Hg, diss	mg/L	8	0.00033	0.00010	0.00100	0.00010	0.00042	0.00	No / No	100.00
Mn, diss	mg/L	8	0.004	0.004	0.009	0.001	0.002	0.00	Yes / Yes	75.00
Ni, diss	mg/L	8	0.004	0.004	0.009	0.001	0.003	0.00	Yes / Yes	87.50
NO3, diss	mg/L	8	0.149	0.125	0.301	0.050	0.079	-0.09	Yes / Yes	62.50
Pb, diss	mg/L	8	0.002	0.001	0.005	0.001	0.002	0.00	No / No	100.00
pH (field)	SU	8	7.090	7.075	7.830	6.210	0.443	-0.40	Yes / Yes	0.00
Sb, diss	mg/L	8	0.003	0.004	0.005	0.001	0.001	0.00	Yes / No	100.00
Se, diss	mg/L	8	0.007	0.004	0.012	0.004	0.004	0.00	No / No	75.00
SO4, diss	mg/L	8	21.650	22.050	23.500	17.000	2.093	1.36	No / No	0.00
TDS	mg/L	8	344.875	373.000	390.000	220.000	57.389	5.90	No / No	0.00
Tl, diss	mg/L	8	0.004	0.004	0.007	0.001	0.002	0.00	Yes / Yes	87.50
Zn, diss	mg/L	8	0.008	0.007	0.019	0.004	0.005	0.00	Yes / Yes	50.00

Shapiro-Wilk Normality test performed at 0.05 significance level.

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Hutsonville Ash Impoundment

Statistical Analysis Procedure

Background Date Range: 01/01/2012 to 12/05/2013
Background Locations: MW1,MW10

Compliance Date Range: 01/01/2012 to 12/05/2013
Compliance Locations: MW10

Comparison Method if all Background Results are Non-Detect:	STmdl = Last MDL
Statistical Test for Parametric Background Data Distributions:	STpar = Parametric Tolerance Interval on Background
Statistical Test for Cases with High Percentage of Non-Detect Background Data:	STlow1 = Non-Parametric Tolerance Interval on background (ND Frequency > 50%)
Statistical Test for Cases with High Percentage of Non-Detect Background Data:	STlow2 = Non-Parametric Tolerance Interval on background (ND Frequency > 50%)
Statistical Test for Non-Parametric Background Data Distributions:	STnon = Non-Parametric Tolerance Interval on background
Background Comparison:	Interwell
Number of Verification Samples:	0
Default Type 1 Individual Comparison Error Level (False Positive Rate) for tests other than Prediction Interval	0.01
Non-Detect Processing (Parametric Tests):	<=15% using MDL * 0.5 >15% using MDL * 0.5
Non-Detect Processing (All Other):	<=50% using MDL * 0.5 >50% using MDL * 0.5
Tolerance Interval Coverage:	95%

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	Ag, diss, mg/L	01/30/2012	16	100.00	No/No	STmdl	N/A	0.0100		<0.0070	No	
		04/13/2012	16	100.00	No/No		N/A	0.0100		<0.0070	No	
		01/07/2013	16	100.00	No/No		N/A	0.0100		<0.0002	No	
		10/18/2012	16	100.00	No/No		N/A	0.0100		<0.0070	No	
		07/09/2012	16	100.00	No/No		N/A	0.0100		<0.0070	No	
		05/20/2013	16	100.00	No/No		N/A	0.0100		<0.0010	No	
		08/26/2013	16	100.00	No/No		N/A	0.0100		<0.0100	No	
		10/10/2013	16	100.00	No/No		N/A	0.0100		<0.0100	No	
MW10	As, diss, mg/L	01/30/2012	16	81.25	No/No	STlowl	55.99	0.012		<0.007	No	
		04/13/2012	16	81.25	No/No		55.99	0.012		<0.007	No	
		07/09/2012	16	81.25	No/No		55.99	0.012		<0.007	No	
		01/07/2013	16	81.25	No/No		55.99	0.012		0.010	No	
		10/18/2012	16	81.25	No/No		55.99	0.012		<0.007	No	
		05/20/2013	16	81.25	No/No		55.99	0.012		<0.001	No	
		08/26/2013	16	81.25	No/No		55.99	0.012		<0.010	No	
		10/10/2013	16	81.25	No/No		55.99	0.012		<0.010	No	
MW10	Ba, diss, mg/L	01/30/2012	16	0.00	Yes/Yes	STpar	99.00	0.028		0.018	No	
		04/13/2012	16	0.00	Yes/Yes		99.00	0.028		0.015	No	
		07/09/2012	16	0.00	Yes/Yes		99.00	0.028		0.018	No	
		01/07/2013	16	0.00	Yes/Yes		99.00	0.028		0.013	No	
		10/18/2012	16	0.00	Yes/Yes		99.00	0.028		0.014	No	
		05/20/2013	16	0.00	Yes/Yes		99.00	0.028		0.018	No	
		08/26/2013	16	0.00	Yes/Yes		99.00	0.028		0.017	No	
		10/10/2013	16	0.00	Yes/Yes		99.00	0.028		0.022	No	
MW10	Be, diss, mg/L	01/30/2012	16	100.00	No/No	STmdl	N/A	0.010		<0.007	No	
		04/13/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		07/09/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		01/07/2013	16	100.00	No/No		N/A	0.010		<0.003	No	
		10/18/2012	16	100.00	No/No		N/A	0.010		<0.007	No	

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	Be, diss, mg/L	05/20/2013	16	100.00	No/No	STmdl	N/A	0.010		<0.001	No	
		08/26/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
		10/10/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
MW10	Boron, Diss, ug/L	01/30/2012	32	6.25	Yes/No	STpar	99.00	190.014		<20.000	No	
		04/13/2012	32	6.25	Yes/No		99.00	190.014		143.000	No	
		07/09/2012	32	6.25	Yes/No		99.00	190.014		143.000	No	
		01/07/2013	32	6.25	Yes/No		99.00	190.014		113.000	No	
		10/18/2012	32	6.25	Yes/No		99.00	190.014		119.000	No	
		05/20/2013	32	6.25	Yes/No		99.00	190.014		66.000	No	
		08/26/2013	32	6.25	Yes/No		99.00	190.014		94.000	No	
		10/10/2013	32	6.25	Yes/No		99.00	190.014		84.000	No	
MW10	Cd, diss, mg/L	01/30/2012	16	100.00	No/No	STmdl	N/A	0.010		<0.002	No	
		04/13/2012	16	100.00	No/No		N/A	0.010		<0.002	No	
		07/09/2012	16	100.00	No/No		N/A	0.010		<0.002	No	
		01/07/2013	16	100.00	No/No		N/A	0.010		<0.012	No	
		10/18/2012	16	100.00	No/No		N/A	0.010		<0.002	No	
		05/20/2013	16	100.00	No/No		N/A	0.010		<0.001	No	
		08/26/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
		10/10/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
MW10	Cl, diss, mg/L	01/30/2012	16	0.00	Yes/Yes	STpar	99.00	83.667		66.400	No	
		04/13/2012	16	0.00	Yes/Yes		99.00	83.667		33.100	No	
		07/09/2012	16	0.00	Yes/Yes		99.00	83.667		22.900	No	
		01/07/2013	16	0.00	Yes/Yes		99.00	83.667		20.100	No	
		10/18/2012	16	0.00	Yes/Yes		99.00	83.667		22.700	No	
		05/20/2013	16	0.00	Yes/Yes		99.00	83.667		38.900	No	
		08/26/2013	16	0.00	Yes/Yes		99.00	83.667		49.000	No	
		10/10/2013	16	0.00	Yes/Yes		99.00	83.667		48.000	No	
MW10	CN, total, mg/L	01/30/2012	16	62.50	No/No	STlow1	55.99	0.360		0.013	No	
		04/13/2012	16	62.50	No/No		55.99	0.360		<0.001	No	

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	CN, total, mg/L	07/09/2012	16	62.50	No/No	STlow1	55.99	0.360		0.005	No	
		01/07/2013	16	62.50	No/No		55.99	0.360		0.010	No	
		10/18/2012	16	62.50	No/No		55.99	0.360		<0.001	No	
		05/20/2013	16	62.50	No/No		55.99	0.360		<0.003	No	
		08/26/2013	16	62.50	No/No		55.99	0.360		<0.003	No	
		10/10/2013	16	62.50	No/No		55.99	0.360		<0.003	No	
MW10	Co, diss, mg/L	01/30/2012	16	100.00	No/No	STmdl	N/A	0.010		<0.007	No	
		04/13/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		07/09/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		01/07/2013	16	100.00	No/No		N/A	0.010		<0.003	No	
		10/18/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		05/20/2013	16	100.00	No/No		N/A	0.010		<0.001	No	
		08/26/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
		10/10/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
MW10	Copper, Diss, ug/L	01/30/2012	16	68.75	No/No	STlow1	55.99	9.000		2.000	No	
		04/13/2012	16	68.75	No/No		55.99	9.000		1.000	No	
		07/09/2012	16	68.75	No/No		55.99	9.000		<1.000	No	
		01/07/2013	16	68.75	No/No		55.99	9.000		<1.000	No	
		10/18/2012	16	68.75	No/No		55.99	9.000		<1.000	No	
		05/20/2013	16	68.75	No/No		55.99	9.000		<1.000	No	
		08/26/2013	16	68.75	No/No		55.99	9.000		<10.000	No	
		10/10/2013	16	68.75	No/No		55.99	9.000		<10.000	No	
MW10	Cr, diss, mg/L	01/30/2012	16	81.25	No/Yes	STlow1	55.99	0.012		0.004	No	
		04/13/2012	16	81.25	No/Yes		55.99	0.012		0.012	No	
		07/09/2012	16	81.25	No/Yes		55.99	0.012		<0.002	No	
		01/07/2013	16	81.25	No/Yes		55.99	0.012		<0.004	No	
		10/18/2012	16	81.25	No/Yes		55.99	0.012		<0.002	No	
		05/20/2013	16	81.25	No/Yes		55.99	0.012		<0.001	No	
		08/26/2013	16	81.25	No/Yes		55.99	0.012		<0.010	No	

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	Cr, diss, mg/L	10/10/2013	16	81.25	No/Yes	STlow1	55.99	0.012		<0.001	No	
MW10	F, diss, mg/L	01/30/2012	16	12.50	Yes/Yes	STpar	99.00	0.262		0.224	No	
		04/13/2012	16	12.50	Yes/Yes		99.00	0.262		<0.200	No	
		07/09/2012	16	12.50	Yes/Yes		99.00	0.262		<0.200	No	
		01/07/2013	16	12.50	Yes/Yes		99.00	0.262		0.166	No	
		10/18/2012	16	12.50	Yes/Yes		99.00	0.262		0.152	No	
		05/20/2013	16	12.50	Yes/Yes		99.00	0.262		0.154	No	
		08/26/2013	16	12.50	Yes/Yes		99.00	0.262		0.132	No	
		10/10/2013	16	12.50	Yes/Yes		99.00	0.262		0.148	No	
MW10	Hg, diss, mg/L	01/30/2012	16	81.25	No/No	STlow1	55.99	0.00070		<0.00020	No	
		04/13/2012	16	81.25	No/No		55.99	0.00070		<0.00020	No	
		07/09/2012	16	81.25	No/No		55.99	0.00070		<0.00020	No	
		01/07/2013	16	81.25	No/No		55.99	0.00070		<0.00020	No	
		10/18/2012	16	81.25	No/No		55.99	0.00070		<0.00020	No	
		05/20/2013	16	81.25	No/No		55.99	0.00070		<0.00020	No	
		08/26/2013	16	81.25	No/No		55.99	0.00070		<0.00200	No	
		10/10/2013	16	81.25	No/No		55.99	0.00070		<0.00200	No	
MW10	Iron, Diss, ug/L	10/18/2012	16	0.00	Yes/Yes	STpar	99.00	1,109.473		667.000	No	
		05/20/2013	16	0.00	Yes/Yes		99.00	1,109.473		99.000	No	
		08/26/2013	16	0.00	Yes/Yes		99.00	1,109.473		387.000	No	
		10/10/2013	16	0.00	Yes/Yes		99.00	1,109.473		504.000	No	
		01/30/2012	16	0.00	Yes/Yes		99.00	1,109.473		575.000	No	
		04/13/2012	16	0.00	Yes/Yes		99.00	1,109.473		932.000	No	
		07/09/2012	16	0.00	Yes/Yes		99.00	1,109.473		366.000	No	
		01/07/2013	16	0.00	Yes/Yes		99.00	1,109.473		242.000	No	
MW10	Mn, diss, mg/L	01/30/2012	32	28.13	No/No	STnon	80.63	0.395		<0.007	No	
		04/13/2012	32	28.13	No/No		80.63	0.395		<0.007	No	
		07/09/2012	32	28.13	No/No		80.63	0.395		0.009	No	
		01/07/2013	32	28.13	No/No		80.63	0.395		<0.005	No	

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	Mn, diss, mg/L	10/18/2012	32	28.13	No/No	STnon	80.63	0.395		<0.007	No	
		05/20/2013	32	28.13	No/No		80.63	0.395		0.001	No	
		08/26/2013	32	28.13	No/No		80.63	0.395		<0.010	No	
		10/10/2013	32	28.13	No/No		80.63	0.395		<0.010	No	
MW10	Ni, diss, mg/L	01/30/2012	16	81.25	Yes/Yes	STlow1	55.99	0.009		0.009	No	
		04/13/2012	16	81.25	Yes/Yes		55.99	0.009		<0.007	No	
		01/07/2013	16	81.25	Yes/Yes		55.99	0.009		<0.004	No	
		10/18/2012	16	81.25	Yes/Yes		55.99	0.009		<0.007	No	
		07/09/2012	16	81.25	Yes/Yes		55.99	0.009		<0.007	No	
		05/20/2013	16	81.25	Yes/Yes		55.99	0.009		<0.001	No	
		08/26/2013	16	81.25	Yes/Yes		55.99	0.009		<0.010	No	
		10/10/2013	16	81.25	Yes/Yes		55.99	0.009		<0.010	No	
MW10	NO3, diss, mg/L	01/30/2012	16	37.50	No/Yes	STpar	99.00	3.870		0.301	No	
		04/13/2012	16	37.50	No/Yes		99.00	3.870		<0.250	No	
		07/09/2012	16	37.50	No/Yes		99.00	3.870		<0.250	No	
		01/07/2013	16	37.50	No/Yes		99.00	3.870		0.188	No	
		10/18/2012	16	37.50	No/Yes		99.00	3.870		0.204	No	
		05/20/2013	16	37.50	No/Yes		99.00	3.870		<0.100	No	
		08/26/2013	16	37.50	No/Yes		99.00	3.870		<0.200	No	
		10/10/2013	16	37.50	No/Yes		99.00	3.870		<0.200	No	
MW10	Pb, diss, mg/L	01/30/2012	16	100.00	No/No	STmdl	N/A	0.010		<0.001	No	
		04/13/2012	16	100.00	No/No		N/A	0.010		<0.001	No	
		07/09/2012	16	100.00	No/No		N/A	0.010		<0.001	No	
		01/07/2013	16	100.00	No/No		N/A	0.010		<0.003	No	
		10/18/2012	16	100.00	No/No		N/A	0.010		<0.001	No	
		05/20/2013	16	100.00	No/No		N/A	0.010		<0.001	No	
		08/26/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
		10/10/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
MW10	pH (field), SU	01/30/2012	32	0.00	No/No	STnon	80.63	7.830	6.210	7.830	No	

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	pH (field), SU	07/09/2012	32	0.00	No/No	STnon	80.63	7.830	6.210	7.060	No	
		04/13/2012	32	0.00	No/No		80.63	7.830	6.210	7.260	No	
		01/07/2013	32	0.00	No/No		80.63	7.830	6.210	7.210	No	
		10/18/2012	32	0.00	No/No		80.63	7.830	6.210	7.090	No	
		05/20/2013	32	0.00	No/No		80.63	7.830	6.210	7.020	No	
		08/26/2013	32	0.00	No/No		80.63	7.830	6.210	6.210	No	
		10/10/2013	32	0.00	No/No		80.63	7.830	6.210	7.040	No	
MW10	Sb, diss, mg/L	01/30/2012	16	100.00	No/No	STmdl	N/A	0.010		<0.007	No	
		04/13/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		07/09/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		01/07/2013	16	100.00	No/No		N/A	0.010		<0.005	No	
		10/18/2012	16	100.00	No/No		N/A	0.010		<0.007	No	
		05/20/2013	16	100.00	No/No		N/A	0.010		<0.001	No	
		08/26/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
		10/10/2013	16	100.00	No/No		N/A	0.010		<0.010	No	
MW10	Se, diss, mg/L	01/30/2012	16	87.50	No/No	STlow1	55.99	0.011		<0.007	No	
		04/13/2012	16	87.50	No/No		55.99	0.011		<0.007	No	
		07/09/2012	16	87.50	No/No		55.99	0.011		<0.007	No	
		01/07/2013	16	87.50	No/No		55.99	0.011		<0.023	No	
		10/18/2012	16	87.50	No/No		55.99	0.011		<0.007	No	
		05/20/2013	16	87.50	No/No		55.99	0.011		0.011	No	
		08/26/2013	16	87.50	No/No		55.99	0.011		<0.010	No	
		10/10/2013	16	87.50	No/No		55.99	0.011		0.011	No	
MW10	SO4, diss, mg/L	01/30/2012	32	0.00	No/Yes	STpar	99.00	67.371		21.400	No	
		04/13/2012	32	0.00	No/Yes		99.00	67.371		21.900	No	
		07/09/2012	32	0.00	No/Yes		99.00	67.371		17.000	No	
		01/07/2013	32	0.00	No/Yes		99.00	67.371		22.200	No	
		10/18/2012	32	0.00	No/Yes		99.00	67.371		20.900	No	
		05/20/2013	32	0.00	No/Yes		99.00	67.371		23.400	No	

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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW10	SO4, diss, mg/L	08/26/2013	32	0.00	No/Yes	STpar	99.00	67.371		22.900	No	
		10/10/2013	32	0.00	No/Yes		99.00	67.371		23.500	No	
MW10	TDS, mg/L	01/30/2012	32	0.00	Yes/No	STpar	99.00	568.570		370.000	No	
		04/13/2012	32	0.00	Yes/No		99.00	568.570		390.000	No	
		07/09/2012	32	0.00	Yes/No		99.00	568.570		310.000	No	
		01/07/2013	32	0.00	Yes/No		99.00	568.570		376.000	No	
		10/18/2012	32	0.00	Yes/No		99.00	568.570		220.000	No	
		05/20/2013	32	0.00	Yes/No		99.00	568.570		333.000	No	
		08/26/2013	32	0.00	Yes/No		99.00	568.570		380.000	No	
		10/10/2013	32	0.00	Yes/No		99.00	568.570		380.000	No	
MW10	Tl, diss, mg/L	07/09/2012	16	87.50	Yes/No	STlow1	55.99	0.007		<0.007	No	
		01/07/2013	16	87.50	Yes/No		55.99	0.007		<0.003	No	
		10/18/2012	16	87.50	Yes/No		55.99	0.007		<0.007	No	
		05/20/2013	16	87.50	Yes/No		55.99	0.007		<0.001	No	
		08/26/2013	16	87.50	Yes/No		55.99	0.007		<0.010	No	
		10/10/2013	16	87.50	Yes/No		55.99	0.007		<0.010	No	
		01/30/2012	16	87.50	Yes/No		55.99	0.007		<0.007	No	
		04/13/2012	16	87.50	Yes/No		55.99	0.007		0.007	No	
MW10	Zn, diss, mg/L	01/30/2012	16	37.50	Yes/Yes	STpar	99.00	0.025		0.009	No	
		04/13/2012	16	37.50	Yes/Yes		99.00	0.025		0.011	No	
		01/07/2013	16	37.50	Yes/Yes		99.00	0.025		0.019	No	
		10/18/2012	16	37.50	Yes/Yes		99.00	0.025		<0.007	No	
		07/09/2012	16	37.50	Yes/Yes		99.00	0.025		<0.007	No	
		05/20/2013	16	37.50	Yes/Yes		99.00	0.025		0.008	No	
		08/26/2013	16	37.50	Yes/Yes		99.00	0.025		<0.010	No	
		10/10/2013	16	37.50	Yes/Yes		99.00	0.025		<0.010	No	

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
00515	Total Dissolved Solids	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
Yes	294.719	110.586	2.476	20.867	568.570

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	24	0	0.000
MW10	Upper Zone	8	0	0.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
00941	Chloride, dissolved	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
No	20.659	20.785	3.031	0.000	83.667

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	8	0	0.000
MW10	Upper Zone	8	0	0.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
00950	Fluoride, dissolved	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
Yes	0.118	0.048	3.031	0.000	0.262

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	8	0	0.000
MW10	Upper Zone	8	2	25.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
01005	Barium, dissolved	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
Yes	0.017	0.004	3.031	0.006	0.028

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	8	0	0.000
MW10	Upper Zone	8	0	0.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
01020	Boron, dissolved	ug/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
No	98.188	37.081	2.476	6.361	190.014

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	24	1	4.167
MW10	Upper Zone	8	1	12.500

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
01046	Iron, dissolved	ug/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
Yes	433.000	223.152	3.031	0.000	1,109.473

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	8	0	0.000
MW10	Upper Zone	8	0	0.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**None**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
01090	Zinc, dissolved	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
No	0.009	0.005	3.031	0.000	0.025

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	8	2	25.000
MW10	Upper Zone	8	4	50.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**Log (Base 10)**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
00618	Nitrate nitrogen, dissolved	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
Yes	0.289	0.330	3.031	0.008	3.870

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	8	1	12.500
MW10	Upper Zone	8	5	62.500

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

Hutsonville Ash Impoundment
Normal Tolerance Interval on Background
Background Data Pool

Probability Distribution:	**One sided**	**Option for LT Pts:**	**x 0.5**
Confidence Level:	**99.00%**	**Background Date Range:**	**01/01/2012 to 12/05/2013**
Data Transformation:	**Log (Base 10)**	**Compliance Date Range:**	**01/01/2012 to 12/05/2013**
		Tolerance Coverage (Gamma):	**95%**
Compliance Locations:	**MW10**		
Background Locations:	**MW1,MW10**		

BACKGROUND

Parameter Code	Parameter Name	Units
00946	Sulfate, dissolved	mg/L

Pooled Results:

Normal	Mean	StdDev	K Value	TL (Lower)	TU (Upper)
Yes	26.216	11.299	2.476	8.620	67.371

Location	Type	Total Pts	LT Pts	% LT Pts
MW1	Upper Zone	24	0	0.000
MW10	Upper Zone	8	0	0.000

Note: Confidence Level is sometimes referred to as Tolerance Coefficient.

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Appendix C

Groundwater Sampling Protocol



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C.1 Sampling Protocol

The following procedures shall be used in sampling groundwater at the site. This sampling protocol shall apply to the routine quarterly (or modified semi-annual or annual) sampling events. A sample collector's worksheet, comparable to the example located in Exhibit A-1, may be used for noting relevant information in regard to each well.

If conditions at the time of sampling could influence the results, sampling should be postponed until a later date. However, under no circumstances will sampling deviate from the schedule in Section 5.1 .

C.1.1 Water Levels

Water levels shall be taken in each well prior to purging and/or sampling. Water levels should be taken as close together as practical, to prevent any time distortion of the water surface data. The following steps shall be followed to obtain accurate water level readings:

1. Note the general condition of the monitoring well on the worksheet. This shall include, but is not limited to the condition of the casing, the lock, evidence of tampering, condition of the pad, and any standing water.
2. Remove the lock and open the monitoring well. Note the condition of the interior of the casing and the condition of the well cap and riser. Open the cap, taking care not to allow dirt or foreign material into the monitoring well.
3. The technician shall rinse the probe and cable of the water level meter with DeCon water.
4. Slowly lower the probe into the monitoring well until the meter indicates the water surface has been reached.
5. Note the depth to water (to the nearest 0.01 ft) and the time on the worksheet.
6. Lower the probe to the bottom of well. (If a dedicated pump is installed in the well, skip this step). Note the well depth on the worksheet. The depth of the well will be measured on an annual basis, at wells that do not contain dedicated pumps. The depth of wells with dedicated pumps will be measured at least once every 5 years, or whenever the pump is removed.
7. Slowly remove the probe from the well. Rinse the probe and line with DeCon water.
8. Replace cap. Close and lock the well. Proceed to the next well, and repeat.

C.1.2 Purging of Monitoring Well – Pump Method

After all water level measurements have been taken, the monitoring wells shall be purged to provide a representative sample. Each groundwater monitoring well shall be purged by using a dedicated pump. The pump construction shall consist of inert materials consistent with the monitoring well construction (e.g., stainless steel pump bodies installed in stainless steel wells).

Purging shall be conducted utilizing a "low-flow" or minimal drawdown technique. Flow rates for this technique will typically fall below 0.5 liters/minutes, with an overall goal of not reducing the water level in the monitoring well by more than 0.3 ft during purging. Water levels should be checked frequently to ensure that the drawdown in the well does not exceed the 0.3-ft limits. Every 3 minutes to 5 minutes, readings shall be taken on the following water quality indicators to determine if a representative water sample is available.

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- pH (in SU),
- Specific Conductance (in µmhos/cm or µS/cm),
- Temperature (in °F),
- And, it is suggested, at least one of the following:
  - Redox Potential (in mV);
  - Dissolved Oxygen (in mg/L); and/or
  - Turbidity (in NTU).

The water quality indicators will be considered stabilized when the following tolerances are reached after three consecutive readings:

- pH..... ±0.05 SU
- Specific Conductance ..... ±5 percent
- Temperature..... ±0.5°F
- Redox Potential ..... ±10 percent
- Dissolved Oxygen..... ±10 percent
- Turbidity..... ±10 percent

Slow recovering wells require special consideration. If a well is dry, or is purged below the bottom of the pump intake, the well will be allowed to recharge for at least 12 hours. Samples shall be collected until all sample containers have been filled or the well becomes dry. Notes shall be kept on the worksheet with regard to water levels, times, volume of water removed, and any other parameters considered to be relevant.

C.1.3 Purging of Monitoring Well – Bailer Method

Purging and sample collection with a bailer shall be performed in the event of a non-functioning pump or from a well that does not have a dedicated pump installed. A sample shall be collected utilizing a factory packaged, clean, disposable bailer with an appropriate length of new, clean rope attached.

Calculate the number of bailer volumes of water needed to remove one (1) well volume of water.

Well Volume Calculations (2-inch well):

Schedule 40 PVC has an inside diameter of 2.067 inches.

$\therefore$ ((2.067 inches/12 inches/ft)/2)^2 • π • 1 ft of water = 0.0233 ft^3/ft of water.

0.0233 ft^3/ft • 7.48 gallons/ft^3 = 0.174 gallon/ft

Schedule 5 Stainless Steel (304 or 316) has an inside diameter of 2.245 inches.

$\therefore$ ((2.245 inches/12 inches/ft)/2)^2 • π • 1 ft of water = 0.0275 ft^3/ft of water.

0.0275 ft^3/ft • 7.48 gallons/ft^3 = 0.206 gallon/ft

Volume of well (in gallons) = well type gallon/ft • (DTB - DTW);
where, DTB = depth to bottom of well (from measuring point), and
DTW = depth to water (from measuring point)

Bailer Volumes: Disposable bailer volumes will vary by type and manufacturer. Volume information should be obtained before going to the site. For comparison, a 3 ft stainless steel bailer has a volume of approximately 1220 cc or 0.322 gallon and a 5 ft PVC bailer has a volume of approximately 1085 cc or 0.287 gallon.

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1. Open monitoring well, being careful that no potential contaminant enters the well.
2. Remove one (1) bailer volume of water from the monitoring well. Test pH, specific conductance and temperature. Note values on worksheet. (Turbidity, redox potential and dissolved oxygen will vary considerably due to the agitation a bailer will cause in the well. Testing for these parameters is not recommended with this method.)
3. Remove one-half (½) gallon of water from the monitoring well. Test pH, specific conductance and temperature. Note values on worksheet.
4. Remove ½ to 1 gallon of water. Test pH, specific conductance and temperature. Record data on worksheet.
5. Repeat Number 5 until pH, specific conductance and temperature stabilize or three (3) well volumes of water have been removed.
6. If the monitoring well becomes dry, or there is insufficient water to obtain all necessary samples, the monitoring well will be allowed to recharge for 24 hours. Samples shall be collected until all sample containers are filled or the well becomes dry. Notes shall be kept on the worksheet regarding water levels, times, volume of water removed, and any other parameters considered by the technician to be relevant.
7. If there is sufficient water volume in the monitoring well to obtain all samples, sample collection shall begin at this time.

C.1.4 Sample Collection Order

Samples shall be collected starting at the monitoring well with the least likelihood for contamination. Sampling shall proceed from the well with the lowest potential for contamination to the well with the highest potential for contamination.

C.1.5 Field Measurements

C.1.5a General

Upon arrival at each groundwater monitoring well, the technician shall note on the sampler's worksheet or in a field notebook the date, time, ambient air temperature, general weather conditions, and individuals present, including sample team members and any observers. (Note: Any observers shall need at a minimum, the same personal protective gear as the members of the sample team.)

Establish a "clean area" near the monitoring well where the sample containers and equipment can be stored while not in use. Every effort should be made to keep the sampling equipment and containers from contacting the ground surface. If necessary, a disposable, plastic tarp can be used as a ground cover to prevent potential contamination of the sample containers and equipment. Typically, the back of the field vehicle will be used as the "clean area".

Any non-dedicated sampling equipment (meter probes, thermometers, etc.) shall be washed in a commercial, laboratory cleaner (Alconox®, Liqui-nox®, or equivalent), and thoroughly rinsed in DeCon water before each use. Calibration shall be performed at each new monitoring location after the initial decontamination. After use, each device shall be powered down (if necessary) decontaminated, and stored in its manufacturer-approved container.

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C.1.5b Temperature

Obtain a water sample from the well. Place the sample aliquot in a disposable container, insert the thermometer (or electronic probe), wait until the readings have stabilized, and record the temperature on the worksheet. Temperature for a glass thermometer should be noted to the nearest degree Fahrenheit (1°F). For electronic thermometers (thermocouples), temperature should be noted to the nearest tenth degree Fahrenheit (0.1°F). The thermometer or probe shall be cleaned and rinsed with DeCon water after use.

C.1.5c pH

Confirm calibration of the instrument by comparing with an appropriate buffer solution. Adjust for temperature compensation (if meter is not self-compensating). Rinse probe with DeCon water. Obtain a sample from the well and place the probe in sample aliquot. Note the pH and record on the sample worksheet. Note pH readings to the nearest tenth unit (0.1).

C.1.5d Specific Conductance

Confirm calibration of the instrument by comparing against an appropriate buffer solution. Adjust for temperature compensation (if meter is not self-compensating). Rinse the probe with DeCon water. Obtain a sample from the well and place the probe in sample aliquot. Note the specific conductance and record on the sample worksheet. Specific conductance should be noted to the nearest micromhos per centimeter (µmhos/cm) or microSiemens per centimeter (µS/cm).

C.1.6 Sample Collection Procedures

Jars and vials may ship pre-labeled from the laboratory, identifying the analysis and preservative for each type of sample. Dependent upon circumstances, sample containers may be prepared by non-laboratory personnel. If so, this should be noted on the sample worksheet or in the field notebook.

A technician shall remove a sample container from the cooler, affix a label, and in indelible, waterproof ink write the well number and/or sample I.D., the facility name, the sample collection date and time, the type of sample in the container, and the sample collector's name. A technician shall organize the containers in the following sampling order:

1. Metals and Minerals (dissolved);
2. Anions (dissolved);
3. Total Dissolved Solids (TDS); and
4. Cyanides (total);

Dissolved parameters include dissolved metals and minerals, total dissolved solids (TDS), and nitrogen should be field filtered. Samples should be filtered using a 0.45-micron filter attached to the sample pump line. Other filter apparatus may be utilized as long as Illinois EPA guidelines are followed. Filters should be replaced no less frequently than at each new well, and may need to be replaced more often if flow is restricted due to particulate matter in the sample water.

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C.2 Transportation of Monitoring Samples

C.2.1 Sample Preservation Techniques

The preservation techniques utilized in the groundwater samples will typically adhere to those listed in Handbook for Sampling and Sample Preservation of Water and Wastewater, U.S. EPA, EPA-600/4-82-029, September 1982 and/or Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, EPA/530/SW-846, 3rd Edition, Final Update IV (January 2008).

C.2.2 Transportation of Samples

Samples shall be transported to the laboratory in sealed, insulated shipping containers, ice chests, or coolers. The shipping containers should be sturdy, and if samples are contained in glass bottles, dividers and/or bubble wrap should be used to restrict potential breakage. All samples will be packed in ice or a packaged refrigerant as necessary for proper preservation. Samples should be packed to maintain sample temperatures as close to 4°C (degrees Celsius) or 39°F as possible from the time the samples are collected to the time the samples are received by the laboratory. The samples should be shipped/delivered to the laboratory as soon as practical, preferably within 24 hours of sample collection.

All samples shall be accompanied by a chain-of-custody record. The sampler shall retain a copy of the record and forward the original with the samples to the analytical laboratory. Once the laboratory has received the samples, a representative from the laboratory is to complete the record, retain the original and return a copy with the chemical analysis reports to the sampler. The chain-of-custody shall contain the facility name, the wells sampled, time and date of sampling, members of the sampling party, type of samples (i.e. water, soil, leachate, etc.), number of sample bottles, requested analysis, overnight courier, etc. A sample chain-of-custody record is provided in Exhibit A-2.

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Exhibit C-1

Example Groundwater Sampling Worksheet

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GROUNDWATER SAMPLING WORKSHEET

HANSON

BACKGROUND INFORMATION:

Well ID: _____

Site: _____ **Project:** _____

Well Condition: _____

Well Information: Well pipe diameter: _____ Well material: _____

Constructed depth: _____ ft. from m.p. Screen length: _____ feet

Sample Depth to Water: _____ ft. from m.p. Date: _____ Time: _____

Water Volume: Btm of well: _____ ft. from m.p. Well volume [0.164*(CD-DTW)]: _____ gal.

SAMPLE COLLECTION:

Personnel: Technician 1: _____ Technician 2: _____

Company: _____ Location: _____

Weather: _____

STABILIZATION TEST:

Reading	Time	Temp. (In °F)	pH (In std .units)	Conductance (In µS/cm)	*Dis. O_2** (In mg/L)	*RedOx Pot.** (In mV)	*Turbidity** (In NTU)
1 *(start)*							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

* Optional stabilization parameter(s)

SAMPLE APPEARANCE:

Clarity:		Clear		Hazy		Sl. Turbid		Turbid		V. Turbid		Opaque
Color:		Clear		Yellow		Brown		Rust		White		Gray
Odor		Sulfurous		Petroleum		Musty		Solvent				None

SAMPLE DATA:

General Information		Sample Types Collected		
Well or Sample ID:		Anions (dissolved)		Anions (total)
Date Collected:		Metals (dissolved)		Metals (total)
Time Collected:		Cyanide (total)		
		Total Dissolved Solids		
Date Sent to Lab:				
Time Sent to Lab:				

EXPENDABLES:

	Bladder		Filter (lg)		Filter (med)		Filter (sm)		Bailer		Lock		Tubing/Rope (ft)

NOTES: _____

_____

_____

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Exhibit C-2

Example Chain-of-Custody Record



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CHAIN OF CUSTODY RECORD

HANSON

CLIENT INFORMATION:

Client: _____ Contact Name: _____

Address: _____ Telephone No.: _____

_____ Fax No.: _____

_____ Project ID/PO: _____

SAMPLE INFORMATION:

Sampler (please print): _____ Sampler (signature): _____

Sample Description	Date Collected	Time Collected	Type: Grab	Type: Composite	Matrix: Water	Matrix: Soil	Matrix: Other	Number of Containers	Analyses Desired	Remarks

Relinquished by (signature): _____ Date/ Time _____ Received by (signature): _____ Date/ Time _____

Relinquished by (signature): _____ Date/ Time _____ Received by (signature): _____ Date/ Time _____

Samples received:

Chilled (≤4°C) Y or N

in proper container Y or N

within holding time Y or N

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[redacted]

Ash Ponds Closure

Groundwater Model Report

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

September 8, 2014

NATURAL RESOURCE TECHNOLOGY

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Appendix C HELP Model Files (DVD)

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Appendix D MODFLOW/MT3DMS Model Files (DVD)

Appendix E Cover-Liner Comparison, dated January 12, 2015

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Acronyms and Abbreviations

Ameren ..... AmerenEnergy Medina Valley Cogen, L.L.C.
CCW ..... coal combustion waste
cm/s ..... centimeters per second
g/cm^3 ..... grams per cubic centimeter
GMZ ..... Groundwater Management Zone
in/yr ..... inches per year
ft ..... feet
HDPE ..... high density polyethylene
HELP ..... Hydrologic Evaluation of Landfill Performance
IAC ..... Illinois Administrative Code
in/yr ..... inches/year
mg/L ..... milligrams per liter
MW ..... megawatts
NGVD ..... National Geodetic Vertical Datum
NRT ..... Natural Resource Technology
TDS ..... total dissolved solids

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1. Background

1.1 Introduction

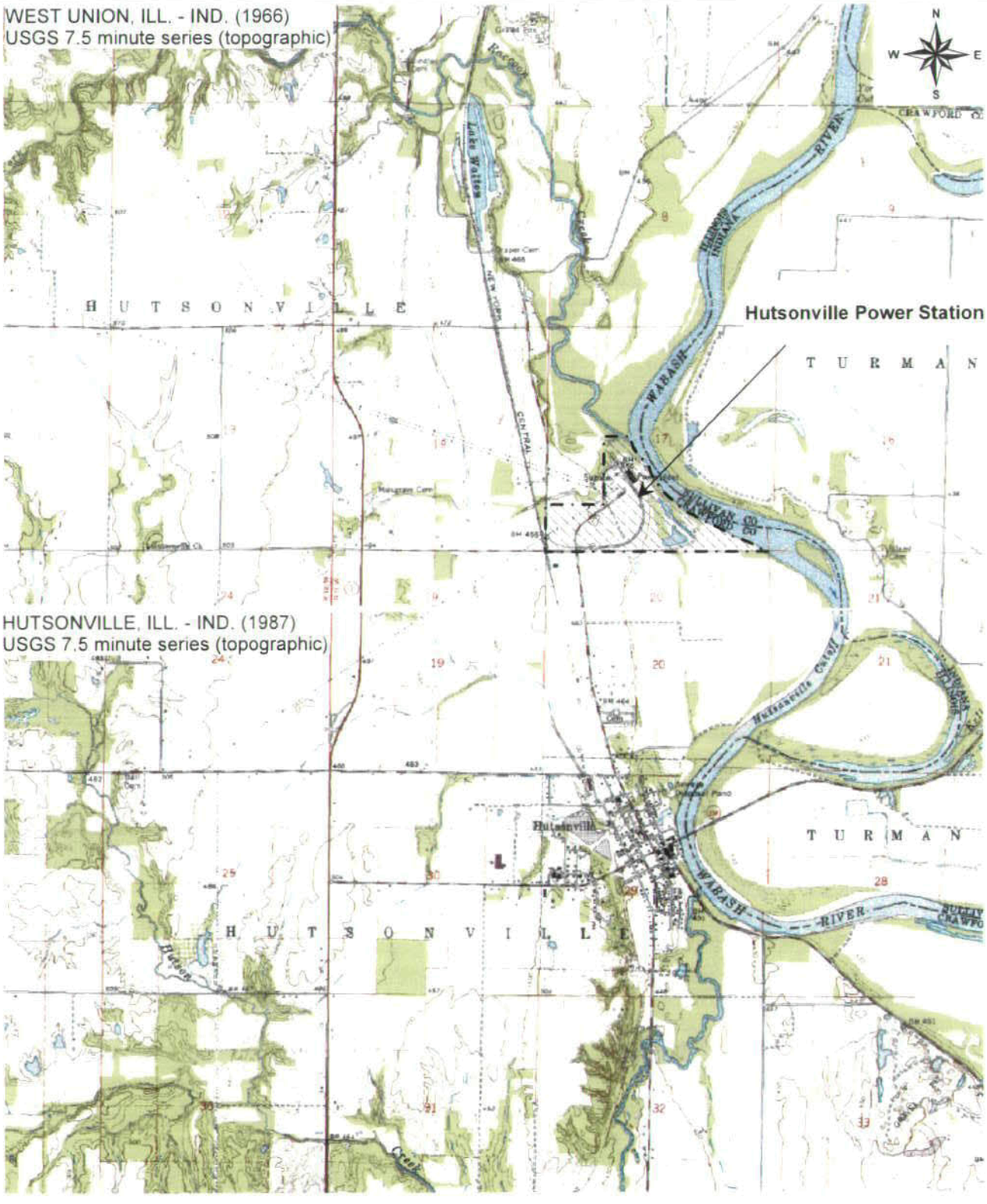
This Groundwater Model and Simulation of Closure has been prepared by Natural Resource Technology (NRT) on behalf of AmerenEnergy Medina Valley Cogen, L.L.C. (Ameren) to describe model development and report on simulation results for closure of Ash Ponds A, B, and C, and the Bottom Ash Sluice Pond at the Hutsonville Power Station (Site). The groundwater flow and transport model was derived and updated from a model previously developed for the Site in 2009 (NRT, 2009). The objective of the updated model was to assess the fate and transport of boron, an indicator constituent for coal combustion waste (CCW) in the shallow groundwater zone at the Site, in response to the multi-step closure activities proposed for the Site. This report summarizes development of the groundwater model and describes its use to predict groundwater quality after the proposed closure activities are implemented.

1.2 Site Description

The Site is located on the west bank of the Wabash River, in Crawford County, Illinois, approximately one and one-half miles north of the City of Hutsonville (Figure 1). The coal fired power plant began operation in the 1940s and was removed from service in 2011. The plant had two units with a combined generating capacity of 164 megawatts (MW). The following portions of the site were considered for modeling (Figure 2):

- Ash Pond A (12 acres) – a high density polyethylene (HDPE) lined fly ash pond that began operation in 1986. Fly ash from the operating units was collected by an electrostatic precipitator and sluiced to Ash Pond A.
- Ash Pond B (4.4 acres) – a HDPE lined interim pond constructed in 2000. Sluice water from Ash Pond A and the bottom ash pond was routed through Ash Pond B before discharge to the Wabash River via a NPDES permitted outfall #002 (IL0000175).
- Ash Pond C (2 acres) – a HDPE lined drainage collection pond constructed in 2000. Sluice water from the bottom ash pond was routed through Ash Pond C before discharge to the Wabash River via the outfall #002.
- Ash Pond D (22 acres) – an unlined ash pond that was constructed during 1967 - 1968. Ash Pond D was the primary ash management unit until Ash Pond A was constructed. Since then, it was used as a secondary settling pond until 2000 when it was removed from service. Precipitation and flood backwater accumulated in the pond at times during the inactive period, resulting in ponded conditions. Ash Pond D was capped during 2012 - 2013.
- Bottom Ash Sluice Pond (1.2 acres) – a bottom ash management unit. Bottom ash was sluiced to the pond and recycled.
- Coal Storage Yard (approximately 8.4 acres).

An ash laydown area was formerly located between Ash Pond A and Ash Pond D. The laydown area, covering approximately 6 acres, was removed before Ash Ponds B and C were constructed in 2000.



EXPLANATION

Property limits (approximate)

SCALE: 1 in. = 1,000 ft.

0 ft. 500 ft. 1,000 ft.

SOURCE
http://www.isgs.uiuc.edu/nsdihome/webdocs/drgs/

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SITE LOCATION MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 1

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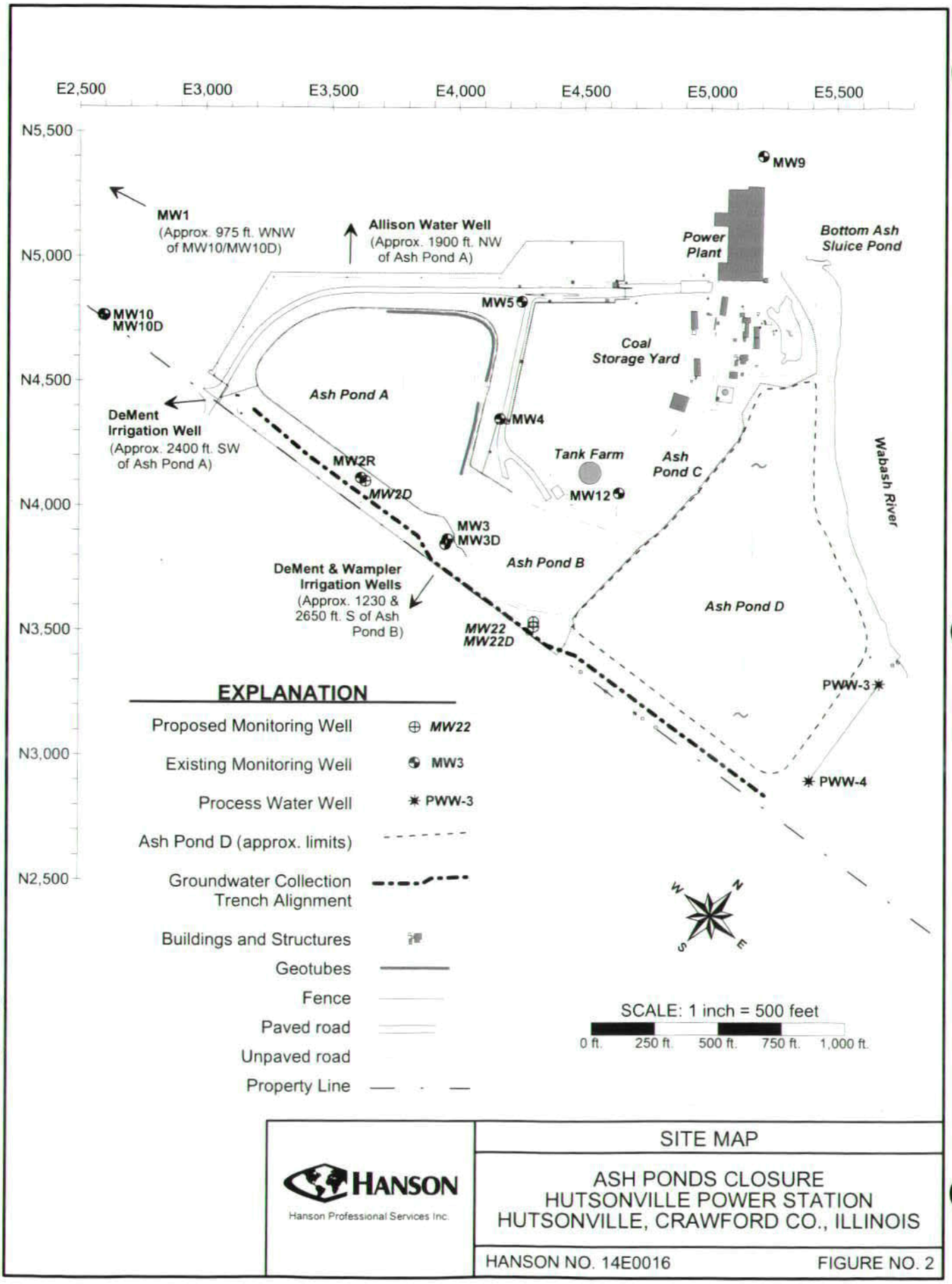

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SITE MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 2

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1.3 Site Hydrogeology

Site geology consists primarily of Wisconsinan Stage fluvial deposits with some Illinoian Stage diamictons overlying Pennsylvanian bedrock. There are various fill materials along with three unlithified surficial units identified at the Site, including fine-grained fluvial deposits classified as Cahokia Alluvium, poorly sorted outwash sand and gravels of the Henry Formation, and silty and clayey diamictons of the Glasford Formation. The details of the Site geology are described in the Hydrogeologic Site Investigation Report (Hanson, 2014).

Two groundwater flow zones are identified at the site: a shallow groundwater zone and a deep groundwater zone. The shallow groundwater zone consists of sand and gravel with varying thickness, typically 10 to 20 ft, underlain by 15 to more than 30 ft of the upper, permeable portions of the sandstone. The shallow sand grades to a fine-grained silty clay toward the northern portion of the Site. A thick shale unit underlies the sandstone at an approximate elevation of about 405 to 410 ft National Geodetic Vertical Datum (NGVD). The Wabash River valley contains a relatively fine-grained alluvium from land surface to an elevation of about 410 to 415 ft NGVD, underlain by sand and gravel to an elevation of about 350 ft—the sand and gravel at depth in the Wabash River valley is referred to as the deep groundwater zone. The shale unit beneath the Wabash River valley has been identified at elevations ranging from 345 to 380 ft NGVD.

Groundwater within the shallow zone generally flows from west to east towards the Wabash River. Horizontal hydraulic gradients range from 0.01 to 0.02, with an average of 0.016. Groundwater within the deep zone moves from southwest to northeast, almost perpendicular to the banks of the Wabash River. Horizontal hydraulic gradients for the deep zone range from 0.007 to 0.015, with an average of 0.011. The hydraulic conductivity measured at the site ranges from 2.6×10^{-4} to 4.8×10^{-2} cm/s, with a geometric mean of 6.5×10^{-3} cm/s for the unlithified materials and 4.7×10^{-4} cm/s for the sandstone bedrock unit.

1.4 Groundwater Quality

Per Illinois Administrative Code (IAC) Title 35, Section 620, groundwater at the site meets the definition of a Class I, Potable Resource Groundwater. Therefore, the groundwater quality standards of Class I set forth in Section 620.420 are the applicable groundwater quality standards.

Groundwater quality has been sampled at the site since 1984. The locations of monitoring wells are illustrated in Figure 2, although not all of these wells are currently monitored. Concentrations of boron, sulfate, iron, manganese, and total dissolved solids (TDS) exceeded the Class I groundwater quality standards at multiple locations downgradient of the ash ponds during the period of 2011 through 2013. Boron and sulfate are the primary indicators for coal ash leachate. As documented in the Hydrogeologic Report (Hanson 2014), median boron concentrations, calculated from 1999 to 2013, were higher than the Class I standard at MW2(R), MW3/3D, MW6, MW8, and MW11(R), and median sulfate concentrations exceeded the standard at MW3/3D, MW6, MW8, and MW11(R).

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1.5 Implemented and Proposed Closure Actions

1.5.1 Implemented Closure Actions

Ash Pond D, the largest and oldest pond at the site, was covered and closed during 2012-2013. Closure activities included placement of a 40-mil textured HDPE geomembrane overlain by a 3-ft protective soil cover with a vegetated surface. Surface water management features incorporated into the final cover design included intermediate berms and ditches to direct runoff to rip-rap-lined chutes running off the ash pond to surrounding areas. Details of the closure are provided in the Project Plans and Specifications (Hanson, 2011a).

In addition, a groundwater collection trench was installed between the outside south toe of Ash Ponds A, B, and D and the south property line, as shown on Figure 2. Ameren intends to begin operation of the trench once the Site's NPDES permit is modified, and this modification is expected to be completed late in 2014 or early 2015. The trench is designed to continuously withdraw groundwater and create a hydraulic barrier to prevent migration south of the property line. Water captured by the Trench will be pumped to a central catch basin located adjacent to the existing Ash Pond D outlet structure along the mid-east side of the pond, from which it will then discharge to the Wabash River in accordance with the Site's NPDES permit. Details are provided in the Ash Pond D closure plan (Hanson, 2011b) and Project Plans and Specifications (Hanson, 2011a).

1.5.2 Proposed Closure Actions

A Closure Plan, for Ash Ponds A, B, C, and the Bottom Ash Sluice Pond, is being submitted simultaneously with this report. The proposed closure actions are:

- Capping Ash Pond A – Ash Pond A is designed to be the depository for disposal of materials excavated from Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond. It will then be graded to drain surface water using a uniform 5% slope toward the outside berm. The proposed cover will include a 40-mil textured HDPE geomembrane overlain by a 3-ft protective soil cover. Surface water management features incorporated into the final cover design include rock chutes to discharge runoff to surrounding areas and a storm water retention pond in the area where Ash Pond B is currently located.
- Clean closure of Ash Pond B – Ash Pond B will be clean-closed and the berms removed to be re-used as cover material for Ash Pond A. The pond bottom will then be graded to a maximum of 9-ft below the pond perimeter. Storm water routed through this pond will be detained for intermediate to large rain events.
- Clean closure of Ash Pond C – Ash Pond C will be clean-closed and graded to drain to the northeast through an open cut channel through the original east perimeter berm of Ash Pond D and discharged towards the Wabash River.
- Clean closure of the Bottom Ash Sluice Pond – The Bottom Ash Sluice Pond will be clean-closed and graded to drain to the northeast through an open cut channel through the original east perimeter berm of Ash Pond D and discharged towards the Wabash River.

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1.6 Timeline of Ash Pond Actions

An approximate schedule is summarized below that outlines the time for implementation of the Closure Plan elements, as well as the timelines of previous ash pond constructions, removals, and other related operations:

- 1968 - 2000: Ash Pond A and Ash Ash Pond D were the only existing ash ponds operated on Site.
- 2000:
  a. Ash Pond D was removed from service.
  b. The ash laydown area was excavated.
  c. Construction of the interim pond (Ash Pond B) and the drainage collection pond (Ash Pond C) were finished.
- January 2013: Capping of Ash Pond D was completed.
- January 2015 (Expected): The groundwater collection trench will begin operation.
- January 2016 (Expected):
  a. Removal of Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond will be completed.
  b. Capping of Ash Pond A will be completed.

2. Groundwater MODEL Approach

2.1 Overview

This section presents the conceptual model and the overall modeling methodology. The model was established to predict the effect of the proposed closure actions for Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond on groundwater quality at the site. These ponds have limited impact on groundwater flow and quality, so Ash Pond D was included in the modeling for calibration purposes.

2.2 Conceptual Model

The conceptual model for the Site is schematically illustrated in Figure 3, below. Three sources of water are present: natural recharge within the model domain, percolation water from the ash ponds, and groundwater flow from the west. Groundwater in the shallow groundwater zone flows horizontally east, discharging into the Wabash River, a regional groundwater sink. Where coal ash is encountered within the shallow groundwater zone, groundwater flows horizontally through the ash. Only Ash Pond D was deep enough to have horizontal groundwater migration through the coal ash.

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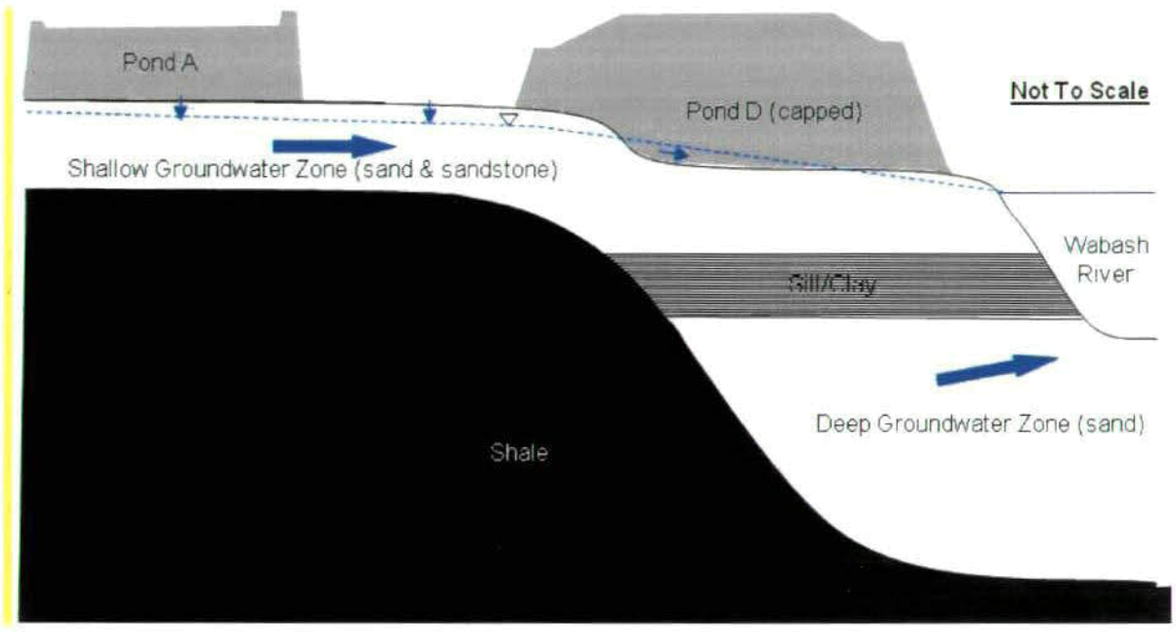

Figure 3. Conceptual Model Schematic

Boron was modeled to simulate migration of CCW leachate because it 1) has concentrations exceeding the Class I standard in a number of on-site monitoring wells, 2) is mobile in groundwater, and 3) is not chemically reactive. The conceptual model for transport assumes two boron sources: boron that leaches to recharge water during percolation through ash above the water table; and boron that leaches to groundwater as it flows through ash below the water table, which is limited to Ash Pond D. Therefore, mass is added to groundwater via vertical recharge through coal ash, and horizontal groundwater flow through coal ash where it lies below the water table. Mass is discharged at the model representation of the Wabash River. It is assumed that boron undergoes reversible adsorption and desorption within the soil matrix along its transport pathways, however no removal of mass occurs with this process. The conceptual transport model also assumes that boron concentration in leachate does not vary as a function of time, although the volume of leachate released decreases over time as a function of pond dewatering and capping.

2.3 Model Approach

Three model codes were used to simulate groundwater flow and boron transport:

- Leachate percolation after Ash Pond D closure was modeled using the Hydrologic Evaluation of Landfill Performance (HELP) model and the leachate percolation rates were applied in MODFLOW to simulate recharge beneath the pond cap.
- Groundwater flow was modeled in three dimensions using MODFLOW.
- Boron transport was modeled in three dimensions using MT3DMS (MODFLOW calculated the flow field that MT3DMS used in the transport calculations).

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The groundwater flow and transport models were calibrated to the monitoring data observed from 1984 to 2013. Multiple stress periods were set in the models to represent the Site changes during the model period. The descriptions of multiple stress periods applied in the model are listed in Table 1. A total of five stress periods were used in the calibration model to simulate site conditions from the initial construction of the ash pond to the end of the observation period and are summarized as following:

- Stress Period 1 - a steady-state flow model over a period from 1967 to 1985. Ash Pond A, Ash Pond D and the ash laydown area were assumed to be present at the Site during the same period for simplicity of the model.
- Stress Period 2 – a transient flow model over a period from 1986 to 1996. All model inputs were similar to stress period 1 with one exception: a continuous small-area leak was modeled in Ash Pond A to simulate a concentration increase observed in MW3 beginning in 1986.
- Stress Period 3 – a transient flow model over a period from 1997 to 2000. A second continuous leak was modeled in Ash Pond A to simulate an increase in boron concentration observed in MW2 beginning in 1997.
- Stress Period 4 – a transient flow model over a period from 2001 to January 2013. This stress period included changes to recharge and concentration inputs to simulate addition of Ash Pond B and Ash Pond C, and removal of the ash laydown area. It also incorporated a recharge rate modification to simulate discontinuation of sluicing to Ash Pond D.
- Stress Period 5 – a transient flow model over a period from January 2013 to December 2014. Recharge was modified in this stress period to simulate capping of Ash Pond D.

The approach used to calibrate the groundwater flow model and transport model was:

- The flow model was calibrated to approximate head observations measured from 1984 to 2013.
- The transport model was calibrated to approximate boron concentration observations measured from 1984 to 2013.

Multiple iterations of MODFLOW and MT3DMS calibration were performed to achieve an acceptable match to the time-series trends of the observed data. In order to obtain a reliable set of fitting parameters, all available well monitoring data were used for the calibration. The transport model calibration required iterative changes to and recalibration of the flow model. The results provided a representative simulation of groundwater flow and transport conditions in the proximity of the Site.

The calibrated model was then used to simulate proposed closure activities and predict changes in groundwater quality over a period of 90 years. Two additional stress periods were added for the prediction model:

- Stress Period 6 – a transient flow model over a period from January 2015 to December 2015. A MODFLOW drain boundary was added for this stress period to simulate operation of the groundwater collection trench.
- Stress Period 7 – a transient flow model over a period from 2016 to 2105. Recharge rates and concentrations were modified to simulate clean-closure of Ash Ponds B, C, and the bottom ash pond, and recharge rates were modified to simulate capping of Ash Pond A.

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Table 1. Model Stress Periods

Modeled Year	Stress Period	Category	Flow Model State	Length (days)	Description
11/9/1967 - 12/31/1985	1	Calibration	Steady	6628	–
1/1/1986 - 12/31/1996	2	Calibration	Transient	4018	Initiation of east leak in Ash Pond A liner
1/1/1997 - 12/31/2000	3	Calibration	Transient	1460	Initiation of west leak in Ash Pond A liner
1/1/2001 - 1/17/2013	4	Calibration	Transient	4400	(1) Laydown area ash excavation complete. (2) Interim Ash Pond (B) and drainage collection Ash Pond (C) construction complete. (3) Ash Pond D removed from service - dewatering.
1/18/2013 - 12/31/2014	5	Calibration	Transient	714	Ash Pond D cover system complete.
1/1/2015 - 12/31/2015	6	Prediction	Transient	364	Groundwater trench system operated
1/1/2016 - 1/1/2105	7	Prediction	Transient	32507	(1) Capping of Ash Pond A. (2) Removal of Ash Pond B, Pond C and Bottom Ash Sluice Pond.

The cover system for Ash Pond D, consisting of 3-ft protection soil and a HDPE geomembrane layer, was modeled using HELP to estimate the percolation rate of leachate underneath the cover system. The rate was applied during Stress Periods 5, 6, and 7.

3. Percolation Modeling

3.1 HELP Model Description

The Hydrologic Evaluation of Landfill Performance (HELP) code was developed by the U.S. Army Corps of Engineers for the U.S. Environmental Protection Agency. HELP calculates one-dimensional vertical percolation from a landfill or soil column based on precipitation, evapotranspiration, runoff, and the geometry and hydrogeologic properties of a layered soil and waste profile.

For this investigation, HELP Version 3.07 (Schroeder et al., 1994) was selected to estimate percolation when a cover system was over Ash Pond D. The hydrologic data required by and entered into HELP are listed in Table 2 and described in the following paragraphs.

3.2 HELP Model Set-up

3.2.1 Percolation Model Scenario

The objective of the HELP modeling was to estimate the recharge rate (percolation) through the cap implemented on Ash Pond D since January 2013. The cap consists of 3-ft protection soil and a geomembrane layer (HDPE). This design meets the requirements of 35 IAC 840.126. For the HELP simulation, it was assumed that any standing water in the pond was removed prior to cap construction.

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Table 2. HELP Input Parameters and Sensitivity Analysis

	Parameter	Test Range	Sensitivity[1]	Notes
Climate-general				
City	Evansville, IN	--	--	nearby city to Hutsonville in database
Latitude	39.13	--	--	plant location
Evap. Zone Depth	21	14, 28	High	14 - poor; 21 - fair; & 28 - good grass
Leaf Index	2	1, 5	Low	1 - poor; 2 - fair; & 5 - excellent grass
All Others	*	--	--	* - defaults for Evansville, IN
Climate-precip/temp/ET				
All	*	--	--	* - Evansville, IN; synthetically generated
Soils-general				
Area (acres)	1	--	--	unit area
% where runoff possible	100	--	--	--
Initial moisture content	N	--	--	initial moistures were calculated by HELP
Surface Water/Snow	0	--	--	--
Soils-layers				
1	*	--	--	*Silty Clay Loam
2	HDPE	--	--	HDPE - High Density Polyethylene
3	Fly Ash	--	--	--
Layer Parameter				
Layer 1				
Type	1	--	--	1 - vertical percolation layer
Thickness	36	12, 48	High	--
Texture	12	4, 11	High	HELP Soil Codes
Porosity	0.471	default	--	default value for selected soil texture
Field Capacity	0.342	default	--	default value for selected soil texture
Wilting point	0.21	default	--	default value for selected soil texture
Hydraulic Conductivity	4.2E-05	default	--	default value for selected soil texture
Layer 2				
Type	4	--	--	4 - geomembrane layer
Thickness	0.04	--	--	--
Texture	35	--	--	HELP Codes: 35 - HDPE
Hydraulic Conductivity	2.0E-11	--	--	default value for selected soil texture
Pinhole Density	1	--	--	"good" placement quality
Installation Defects	4	1, 10	High	1 - excellent; 4 - good; 10 - poor
Placement Quality	3	2, 4	High	2 - excellent; 3 - good; 4 - poor
Layer 3				
Type	1	--	--	1 - vertical percolation layer
Thickness	360	120 x 3, 180 x 2	Negligible	assume 360-in ash
Texture	30	--	--	HELP Codes: 30 - fly ash
Porosity	0.541	--	--	default value for selected soil texture
Field Capacity	0.187	--	--	default value for selected soil texture
Wilting point	0.047	--	--	default value for selected soil texture
Hydraulic Conductivity	5.0E-05	--	--	default value for selected soil texture
Soils--runoff				
Equation	*	*	*	* - HELP Calculated
Slope	5%	1%, 3%	Negligible	-
Length	600	--	--	estimated based on pond size
Texture	12	default	default	based on uppermost soil type in column
Vegetation	3	1, 5	High	HELP Vegetation Codes

[1]Sensitivity Explanation
Negligible - less than 1 percent change in total percolation volume relative to base scenario.
Low - 1 to 2 percent change in total percolation volume.
Moderate - 2 to 10 percent change in total percolation volume.
High - greater than 10 percent change in total percolation volume.

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3.2.2 Percolation Model Input Data

Table 2 presents all input data to configure the HELP model. Climatic input variables were synthetically generated by the HELP model using default values for Evansville, Indiana, and latitude of 39.13° N for the Site. Rainfall frequency and temperature patterns for more than 100 cities are programmed into HELP. Evansville was selected as the closest city to the Site. The model used Evansville precipitation and temperature patterns with default precipitation and temperature data to generate daily precipitation and temperature data.

Physical input data were based on the configuration of Ash Pond D and a combination of measured and assumed soil properties. Cap materials were chosen from the HELP database to match the conceptual design. The HELP modeling assumed that cap materials and ash had uniform texture and hydraulic properties during the simulation period. Hydraulic properties of the cap materials, including hydraulic conductivity, porosity, field capacity, and wilting point, were the default database values. The initial moisture content in each layer was calculated by assuming constant values via the HELP program. It was also assumed 100% runoff given the condition that capping system was properly constructed and maintained.

The HELP modeling assumed that the geomembrane layer of the cap was constructed with good placement quality, standing water was removed from the capped ponds, no groundwater flowed into the pond, and all flow to groundwater was vertical. Other assumptions inherent in the model are listed in Schroeder et al. (1994).

3.3 HELP Model Approach

Two types of HELP simulations were performed: prediction analysis and sensitivity analysis. The prediction analysis was performed to estimate the percolation rate of the cap, which was later input to the Stress Periods 5 through 7 in the groundwater flow model. Sensitivity analysis was used to determine the contribution of each input parameter to the final percolation rate calculation.

3.4 HELP Model Results

3.4.1 Prediction Analysis

HELP input and output files are included on the attached CD (Appendix C). Predicted percolation rates fluctuated with changes in predicted precipitation and evaporation conditions. Average percolation rate calculated from the HELP simulations was later used in the groundwater flow model. The average percolation rate for Ash Pond D cover was calculated as 1.5 inches/year (in/yr).

3.4.2 Sensitivity Analysis

Sensitivity analyses were performed on selected hydrogeologic and soil parameters and are presented in Table 2. The results showed that percolation rates calculated by HELP were highly sensitive to vegetation assumptions, the thickness and texture of the native soil assumed for the protection layer, and the installation and placement quality of the geomembrane. The model was not sensitive to the simulation of coal ash thickness and the parameters used in the runoff calculation, such as the capping slope and the runoff length.

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4. Flow and Transport Model SET-UP AND CALIBRATION

4.1 Model Overview

The 2014 model is an update to, and was derived from, a model developed for the Site in 2009 (NRT, 2009). Several changes were made to the 2009 model, specifically:

- The calibration period was extended through December 2013. New wells were included as calibration points (MW115S/D, MW11(R), MW121 and MW14).
- Instead of using ponded and dry portions to represent Ash Pond D before its closure (Stress Periods 1-4), a uniform recharge rate was applied to Ash Pond D to simplify the model.
- Small leaks were simulated in Ash Pond A to simulate increases in boron concentration observed in MW2 and MW3.
- A high recharge zone was added along the Wabash River bank to represent increased infiltration when the Wabash River overflows its banks.
- Recharge rates for the ponds were adjusted to improve matches with the observed data.

4.2 Model Descriptions

MODFLOW uses a finite difference approximation to solve a three-dimensional head distribution in a transient, multi-layer, heterogeneous, anisotropic, variable-gradient, variable-thickness, confined or unconfined flow system - given user-supplied inputs of hydraulic conductivity, aquifer/layer thickness, recharge, wells, and boundary conditions. The program also calculates water balance at wells, rivers, and drains.

MODFLOW was developed by the United States Geological Survey (McDonald and Harbaugh, 1988) and has been updated several times since. Major assumptions of the code are: (1) groundwater flow is governed by Darcy's law; (2) the formation behaves as a continuous porous medium; (3) flow is not affected by chemical, temperature, or density gradients; and (4) hydraulic properties are constant within a grid cell. Other assumptions concerning the finite difference equation can be found in McDonald and Harbaugh (1988).

MT3DMS (Zheng and Wang, 1998) is an update of MT3D. It calculates concentration distribution for a single dissolved solute as a function of time and space. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. Solute mass may be input at discrete points (wells, drains, river nodes, constant head cells), or distributed, evenly or unevenly, over the land surface (recharge).

MT3DMS accounts for advection, dispersion, diffusion, first-order decay, and sorption. Sorption can be calculated using linear, Freundlich, or Langmuir isotherms. First-order decay terms may be differentiated for the adsorbed and dissolved phases.

The program uses the standard finite difference method, the particle-tracking-based Eulerian-Lagrangian methods, and the higher-order finite-volume TVD method for the solution schemes. The finite difference solution is subject to numerical dispersion for low-dispersivity transport scenarios but maintains mass-balance. The particle-tracking method avoids numerical dispersion but is subject to greater mass-balance errors. The TVD solution is not subject to significant numerical distribution and

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adequately conserves mass-balance, but is numerically intensive, particularly for long-term models. The TVD solution was used for this simulation.

Major assumptions of MT3DMS are: (1) changes in the concentration field do not affect the flow field; (2) changes in the concentration of one solute do not affect the concentration of another solute; (3) chemical and hydraulic properties are constant within a grid cell; and (4) sorption is instantaneous and fully reversible, while decay is not reversible.

4.3 Flow and Transport Model Setup

4.3.1 Grid and Boundary Conditions

A four layer, 56 by 60 node grid was established with variable grid spacing ranging from 100 ft. to 500 ft. in length parallel to the primary flow direction and 100 ft. to 500 ft. perpendicular to the primary flow direction (Figure A-1). The largest node spacings were near the upgradient and lateral model boundaries, and the finest node spacings were along the river and near the ponds.

Flow boundaries for all stress periods are presented on Figure A-1. The upgradient edge of the model was a constant head (Dirichlet) boundary. The input for head was not sensitive to the model hydraulic conditions (Table 3). The lower and lateral boundaries were no-flow (Neumann) boundaries. The downgradient boundaries were either MODFLOW river (Mixed) boundaries (layers 2-4) or no flow (layer 1). The upper boundary was a time-dependent specified flux (Neumann) boundary, with specified flux rates equal to the recharge rate or the rate of percolation from ponds.

Two types of transport boundaries were used. Specified mass flux (Cauchy condition) boundaries were used to simulate downward percolation of solute mass in areas where ash is above the water table, and constant concentration (Dirichlet condition) boundaries were used in areas where ash is below the water table. The former boundary condition assigned a specified concentration to recharge water entering the cell, and in this application the resulting concentration in the cell was a function of the relative rate and concentration of water percolating from the ash compared to the rate and concentration of groundwater flow. The latter boundary type assigned the specified concentration to all water passing through the cell and was only applied to Ash Pond D in the model.

4.3.2 Flow Model Input Values and Sensitivity

Flow model input values and sensitivity analyses results are presented in Table 3 and described below.

4.3.2a Layer Top/Bottom

Groundwater in the shallow groundwater zone is unconfined; therefore, the top of the aquifer was the water table and the elevation of the top model layer (layer 1) was set at 460 ft NGVD, a value slightly higher than the observed water table elevation of 427 to 450 ft NGVD. The top of layers 2-4 was the base of the overlying layer.

The base of the upper sand unit was determined by contouring bedrock elevation and importing the contour data into MODFLOW. The corresponding base elevations for layer 1 were between 424 and 450 ft. NGVD. The base of the second layer corresponded to the base of the sandstone, 418 ft NGVD.

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Table 3. MODFLOW Input Parameters

Horizontal Hydraulic Conductivity	Applied Stress Period	ft/d	cm/s	Sensitivity[1]
Layer 1 fly ash	1-7	0.14	5.0E-05	Low
Layer 1 silt unit		0.10	3.5E-05	Low
Layer 1 sand unit		80	2.8E-02	High
Layer 1, 2, 3 alluvium		30	1.1E-02	High
Layer 2 sandstone		4.0	1.4E-03	High
Layer 4 valley fill sand and gravel		136	4.8E-02	High
Vertical Hydraulic Conductivity	**Applied Stress Period**	**ft/d**	**K_h / K_v**	**Sensitivity[1]**
Layer 1 fly ash	1-7	0.07	2.0	Negligible
Layer 1 silt unit		0.05	2.0	Low
Layer 1 sand unit		40	2.0	Negligible
Layer 1, 2, 3 alluvium		3.0	10.0	High
Layer 2 sandstone		2.0	2.0	Negligible
Layer 4 valley fill sand and gravel		68	2.0	Low
Recharge	**Applied Stress Period**	**ft/d**	**in/yr**	**Sensitivity[1]**
General	1-7	0.001	4.4	Moderate
Lowlands	1-7	0.0015	6.6	Negligible
River bank	1-7	0.35	1533.0	Low
Area between ponds	1-7	0.0027	11.8	Negligible
Coal pile	1-7	0.0027	11.8	Negligible
Ash laydown area	1-3	0.0027	11.8	Negligible
Bottom ash pond	1-6	0.0027	11.8	Negligible
Ash Pond D - in service	1-3	0.01	44	Negligible
Ash Pond D - out of service	4	0.008	35.0	Negligible
Ash Pond D - capped	5-7	3.50E-04	1.5	Negligible
Ash Pond A - in service	1-6	2.30E-05	0.10	Negligible
Ash Pond A - west leak	3-6	0.025	109.5	Negligible
Ash Pond A - east leak	2-6	0.01 - 2.3E-5*	44 - 0.1*	Negligible
Ash Pond A - capped	7	2.30E-05	0.10	Negligible
Ash Ponds B & C - in service	4-6	0.000023	0.1	Negligible
Storage/Porosity	**Applied Stress Period**	**S_S (1/ft)**	**S_Y**	**Sensitivity[1]**
Layer 1 fly ash	1-7	1.00E-03	0.10	Negligible
Layer 1 silt unit		1.00E-03	0.10	Negligible
Layer 1 sand unit		1.00E-05	0.20	Negligible
Layer 1, 2, 3 alluvium		1.00E-03	0.10	Negligible
Layer 2 sandstone		1.00E-06	0.15	Negligible
Layer 4 valley fill sand and gravel		1.00E-05	0.20	Negligible
River Parameters	**Applied Stress Period**	**Wabash**	**Trib West/ Trib East**	**Sensitivity[1]**
Bed Thickness (ft)	1-7	1	1	--
Hydraulic Conductivity (ft/d)		0.7	0.1/0.01	--
Conductance (ft^2/d, normalized per ft^2 area)		0.7	0.1/0.01	Moderate - High[2]
River Width (ft)		variable	5	--
River Cell Length (ft)		variable	variable	--
Constant Head Boundary Parameters	**Applied Stress Period**	**Layer 1 (west)**	**-**	**Sensitivity[1]**
Head (ft)	1-7	451	-	Negligible

[1]Sensitivity Explanation
Negligible - SSR change in one scale
Low - SSR change between one and two scales
Moderate - SSR change between two and three scales
High - SSR change higher than three scales

[2]The sensitivity for Wabash and Trib west is moderate and for Trib east is high.

* The recharge rate for the east leak was set to 0.01 ft/d before 2000 and 2.3e-5 ft/d afterward.

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The base of the third layer corresponded to the top of the Wabash River valley sand unit, 412 ft NGVD. The base of the bottom layer (deep alluvial aquifer) corresponded to the base of the Wabash River valley sand unit (350 ft NGVD).

Layer 1 of the model included a zone with hydraulic conductivity representing fly ash. This zone was also used as a source area, representing saturated ash, during transport modeling. The base elevation of this zone was determined from contouring, as was the rest of model layer 1. Base elevations of the coal ash were contoured from 424 to 444 ft NGVD. In the model, only the first-layer nodes of Ash Pond D represented saturated ash.

4.3.2b Hydraulic Conductivity

Six hydraulic conductivity zones were established to simulate hydrogeology in the proximity of the Site, including fly ash, silt, sand, alluvium, sandstone and valley fill sand/gravel (Figure A-2). Hydraulic conductivity values were initially derived from field-measured values, and adjusted during calibration.

Vertical anisotropy ratios were set at 2.0 everywhere except the alluvium units in Layers 1, 2 and 3, where a ratio of 10 was set. The Kx/Kz ratios represent expected stratification within the formations.

The shale bedrock underlying the sandstone was not discretely modeled. Rather, cells representing shale, all in layers 3 and 4, were set with no-flow boundary conditions. This setting inherently assumed that groundwater flow in the shale bedrock is negligible.

The model sensitivity to the horizontal hydraulic conductivity ranged from low for fly ash and silt, to high for sand, alluvium, sandstone and valley fill sand/gravel. Sensitivity to vertical hydraulic conductivity also varied, with alluvium being highly sensitive; silt and valley fill sand/gravel having low sensitivity; and ash, sand, and sandstone having negligible sensitivity.

4.3.2c Storage

Representative values were obtained from Smith and Wheatcraft (1993). The storage zones were set consistent with hydraulic conductivity to represent the hydrogeology units as shown on Figure A-3. The storage affects the rate at which groundwater elevation changes as percolation rates changes, such as Ash Pond D closure, capping and construction of new ponds. Overall, the model was insensitive to this parameter.

4.3.2d Recharge

Recharge rates for the ash ponds and surrounding area were established during calibration (Figure A-4). Recharge zones were established for each individual pond at different stress periods as presented in Table 3. Recharge values were modified during the simulation to represent the following changes in Site conditions:

- Recharge representing Ash Pond D was decreased beginning in stress period 4 when sluicing to the pond was discontinued, and again in stress period 5 to simulate the cap.
- Recharge representing the bottom ash pond was discontinued and replaced with the rate for the area between ponds during stress period 7 to represent clean-closure of this facility.

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- Recharge representing the ash laydown area was discontinued after stress period 3 when this area was removed. Recharge rates for these cells in future stress periods were either the area between ponds rate or Ash Ponds B & C rate, as appropriate.
- Recharge representing Ash Ponds B and C was initiated during stress period 4, and discontinued after stress period 6.
- Recharge representing Ash Pond A was not changed for stress period 7 (when the pond was capped) because the calibrated recharge rate for this HDPE-line pond was already lower than the HELP-determined capped recharge value representing Ash Pond D. However, the recharge rates for the two cells simulating leaks in Ash Pond A were reset to the capped value for Ash Pond A to simulate the effect of capping on the leaks.

The recharge rates for all pond areas had negligible sensitivity on the flow model. The recharge rates for the general site and the river bank had moderate and low sensitivities, respectively.

4.3.2e River and Drain Parameters

The Wabash River and tributaries were represented by head-dependent flux nodes that required inputs for river stage, width, bed thickness, and bed hydraulic conductivity. The latter three parameters were used to calculate a conductance term for the boundary node. River stage for the Wabash River was set near mean stage, and adjusted slightly during calibration. River stage for the tributaries was determined from USGS topographic maps. For model simplicity, it was assumed that stage does not fluctuate in any river and drain boundaries.

Sensitivity analysis showed that the model was moderately to highly sensitive to the conductance term used.

A MODFLOW drain boundary was added to the model to evaluate the effect of a groundwater collection trench on migration south of Ash Ponds A and D (Figure A-5). Drain parameters are listed in Table 4.

Table 4. MODFLOW Drain Construction

Drain	Value
Drain Length (feet)	1000
Drain Pipe Diameter (feet)	3
Drain Bed Thickness (feet)	1
Drain Bed Hydraulic Conductivity (cm/s)	0.10
Drain Bed Hydraulic Conductivity (ft/day)	283
East Drain Base Elevation	440
West Drain Base Elevation	423
MODFLOW Layer Number	1-2*
MODFLOW Drain Reach	1

*- Dependent on the drain elevation

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4.3.3 Transport Model Input Values and Sensitivity

Transport model input values are listed in Table 5 and described below. The results of sensitivity analyses are presented in Table 5.

4.3.3a Initial Concentration

Initial concentration for the model was set at zero, implicitly implying a background concentration of zero, which is reasonable for boron. Since the prediction model was an extension of the calibration model, it did not have its own initial concentration values.

4.3.3b Source Concentration

Concentration values for the ash cells were held constant throughout the simulation period for all sources. Boron concentrations in leachate were modeled as 2 mg/L for the coal pile, 20 mg/L for Ash Ponds A, B, C, and D, and 30 mg/L for the Ash Laydown Area. The leachate concentrations were applied to the model consistent with the corresponding recharge zones for each stress period as listed in Table 5. The concentrations were set based on previous hydrogeologic assessment (NRT, 2009). Predicted concentrations were highly sensitive to source concentrations.

4.3.3c Effective Porosity

Effective porosity values were based on ranges provided by Mercer and Waddel (1993). Predicted concentrations were moderately sensitive to the effective porosity of Layer 2 sandstone, had low sensitivity to the effective porosity of Layer 4 valley fill sand/gravel, and were negligibly sensitive for the other units.

4.3.3d Dispersivity

Longitudinal dispersivity was set as 30 ft during model calibration. Transverse and vertical dispersion were estimated according to ratios developed by Gelhar et al. (1985). Predicted boron concentrations were highly sensitive to dispersivity values, in all directions.

4.3.3e Retardation

Retardation was calculated by the model based on the distribution coefficient (K_d) (Figure A-6). The model assumed a reversible adsorption and desorption process, which would slow migration of dissolved boron without reducing the total mass. The K_d value used for the sandy materials in this model (0.17 milliliters per gram, or mL/g) was based on testing performed by NRT for similar materials at another site. The K_d value for the silt materials (0.85 mL/g) was assumed a factor of five higher than that for sand. Predicted boron concentrations were highly sensitive to the K_d value of both materials.

4.3.3f Diffusion

Diffusion was assumed to be zero for the entire model domain.

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Table 5. MT3DMS Input Parameters

Initial Concentration (mg/L)	Value	Alternatives	Sensitivity[1]
Entire Domain	0.0	not tested	–
Source Concentration - Recharge (mg/L)	**Value**	**Alternatives**	**Sensitivity[1]**
Ash Ponds A, B, C, D	20	not tested	–
Ash Laydown Area	30	not tested	–
Coal Pile	2	not tested	–
Bottom Ash Sluice Pond	5	not tested	–
Source Concentration - Constant (mg/L)	**Value**	**Alternatives**	**Sensitivity[1]**
Saturated Ash Nodes (Ash Pond D)	20	10, 30	High
Effective Porosity	**Value**	**Alternatives**	**Sensitivity[1]**
Layer 1 fly ash	0.10	0.05, 0.15	Negligible
Layer 1 silt unit	0.10	0.05, 0.15	Negligible
Layer 1 sand unit	0.20	0.15, 0.25	Negligible
Layer 1-3 alluvium	0.10	0.05, 0.15	Negligible
Layer 2 sandstone	0.15	0.10, 0.20	Moderate
Layer 4 valley fill sand and gravel	0.20	0.15, 0.25	Low
Dispersivity (ft)	**Value**	**Alternatives**	**Sensitivity[1]**
Longitudinal	30	10, 50	High
Transverse	3.75	2, 5	High
Vertical	0.188	0.10, 0.30	High
Retardation	**Value**	**Alternatives**	**Sensitivity[1]**
Bulk Density (g/cm^3)	1.6	not tested	–
Distribution Coefficient - sand (mL/g)	0.17	0, 0.25	High
Distribution Coefficient - silt (mL/g)	0.85	0, 0.5, 1.2	High

[1]Sensitivity Explanation:
Negligible - little effect on concentrations
Low - concentrations at one or two wells changed by 2 to 10%
Moderate - concentrations at one or two wells changed by 10 to 20%
High - concentration at one or two wells changed by more than 20% or concentration at more than two wells changed more than 20%
[2]Determined to be highly sensitive during transport model calibration

4.4 Flow and Transport Model Assumptions and Limitations

Simplifying assumptions are necessary when numerically representing the natural environment in a groundwater flow model. Assumptions specific to this model are listed below. The reader is referred to McDonald and Harbaugh (1988), Zheng and Wang (1998), and Schroeder et al., (1994) for assumptions inherent with the codes used to develop the model.

- Natural recharge is constant over the long term.
- Hydraulic conductivity is consistent within hydrostratigraphic units.
- Fluctuations in surface water elevations are short in duration and do not affect groundwater flow and transport.
- Source concentrations remain constant over the time period modeled.
- Leachate instantaneously migrates to groundwater (e.g., rapid migration through the unsaturated zone).
- Boron undergoes a reversible adsorption and desorption process and does not decay. Dispersion is the primary attenuation mechanism.
- Cap construction has an instantaneous effect on recharge and percolation through the underlying ash fill deposit, relative to the 90 year period of the prediction model.

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Model predictions of flow and concentration are less reliable with increasing distance from the Site. Furthermore, the reliability of model predictions decreases with increasing time since changes may occur that were not accounted for in the model.

4.5 Calibration Flow and Transport Model Results

Results of the MODFLOW/MT3DMS modeling are presented below. A disk containing the model files is attached to this report (Appendix D).

In Figure B-1, the simulated hydraulic heads are compared with the observed range of heads measured in 19 monitoring wells at or surrounding the Site from 1984 through 2013. Several monitoring wells, including MW3D, MW7D, MW10/10D, MW11(R), MW12, MW14, MW115S/115D and MW121, were installed around 2000; therefore, measurements prior to the installation dates are not available. The observed hydraulic heads fluctuate around a mean value. The simulated values successfully fall within the head data measured for the observation period. In addition, the flow model also predicted successfully the slight decreases of hydraulic heads in 2000 when Ash Pond D was dewatering and 2013 when it was covered. These observations indicate that this model provides a reasonable simulation of groundwater flow at and surrounding the site.

Simulated boron concentrations are compared to the observed data over the sampling period from 1984 through 2013 in Figure B-2. The monitoring wells can be categorized as: (1) wells with observed boron concentrations higher than the Class I standard (2 mg/L), including MW2(R), MW3, MW3D, MW6, MW8, and MW11(R), and 2) wells with observed boron concentrations equal to or below the standard, including MW1, MW4, MW5, MW7/7D, MW12, MW14, MW115S/D, and MW121. The simulated boron concentrations match the observed concentrations and meet the calibration criterion that simulated results for category (1) are all higher than 2 mg/L while the simulated results for category (2) are all equal to or below 2 mg/L. The model also successfully simulates boron concentration changes responding to various hydraulic and transport condition changes, specifically capturing the increasing or decreasing trends observed in category (1) wells. The agreement between modeled and predicted concentrations demonstrates that the transport model adequately simulates contaminant transport in groundwater in the proximity of the site.

5. Simulation of Closure Activities

5.1 Overview

As described in Section 2, the prediction model was established to simulate groundwater quality for a time frame of 90 years. Hydraulic heads and boron concentrations were predicted for monitoring wells in proximity of Ash Ponds A, B, C, and the Bottom Ash Sluice Pond, where closure is proposed. The well network consists of 9 wells: MW2(R), MW3, MW3D, MW4, MW5, MW9, MW10, MW10D, and MW12. Several simplifying assumptions were made during the simulation. Specifically:

- Boron concentrations in leachate were assumed to remain constant as a function of time.
- Construction and removal were completed over a brief period, relative to the length of the flow simulation.

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Model predictions of flow and concentration are less reliable with increasing distance from the Site. Furthermore, the reliability of model predictions decreases with increasing time since changes may occur that were not accounted for in the model.

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5. Simulation of Closure Activities

5.1 Overview

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- Boron concentrations in leachate were assumed to remain constant as a function of time.
- Construction and removal were completed over a brief period, relative to the length of the flow simulation.

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5.2 Simulation of Closure Activities

The implemented and proposed closure activities at the Site include: capping Ash Pond D (completed in 2013), operation of a groundwater collection trench (simulated beginning in January, 2015), clean closure of Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond (simulated as complete by January, 2016), and capping Ash Pond A (simulated as complete by January, 2016). Capping was simulated by modifying recharge rates; the groundwater collection trench was simulated by assigning drainage cells; and clean closure was simulated by modifying recharge rates and setting recharge concentrations to zero.

5.2.1 Predicted Hydraulic Heads

Figure 4 presents the modeled heads at current monitoring wells from calibration through the 90-year prediction period (2015-2105). Significant decreases (as much as 10 feet) are predicted for wells [see MW2(R) and MW3D] when the trench begins operation. The model predicts that some wells will be dry once the trench is operational; although field conditions at the small scale of individual wells may differ from model predictions. The effect on head decreases with distance from the trench.

5.2.2 Predicted Boron Concentrations

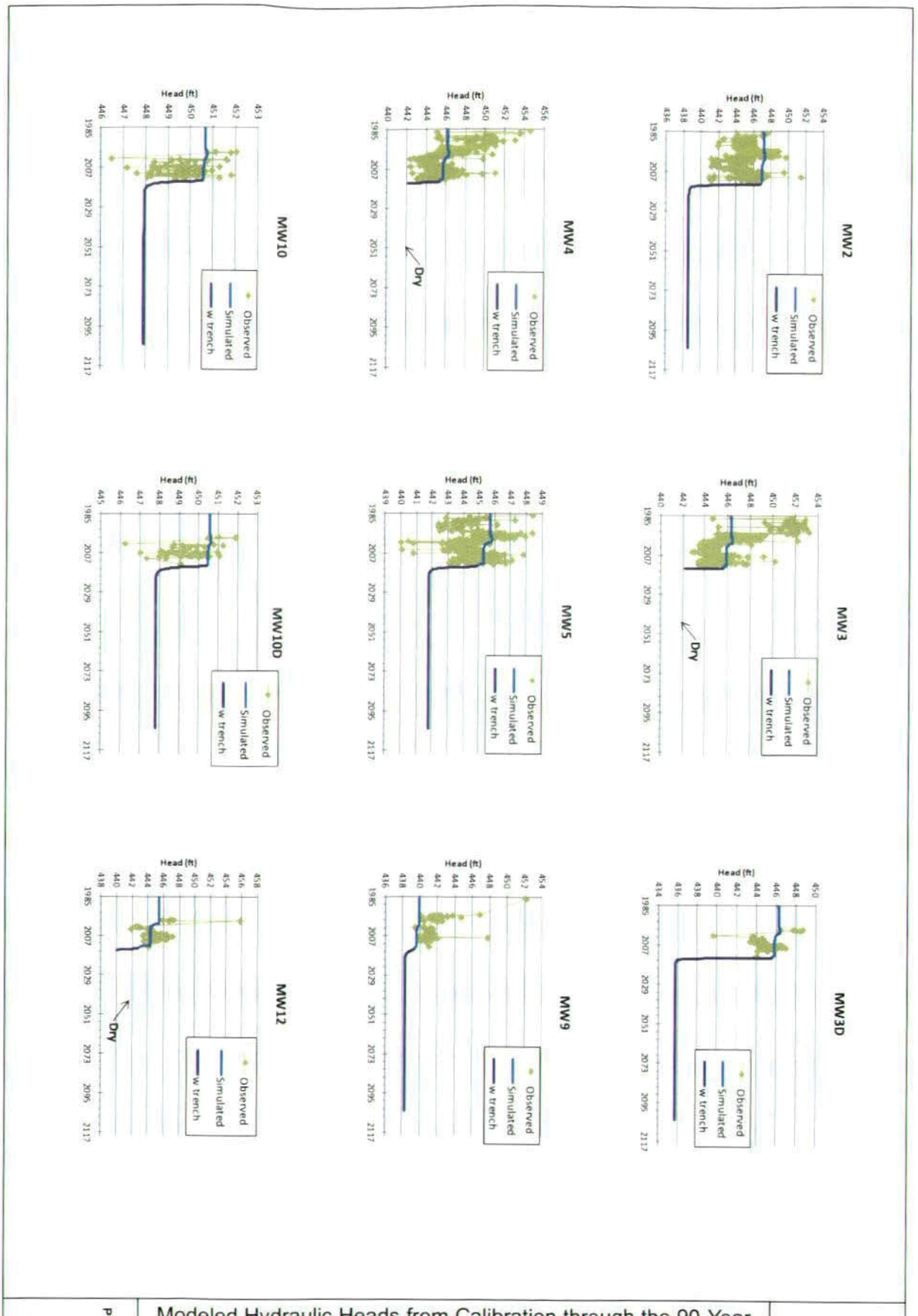
Figure 5 presents predicted boron concentrations from calibration through the 90-year prediction period (2015-2105). The model predicts a decrease in boron concentrations in all category (1) wells in response to the closure activities. All of these wells are predicted to attain compliance with the Class I Groundwater Standard during the simulation period (Table 6). A temporary increase in boron concentration is predicted at MW3D. This occurs because operation of the trench changes groundwater flow direction and higher concentration groundwater, predicted to occur north of this well, is drawn toward the well. However, the concentration predicted in MW3D decreases quickly after the temporary peak.

The number of years for predicted boron concentrations to attain the Class I Groundwater Standard and to stabilize is presented in Table 6. Concentrations in Ash Pond A, B, C monitoring wells are predicted to decrease to levels lower than the Class I Groundwater Standard in approximately 10 years (2025). Correspondingly, the modeled plume upgradient of Ash Pond D is predicted to dissipate by 2030.[1]

Predicted concentrations stabilize shortly after the closure plan is implemented in wells with low concentrations (MW5, MW9), while other wells are predicted to take as long as 40 years to stabilize. Stabilization time is greater than time to comply with Class I Groundwater Standards at some wells because concentrations continue to decrease for a period after the standard is attained.

Figure 6 presents the maximum plume extent.[1] According to the simulation results, the maximum plume extent will occur on 1/1/2015, just before the trench begins operation.

[1] For purposes of this comparison, plume extent is defined as the area where predicted concentrations are higher than the Class I standard.



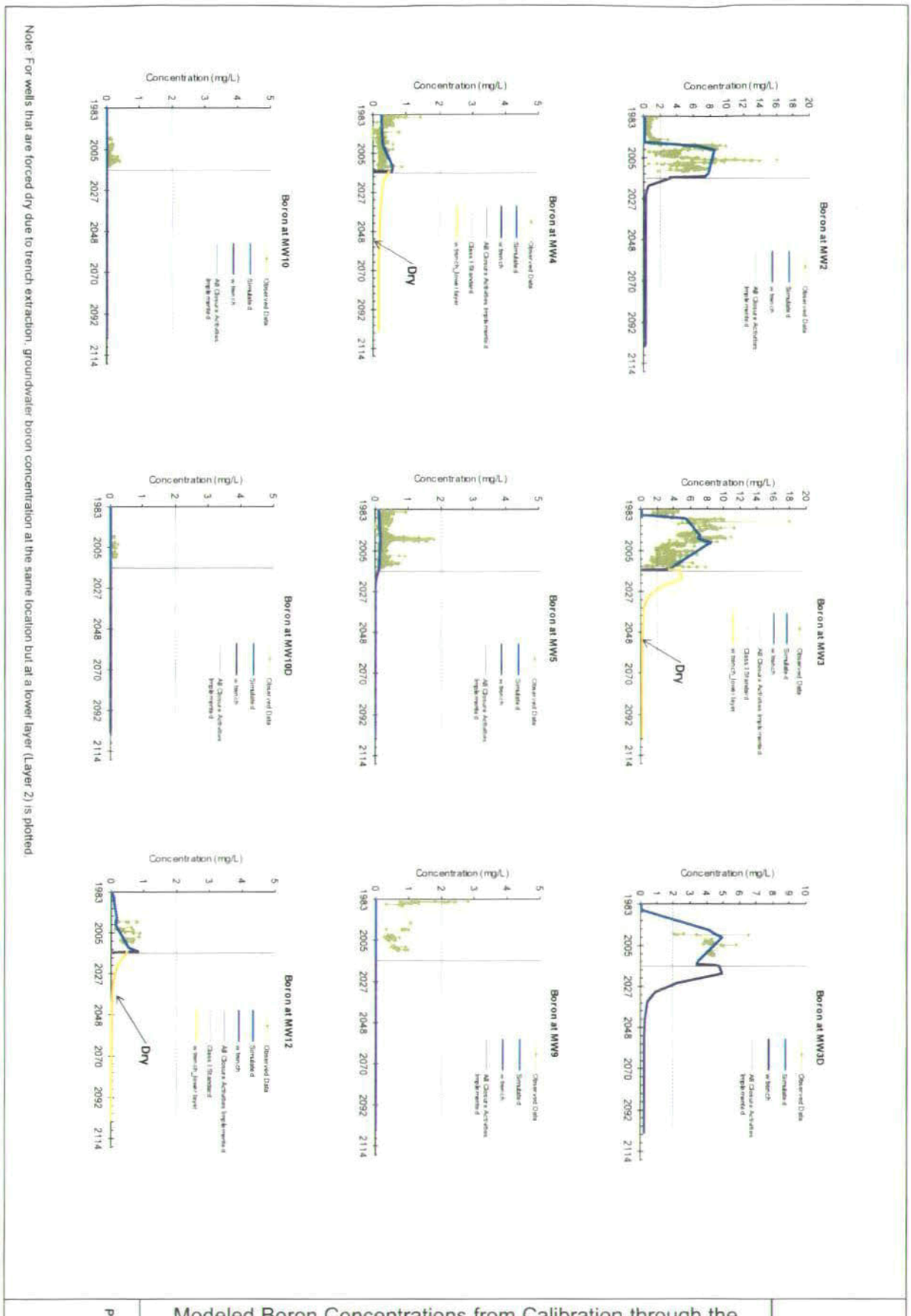
Modeled Hydraulic Heads from Calibration through the 90-Year Prediction Period

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

PROJECT NO: 2198
FIGURE NO: 4

NATURAL RESOURCE TECHNOLOGY



Note: For wells that are forced dry due to trench extraction, groundwater boron concentration at the same location but at a lower layer (Layer 2) is plotted.

Modeled Boron Concentrations from Calibration through the 90-Year Prediction Period

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

PROJECT NO: 2198
FIGURE NO: 5

PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Maximum Plume Size

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

NATURAL RESOURCE TECHNOLOGY

PROJECT NO: 2198
FIGURE NO: 6

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Table 6. Model-Predicted Milestones

Monitoring Well ID	Concentration less than Class I Std.	Concentration Stabilizes
MW2	2017	2025
MW3	Dry / 2025*	Dry / 2045*
MW3D	2025	2045
MW4	-1-	Dry / 2055*
MW5	-1-	2015
MW9	-1-	2015
MW10	-1-	-2-
MW10D	-1-	-2-
MW12	-1-	Dry / 2025*

*When the cell representing a monitoring well is predicted to go dry during the simulation, concentration less than Class I Standard or stable status is based on the same location in the next layer down in the model.
'concentration not predicted to exceed Class I standard.
'not applicable because well is upgradient and not affected by pond closure.

5.3 Prediction Summary

In summary, the model predicts:

- The proposed closure activities, consisting of capping Ash Pond A and clean closure of ponds B, C, and the bottom ash pond will facilitate attainment of groundwater quality standards in monitoring wells dedicated to these facilities within 10 years. The plume upgradient of Ash Pond D is predicted to dissipate within 15 years.
- Concentrations in these wells are predicted to stabilize within 40 years.

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Appendix A

Flow and Transport Model Setup Figures

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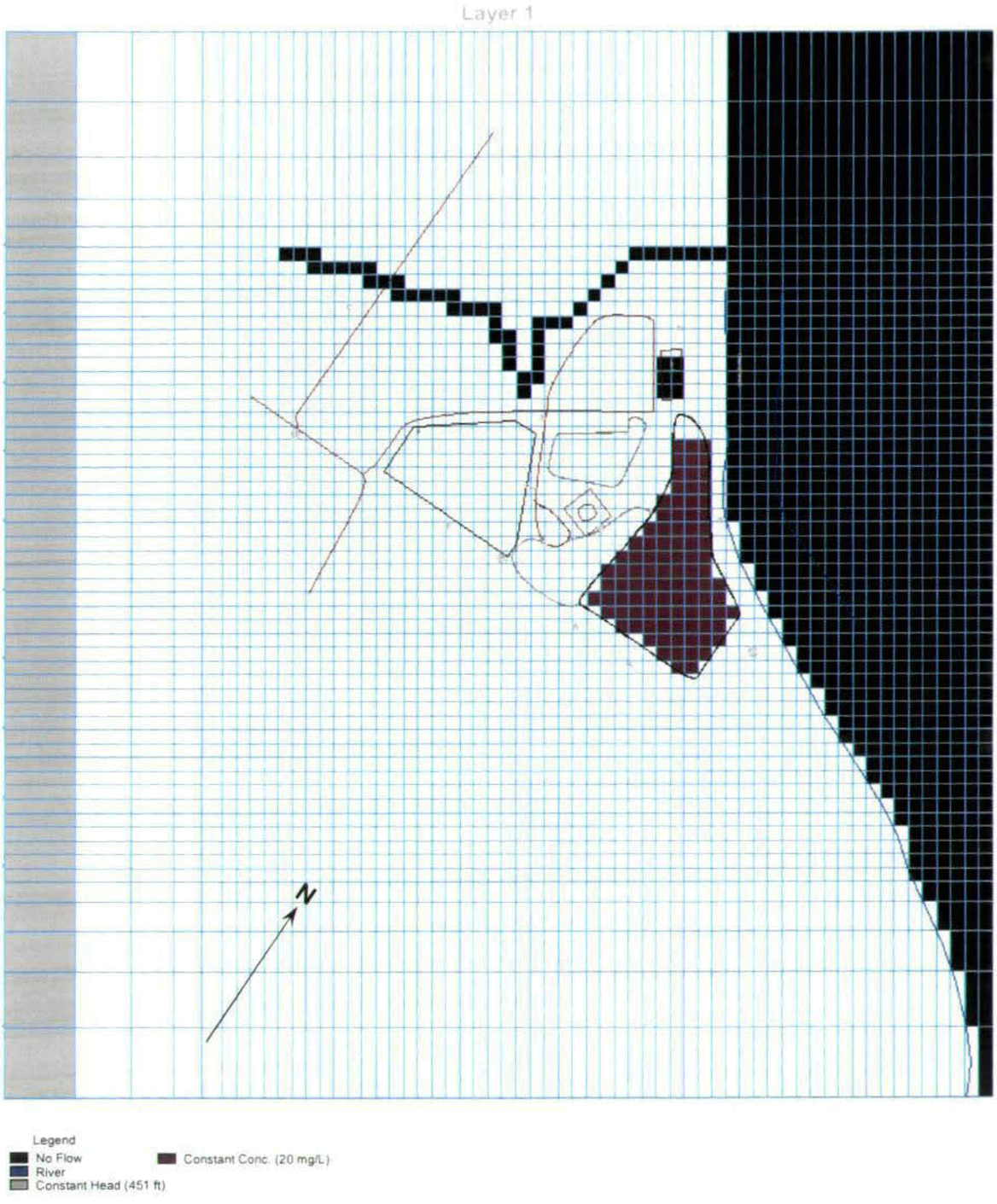


PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

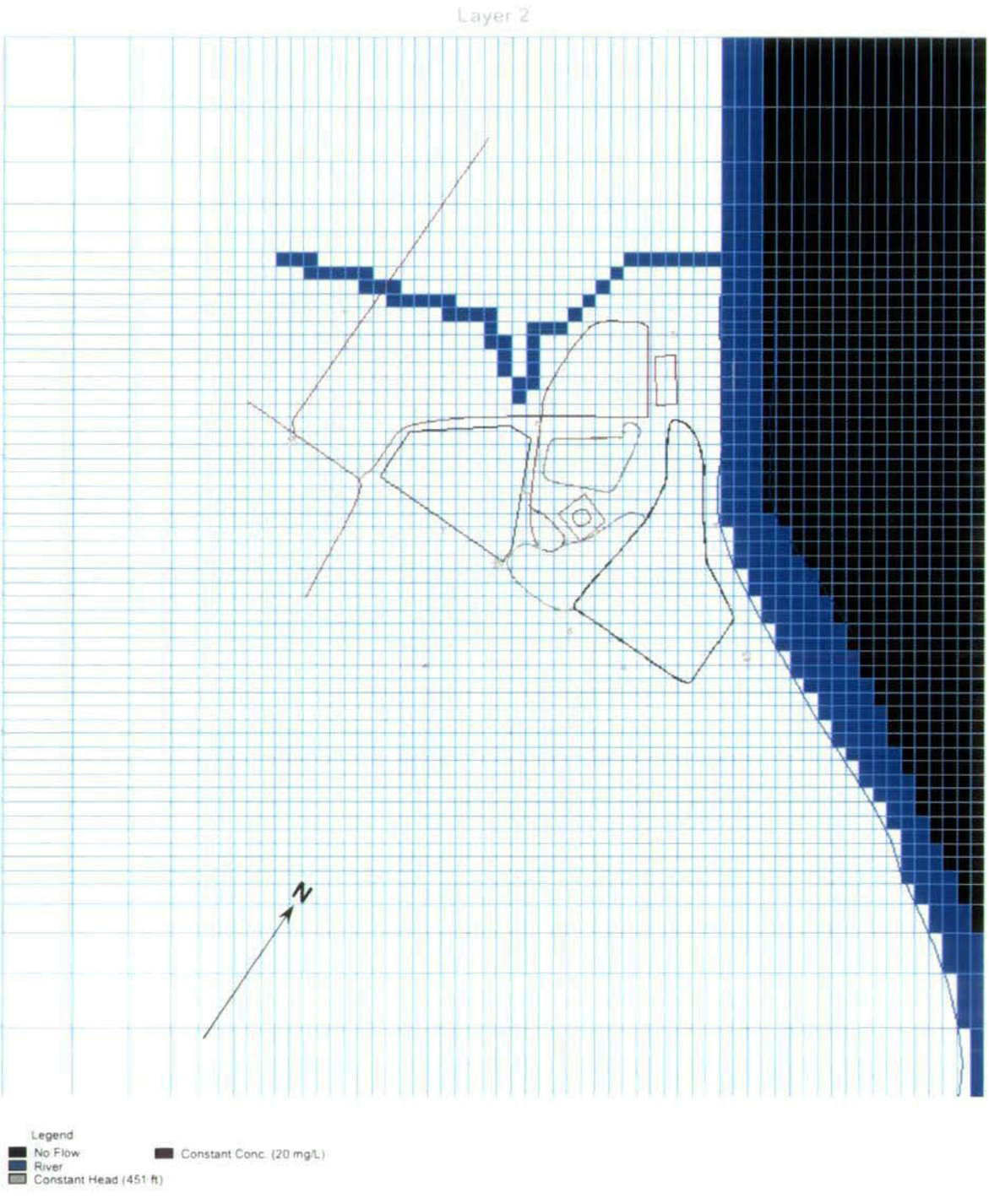
MODFLOW and MT3DMS Grid and Boundary Conditions

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-1

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

MODFLOW and MT3DMS Grid and Boundary Conditions

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

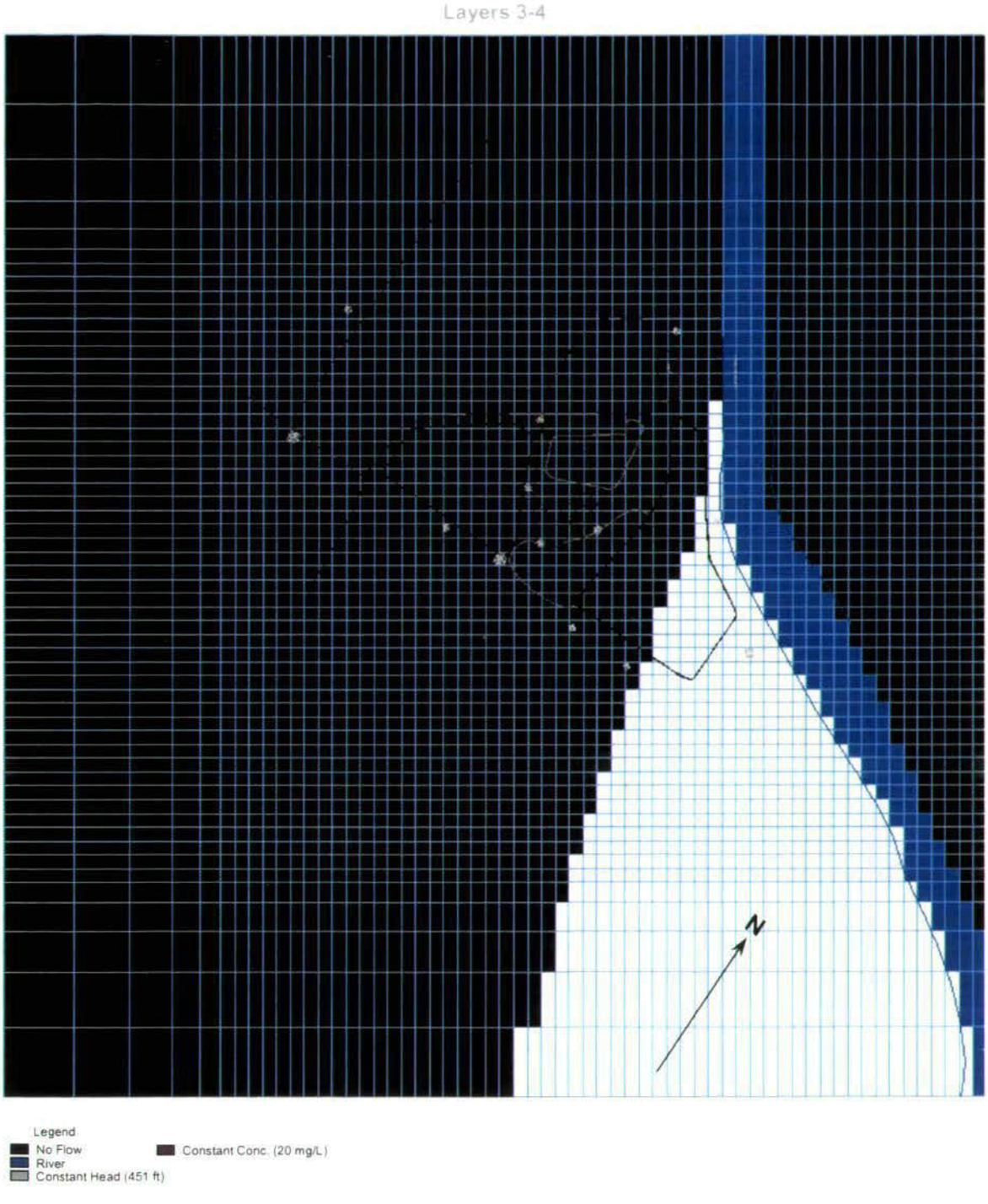
PROJECT NO: 2198

FIGURE NO: A-1

(cont'd)

NATURAL RESOURCE TECHNOLOGY

301



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

MODFLOW and MT3DMS Grid and Boundary Conditions

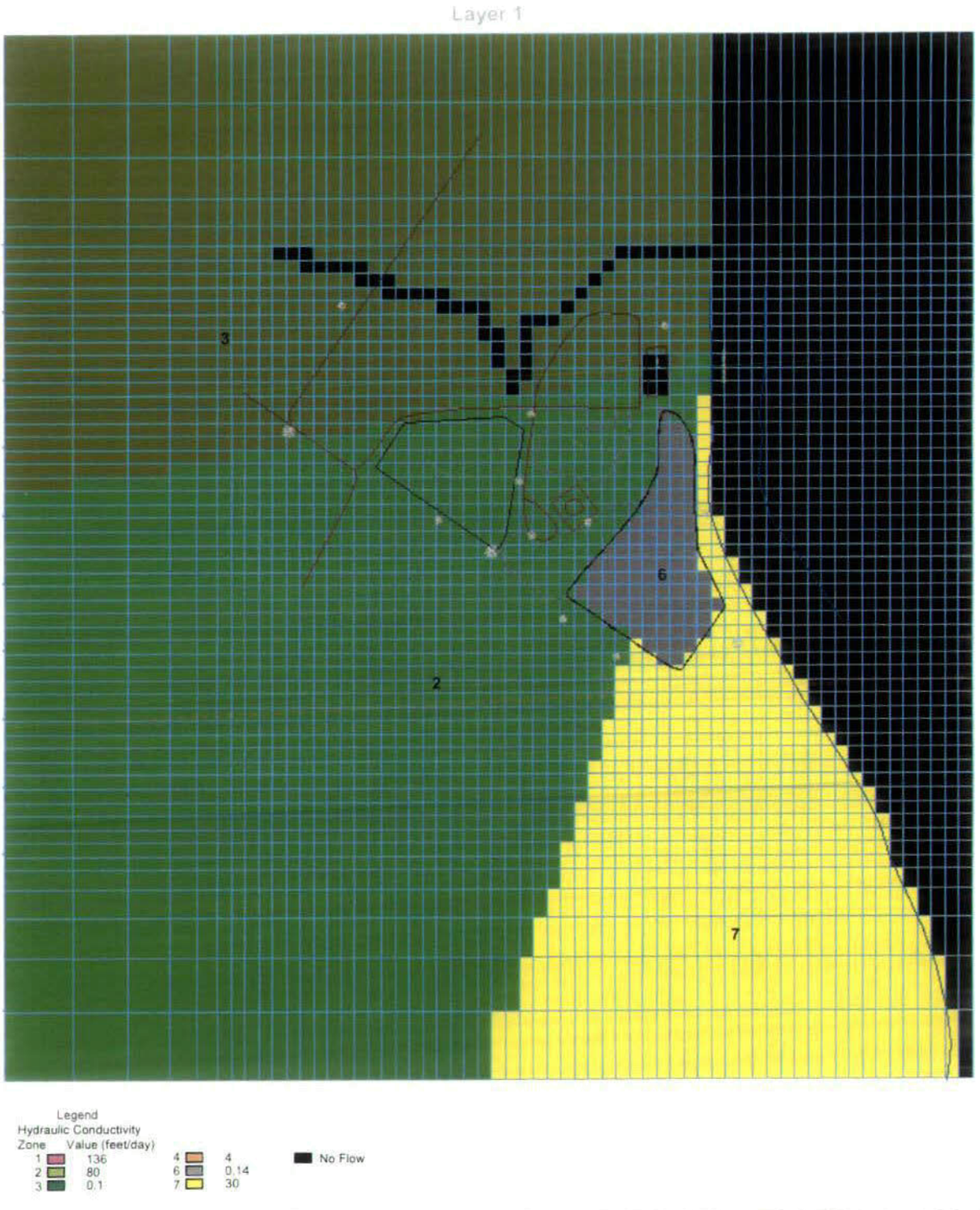
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-1

(cont'd)

NATURAL RESOURCE TECHNOLOGY



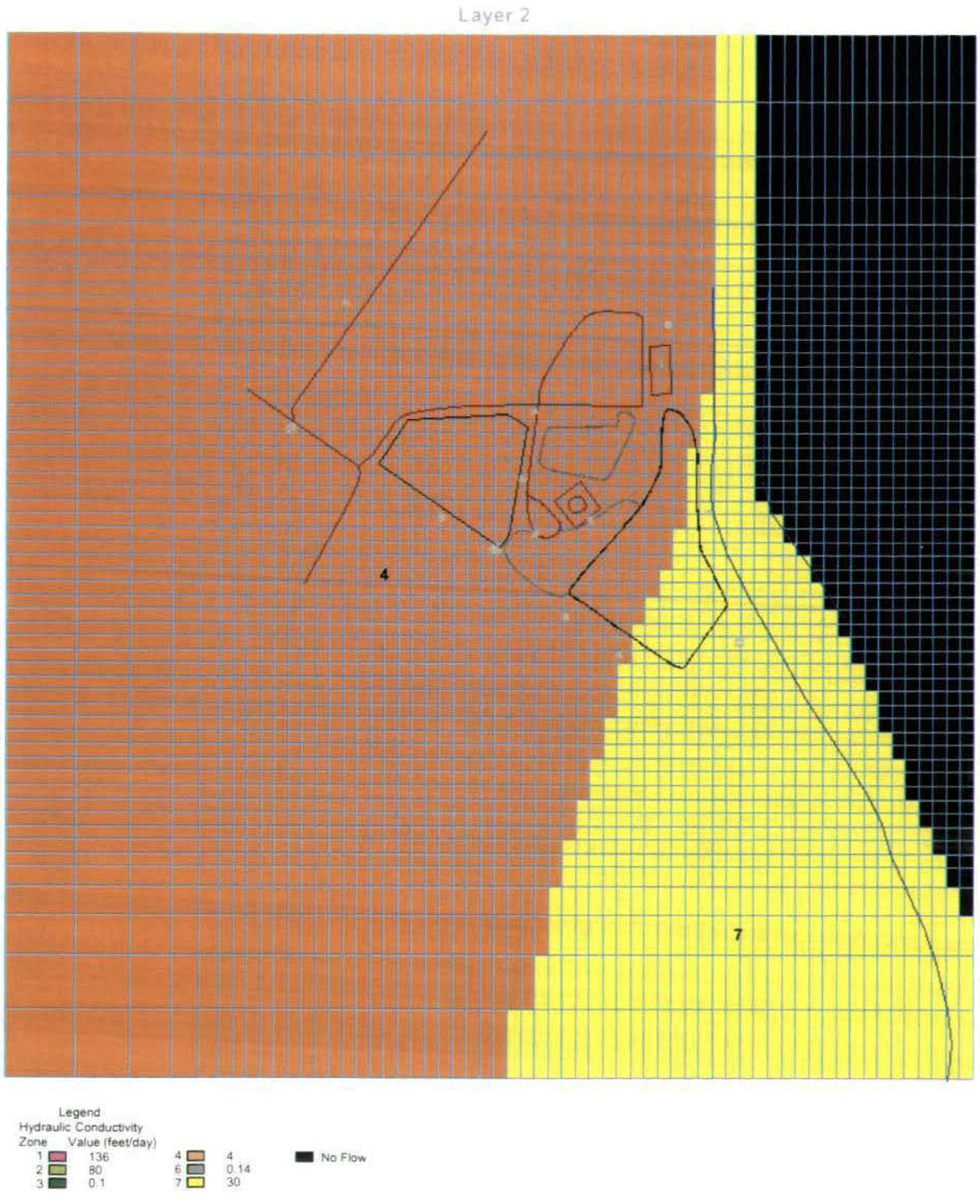
PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Hydraulic Conductivity (ft/d) Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198
FIGURE NO: A-2

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Hydraulic Conductivity (ft/d) Array

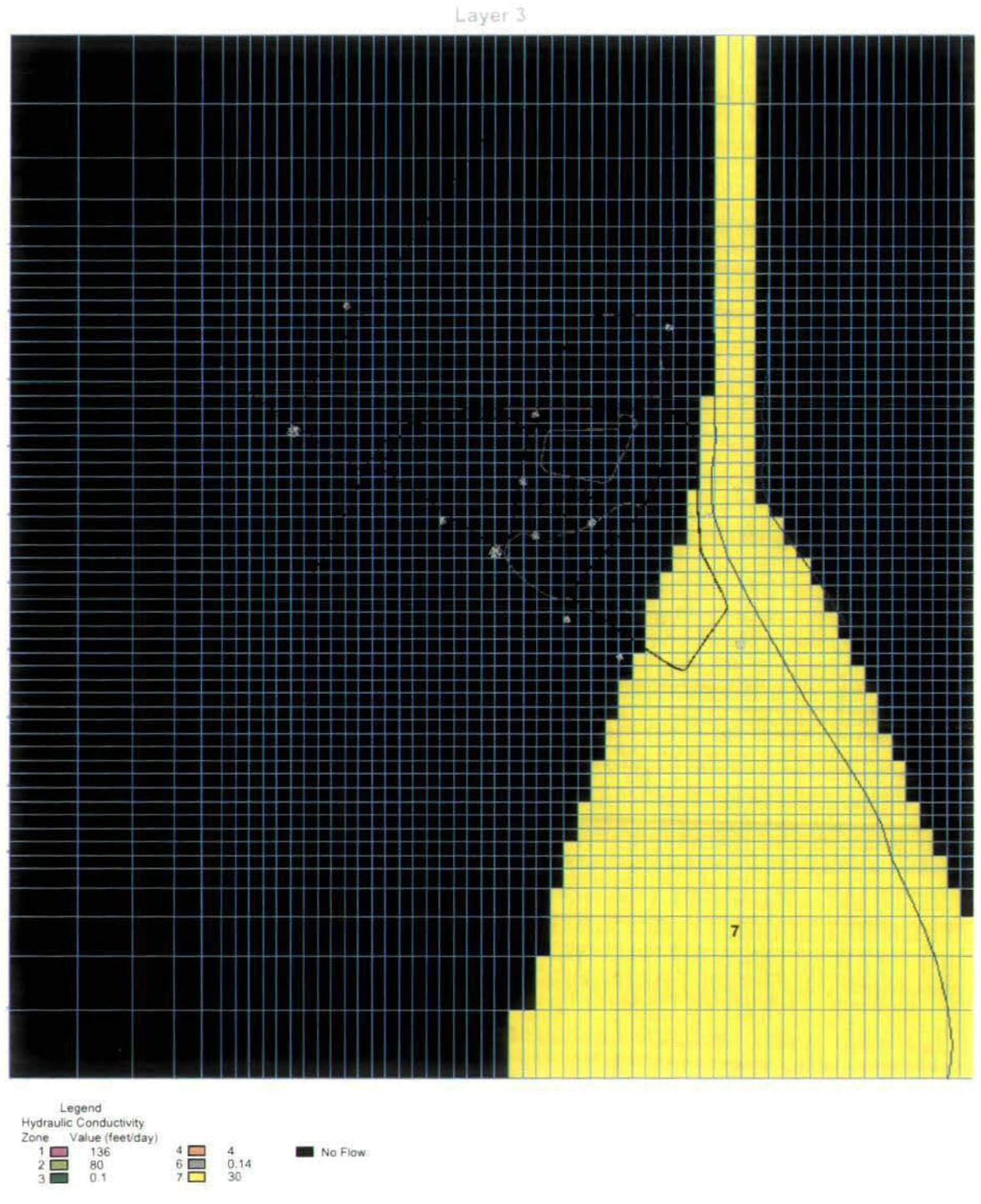
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-2

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Hydraulic Conductivity (ft/d) Array

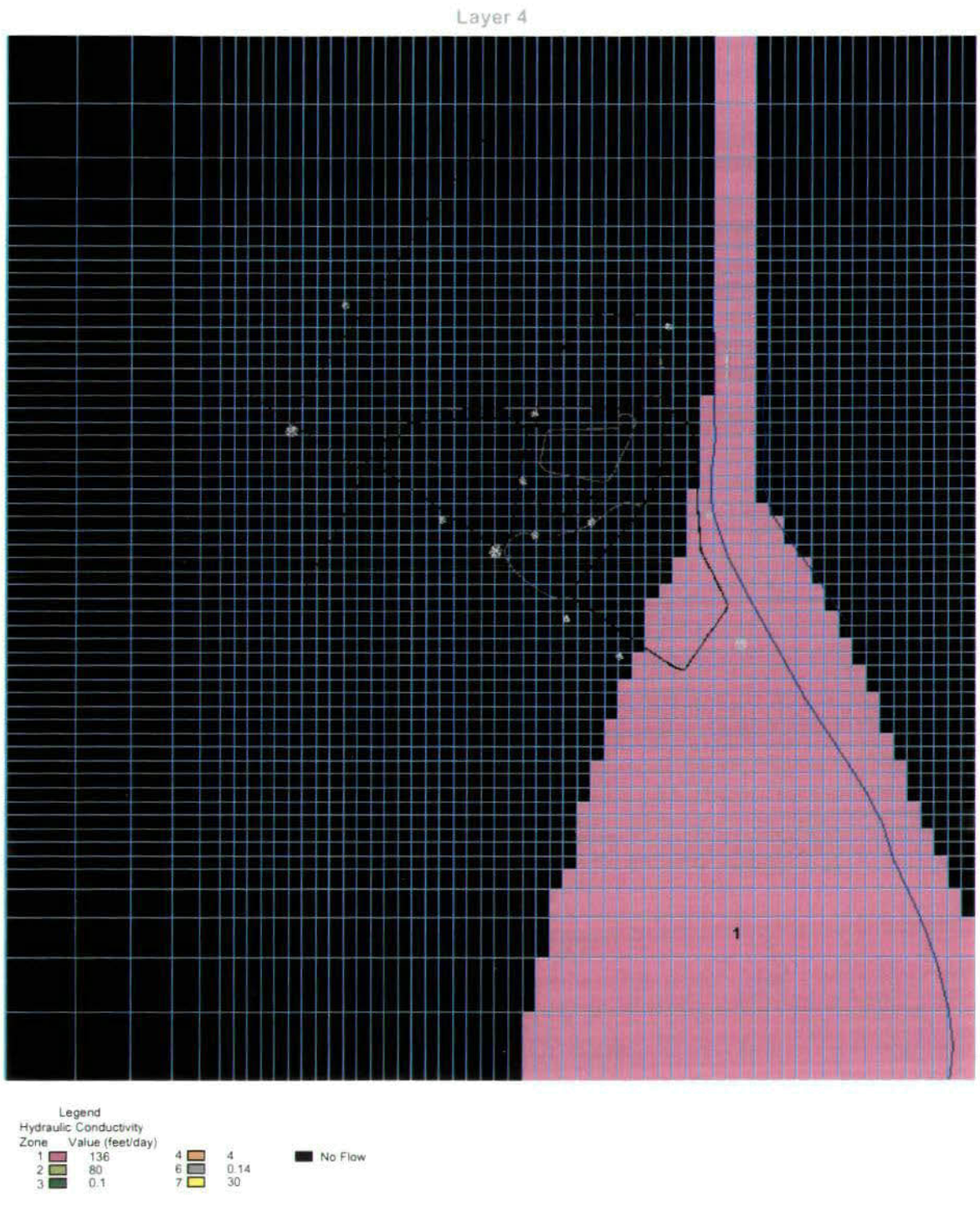
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-2

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



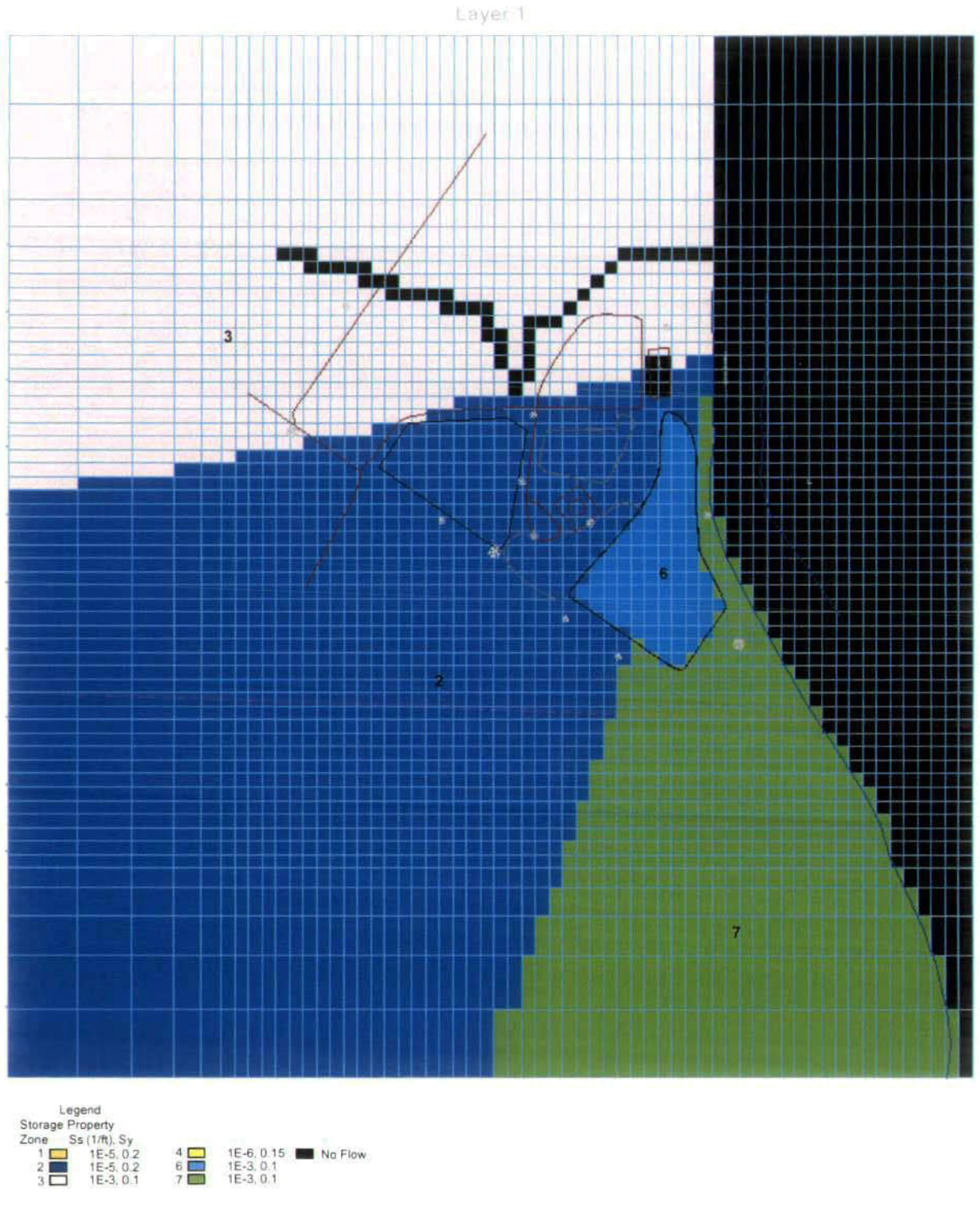
PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Hydraulic Conductivity (ft/d) Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198
FIGURE NO: A-2
(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

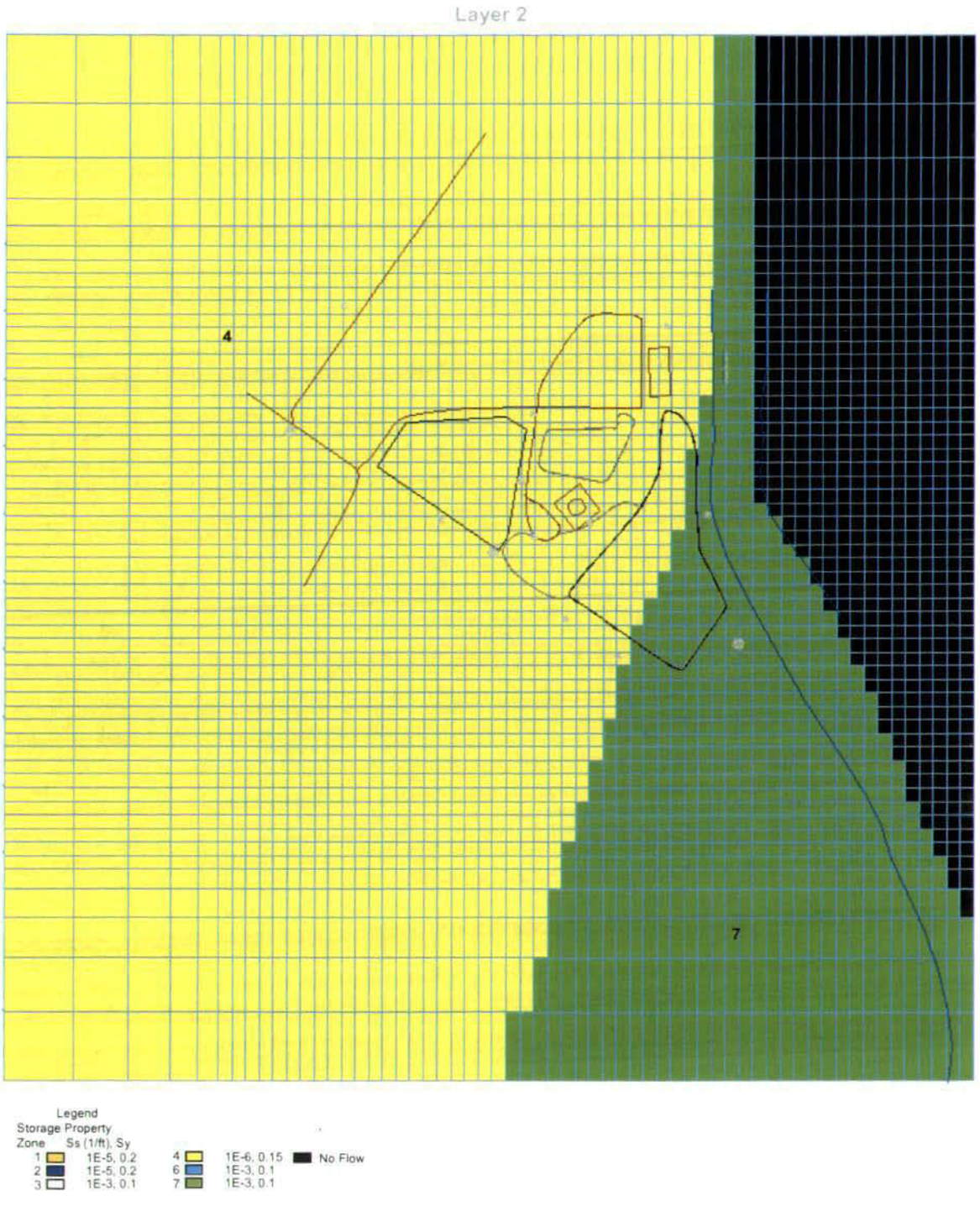
Storage Property Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-3

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Storage Property Array

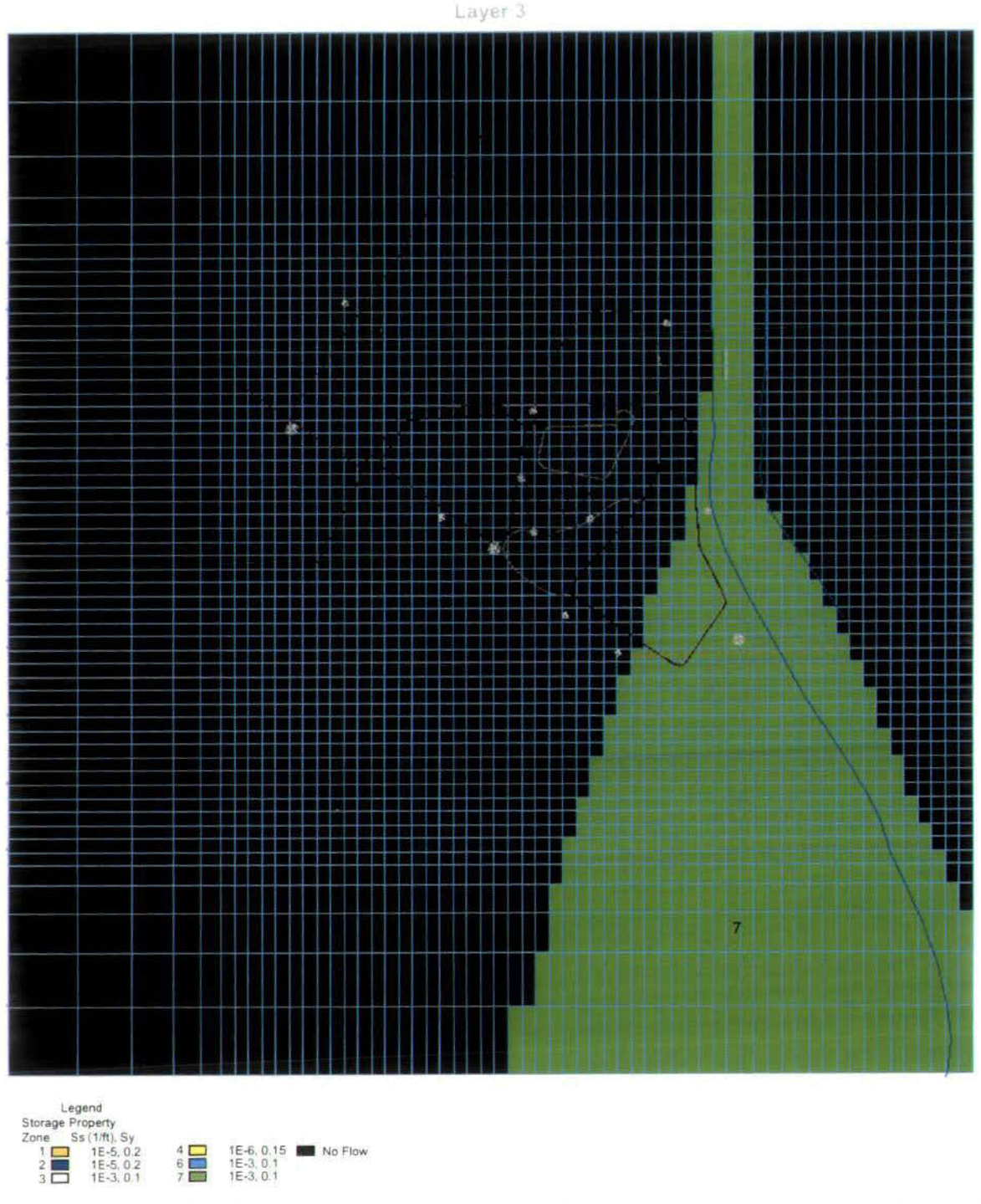
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-3

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Storage Property Array

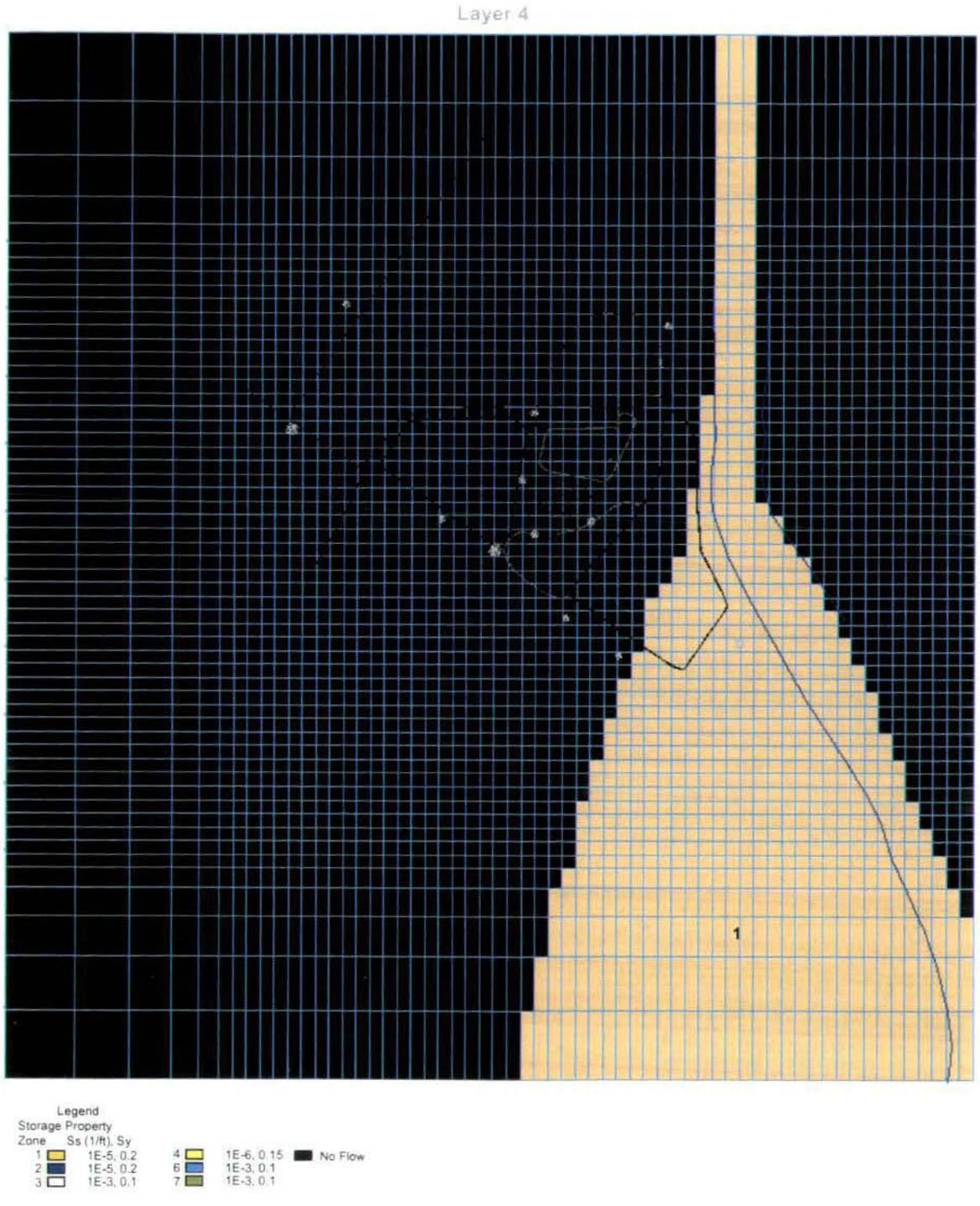
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-3

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Storage Property Array

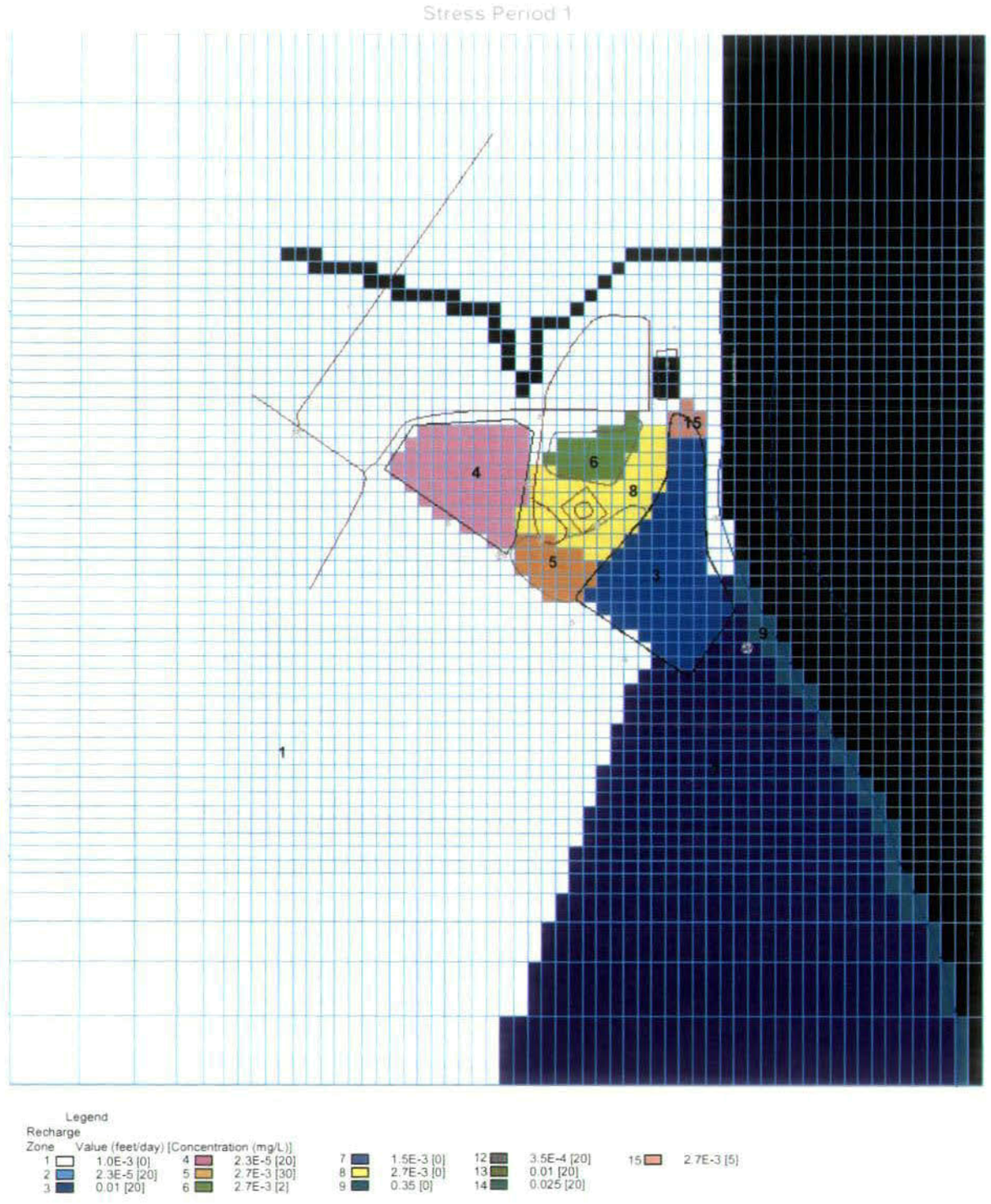
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-3

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

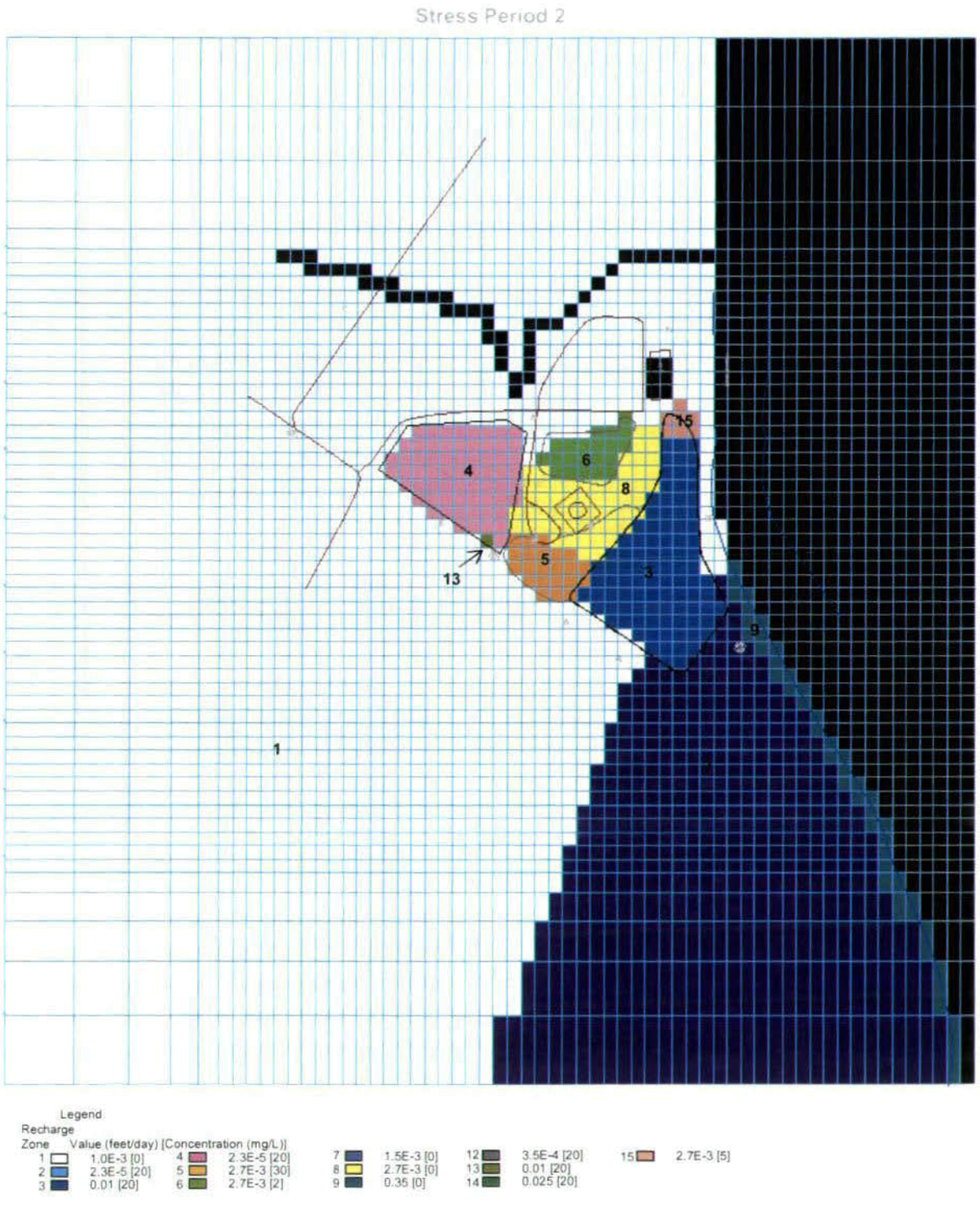
Recharge (ft/d) Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-4

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Recharge (ft/d) Array

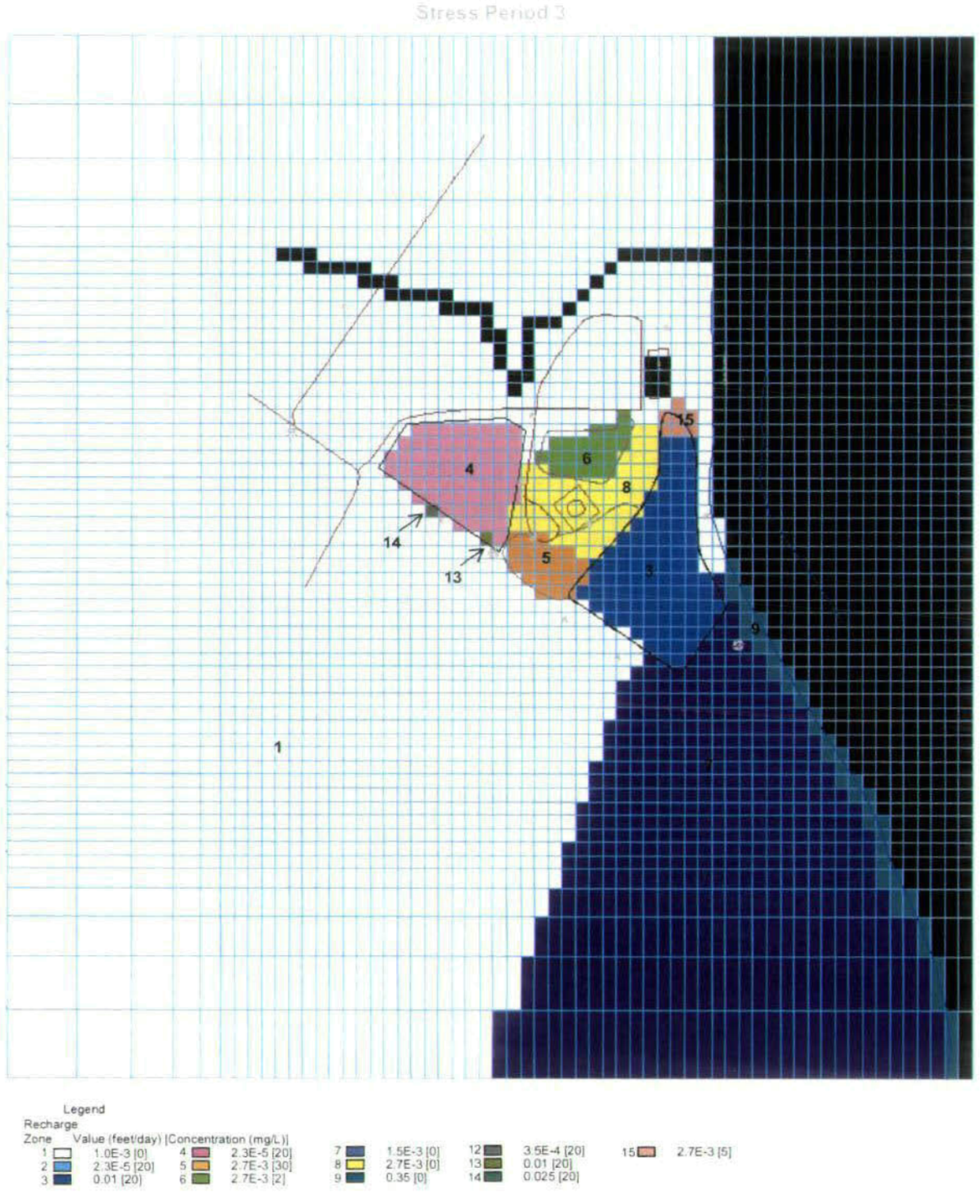
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-4

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Recharge (ft/d) Array

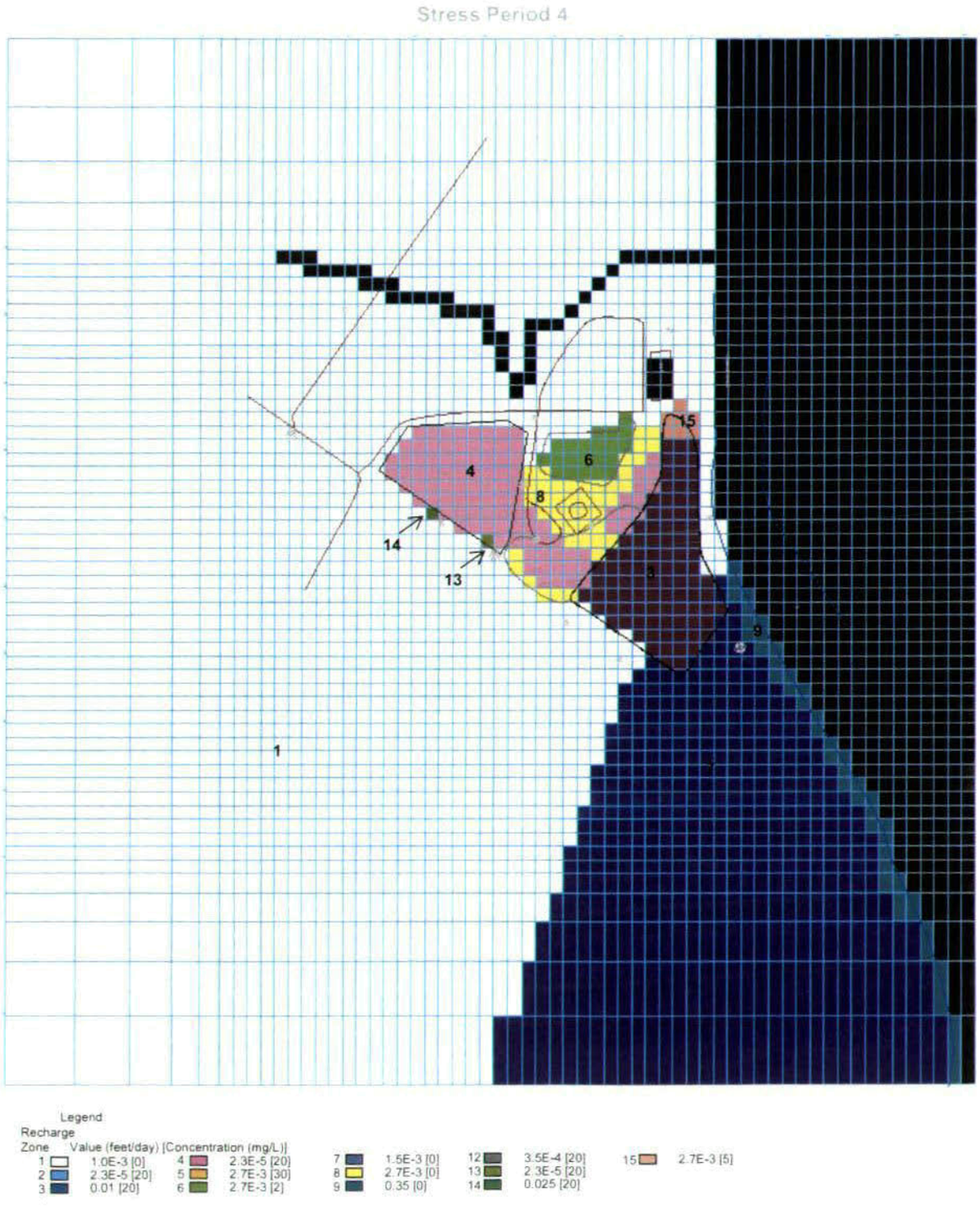
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-4

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Recharge (ft/d) Array

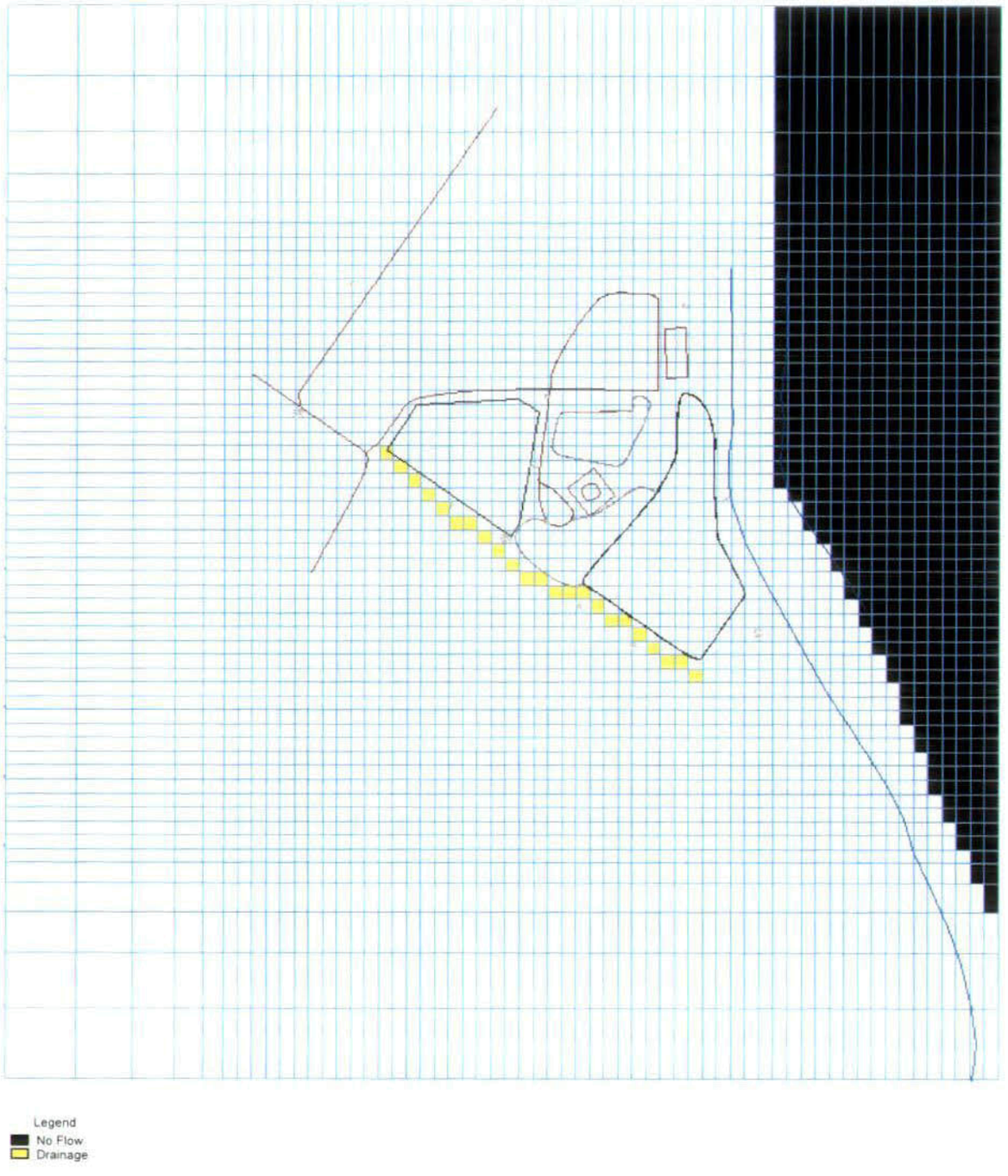
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-4

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



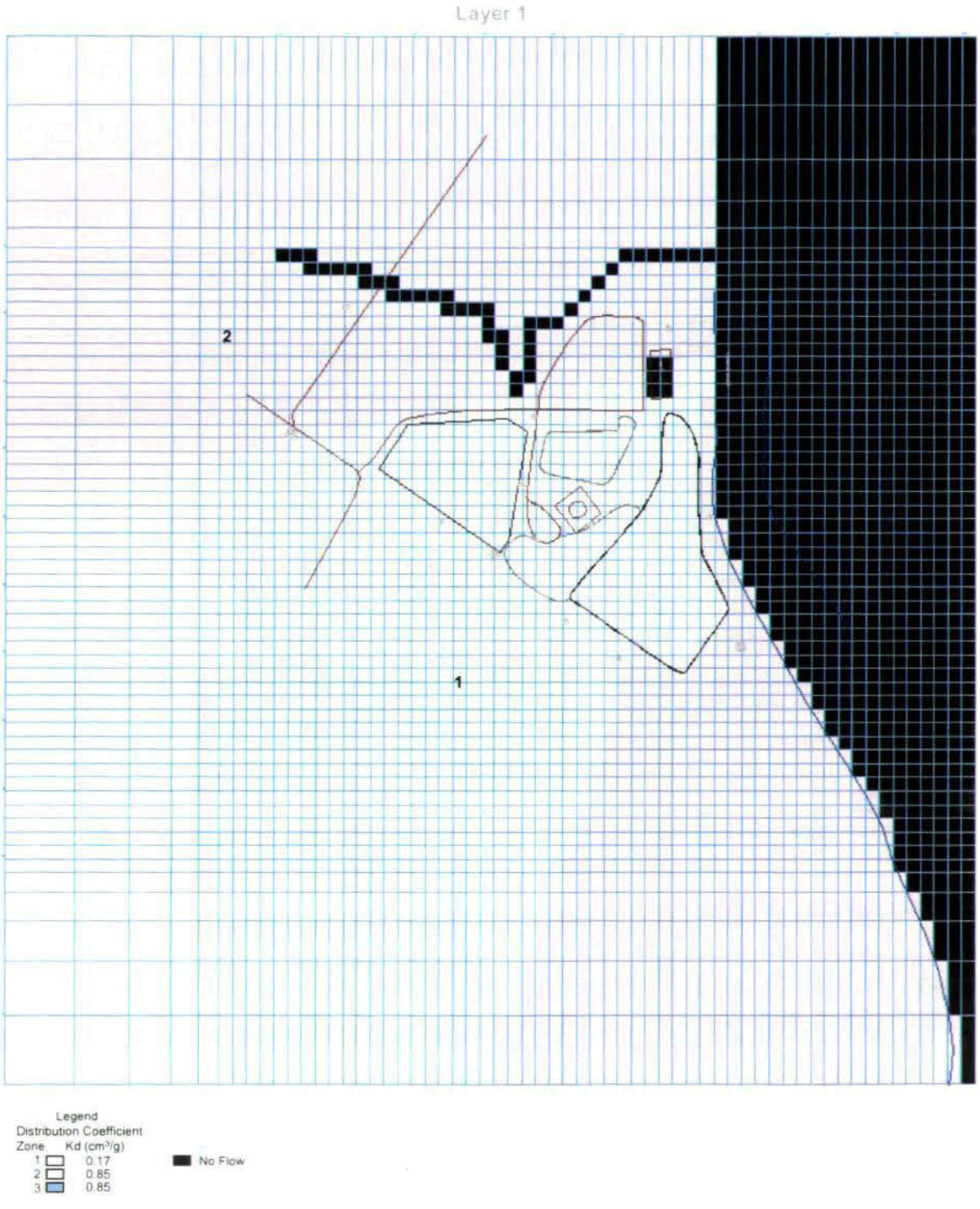
PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Drain Boundary Condition

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198
FIGURE NO: A-5

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

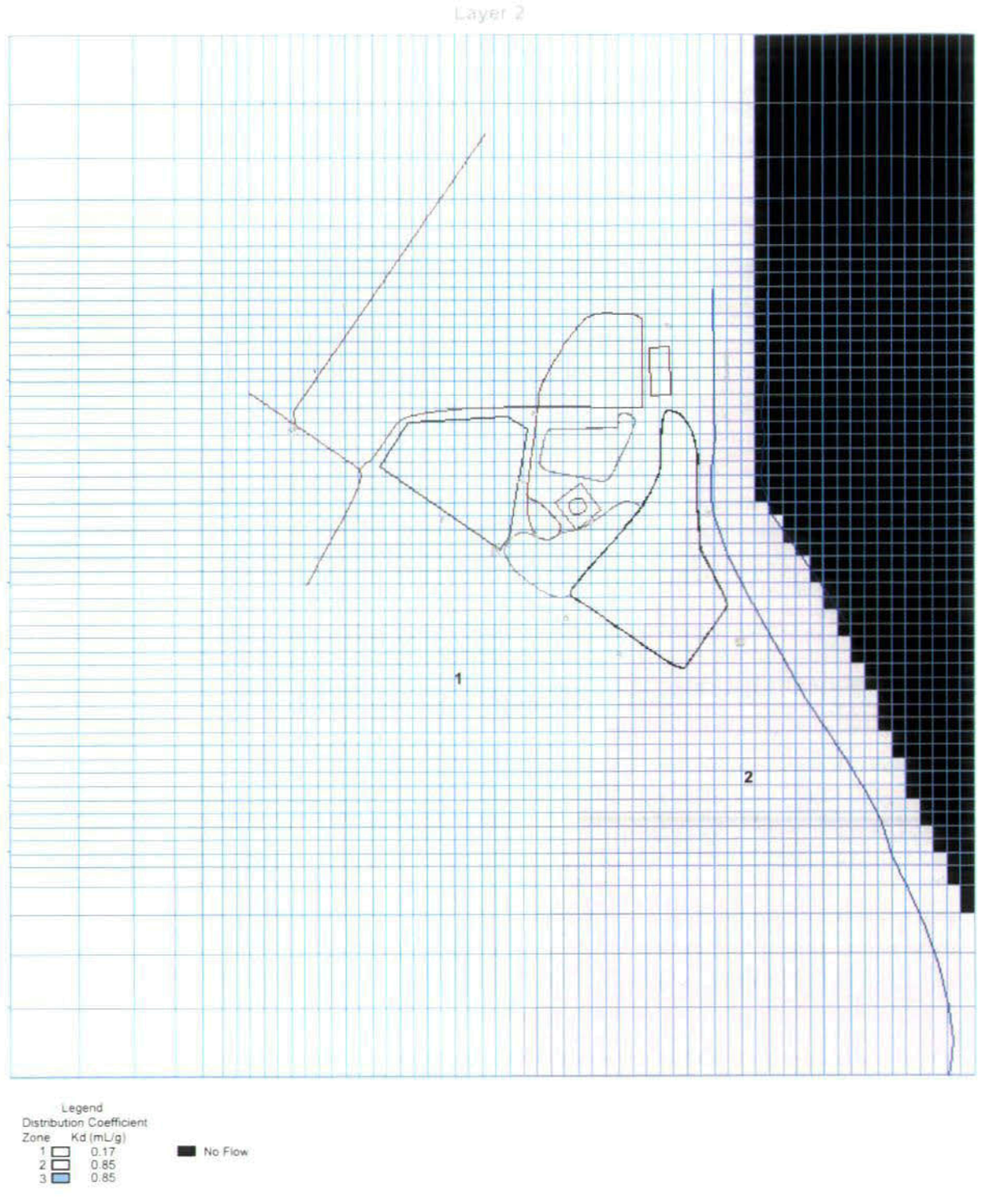
Reaction K_d (cm^3/g) Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-6

NATURAL RESOURCE TECHNOLOGY



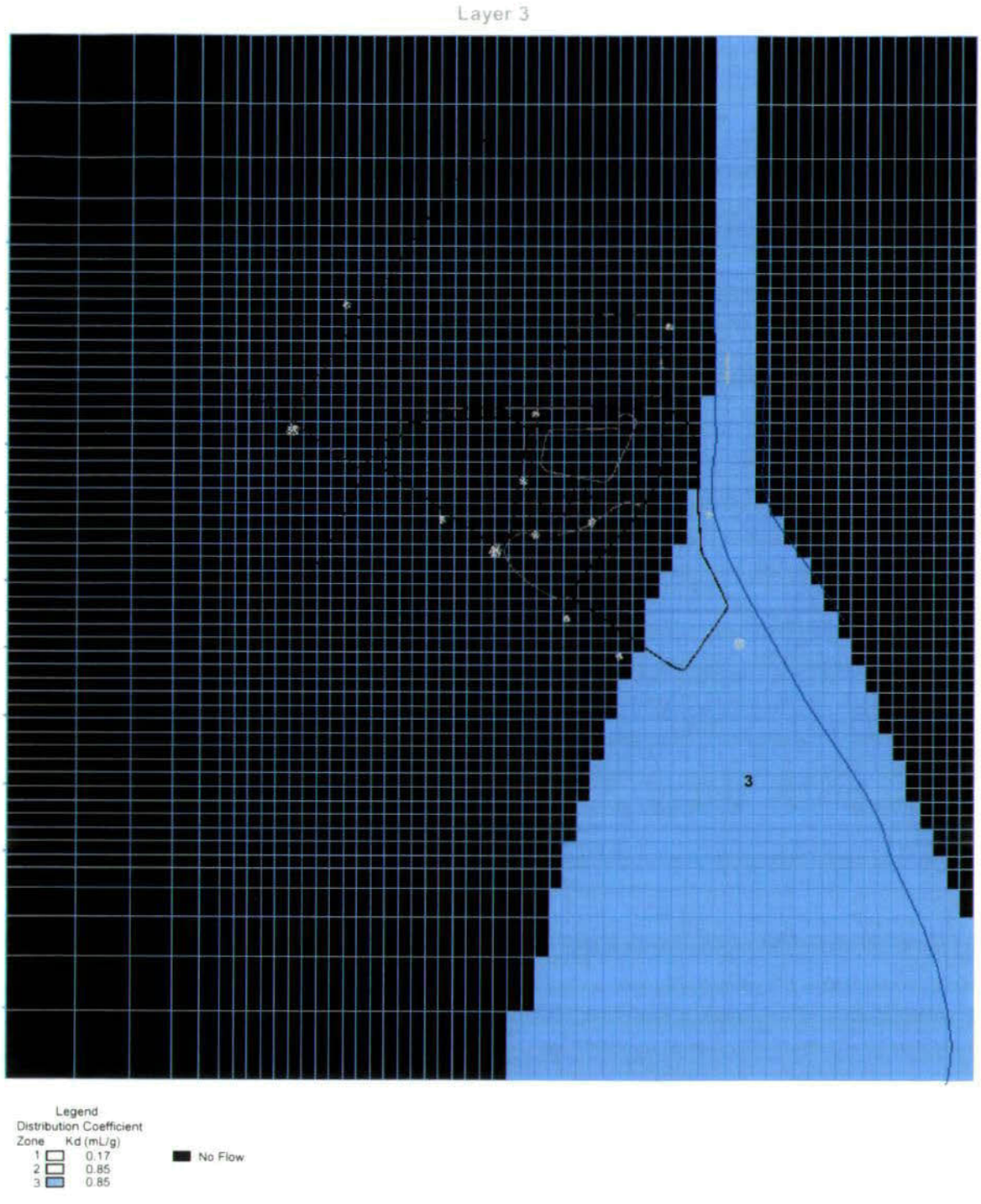
PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Reaction K_d (cm^3/g) Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198
FIGURE NO: A-6
(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Reaction K_d (cm^3/g) Array

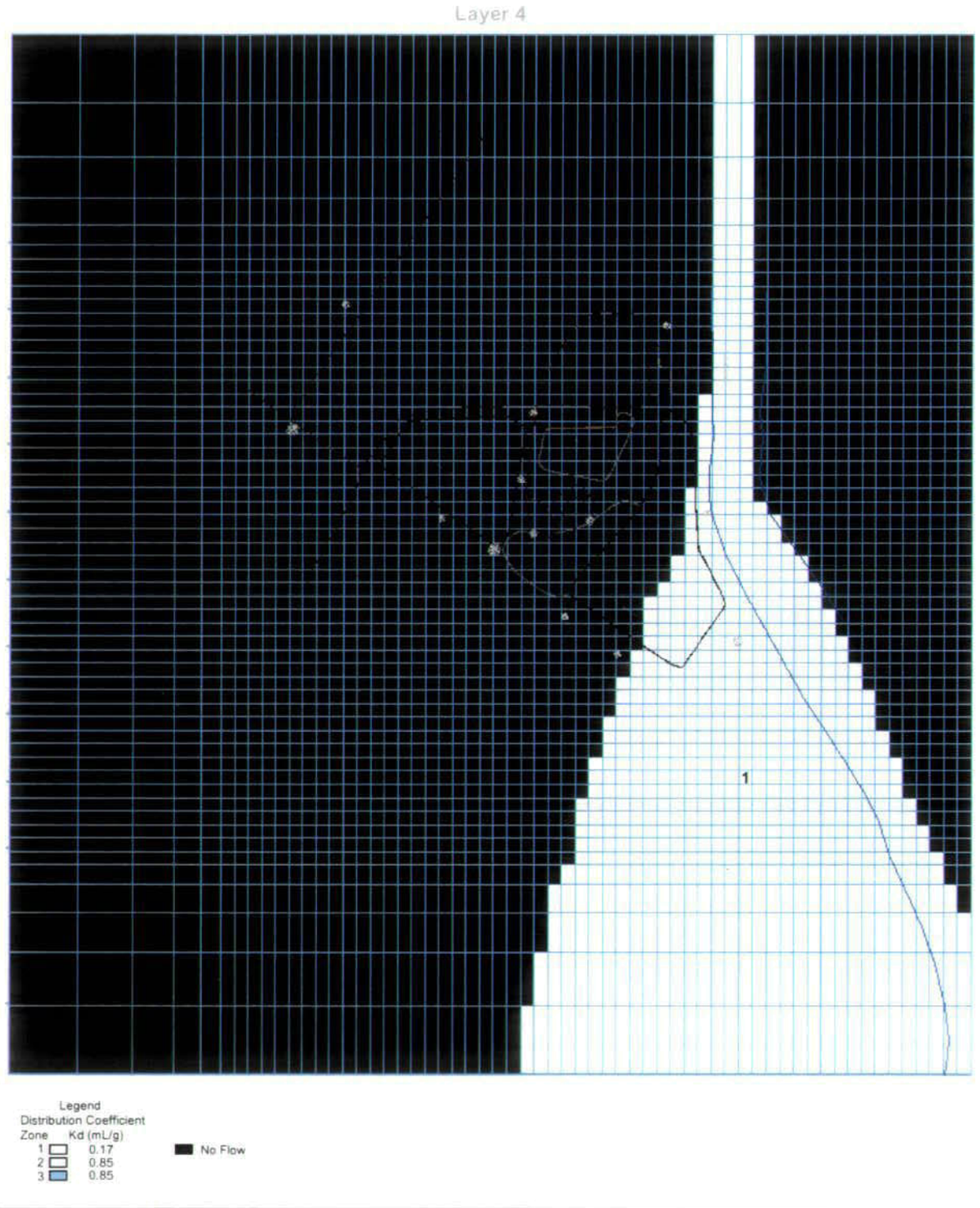
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-6

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Reaction K_d (cm^3/g) Array

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: A-6

(Cont'd)

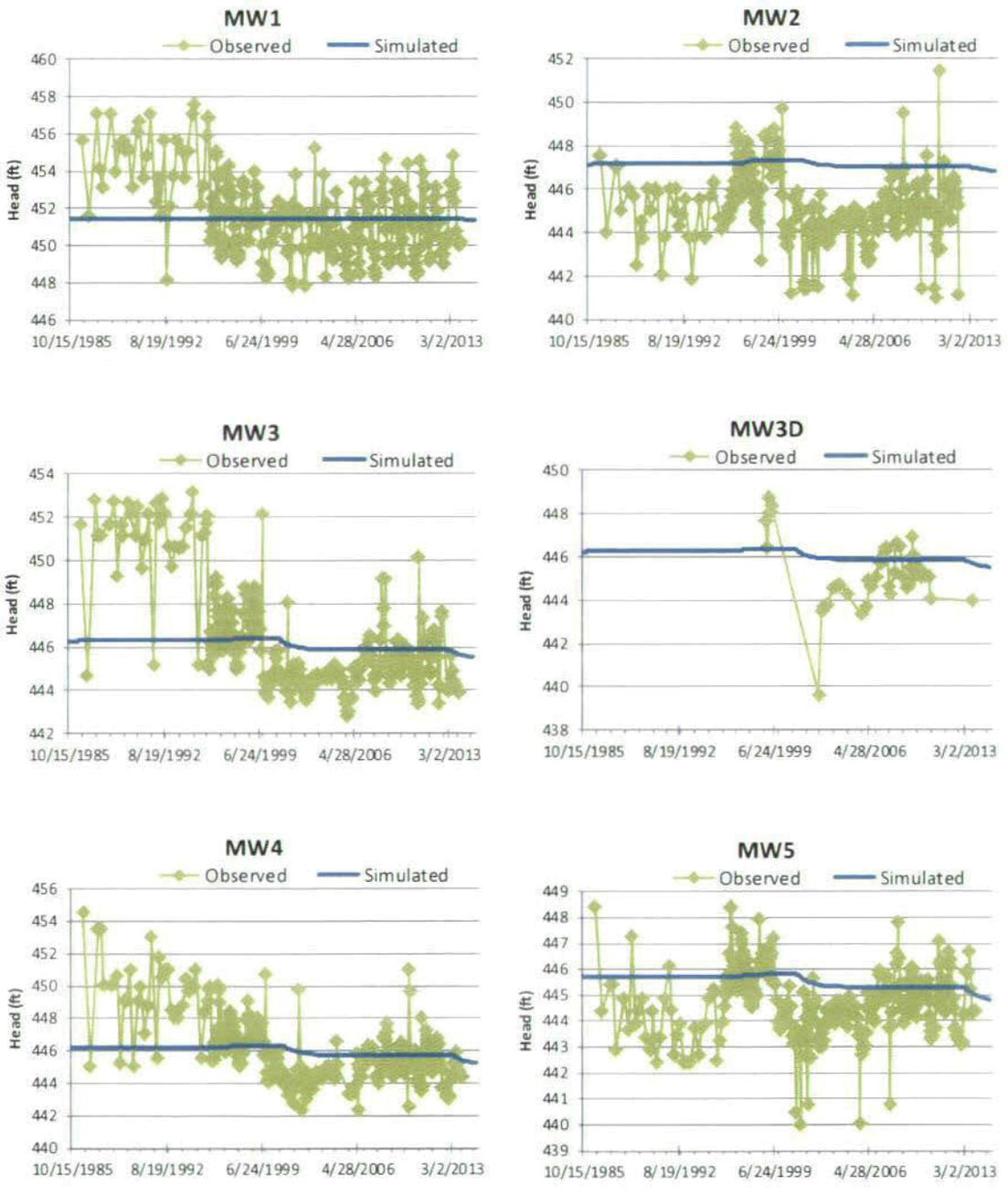
NATURAL RESOURCE TECHNOLOGY

Appendix B

Model Calibration Results



Electronic Filing: Received, Clerk's Office 09/28/2020



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

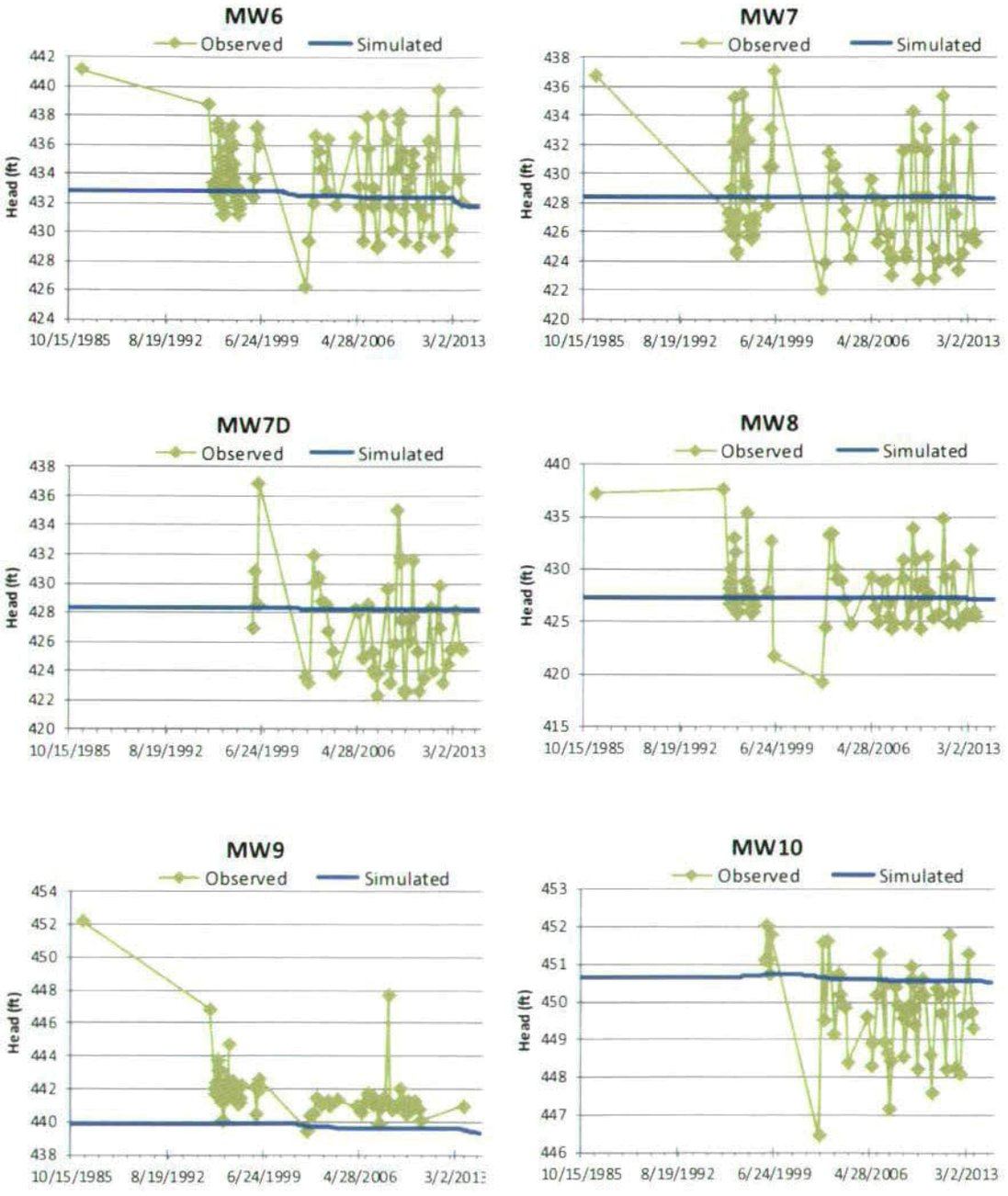
Comparison between Model Calibration and Field Measurement in Hydraulic Heads

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: B-1

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Comparison between Model Calibration and Field Measurement in Hydraulic Heads

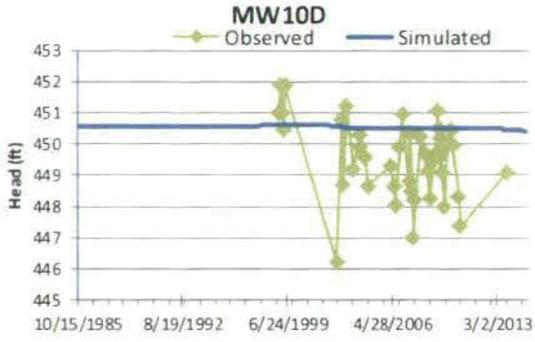
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

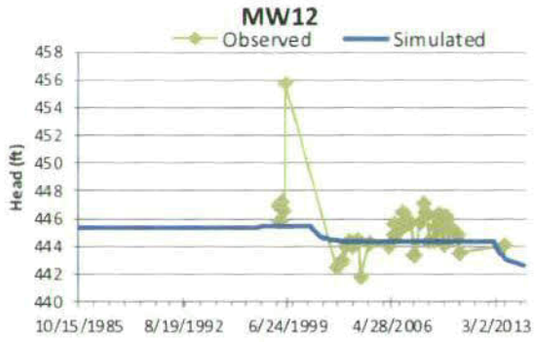
PROJECT NO: 2198

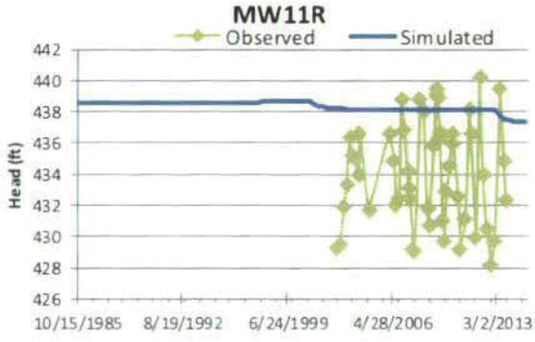
FIGURE NO: B-1

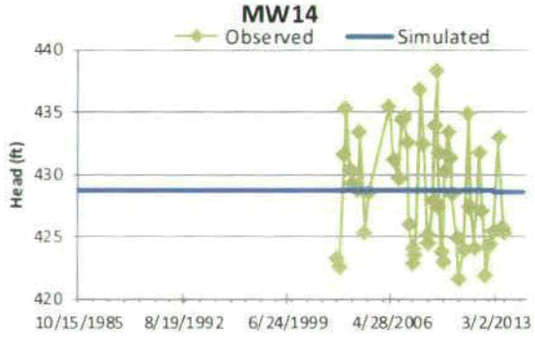
(Cont'd)

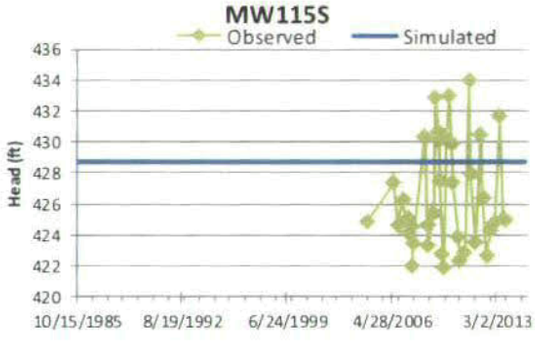
NATURAL RESOURCE TECHNOLOGY

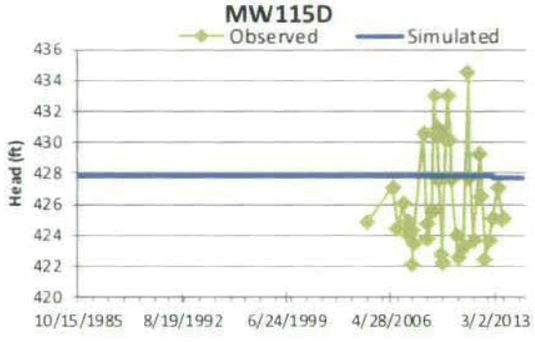


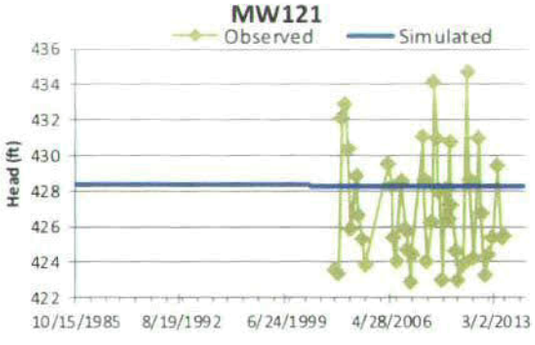












PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Comparison between Model Calibration and Field Measurement in Hydraulic Heads

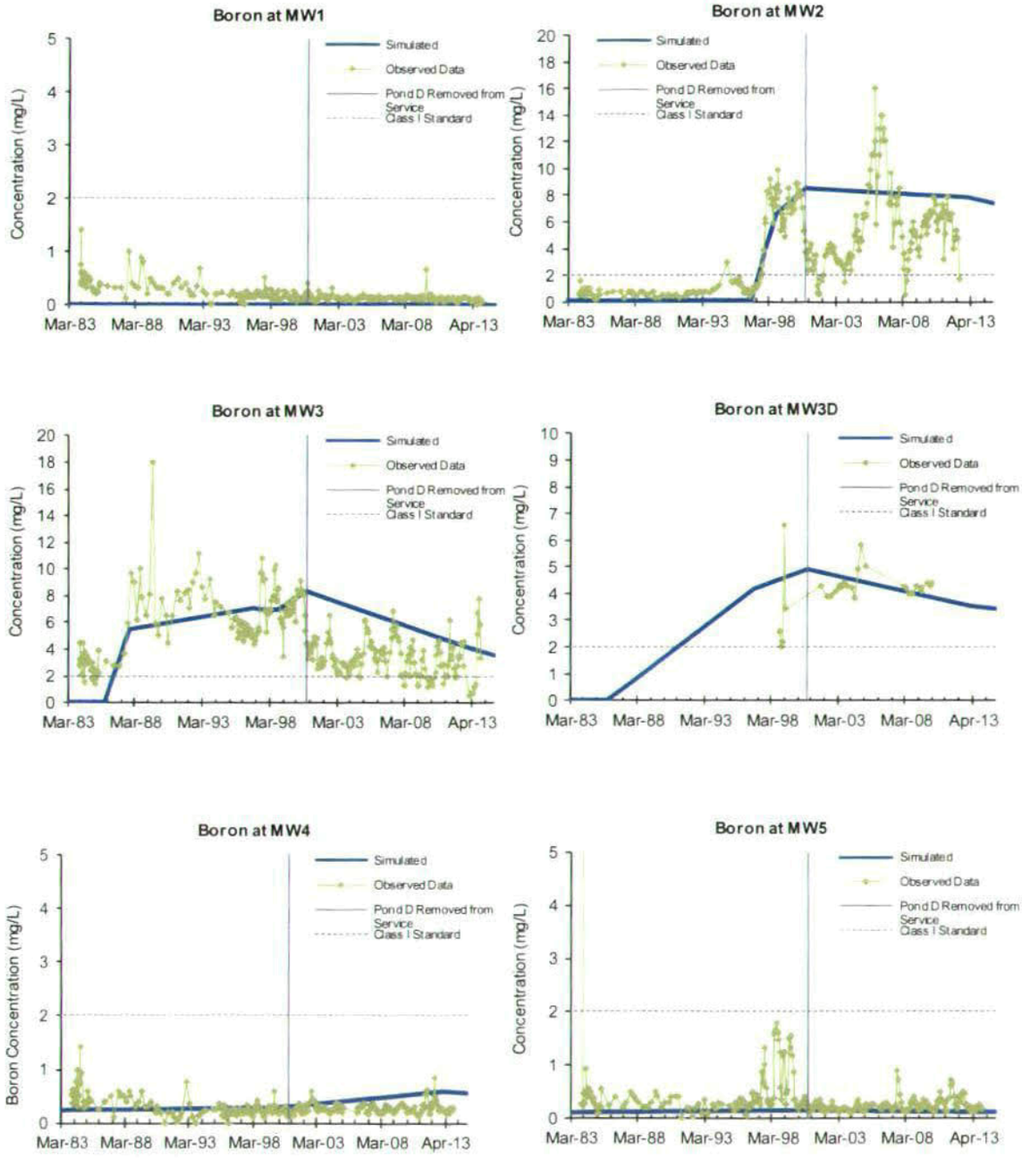
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: B-1

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

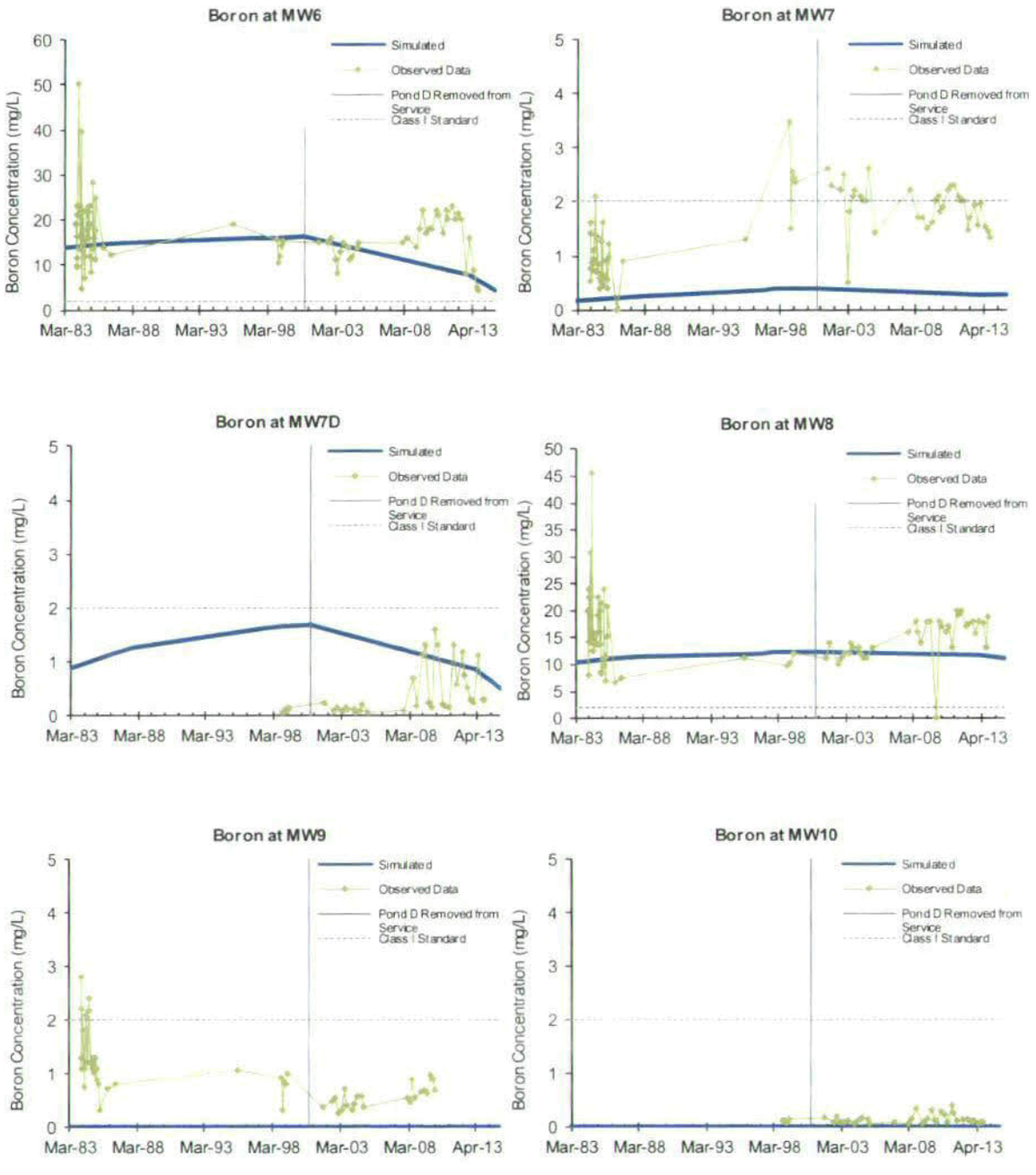
Comparison between Model Calibration and Field Measurement in Boron Concentrations

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: B-2

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Comparison between Model Calibration and Field Measurement in Boron Concentrations

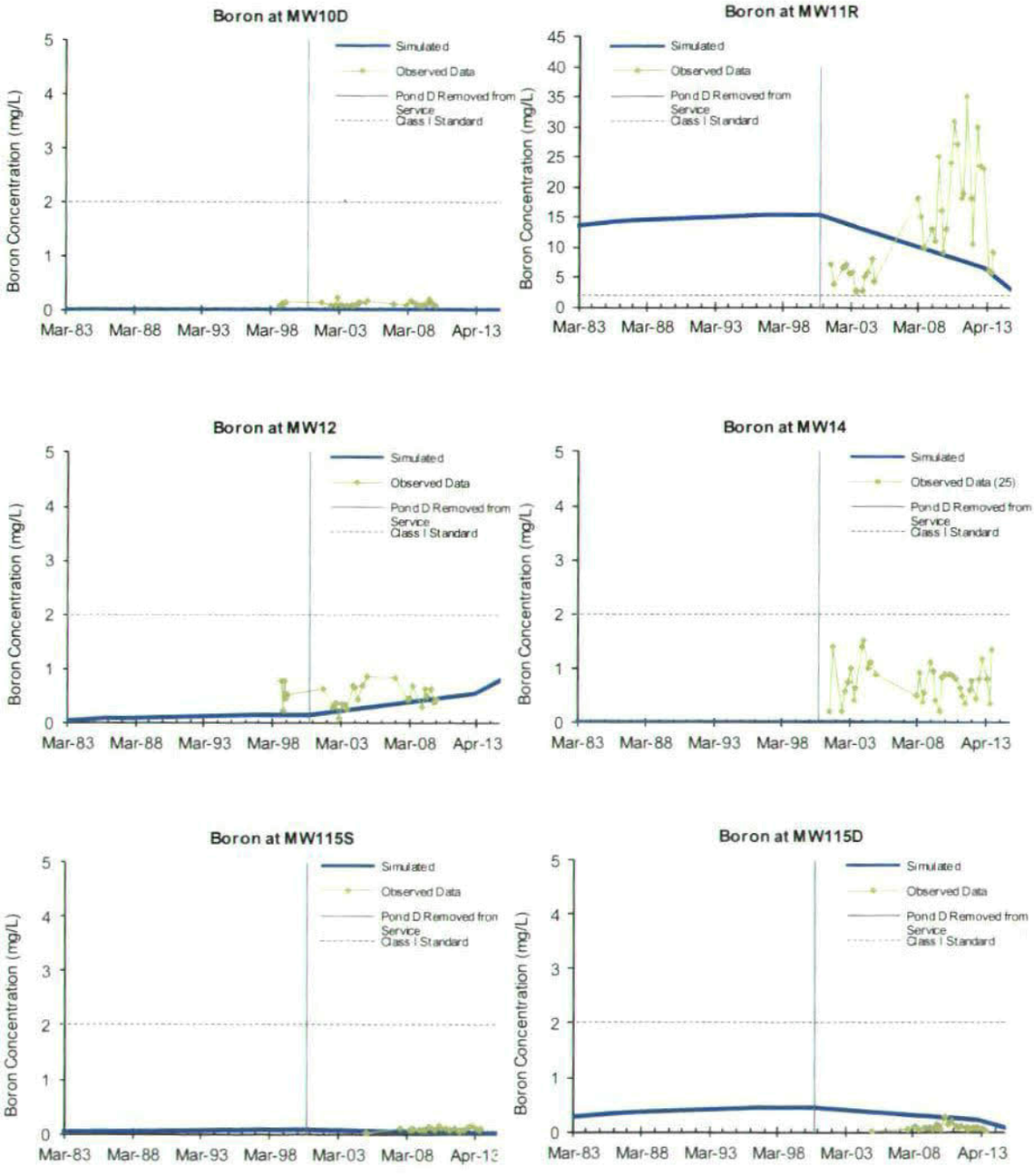
GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: B-2

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Comparison between Model Calibration and Field Measurement in Boron Concentrations

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: B-2

(Cont'd)

NATURAL RESOURCE TECHNOLOGY



PREPARED BY/DATE:
M_W 8/7/2014
REVIEWED BY/DATE:
BRH 8/8/2014

Comparison between Model Calibration and Field Measurement in Boron Concentrations

GROUNDWATER MODEL AND SIMULATION OF CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, IL

PROJECT NO: 2198

FIGURE NO: B-2

(Cont'd)

NATURAL RESOURCE TECHNOLOGY

Electronic Filing: Received, Clerk's Office 09/28/2020

Appendix C

HELP Model Files (DVD)

Electronic Filing: Received, Clerk's Office 09/28/2020

Top directory structure and file list for Appendix C HELP Files:

```
Directory of  D:\Appendix C HELP Files\*

   09/03/2014  12:48         <DIR>    Sensitivity Analysis

   06/16/2014  15:21               490  HUTCAPD1.D10
   06/16/2014  15:21            48,655  HUTCAPD1.OUT
   06/16/2014  15:14            66,724  HUT_CAP.D4
   06/16/2014  15:14            66,724  HUT_CAP.D7
   06/16/2014  15:15               110  HUT_CAP.D11
   06/16/2014  15:15            66,658  HUT_CAP.D13

   Total for:  D:\Appendix C HELP Files\*
           1,935,388 bytes in 55 files and 5 dirs
```

Electronic Filing: Received, Clerk's Office 09/28/2020

Appendix D

MODFLOW/MT3DMS Model Files (DVD)



Electronic Filing: Received, Clerk's Office 09/28/2020

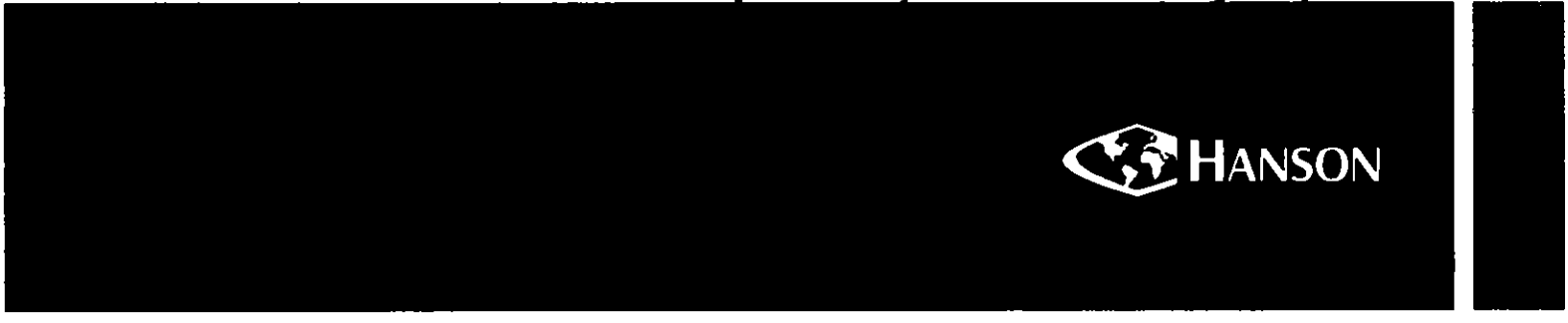
Top directory structure and file list for Appendix D MODFLOW and MT3DMS Files:

```
Directory of  D:\Appendix D MODFLOW and MT3DMS\*

   09/03/2014  12:48         <DIR>    Calibration
   09/03/2014  12:48         <DIR>    Prediction
   09/03/2014  12:48         <DIR>    Sensitivity

   12/03/1999   9:09           110,521  hutsonville2.map

   Total for:  D:\Appendix D MODFLOW and MT3DMS\*
   2,591,524,870 bytes in 1,181 files and 35 dirs
```

Electronic Filing: Received, Clerk's Office 09/28/2020

Appendix E

Cover-Liner Comparison, dated January 12, 2015



Electronic Filing: Received, Clerk's Office 09/28/2020

Ash Ponds Closure

Cover-Liner Comparison

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

January 12, 2015

NATURAL RESOURCE TECHNOLOGY

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1. Introduction

An evaluation of the liner performance has been requested for the AmerenEnergy Medina Valley Cogen, L.L.C. Hutsonville Power Station (Site) water treatment device known as Ash Pond A, This pond is to be closed in compliance with the requirements of Title 35 Illinois Administrative Code, Part 620 (35 IAC 620), and elements of this Plan have been prepared to generally conform with the Ash Pond D site-specific rule at 35 IAC 840 (Illinois PCB, 2011), and where judged appropriate, elements of the proposed 35 IAC 841 rules, currently under development (Illinois PCB, 2013).

2. Low Permeability Layer Standards

Both 35 IAC 840 (Ash Pond D closure rule) and 35 IAC 841 (proposed Ash Pond closure rules) have performance requirements for the geosynthetic membrane or flexible membrane liner (FML). If a FML is used as a component in the closure of an ash pond, then the FML must, in terms of hydraulic flux, be equivalent or superior to a 3-foot thick layer of soil with a hydraulic conductivity of 1×10^{-7} cm/s.

2.1 Darcy Flux In Soil Liner

Hydraulic flux through a homogeneous and isotropic porous media, like a recompacted soil liner, may be evaluated using Darcy's Law (Freeze & Cherry, 1979):

$$Q = k * i * A$$

Where,
- Q ≡ hydraulic flux (in L^3/T),
- k ≡ hydraulic conductivity (in $L^3/T/L^2$)
- i ≡ hydraulic gradient (dimensionless), and
- A ≡ area (in L^2)

For this evaluation, the Darcy flux is calculated using the following inputs:

$$Q = 1 \times 10^{-9}\ m^3/s/m^2\ (1.833\ m/m)\ 4046.856\ m^2$$
$$Q = 7.42 \times 10^{-6}\ m^3/s$$

Where,
- k = the specified 1×10^{-7} cm/s in SI units
- A = representative area of 1 acre or 4046.856 m^2, and
- i = (h + t)/t
  - Where,
    - t = liner thickness of 3 ft. or 0.915 m, and
    - h = head on liner of 30 inches or 0.762 m.

2.2 Flexible Membrane Liner Darcy Flux

The FML evaluation is done using the Giroud (1997) equations for liner leakage. The Giroud equations calculate flux through a FML/soil liner (composite) system, and evaluate this flux in several types of liner defects, including circular, rectangular and linear defects. The liner defects, in combination with the underlying material hydraulic conductivity, drive the flux through the liner system. The thickness of the FML is independent of this calculation, and for the FML by itself, has little effect on true liner flux.

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The Giroud equations are empirical derived, and assume that the installation defects are the primary mechanism for flux through the liner system. Complete flux calculations are located in Appendix A. The inputs to the equations are:

n = 5, number of defects per unit area,
A_g = 4046.856 m^2, area of geomembrane,
t_s = 0.305 m, thickness of soil liner (fly ash),
h = 0.762 m, head on liner (from HELP model),
k_s = 3.62 x 10^{-7} m/s, liner hydraulic conductivity (fly ash),
d = 0.01 m^2, circular defect diameter,
b = 0.001 m^2, rectangular defect width,
B = 0.01 m^2, rectangular defect length,
w = 0.01 m^2, long defect width.

The selected hydraulic conductivity for the liner component is taken from a VFL Technology Corporation (VFL) prepared in March 2003 assessing pozzolanic cap options for the closure of Ash Pond D at Hutsonville (a copy of this report is in Appendix B). This hydraulic conductivity value is the average of the most conservative test result (Test 16) at 28 and 56 days, and should be representative of a properly prepared surface prior to placement of the FML during construction. This value is also approximately the same magnitude as the HELP model (Schroeder et al., 1994) default soil value for fly ash.

Results of the Giroud (1997) calculations indicate that the performance of the FML applied on top of fly ash exceed the required flux requirements. The calculation results are summarized in Table 1.

Table 1. Liner Flux Calculation Results

Liner / defect type	Flux (m^3/s)	Flux (gpm)
Soil liner (3 ft. thick)	7.42 x 10^{-8}	0.1176
FML - circular	6.77 x 10^{-8}	0.1074
FML – rectangular	4.42 x 10^{-8}	0.0700
FML – linear	5.34 x 10^{-8}	0.0846

3. Cover versus Bottom Liner Performance

Along with the equivalence evaluation for the cover FML, the proposed regulation (PCB, 2013) also requires that if a bottom liner system exists, that the performance of the two liner system be evaluated and a demonstration made to show that the bottom liner system permeability is greater than the cover system.

3.1 HELP Model Input Parameters

This required evaluation was made using the US Army Corp of Engineer's HELP model (Schroeder et al., 1994). Climate and weather data is either site specific (based on the Site latitude), or based on Indianapolis, Indiana data provided with the HELP model. The model layer input parameters are included in Table 2. As a conservative approach, initial moisture contents at the beginning of the model run were pre-configured for each soil layer with its field capacity value. Lastly, the bottom liner, due to its age and its construction methods is assumed to have twice as many defects per acre than the modern cover and poor versus good placement/quality control.

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Table 2. HELP Model Layer Inputs

Layer	Thickness (inches)	Porosity (–)	Field Capacity (–)	Wilting Point (–)	Hydraulic Conductivity (cm/s)	Pinhole Density (#/acre)	Installation Defects (#/acre)	Placement
1	36	0.471	0.342	0.210	4.12×10^{-3}			
2	0.04	0.0	0.0	0.0	2.00×10^{-13}	5	1	good
3	360	0.541	0.187	0.047	5.00×10^{-3}			
4	0.08	0.0	0.0	0.0	2.00×10^{-13}	10	2	poor
5	60	0.417	0.045	0.018	1.00×10^{-4}			

3.2 HELP Model Results

The model was evaluated over a 100 year period. This long modeling period allows for evaluation over a wider variation of precipitation event probabilities. Results of the HELP model evaluation show that average annual head on the bottom liner is only 0.042 inches, and the peak daily (average) head 0.059 inches. This clearly indicates that seepage through the cover controls moisture within the ash pond, and the cover out performs the bottom liner.

4. Conclusion

An evaluation of liner performance has been performed for Ash Pond A at the Site. This evaluation was done in two parts, a performance comparison of the designed 40-mil HDPE liner versus a 3-foot thick soil liner with hydraulic conductivity of 1×10^{-7} cm/s, and a determination that the cover system has equal or superior performance to the bottom liner system. The former evaluation was done using a series of Darcy flux calculations and the latter evaluation was performed using the US ACE HELP model. Results of both evaluations indicate that the designed cover system can meet the performance standards expected.

5. Licensed Professional Acknowledgement

The geological work product contained in this document has been prepared under my personal supervision and has been prepared and administered in accordance with the standards of reasonable professional skill and diligence.

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Appendix A

Liner Flux Calculations



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Giroud (1997) Liner Leakage Calculations – Hutsonville Ash Pond A Liner Comparison

Number of defects per area (#) – $n := 5$

Area of geomembrane (m^2) – $A_g := 4046.85$

Soil liner thickness (m) – $t_s := 0.30$

Head on liner (m) – $h := 0.76$

Liner hydraulic conductivity (m/s) – $k_s := 3.62 \times 10^{-7}$

Liner contact quality factor (select one)

Good
Poor

Circular Defect Leakage Calculations

Circular defect diameter (m) – $d := 0.01$

Leakage from circular defect – $Q_c := n \cdot 0.976 C_{qo} \cdot \left[1 + 0.1 \cdot \left(\frac{h}{t_s}\right)^{0.95}\right] \cdot d^{0.2} \cdot h^{0.9} \cdot k_s^{0.74}$

Volumetric flow (in m^3/s) – $Q_c = 6.773 \times 10^{-6}$ $Q_{c\_HELP} := Q_c \cdot 15850.323158 = 0.1074$
HELP=gpm

Leakage rate (in $m^3/s/m^2$) – $q_c := \frac{Q_c}{A_g} = 1.674 \times 10^{-9}$

Rectangular Defect Leakage Calculations

Rectangular defect side width & length (m) – $b := 0.001$ $B := 0.01$

Leakage from square defect –

$$Q_r := \left[n \cdot C_{qo} \cdot \left[1 + 0.1 \cdot \left(\frac{h}{t_s}\right)^{.95}\right] \cdot b^{0.2} \cdot h^{0.9} \cdot k_s^{0.74}\right] + \left[n \cdot C_{qi} \cdot \left[1 + 0.2 \cdot \left(\frac{h}{t_s}\right)^{.95}\right] \cdot (B - b) \cdot b^{0.1} \cdot h^{0.45} \cdot k_s^{0.87}\right]$$

Volumetric flow (in m^3/s) – $Q_r = 4.417 \times 10^{-6}$ $Q_{r\_HELP} := Q_r \cdot 15850.323158 = 0.07$
HELP=gpm

Leakage rate (in $m^3/s/m^2$) – $\frac{Q_r}{A_g} = 1.091 \times 10^{-9}$

Infinitely Long Defect Leakage Calculations

Width of defect (m) – $w := 0.01$

Leakage from square defect – $Q_L := n \cdot C_{qi} \cdot \left[1 + 0.2 \cdot \left(\frac{h}{t_s}\right)^{.95}\right] \cdot w^{0.1} \cdot h^{0.45} \cdot k_s^{0.87}$

Volumetric flow (in m^3/s) – $Q_L = 5.338 \times 10^{-6}$ $Q_{L\_HELP} := Q_L \cdot 15850.323158 = 0.0846$
HELP=gpm

Leakage rate (in $m^3/s/m^2$) – $q_L := \frac{Q_L}{A_g} = 1.319 \times 10^{-9}$

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Appendix B

VFL Technology Corp. Report



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FINAL REPORT

CONCEPTUAL DEVELOPMENT OF A POZZOLANIC CAP FOR CLOSURE OF BASIN D AT THE HUTSONVILLE POWER STATION HUTSONVILLE, IL

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March 25, 2003

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Final Report

Conceptual Development of a Pozzolanic Cap for the Closure of Basin D at the Hutsonville Power Station

1.0 Background

Basin D at the Hutsonville Power Station (Photo #1) is an inactive ash disposal area that will be closed under Illinois Title 35 Part 811. Natural Resource Technology (NRT), Pewaukee, Wisconsin, contracted the services of VFL Technology Corp. (VFL) to determine the feasibility of developing a concept for the creation, manufacture, and placement of a pozzolanic cap for Basin D.

The purpose of this report is to present a final summary of the information, findings and test results that have been generated for the conceptual development of the pozzolanic cap for the closure of Basin D at the Hutsonville Power Station in Hutsonville Illinois.

The Program Goals of this study were to:

- Attempt to develop a pozzolanic cap material that would achieve a permeability of 1×10^{-7} cm/sec, have an unconfined compressive strength of approximately 150 psi, and have minimal cracking after placement.
- Develop a pozzolanic material that is environmentally acceptable and minimizes leaching.
- If the 1×10^{-7} cm/sec permeability goal is unrealistic or unachievable with these materials, estimate the most realistic performance of these materials under field conditions.
- Produce a cost-effective pozzolanic cap material that can be easily handled and placed with common earth moving equipment.

To accomplish these goals, VFL and NRT developed a scope of work for the project. VFL employed the help of GeoSystems Consultants Inc. (GeoSystems) to assist with the geotechnical engineering portion of the program. The scope of work basically included:

- A field assessment of the site (VFL and GeoSystems);
- A review of existing geotechnical data of the site to determine if additional information is needed to finalize the cap design and construction (GeoSystems).

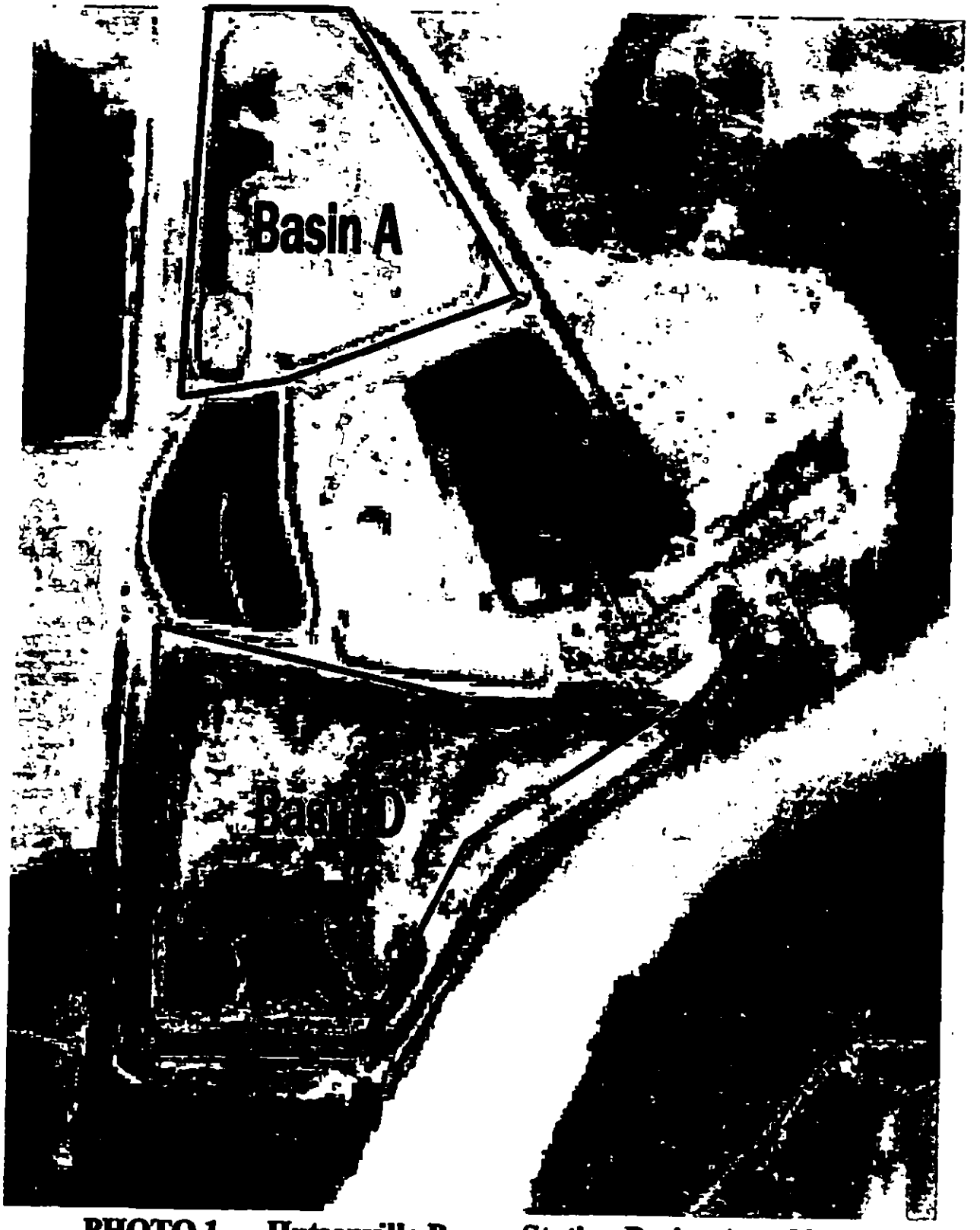

PHOTO 1 Hutsonville Power Station Basins A and D

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- Collect samples of the Basin materials (VFL);
- Conduct a treatability study to determine if a pozzolanic cap can be developed to meet the current design guidelines for closure cap construction and develop an operational approach to construct the cap (VFL); and
- Conceptual development of the basic cap design, appearance and estimated volumes of material to be used in the cap construction (GeoSystems).

On March 5 and 6, 2002, representatives of VFL and GeoSystems visited the Hutsonville site. Samples from basins A and D were collected, and existing geotechnical data was reviewed. The Hutsonville ash samples were tested at VFL's Corporate laboratory in West Chester Pa. using a variety of locally available stabilization reagents.

2.0 Overall Program Conclusions

- The preliminary geotechnical evaluation indicates that the construction of a pozzolanic cap is feasible; however, some additional, more refined analyses are needed to finalize the engineering and design of the cap system.

- The results of the Treatability Study program show that it is feasible to construct a structurally stable, environmentally acceptable Pozzolanic Cap and use this cap in the final closure of Basin D at the Huntsville Power Station. Although the permeability results do not meet the original goal of 1×10^{-7} cm/sec, the results of several mixes are in the mid to low 10^{-7} cm/sec range.

- By using Basin A ash as a construction material for the pozzolanic cap, approximately 160,000 yds^3 of ash can be utilized; 100,000yd^3 as a pozzolanic final cover and 60,000yd^3 to adjust the Basin A final slopes.

- All of the mixes that were considered potential candidates for cap construction easily met the unconfined compressive strength goal of 150 psi.

3.0 Geotechnical Investigation

As indicated above, the geotechnical data review, conceptual design, material volume estimates, preliminary settlement and slope stability analyses were conducted by GeoSystems. The report of their findings and analyses has been included in Appendix 1 of this report.

In summary, GeoSystems believes the construction of a pozzolanic cap is feasible and will be an effective system.

An overview of the conclusions of the GeoSystems report indicate:

- .... A parametric analysis varying cap permeability from1 x 10^{-5}cm/sec to 1 x 10^{-7}cm/sec yielded "effectiveness" ranging from 78% to 97%.....
- .....As the slope of the final cover increases from 1% to 5%, the volume of regrading reduces from 110,000yds^3 to 75,000 yds^3 .....
- .....With a 5% slope, the volume of ash fill material needed from Basin A is estimated to be 160,000 yds^3 .....
- .....The volume of the pozzolanic cap (3 feet thick) is estimated to be 100,000 yds^3 and varies little as the slope varies from 1% to 5%.....

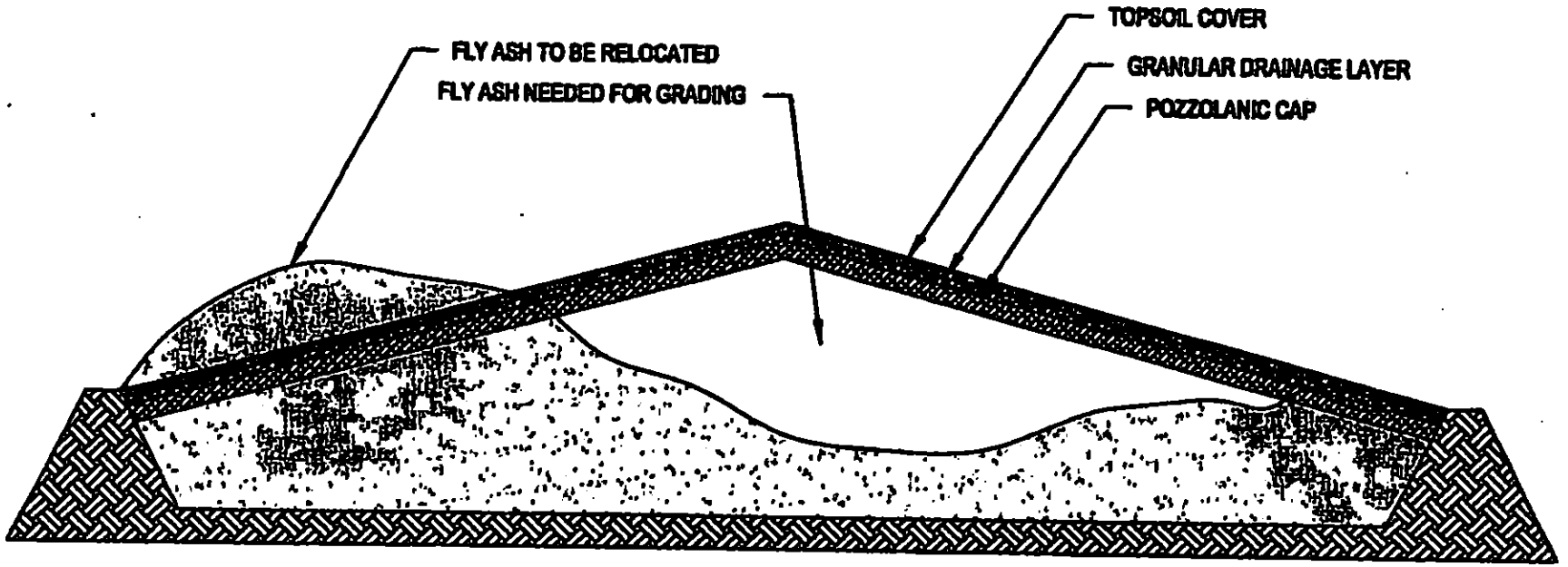
A graphical presentation of a conceptual, representative cross section of Basin D showing the cap design, regrading requirements, needed fly ash fill material from Basin A, etc. was developed by GeoSystems (part of GeoSystems report - see Appendix 1) and has been included here as Figure 1 for reference purposes.

4.0 Treatability Study

A few "Performance Goals" were established for the final pozzolanic cap material. The intent was to see if the stabilized materials could meet the existing cap design specifications, and if not, determine how well they performed against these existing specifications. The "Performance Goals" for this project were to:

- Develop a permeability of 1 x 10^{-7}cm/sec, or determine how close the stabilized materials can realistically come to these specifications.
- Develop approximately 150 psi unconfined compressive strength;
- Attempt to develop a cost-effective mix design that can be easily implemented and constructed in the field;
- Minimize cracking; and
- Develop a cap system that was environmentally acceptable (minimizes leaching).

VFL's treatability study can be broken down into four basic areas: Raw Materials Characterization; Reagents; Mix Design Development and Mix Design Performance Testing. Each of these areas is discussed further in the following sections of this report.



REPRESENTATIVE CROSS SECTION
POND D
HUTSONVILLE POWER STATION
HUTSONVILLE, ILLINOIS

GeoSystems Consultants, Inc.

PROJECT NO.: 02G108

APRIL 2002

FIGURE 1

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4.1 Raw Materials Characterization

During the site visit, VFL collected six (6) samples of sluiced ash from different locations in Basin A, and two (2) samples of ash from different locations in Basin D. The six samples from Basin A and two samples from Basin D were individually tested for moisture content, pH, density and Loss on Ignition (LOI).

The solids content of the ash excavated from Basin A ranged from 71.4% to 74.2% solids (40.0% to 34.8% moisture – on a dry weight basis or dwb). The dry weight basis refers to the test that uses the dry weight of the sample in the calculation. Please see the further explanation in this section. The pH values for Basin A ranged from 8.4 to 11.0, while the LOI's for Basin A ranged from 2.1% to 8.9%. All ash samples showed varying degrees of bleeding (draining of free liquids from the material).

As indicated previously, the intent is to use material from Basin A to produce the pozzolanic cap for the closure of Basin D. In order to simulate full-scale operations, the "as received" samples of ash from Basin A were allowed to decant/drain. This was done to estimate the handling and solids content characteristics of the ash that will be used in the full-scale operations. The data showed that some of the ash samples decanted/drained nicely, while others did not decant/drain as well. The decanted/drained solids content of the Basin A materials ranged from 73.9% to 81% solids (35.3% to 23.5% moisture – dwb), or a 11.8% to 32.5% decrease in moisture content.

At this point a more thorough explanation of solids content and moisture content is required. The calculations are:

$$\text{Solids Content \%} = \frac{\text{Dry Weight of Sample}}{\text{Wet Weight of Sample}} \times 100$$

$$\text{Moisture Content \% (dwb)} = \frac{\text{Weight of Water in the Sample}}{\text{Dry Weight of Sample}} \times 100$$

As shown, both calculations are sometimes needed to explain what is happening with certain materials. We have provided both sets of numbers at various points in this text. Generally moisture content is referred to when describing soils. Solids content is required for our purposes when describing mixtures of materials that may not all be soils. The two systems developed independently based on the type of work taking place. In summary, moisture content is generally soil based and solids content is mixed material based.

The two samples of ash collected from Basin D showed a solids content range

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of 72.9% to 82.6% solids (37.2% to 21.1% moisture – dwb). The sample that showed the high solids content was taken from a stockpile of material that was sitting on the Basin (age unknown). The pH's for the two samples collected from Basin D were 8.8 and 8.2 respectively. The results of the physical analysis of the ash samples can be found on Table 1.

TABLE 1
Physical Characterization of the Hutsonville Ash

Basin #	Sample Number	Sample ID	As Received pH (SU)	As Received Solids (%)	Decanted Solids (%)	Loss on Ignition %	Particle Size #100	Particle Size #200 % Passing	Particle Size #325	Density (Wet/Dry) Rodded lbs/ft³	Density (Wet/Dry) Compacted lbs/ft³
A	A-1	#1 Inflow	10.4	72.7	80.8	3.1	95.9	83.8	64.1		
A	A-2	#2 Inflow +1	9.8	74.2	80.8	2.1					
A	A-3	#3 Inflow +2	11.0	72.2	81.0	4.5	90.4	78.0	63.1		
A	A-4	#4 Inflow +3	11.0	71.4	79.3	2.6					
A	A-5	#5 Inflow +4	8.6	72.3	78.2	2.5					
A	A-6	#6 Outfall	8.4	72.5	73.9	8.9	93.0	79.5	68.0		
A	A-7	Composite A1-A6	10.0	NA	79.6		95.9	85.6	71.4	87.6 / 69.7	115.2 / 91.7
D	D-1	Basin D	8.8	72.9		5.2					
D	D-2	55K Stkpl.	8.2	82.6	NA	4.0					

In addition to the physical characterization of the ash samples listed above, an elemental analysis and TCLP leachate analysis for the 8 RCRA metals was run on a composite sample of the Hutsonville ash. The composite sample was generated by combining equal portions of ash samples A-1 through A-6. The results of the chemical analyses are listed in Table 2. The actual data reports from Dalare Labs in Philadelphia, Pa. have been included in Appendix A-2.

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TABLE 2
Elemental and TCLP Analysis of the Hutsonville Ash

PARAMETER	Basin A Fly Ash Composite METALS ANALYSIS	
	TOTAL	LEACHABLE
Arsenic	34.4	0.020
Barium	95.0	0.56
Cadmium	< 1.0	0.01
Chromium	24.3	< 0.01
Lead	55.6	0.12
Mercury	0.076	< 0.001
Selenium	18.3	0.013
Silver	< 1.0	< 0.01

Notes: Total = Total Elemental Concentration in mg/kg
Leachable = TCLP Leachable Metals in mg/L
< = Less than

4.2 Reagents

VFL has used numerous reagents in the development of pozzolanic construction materials. VFL reviewed these various reagents and based on previous full-scale experience with similar projects, selected what it believes to be the best performing, commercially available (in large quantities), and most cost-effective reagents for this project, from sources in the vicinity of the job site. These reagents include:

- Portland Cement;
- Class C Fly Ash (self-setting type);
- Fluidized Bed Residue Ash;
- Quicklime;
- FGD Scrubber Sludge (used to make the particle size of the mix design finer, which improves permeability); and
- Native Soils (used to make the particle size of the mix design finer, which improves permeability).

VFL experienced a few minor delays in the treatability study portion of the project. These delays are directly attributed to the delays in receiving some of the samples of reagents from the various vendors. One of the most problematic was the FGD Scrubber Sludge, which was finally received on date *06/06/02*.

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4.3 Mix Design Preparation

In order to simulate full-scale conditions, VFL combined the six (6) decanted/drained samples of ash from Basin A into one (1) composite ash sample that was used to prepare all of the mixes. The solids content of this composite sample was approximately 79% solids (26.6% moisture – dwb).

All mix designs were prepared in a laboratory mixer and mixed to the consistency expected to be achieved using full-scale processing equipment. All mix designs were damp, granular, soil-like materials that could be easily handled and placed with common earth moving equipment. All of the mixes were prepared on the "wet side of optimum moisture" to assure that there was enough moisture in the mix for reagent hydration and proper compaction. This "wet side of optimum moisture" consistency also minimizes the potential for dusting during full-scale operations. After blending, the mixes were allowed to rest and cure for one hour prior to compaction in the test cylinder molds. This was done to simulate the approximate amount of time the mixed material would need to be moved from the mixing plant spread and compacted. See Table 2 for the mix designs developed in this project.

Solids contents, as well as wet and dry compacted densities were recorded for all mixes. These values will be used as operating specifications during full-scale production and placement operations.

All mixes were compacted into standard size compaction molds, labeled, and stored in sealed plastic bags to insure proper curing and prevent moisture loss during their curing cycle.

4.4 Mix Design Performance Testing

Immediately after mix preparation, all of the mixes were evaluated for consistency, handlability, and constructability. As previously mentioned, all of the mixes had a damp, granular, soil-like consistency. All mixes could be easily handled, transported and placed with common earth moving equipment. All of the mixes could support heavy equipment traffic immediately after placement and compaction. This means that multiple lifts of stabilized material could be sequentially placed on top of each other throughout the day during full-scale operations.

As proposed, all of the mixes were tested for unconfined compressive strength (UCS) in accordance with ASTM C - 39. All compressive strength

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cylinders were tested in duplicate and capped prior to UCS testing. The mix designs and UCS test results can be found in Table 3.

Overall, the mixes generally performed as expected, with the exception of the quicklime mixes. All mixes showed good solids contents as well as wet and dry compacted densities. Based on the mix densities, costs, UCS results, etc, the best performing mixes were selected for the next phase of permeability testing. These mixes were:

Mix 1 – 10% cement
Mix 2 – 5% cement
Mix 5 – 5% fluidized bed residue
Mix 9 – 6.3% cement + 15% native soils
Mix14 – 30% FGD Filtercake + 10% cement
Mix 16 - 30% FGD Filtercake + 10% quicklime

Triaxial permeability tests were run on the above listed mixes after 28 and 84 days of curing. The results of these tests are listed in Table 3. During the 84 day permeability testing, a problem was discovered in the test results. All of the test specimens showed higher (more permeable) values than the 28 day results. In some cases, it was over an order of magnitude. This data trend is extremely unusual for pozzolanic reaction mechanisms, which are known to improve with time. It was concluded that the entire set of cylinders must have been damaged during transport and handling. Companion cylinders were tested again after curing 84 days and these permeability values fell in the expected range.

The only mix that did not show the normal permeability improvement characteristics was Mix #16. All of the indicator parameters for this Mix looked promising (consistency, compaction characteristics, densities, strength development, etc.), yet the permeability data did not follow the usual trends.

At this point, the mixes prepared in this program are considered to be excellent indicator mixes to examine the feasibility of the program and provide data to determine the basis for a final mix design. Further refinement of the mix design can be assessed to improve performance, permeability, and cost-effectiveness of the pozzolanic cap material as necessary.

After reviewing all of the permeability data listed in Table 3, it appears that the realistic performance range for these types of pozzolanic materials is the low 10^{-6}cm/sec to the mid→low 10^{-7}cm/sec range for materials to be produced under full-scale field conditions. The typical 1 x 10^{-7}cm/sec liner spec means that the material must be in the 10^{-8}cm/sec range so as not to exceed the1 x 10^{-7}cm/sec spec under field conditions. These types of values are extremely difficult to meet with most materials under field conditions.

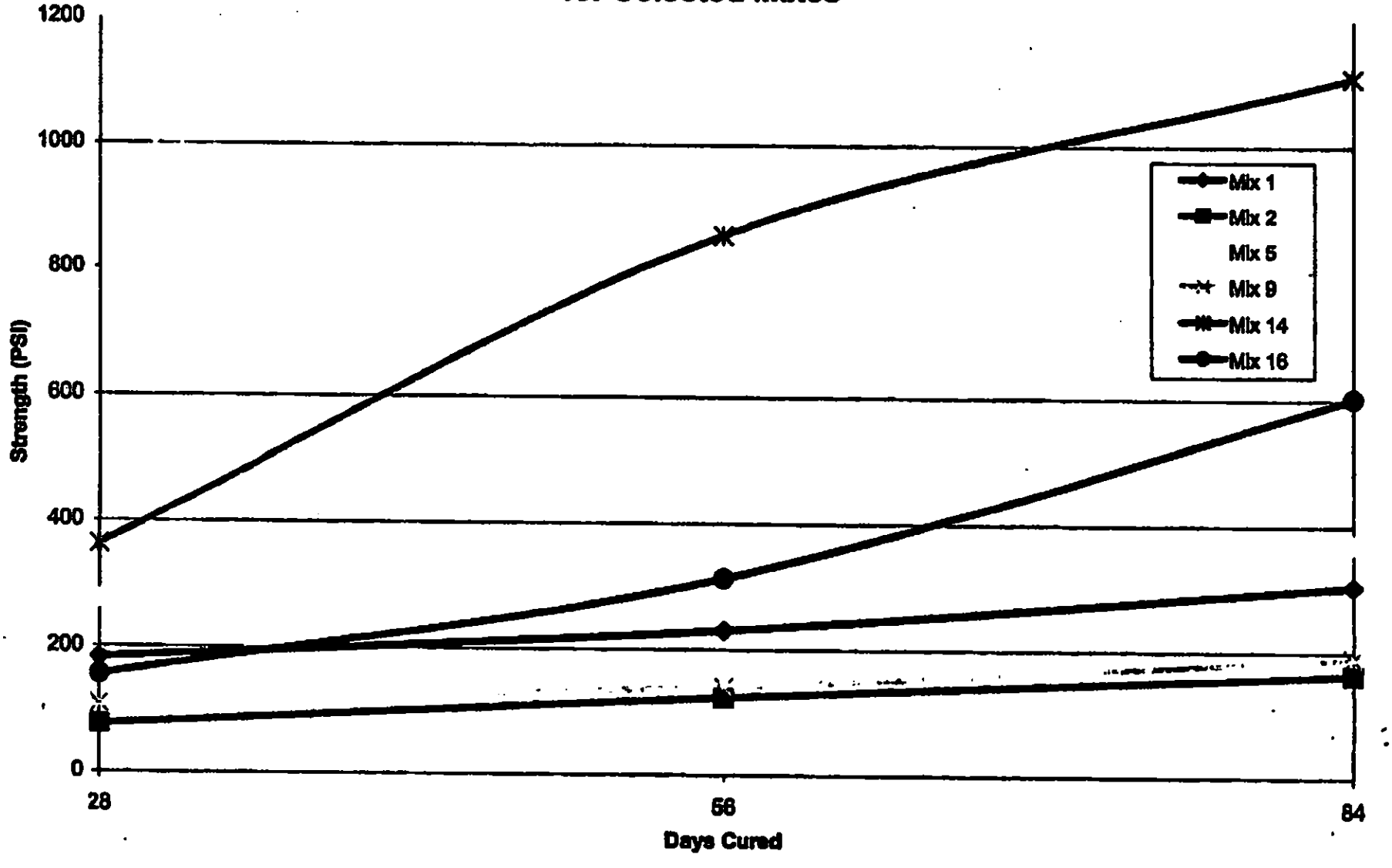
TABLE 3
TREATABILITY STUDY SUMMARY SHEET

Mix Number	Mix Design %			Reagents[4]				Solids	pH	Density		UCS[1]			Permeability K20 - (cm/sec)	
	Fly Ash	Filter Cake[2]	Soil[3]	Cement	C Ash	FBR	Q-lime			Wet	Dry	28 day	56 day	84 day	28 day	84 day
	(Comp 1-6)		(Black Sand)	(Lafarge)	(Newton)	(ADM)	(Misc.)	(%)	(SU)	(lbs/ft³)	(lbs/ft³)	(PSI)	(PSI)	(PSI)		
1	100		0	10.0				81.5	11.9	116.0	94.5	184	231	305	5.37E-07	7.64E-07
2	100		0	5.0				80.3	11.7	116.5	93.5	79	125	165	5.03E-06	4.74E-06
3	100		0		15.0			82.3	10.9	113.4	93.3	31	41	37		
4	100		0		30.0			83.5	11.4	107.5	89.8	81	124	114		
5	100		0			10.0		82.2	12.3	106.4	87.5	277	276	372	1.75E-06	5.84E-06
6	100		0			20.0		84.3	12.5	97.7	82.4	291	583	609		
7	100		0				10.0	81.1	12.5	107.1	86.9	38	70	138		
8	100		0				5.0	80.5	12.3	113.4	91.2	22	27	82		
9	85		15	6.3				83.5	11.7	114.2	95.4	110	142	191	1.99E-06	1.30E-06
10	85		15	12.5				83.4	11.9	117.4	97.9	320	416	380		
11	85		15				6.3	83.5	12.4	110.7	92.4	26	42	48		
12	85		15				10.0	81.9	12.6	113.1	92.6	35	84	82		
13	70	30		5.0				77.3	11.6	112.4	88.9	123	168	164		
14[5]	70	30		10.0				77.9	12.0	113.0	88.0	364	856	1110	1.22E-07	1.38E-07
15	70	30					6.6	79.9	12.8	114.2	91.2	130	194	304		
16[5]	70	30					10.0	81.1	12.9	112.4	91.2	157	314	603	4.32E-05	2.91E-05

Note: *Reagent added on a dry weight basis to to soil-fly ash blend.*
Stockpile Time for all mixes was 30 minutes

[1] *UCS strength data is average of 2 cylinders.*
[2] *FGD sludge added on a wet weight basis to ash.*
[3] *Soil added on a wet weight basis.*
[4] *Reagents added on a dry weight basis*
[5] *Second set of permeability results for mixes 14 and 16 are at 56-day cures.*

FIGURE 2
Unconfined Compressive Strength Development for Selected Mixes



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Based on all of the above data, the four (4) best performing mixes in the study were then tested for leachate characteristics using the TCLP leaching procedure. The results of the TCLP leaching tests are presented in Table 4.

TABLE 4
TCLP Leachate Analysis of the Treated Ash

PARAMETER	Untreated Fly Ash	TREATED ASH Mix #2	Mix #5	Mix #9	Mix #14
Arsenic	0.020	< 0.010	< 0.010	< 0.010	< 0.010
Barium	0.56	0.28	0.25	0.14	0.11
Cadmium	0.01	< 0.01	< 0.01	0.01	< 0.01
Chromium	< 0.01	0.06	< 0.01	0.05	< 0.01
Lead	0.12	< 0.02	< 0.02	< 0.02	< 0.02
Mercury	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	0.013	0.019	0.010	< 0.010	< 0.010
Silver	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes: Treated material cured for 84 days
All results expressed in ppm unless otherwise noted.
ppm = Parts per Million
< = Less than

As shown in Table 4, all of the mixes showed very low leaching potential. One interesting trend to observe is the fact that all of the stabilized mixes reduced the leachable level of arsenic, barium and lead when compared to the original, untreated ash. This is a common trend seen in the leachate characteristics of pozzolanic stabilization matrices.

Upon reviewing all of the data generated in the study, the most promising reagents and material blends to produce a pozzolanic cap under field conditions appear to be:

- Basin A fly ash and cement (Mix 1 and 2)
- Basin A fly ash, onsite soil and cement (Mix 9 and 10)
- Basin A fly ash, FGD Filtercake and cement (Mix 14)

FBR was not included in the final selection for several reasons. FBR has been used in the past for various construction needs including permeability which is why we

have included it in this treatability study. FBR is quite useful when handled properly and used in the correct application. Recently, there have been reports on several construction projects that some FBR's are susceptible to expansion problems. Situations where it should be avoided are employing it where slight expansion is not acceptable.

FGD sludge is a good additive for most mix applications. However, FGD sludge from each power plant can be very different (chemically and physically) based on the coal source and type of boiler used. Another issue that VFL has with FGD sludge, in this specific application, is making sure that it is mixed thoroughly with the other ingredients. FGD sludge is a very sticky material. It is difficult to accurately feed it into a portable processing system because the FGD sludge has a tendency to adhere to the sides of feed hoppers that are used on portable pugmill plants (known as bridging). In most construction applications, where precise mix designs are not required, this is not a problem.

The mixes containing cement tend to be the easiest to quality control in field construction applications. Cement is a manufactured product and varies very little. Further optimization testing is recommended for the final mix design prior to full-scale operations. VFL would recommend that a test pad be constructed with full-scale equipment and sampled in substantial conformance with 35 Illinois Administrative Code (IAC) Part 816 to evaluate the proposed process equipment train and optimized the final mix design.

5.0 Extrapolation to Full-Scale Operations

The basic full-scale operational approach that VFL would use to construct the pozzolanic cap for Basin D's closure would conform to the following schedule of events:

- Regrade Basin D to the lines and grades specified by the Engineer.
- Excavate the fly ash from Basin A and allow it to drain to the proper moisture content before using it in the mix design. Run On/Run Off to and from the area will be controlled and water drained from the ash will be routed back through the plants pond system.
- Construct a processing area in the vicinity of the two Basins. Erect the processing plant, silos and any other ancillary processing equipment needed. Construct haul roads to and from the placement area.
- Process the designated mix design.
- Place and compact the stabilized cap mix in a reasonable time frame allowing the material a curing period prior to compaction to the lines and grades established by the Engineer for the final cap design.
- Cover the placed material with the cover soils to protect the pozzolanic cap from severe weather events.

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- Place the topsoil and vegetate as soon as possible.

To develop the necessary documentation for submittal to the State Regulatory Agencies, the basic Quality Control program for the pozzolanic cap construction would involve:

- Quality Control conformation testing on the materials to be used in the cover system and their placement.
- Process control testing of the mix design during production in substantial conformance with 35 IAC Part 816.
- Quality Control of the cap mix design during placement and compaction in substantial conformance with QA/QC procedures outlined in 35 IAC Part 816.
- Moisture monitoring on the excavated and drained Basin A fly ash. Control and QC confirmation checks on the reagents and any other materials of construction that will be used in the mix design.
- Plant calibration.
- Insure that Basin D has been regraded to the lines and grades specified.
- Insure that the cover system has been installed to the lines and grades specified.

The cap construction activities listed in this section have been used by VFL on several other pozzolanic cap projects. To demonstrate this, the following photos of a pozzolanic cap system that VFL constructed on an industrial landfill in New Jersey have been included for review.

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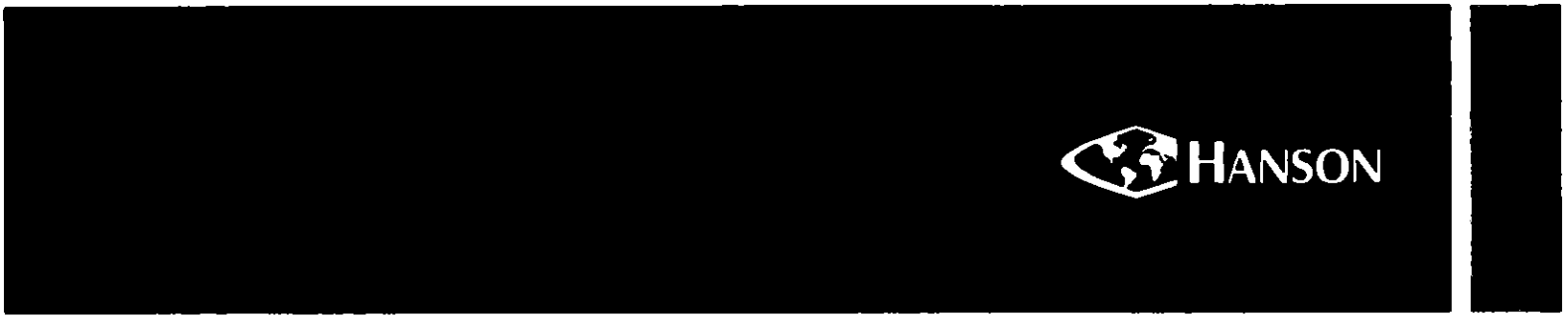
Appendix C

HELP Model Output File



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**********************************************************************************
**********************************************************************************
**                                                                              **
**                                                                              **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                   **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                    **
**                   DEVELOPED BY ENVIRONMENTAL LABORATORY                      **
**                     USAE WATERWAYS EXPERIMENT STATION                        **
**              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                 **
**                                                                              **
**                                                                              **
**********************************************************************************
**********************************************************************************


PRECIPITATION DATA FILE:     E:\HELP307\HPS.D4
TEMPERATURE DATA FILE:       E:\HELP307\HPS.D7
SOLAR RADIATION DATA FILE:   E:\HELP307\HPS.D13
EVAPOTRANSPIRATION DATA:     E:\HELP307\HPS.D11
SOIL AND DESIGN DATA FILE:   E:\HELP307\HUT-CL1.D10
OUTPUT DATA FILE:            E:\HELP307\HUT-CL1.OUT


TIME:   9:20     DATE:  12/ 9/2014


**********************************************************************************

     TITLE:  Hutsonville Power Station - Ash Pond A Cover/Liner Comp

**********************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
            WERE SPECIFIED BY THE USER.


                                LAYER  1
                                --------

                TYPE 1 - VERTICAL PERCOLATION LAYER
                    MATERIAL TEXTURE NUMBER  12
          THICKNESS                    =     36.00   INCHES
          POROSITY                     =      0.4710 VOL/VOL
          FIELD CAPACITY               =      0.3420 VOL/VOL
          WILTING POINT                =      0.2100 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.3420 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.419999997000E-04 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.48
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                LAYER  2
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TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.04 INCHES
POROSITY	=	0.0000 VOL/VOL
FIELD CAPACITY	=	0.0000 VOL/VOL
WILTING POINT	=	0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12 CM/SEC
FML PINHOLE DENSITY	=	5.00 HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00 HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 30

THICKNESS	=	360.00 INCHES
POROSITY	=	0.5410 VOL/VOL
FIELD CAPACITY	=	0.1870 VOL/VOL
WILTING POINT	=	0.0470 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1870 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04 CM/SEC

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.08 INCHES
POROSITY	=	0.0000 VOL/VOL
FIELD CAPACITY	=	0.0000 VOL/VOL
WILTING POINT	=	0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12 CM/SEC
FML PINHOLE DENSITY	=	10.00 HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00 HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 1

THICKNESS	=	60.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0450 VOL/VOL
WILTING POINT	=	0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4170 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02 CM/SEC

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GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #12 WITH A FAIR STAND OF GRASS, A SURFACE SLOPE OF 5.% AND A SLOPE LENGTH OF 525. FEET.

SCS RUNOFF CURVE NUMBER	=	87.70	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.052	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.826	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.260	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	104.652	INCHES
TOTAL INITIAL WATER	=	104.652	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHEdS/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM HUTSONVILLE ILLINOIS

STATION LATITUDE	=	39.11	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.30	
START OF GROWING SEASON (JULIAN DATE)	=	107	
END OF GROWING SEASON (JULIAN DATE)	=	293	
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	9.60	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	68.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	74.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	75.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR INDIANAPOLIS INDIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.65	2.46	3.61	3.68	3.66	3.99
4.32	3.46	2.74	2.51	3.04	3.00

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR INDIANAPOLIS INDIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
26.00	29.90	40.00	52.40	62.50	71.60
75.10	73.20	66.60	54.80	41.80	31.50

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NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR HUTSONVILLE ILLINOIS
AND STATION LATITUDE = 39.11 DEGREES

****

ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	35.76	129808.797	100.00
RUNOFF	5.796	21040.686	16.21
EVAPOTRANSPIRATION	23.035	83617.648	64.42
PERC./LEAKAGE THROUGH LAYER 2	2.379088	8636.088	6.65
AVG. HEAD ON TOP OF LAYER 2	22.9982		
PERC./LEAKAGE THROUGH LAYER 5	0.003522	12.784	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	6.925	25137.650	19.37
SOIL WATER AT START OF YEAR	110.808	402232.531	
SOIL WATER AT END OF YEAR	117.733	427370.187	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.022	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.59	158231.703	100.00
RUNOFF	14.135	51308.930	32.43
EVAPOTRANSPIRATION	25.773	93556.758	59.13
PERC./LEAKAGE THROUGH LAYER 2	2.887105	10480.192	6.62
AVG. HEAD ON TOP OF LAYER 2	29.9029		

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PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	3.682	13366.040	8.45
SOIL WATER AT START OF YEAR	117.733	427370.187	
SOIL WATER AT END OF YEAR	119.681	434442.594	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.734	6293.645	3.98
ANNUAL WATER BUDGET BALANCE	0.0000	-0.030	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.36	168286.797	100.00
RUNOFF	16.742	60772.223	36.11
EVAPOTRANSPIRATION	27.250	98917.687	58.78
PERC./LEAKAGE THROUGH LAYER 2	2.877049	10443.688	6.21
AVG. HEAD ON TOP OF LAYER 2	29.7364		
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	2.368	8596.826	5.11
SOIL WATER AT START OF YEAR	119.681	434442.594	
SOIL WATER AT END OF YEAR	123.428	448042.937	
SNOW WATER AT START OF YEAR	1.734	6293.645	3.74
SNOW WATER AT END OF YEAR	0.355	1290.101	0.77
ANNUAL WATER BUDGET BALANCE	0.0000	0.067	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT

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PRECIPITATION	34.80	126324.008	100.00
RUNOFF	6.983	25347.947	20.07
EVAPOTRANSPIRATION	26.231	95220.039	75.38
PERC./LEAKAGE THROUGH LAYER 2	2.906209	10549.538	8.35
AVG. HEAD ON TOP OF LAYER 2	30.0842		
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	1.586	5755.985	4.56
SOIL WATER AT START OF YEAR	123.428	448042.937	
SOIL WATER AT END OF YEAR	125.369	455089.031	
SNOW WATER AT START OF YEAR	0.355	1290.101	1.02
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.036	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.81	137250.250	100.00
RUNOFF	10.015	36353.055	26.49
EVAPOTRANSPIRATION	23.799	86391.266	62.94
PERC./LEAKAGE THROUGH LAYER 2	2.876222	10440.687	7.61
AVG. HEAD ON TOP OF LAYER 2	29.7143		
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	3.996	14505.986	10.57
SOIL WATER AT START OF YEAR	125.369	455089.031	
SOIL WATER AT END OF YEAR	129.365	469595.031	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.055	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.36	153766.781	100.00
RUNOFF	10.486	38065.855	24.76
EVAPOTRANSPIRATION	29.016	105329.891	68.50
PERC./LEAKAGE THROUGH LAYER 2	2.964767	10762.104	7.00
AVG. HEAD ON TOP OF LAYER 2	31.1128		
PERC./LEAKAGE THROUGH LAYER 5	0.003450	12.525	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	2.854	10358.539	6.74
SOIL WATER AT START OF YEAR	129.365	469595.031	
SOIL WATER AT END OF YEAR	132.219	479953.562	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.021	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.65	136669.500	100.00
RUNOFF	12.824	46552.496	34.06
EVAPOTRANSPIRATION	22.038	79999.211	58.53
PERC./LEAKAGE THROUGH LAYER 2	2.918617	10594.581	7.75
AVG. HEAD ON TOP OF LAYER 2	30.3918		
PERC./LEAKAGE THROUGH LAYER 5	0.308375	1119.401	0.82
AVG. HEAD ON TOP OF LAYER 4	0.0039		

CHANGE IN WATER STORAGE	2.479	8998.396	6.58
SOIL WATER AT START OF YEAR	132.219	479953.562	
SOIL WATER AT END OF YEAR	134.698	488951.969	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.002	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.53	139863.891	100.00
RUNOFF	12.169	44173.367	31.58
EVAPOTRANSPIRATION	23.241	84366.094	60.32
PERC./LEAKAGE THROUGH LAYER 2	2.981773	10823.837	7.74
AVG. HEAD ON TOP OF LAYER 2	31.2804		
PERC./LEAKAGE THROUGH LAYER 5	0.980284	3558.432	2.54
AVG. HEAD ON TOP OF LAYER 4	0.0137		
CHANGE IN WATER STORAGE	2.139	7765.982	5.55
SOIL WATER AT START OF YEAR	134.698	488951.969	
SOIL WATER AT END OF YEAR	136.837	496717.937	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.019	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.08	163640.437	100.00
RUNOFF	15.214	55226.371	33.75

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EVAPOTRANSPIRATION	25.711	93331.344	57.03
PERC./LEAKAGE THROUGH LAYER 2	2.879380	10452.150	6.39
AVG. HEAD ON TOP OF LAYER 2	29.7797		
PERC./LEAKAGE THROUGH LAYER 5	1.670422	6063.632	3.71
AVG. HEAD ON TOP OF LAYER 4	0.0246		
CHANGE IN WATER STORAGE	2.485	9019.046	5.51
SOIL WATER AT START OF YEAR	136.837	496717.937	
SOIL WATER AT END OF YEAR	138.093	501276.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.229	4460.498	2.73
ANNUAL WATER BUDGET BALANCE	0.0000	0.044	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.77	115325.086	100.00
RUNOFF	8.883	32245.350	27.96
EVAPOTRANSPIRATION	20.746	75307.656	65.30
PERC./LEAKAGE THROUGH LAYER 2	2.859982	10381.735	9.00
AVG. HEAD ON TOP OF LAYER 2	29.4728		
PERC./LEAKAGE THROUGH LAYER 5	2.132545	7741.138	6.71
AVG. HEAD ON TOP OF LAYER 4	0.0323		
CHANGE IN WATER STORAGE	0.009	30.920	0.03
SOIL WATER AT START OF YEAR	138.093	501276.500	
SOIL WATER AT END OF YEAR	138.804	503860.250	
SNOW WATER AT START OF YEAR	1.229	4460.498	3.87
SNOW WATER AT END OF YEAR	0.526	1907.668	1.65
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	29.60	107448.031	100.00
RUNOFF	7.772	28210.936	26.26
EVAPOTRANSPIRATION	18.878	68527.266	63.78
PERC./LEAKAGE THROUGH LAYER 2	2.851693	10351.647	9.63
AVG. HEAD ON TOP OF LAYER 2	29.3401		
PERC./LEAKAGE THROUGH LAYER 5	2.383102	8650.662	8.05
AVG. HEAD ON TOP OF LAYER 4	0.0365		
CHANGE IN WATER STORAGE	0.567	2059.154	1.92
SOIL WATER AT START OF YEAR	138.804	503860.250	
SOIL WATER AT END OF YEAR	139.289	505618.094	
SNOW WATER AT START OF YEAR	0.526	1907.668	1.78
SNOW WATER AT END OF YEAR	0.609	2208.984	2.06
ANNUAL WATER BUDGET BALANCE	0.0000	0.013	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.14	113038.195	100.00
RUNOFF	8.246	29933.818	26.48
EVAPOTRANSPIRATION	20.902	75875.094	67.12
PERC./LEAKAGE THROUGH LAYER 2	2.895914	10512.169	9.30
AVG. HEAD ON TOP OF LAYER 2	29.9166		
PERC./LEAKAGE THROUGH LAYER 5	2.547845	9248.677	8.18
AVG. HEAD ON TOP OF LAYER 4	0.0392		
CHANGE IN WATER STORAGE	-0.556	-2019.442	-1.79
SOIL WATER AT START OF YEAR	139.289	505618.094	

SOIL WATER AT END OF YEAR	139.341	505807.625	
SNOW WATER AT START OF YEAR	0.609	2208.984	1.95
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.052	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.12	131115.562	100.00
RUNOFF	10.977	39848.254	30.39
EVAPOTRANSPIRATION	21.964	79728.555	60.81
PERC./LEAKAGE THROUGH LAYER 2	2.899045	10523.532	8.03
AVG. HEAD ON TOP OF LAYER 2	30.0912		
PERC./LEAKAGE THROUGH LAYER 5	2.648971	9615.764	7.33
AVG. HEAD ON TOP OF LAYER 4	0.0411		
CHANGE IN WATER STORAGE	0.530	1923.065	1.47
SOIL WATER AT START OF YEAR	139.341	505807.625	
SOIL WATER AT END OF YEAR	139.871	507730.687	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.067	0.00

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.09	138266.687	100.00
RUNOFF	12.941	46977.289	33.98
EVAPOTRANSPIRATION	21.708	78798.539	56.99
PERC./LEAKAGE THROUGH LAYER 2	2.903492	10539.676	7.62

AVG. HEAD ON TOP OF LAYER 2	30.1590		
PERC./LEAKAGE THROUGH LAYER 5	2.759606	10017.370	7.24
AVG. HEAD ON TOP OF LAYER 4	0.0430		
CHANGE IN WATER STORAGE	0.681	2473.489	1.79
SOIL WATER AT START OF YEAR	139.871	507730.687	
SOIL WATER AT END OF YEAR	139.865	507710.594	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.687	2493.596	1.80
ANNUAL WATER BUDGET BALANCE	0.0000	0.002	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.05	138121.500	100.00
RUNOFF	15.003	54460.750	39.43
EVAPOTRANSPIRATION	20.651	74963.992	54.27
PERC./LEAKAGE THROUGH LAYER 2	2.853869	10359.544	7.50
AVG. HEAD ON TOP OF LAYER 2	29.3832		
PERC./LEAKAGE THROUGH LAYER 5	2.832414	10281.664	7.44
AVG. HEAD ON TOP OF LAYER 4	0.0443		
CHANGE IN WATER STORAGE	-0.437	-1584.877	-1.15
SOIL WATER AT START OF YEAR	139.865	507710.594	
SOIL WATER AT END OF YEAR	140.116	508619.312	
SNOW WATER AT START OF YEAR	0.687	2493.596	1.81
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.031	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	28.52	103527.609	100.00
RUNOFF	7.951	28861.682	27.88
EVAPOTRANSPIRATION	17.859	64827.145	62.62
PERC./LEAKAGE THROUGH LAYER 2	2.846871	10334.141	9.98
AVG. HEAD ON TOP OF LAYER 2	29.1454		
PERC./LEAKAGE THROUGH LAYER 5	2.875049	10436.429	10.08
AVG. HEAD ON TOP OF LAYER 4	0.0449		
CHANGE IN WATER STORAGE	-0.165	-597.652	-0.58
SOIL WATER AT START OF YEAR	140.116	508619.312	
SOIL WATER AT END OF YEAR	139.951	508021.656	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.007	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.59	169121.719	100.00
RUNOFF	15.149	54989.125	32.51
EVAPOTRANSPIRATION	27.002	98016.414	57.96
PERC./LEAKAGE THROUGH LAYER 2	2.951207	10712.881	6.33
AVG. HEAD ON TOP OF LAYER 2	30.9103		
PERC./LEAKAGE THROUGH LAYER 5	2.778898	10087.400	5.96
AVG. HEAD ON TOP OF LAYER 4	0.0433		
CHANGE IN WATER STORAGE	1.661	6028.754	3.56
SOIL WATER AT START OF YEAR	139.951	508021.656	
SOIL WATER AT END OF YEAR	140.228	509026.812	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	1.384	5023.602	2.97
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.68	118628.398	100.00
RUNOFF	11.508	41775.230	35.22
EVAPOTRANSPIRATION	20.341	73838.000	62.24
PERC./LEAKAGE THROUGH LAYER 2	2.833165	10284.389	8.67
AVG. HEAD ON TOP OF LAYER 2	29.0650		
PERC./LEAKAGE THROUGH LAYER 5	2.884884	10472.128	8.83
AVG. HEAD ON TOP OF LAYER 4	0.0452		
CHANGE IN WATER STORAGE	-2.054	-7456.953	-6.29
SOIL WATER AT START OF YEAR	140.228	509026.812	
SOIL WATER AT END OF YEAR	139.107	504957.344	
SNOW WATER AT START OF YEAR	1.384	5023.602	4.23
SNOW WATER AT END OF YEAR	0.451	1636.109	1.38
ANNUAL WATER BUDGET BALANCE	0.0000	-0.008	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.15	185674.484	100.00
RUNOFF	17.197	62425.437	33.62
EVAPOTRANSPIRATION	30.236	109758.219	59.11
PERC./LEAKAGE THROUGH LAYER 2	2.856656	10369.661	5.58
AVG. HEAD ON TOP OF LAYER 2	29.4034		
PERC./LEAKAGE THROUGH LAYER 5	2.885682	10475.027	5.64

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AVG. HEAD ON TOP OF LAYER 4	0.0452		
CHANGE IN WATER STORAGE	0.831	3015.804	1.62
SOIL WATER AT START OF YEAR	139.107	504957.344	
SOIL WATER AT END OF YEAR	140.063	508427.437	
SNOW WATER AT START OF YEAR	0.451	1636.109	0.88
SNOW WATER AT END OF YEAR	0.326	1181.822	0.64
ANNUAL WATER BUDGET BALANCE	0.0000	0.006	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.95	141388.516	100.00
RUNOFF	14.685	53308.344	37.70
EVAPOTRANSPIRATION	21.620	78481.891	55.51
PERC./LEAKAGE THROUGH LAYER 2	2.898271	10520.724	7.44
AVG. HEAD ON TOP OF LAYER 2	29.9536		
PERC./LEAKAGE THROUGH LAYER 5	2.874421	10434.146	7.38
AVG. HEAD ON TOP OF LAYER 4	0.0449		
CHANGE IN WATER STORAGE	-0.230	-835.860	-0.59
SOIL WATER AT START OF YEAR	140.063	508427.437	
SOIL WATER AT END OF YEAR	140.158	508773.406	
SNOW WATER AT START OF YEAR	0.326	1181.822	0.84
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.006	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT

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PRECIPITATION	42.84	155509.203	100.00
RUNOFF	11.921	43273.105	27.83
EVAPOTRANSPIRATION	27.945	101439.680	65.23
PERC./LEAKAGE THROUGH LAYER 2	2.966549	10768.572	6.92
AVG. HEAD ON TOP OF LAYER 2	31.1485		
PERC./LEAKAGE THROUGH LAYER 5	2.821312	10241.361	6.59
AVG. HEAD ON TOP OF LAYER 4	0.0441		
CHANGE IN WATER STORAGE	0.153	555.057	0.36
SOIL WATER AT START OF YEAR	140.158	508773.406	
SOIL WATER AT END OF YEAR	140.311	509328.437	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.001	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.94	166762.234	100.00
RUNOFF	15.219	55244.199	33.13
EVAPOTRANSPIRATION	27.896	101263.031	60.72
PERC./LEAKAGE THROUGH LAYER 2	2.951280	10713.146	6.42
AVG. HEAD ON TOP OF LAYER 2	30.9135		
PERC./LEAKAGE THROUGH LAYER 5	2.861707	10387.997	6.23
AVG. HEAD ON TOP OF LAYER 4	0.0448		
CHANGE IN WATER STORAGE	-0.037	-133.058	-0.08
SOIL WATER AT START OF YEAR	140.311	509328.437	
SOIL WATER AT END OF YEAR	139.831	507586.219	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.443	1609.160	0.96
ANNUAL WATER BUDGET BALANCE	0.0000	0.063	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.90	162986.984	100.00
RUNOFF	14.469	52522.816	32.23
EVAPOTRANSPIRATION	26.367	95710.594	58.72
PERC./LEAKAGE THROUGH LAYER 2	2.945029	10690.457	6.56
AVG. HEAD ON TOP OF LAYER 2	30.8075		
PERC./LEAKAGE THROUGH LAYER 5	2.923329	10611.683	6.51
AVG. HEAD ON TOP OF LAYER 4	0.0459		
CHANGE IN WATER STORAGE	1.141	4141.901	2.54
SOIL WATER AT START OF YEAR	139.831	507586.219	
SOIL WATER AT END OF YEAR	140.418	509719.125	
SNOW WATER AT START OF YEAR	0.443	1609.160	0.99
SNOW WATER AT END OF YEAR	0.997	3618.181	2.22
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.68	144038.391	100.00
RUNOFF	15.231	55286.781	38.38
EVAPOTRANSPIRATION	22.580	81966.086	56.91
PERC./LEAKAGE THROUGH LAYER 2	2.919841	10599.023	7.36
AVG. HEAD ON TOP OF LAYER 2	30.3063		
PERC./LEAKAGE THROUGH LAYER 5	2.942690	10681.964	7.42
AVG. HEAD ON TOP OF LAYER 4	0.0461		
CHANGE IN WATER STORAGE	-1.073	-3896.458	-2.71

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SOIL WATER AT START OF YEAR	140.418	509719.125	
SOIL WATER AT END OF YEAR	140.342	509440.844	
SNOW WATER AT START OF YEAR	0.997	3618.181	2.51
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.014	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.75	137032.500	100.00
RUNOFF	12.844	46624.797	34.02
EVAPOTRANSPIRATION	21.763	79000.906	57.65
PERC./LEAKAGE THROUGH LAYER 2	2.918902	10595.615	7.73
AVG. HEAD ON TOP OF LAYER 2	30.3944		
PERC./LEAKAGE THROUGH LAYER 5	2.935420	10655.575	7.78
AVG. HEAD ON TOP OF LAYER 4	0.0461		
CHANGE IN WATER STORAGE	0.207	751.235	0.55
SOIL WATER AT START OF YEAR	140.342	509440.844	
SOIL WATER AT END OF YEAR	140.333	509409.219	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.216	782.863	0.57
ANNUAL WATER BUDGET BALANCE	0.0000	-0.010	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.07	159974.094	100.00
RUNOFF	10.486	38065.000	23.79

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EVAPOTRANSPIRATION	30.866	112044.312	70.04
PERC./LEAKAGE THROUGH LAYER 2	2.989308	10851.188	6.78
AVG. HEAD ON TOP OF LAYER 2	31.5228		
PERC./LEAKAGE THROUGH LAYER 5	2.872868	10428.510	6.52
AVG. HEAD ON TOP OF LAYER 4	0.0450		
CHANGE IN WATER STORAGE	-0.155	-563.687	-0.35
SOIL WATER AT START OF YEAR	140.333	509409.219	
SOIL WATER AT END OF YEAR	140.393	509628.375	
SNOW WATER AT START OF YEAR	0.216	782.863	0.49
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.036	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	33.39	121205.727	100.00
RUNOFF	7.469	27112.551	22.37
EVAPOTRANSPIRATION	23.120	83927.039	69.24
PERC./LEAKAGE THROUGH LAYER 2	2.881216	10458.815	8.63
AVG. HEAD ON TOP OF LAYER 2	29.8150		
PERC./LEAKAGE THROUGH LAYER 5	3.013767	10939.974	9.03
AVG. HEAD ON TOP OF LAYER 4	0.0474		
CHANGE IN WATER STORAGE	-0.213	-773.845	-0.64
SOIL WATER AT START OF YEAR	140.393	509628.375	
SOIL WATER AT END OF YEAR	140.180	508854.531	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.010	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.58	132785.453	100.00
RUNOFF	10.688	38796.242	29.22
EVAPOTRANSPIRATION	21.813	79180.320	59.63
PERC./LEAKAGE THROUGH LAYER 2	2.925561	10619.788	8.00
AVG. HEAD ON TOP OF LAYER 2	30.3975		
PERC./LEAKAGE THROUGH LAYER 5	2.919352	10597.249	7.98
AVG. HEAD ON TOP OF LAYER 4	0.0457		
CHANGE IN WATER STORAGE	1.160	4211.586	3.17
SOIL WATER AT START OF YEAR	140.180	508854.531	
SOIL WATER AT END OF YEAR	140.291	509256.281	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.050	3809.847	2.87
ANNUAL WATER BUDGET BALANCE	0.0000	0.055	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.73	133329.906	100.00
RUNOFF	10.398	37744.453	28.31
EVAPOTRANSPIRATION	23.829	86499.055	64.88
PERC./LEAKAGE THROUGH LAYER 2	2.866230	10404.414	7.80
AVG. HEAD ON TOP OF LAYER 2	29.5704		
PERC./LEAKAGE THROUGH LAYER 5	2.955507	10728.490	8.05
AVG. HEAD ON TOP OF LAYER 4	0.0464		
CHANGE IN WATER STORAGE	-0.452	-1642.081	-1.23
SOIL WATER AT START OF YEAR	140.291	509256.281	
SOIL WATER AT END OF YEAR	140.218	508992.562	

SNOW WATER AT START OF YEAR	1.050	3809.847	2.86
SNOW WATER AT END OF YEAR	0.670	2431.475	1.82
ANNUAL WATER BUDGET BALANCE	0.0000	-0.006	0.00

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.15	116704.492	100.00
RUNOFF	9.347	33930.262	29.07
EVAPOTRANSPIRATION	19.572	71046.578	60.88
PERC./LEAKAGE THROUGH LAYER 2	2.839852	10308.662	8.83
AVG. HEAD ON TOP OF LAYER 2	29.1399		
PERC./LEAKAGE THROUGH LAYER 5	2.958126	10737.997	9.20
AVG. HEAD ON TOP OF LAYER 4	0.0465		
CHANGE IN WATER STORAGE	0.273	989.654	0.85
SOIL WATER AT START OF YEAR	140.218	508992.562	
SOIL WATER AT END OF YEAR	140.034	508322.812	
SNOW WATER AT START OF YEAR	0.670	2431.475	2.08
SNOW WATER AT END OF YEAR	1.127	4090.898	3.51
ANNUAL WATER BUDGET BALANCE	0.0000	0.003	0.00

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ANNUAL TOTALS FOR YEAR 31

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.08	145490.406	100.00
RUNOFF	10.331	37501.199	25.78
EVAPOTRANSPIRATION	27.842	101065.211	69.47
PERC./LEAKAGE THROUGH LAYER 2	2.986124	10839.629	7.45

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AVG. HEAD ON TOP OF LAYER 2	31.4461		
PERC./LEAKAGE THROUGH LAYER 5	2.807561	10191.448	7.00
AVG. HEAD ON TOP OF LAYER 4	0.0438		
CHANGE IN WATER STORAGE	-0.900	-3267.436	-2.25
SOIL WATER AT START OF YEAR	140.034	508322.812	
SOIL WATER AT END OF YEAR	140.247	509097.312	
SNOW WATER AT START OF YEAR	1.127	4090.898	2.81
SNOW WATER AT END OF YEAR	0.013	48.952	0.03
ANNUAL WATER BUDGET BALANCE	0.0000	-0.015	0.00

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ANNUAL TOTALS FOR YEAR 32

	INCHES	CU. FEET	PERCENT
PRECIPITATION	33.17	120407.109	100.00
RUNOFF	9.775	35481.949	29.47
EVAPOTRANSPIRATION	20.324	73775.766	61.27
PERC./LEAKAGE THROUGH LAYER 2	2.951133	10712.613	8.90
AVG. HEAD ON TOP OF LAYER 2	30.7781		
PERC./LEAKAGE THROUGH LAYER 5	2.902695	10536.782	8.75
AVG. HEAD ON TOP OF LAYER 4	0.0454		
CHANGE IN WATER STORAGE	0.169	612.564	0.51
SOIL WATER AT START OF YEAR	140.247	509097.312	
SOIL WATER AT END OF YEAR	140.429	509758.812	
SNOW WATER AT START OF YEAR	0.013	48.952	0.04
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.046	0.00

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ANNUAL TOTALS FOR YEAR 33

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.09	160046.703	100.00
RUNOFF	15.498	56257.762	35.15
EVAPOTRANSPIRATION	22.916	83183.539	51.97
PERC./LEAKAGE THROUGH LAYER 2	2.973137	10792.487	6.74
AVG. HEAD ON TOP OF LAYER 2	31.2575		
PERC./LEAKAGE THROUGH LAYER 5	2.872928	10428.728	6.52
AVG. HEAD ON TOP OF LAYER 4	0.0450		
CHANGE IN WATER STORAGE	2.803	10176.673	6.36
SOIL WATER AT START OF YEAR	140.429	509758.812	
SOIL WATER AT END OF YEAR	140.339	509429.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.894	10506.239	6.56
ANNUAL WATER BUDGET BALANCE	0.0000	0.002	0.00

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ANNUAL TOTALS FOR YEAR 34

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.53	183423.891	100.00
RUNOFF	19.297	70049.102	38.19
EVAPOTRANSPIRATION	28.074	101908.469	55.56
PERC./LEAKAGE THROUGH LAYER 2	2.971627	10787.006	5.88
AVG. HEAD ON TOP OF LAYER 2	31.2183		
PERC./LEAKAGE THROUGH LAYER 5	2.948247	10702.137	5.83
AVG. HEAD ON TOP OF LAYER 4	0.0463		
CHANGE IN WATER STORAGE	0.211	764.185	0.42
SOIL WATER AT START OF YEAR	140.339	509429.250	
SOIL WATER AT END OF YEAR	140.549	510193.812	
SNOW WATER AT START OF YEAR	2.894	10506.239	5.73
SNOW WATER AT END OF YEAR	2.894	10505.885	5.73

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ANNUAL WATER BUDGET BALANCE	0.0000	0.005	0.00

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ANNUAL TOTALS FOR YEAR 35

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.59	136451.687	100.00
RUNOFF	15.292	55509.215	40.68
EVAPOTRANSPIRATION	22.421	81389.320	59.65
PERC./LEAKAGE THROUGH LAYER 2	2.891639	10496.648	7.69
AVG. HEAD ON TOP OF LAYER 2	29.9799		
PERC./LEAKAGE THROUGH LAYER 5	2.972867	10791.508	7.91
AVG. HEAD ON TOP OF LAYER 4	0.0467		
CHANGE IN WATER STORAGE	-3.096	-11238.354	-8.24
SOIL WATER AT START OF YEAR	140.549	510193.812	
SOIL WATER AT END OF YEAR	140.347	509461.312	
SNOW WATER AT START OF YEAR	2.894	10505.885	7.70
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

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ANNUAL TOTALS FOR YEAR 36

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.30	149919.016	100.00
RUNOFF	11.202	40663.930	27.12
EVAPOTRANSPIRATION	27.026	98103.437	65.44
PERC./LEAKAGE THROUGH LAYER 2	3.009168	10923.279	7.29
AVG. HEAD ON TOP OF LAYER 2	31.6948		
PERC./LEAKAGE THROUGH LAYER 5	2.915609	10583.661	7.06

AVG. HEAD ON TOP OF LAYER 4	0.0456		
CHANGE IN WATER STORAGE	0.156	567.963	0.38
SOIL WATER AT START OF YEAR	140.347	509461.312	
SOIL WATER AT END OF YEAR	140.504	510029.281	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.022	0.00

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ANNUAL TOTALS FOR YEAR 37

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.08	145490.375	100.00
RUNOFF	11.678	42391.977	29.14
EVAPOTRANSPIRATION	23.751	86215.664	59.26
PERC./LEAKAGE THROUGH LAYER 2	2.910854	10566.400	7.26
AVG. HEAD ON TOP OF LAYER 2	30.2740		
PERC./LEAKAGE THROUGH LAYER 5	2.966918	10769.914	7.40
AVG. HEAD ON TOP OF LAYER 4	0.0466		
CHANGE IN WATER STORAGE	1.684	6112.895	4.20
SOIL WATER AT START OF YEAR	140.504	510029.281	
SOIL WATER AT END OF YEAR	140.423	509733.719	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.765	6408.452	4.40
ANNUAL WATER BUDGET BALANCE	0.0000	-0.069	0.00

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ANNUAL TOTALS FOR YEAR 38

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.11	149229.328	100.00

RUNOFF	16.328	59270.270	39.72
EVAPOTRANSPIRATION	23.350	84761.078	56.80
PERC./LEAKAGE THROUGH LAYER 2	2.839828	10308.576	6.91
AVG. HEAD ON TOP OF LAYER 2	29.1655		
PERC./LEAKAGE THROUGH LAYER 5	3.016272	10949.065	7.34
AVG. HEAD ON TOP OF LAYER 4	0.0475		
CHANGE IN WATER STORAGE	-1.584	-5751.111	-3.85
SOIL WATER AT START OF YEAR	140.423	509733.719	
SOIL WATER AT END OF YEAR	140.157	508770.281	
SNOW WATER AT START OF YEAR	1.765	6408.452	4.29
SNOW WATER AT END OF YEAR	0.446	1620.784	1.09
ANNUAL WATER BUDGET BALANCE	0.0000	0.029	0.00

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ANNUAL TOTALS FOR YEAR 39

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.32	149991.594	100.00
RUNOFF	15.043	54606.934	36.41
EVAPOTRANSPIRATION	22.635	82166.328	54.78
PERC./LEAKAGE THROUGH LAYER 2	2.887347	10481.067	6.99
AVG. HEAD ON TOP OF LAYER 2	29.9185		
PERC./LEAKAGE THROUGH LAYER 5	2.897640	10518.435	7.01
AVG. HEAD ON TOP OF LAYER 4	0.0454		
CHANGE IN WATER STORAGE	0.744	2699.851	1.80
SOIL WATER AT START OF YEAR	140.157	508770.281	
SOIL WATER AT END OF YEAR	140.228	509027.531	
SNOW WATER AT START OF YEAR	0.446	1620.784	1.08
SNOW WATER AT END OF YEAR	1.119	4063.407	2.71
ANNUAL WATER BUDGET BALANCE	0.0000	0.049	0.00

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ANNUAL TOTALS FOR YEAR 40

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.71	125997.297	100.00
RUNOFF	12.865	46699.809	37.06
EVAPOTRANSPIRATION	20.862	75730.289	60.10
PERC./LEAKAGE THROUGH LAYER 2	2.858813	10377.492	8.24
AVG. HEAD ON TOP OF LAYER 2	29.3413		
PERC./LEAKAGE THROUGH LAYER 5	2.933057	10646.995	8.45
AVG. HEAD ON TOP OF LAYER 4	0.0459		
CHANGE IN WATER STORAGE	-1.950	-7079.748	-5.62
SOIL WATER AT START OF YEAR	140.228	509027.531	
SOIL WATER AT END OF YEAR	139.397	506011.187	
SNOW WATER AT START OF YEAR	1.119	4063.407	3.22
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.048	0.00

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ANNUAL TOTALS FOR YEAR 41

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.17	142187.078	100.00
RUNOFF	11.106	40315.523	28.35
EVAPOTRANSPIRATION	23.777	86309.477	60.70
PERC./LEAKAGE THROUGH LAYER 2	2.987747	10845.521	7.63
AVG. HEAD ON TOP OF LAYER 2	31.5117		
PERC./LEAKAGE THROUGH LAYER 5	2.829270	10270.249	7.22
AVG. HEAD ON TOP OF LAYER 4	0.0442		
CHANGE IN WATER STORAGE	1.458	5291.813	3.72

SOIL WATER AT START OF YEAR	139.397	506011.187	
SOIL WATER AT END OF YEAR	140.407	509676.625	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.448	1626.364	1.14
ANNUAL WATER BUDGET BALANCE	0.0000	0.020	0.00

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ANNUAL TOTALS FOR YEAR 42

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.88	159284.391	100.00
RUNOFF	18.159	65918.578	41.38
EVAPOTRANSPIRATION	23.540	85450.523	53.65
PERC./LEAKAGE THROUGH LAYER 2	2.913154	10574.749	6.64
AVG. HEAD ON TOP OF LAYER 2	30.3164		
PERC./LEAKAGE THROUGH LAYER 5	2.894777	10508.040	6.60
AVG. HEAD ON TOP OF LAYER 4	0.0454		
CHANGE IN WATER STORAGE	-0.714	-2592.743	-1.63
SOIL WATER AT START OF YEAR	140.407	509676.625	
SOIL WATER AT END OF YEAR	140.141	508710.250	
SNOW WATER AT START OF YEAR	0.448	1626.364	1.02
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

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ANNUAL TOTALS FOR YEAR 43

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.91	141243.297	100.00
RUNOFF	10.823	39288.555	27.82
EVAPOTRANSPIRATION	25.046	90916.570	64.37

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PERC./LEAKAGE THROUGH LAYER 2	2.923199	10611.214	7.51
AVG. HEAD ON TOP OF LAYER 2	30.4937		
PERC./LEAKAGE THROUGH LAYER 5	2.944610	10688.936	7.57
AVG. HEAD ON TOP OF LAYER 4	0.0463		
CHANGE IN WATER STORAGE	0.096	349.205	0.25
SOIL WATER AT START OF YEAR	140.141	508710.250	
SOIL WATER AT END OF YEAR	140.176	508837.531	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.061	221.920	0.16
ANNUAL WATER BUDGET BALANCE	0.0000	0.033	0.00

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ANNUAL TOTALS FOR YEAR 44

	INCHES	CU. FEET	PERCENT
PRECIPITATION	35.72	129663.602	100.00
RUNOFF	9.096	33020.148	25.47
EVAPOTRANSPIRATION	22.651	82222.250	63.41
PERC./LEAKAGE THROUGH LAYER 2	2.875142	10436.764	8.05
AVG. HEAD ON TOP OF LAYER 2	29.5966		
PERC./LEAKAGE THROUGH LAYER 5	2.951907	10715.421	8.26
AVG. HEAD ON TOP OF LAYER 4	0.0462		
CHANGE IN WATER STORAGE	1.021	3705.817	2.86
SOIL WATER AT START OF YEAR	140.176	508837.531	
SOIL WATER AT END OF YEAR	140.319	509357.250	
SNOW WATER AT START OF YEAR	0.061	221.920	0.17
SNOW WATER AT END OF YEAR	0.939	3408.019	2.63
ANNUAL WATER BUDGET BALANCE	0.0000	-0.029	0.00

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ANNUAL TOTALS FOR YEAR 45

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.94	115942.234	100.00
RUNOFF	7.148	25947.906	22.38
EVAPOTRANSPIRATION	22.907	83153.766	71.72
PERC./LEAKAGE THROUGH LAYER 2	2.906116	10549.199	9.10
AVG. HEAD ON TOP OF LAYER 2	30.2020		
PERC./LEAKAGE THROUGH LAYER 5	2.906937	10552.183	9.10
AVG. HEAD ON TOP OF LAYER 4	0.0456		
CHANGE IN WATER STORAGE	-1.023	-3711.719	-3.20
SOIL WATER AT START OF YEAR	140.319	509357.250	
SOIL WATER AT END OF YEAR	140.235	509053.562	
SNOW WATER AT START OF YEAR	0.939	3408.019	2.94
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.101	0.00

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ANNUAL TOTALS FOR YEAR 46

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.01	145236.297	100.00
RUNOFF	12.483	45315.016	31.20
EVAPOTRANSPIRATION	24.953	90579.195	62.37
PERC./LEAKAGE THROUGH LAYER 2	2.951135	10712.621	7.38
AVG. HEAD ON TOP OF LAYER 2	30.9101		
PERC./LEAKAGE THROUGH LAYER 5	2.857502	10372.733	7.14
AVG. HEAD ON TOP OF LAYER 4	0.0447		
CHANGE IN WATER STORAGE	-0.284	-1030.631	-0.71
SOIL WATER AT START OF YEAR	140.235	509053.562	
SOIL WATER AT END OF YEAR	139.951	508022.906	

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SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.018	0.00

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ANNUAL TOTALS FOR YEAR 47

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.32	149991.609	100.00
RUNOFF	14.583	52936.230	35.29
EVAPOTRANSPIRATION	23.442	85095.922	56.73
PERC./LEAKAGE THROUGH LAYER 2	2.942301	10680.554	7.12
AVG. HEAD ON TOP OF LAYER 2	30.7720		
PERC./LEAKAGE THROUGH LAYER 5	2.904581	10543.629	7.03
AVG. HEAD ON TOP OF LAYER 4	0.0455		
CHANGE IN WATER STORAGE	0.390	1415.850	0.94
SOIL WATER AT START OF YEAR	139.951	508022.906	
SOIL WATER AT END OF YEAR	140.030	508308.844	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.311	1129.930	0.75
ANNUAL WATER BUDGET BALANCE	0.0000	-0.017	0.00

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ANNUAL TOTALS FOR YEAR 48

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.29	135362.719	100.00
RUNOFF	10.084	36604.727	27.04
EVAPOTRANSPIRATION	23.479	85227.352	62.96
PERC./LEAKAGE THROUGH LAYER 2	2.940601	10674.380	7.89
AVG. HEAD ON TOP OF LAYER 2	30.6292		

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PERC./LEAKAGE THROUGH LAYER 5	2.942794	10682.341	7.89
AVG. HEAD ON TOP OF LAYER 4	0.0461		
CHANGE IN WATER STORAGE	0.785	2848.260	2.10
SOIL WATER AT START OF YEAR	140.030	508308.844	
SOIL WATER AT END OF YEAR	140.455	509852.750	
SNOW WATER AT START OF YEAR	0.311	1129.930	0.83
SNOW WATER AT END OF YEAR	0.671	2434.265	1.80
ANNUAL WATER BUDGET BALANCE	0.0000	0.041	0.00

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ANNUAL TOTALS FOR YEAR 49

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.02	138012.609	100.00
RUNOFF	10.093	36639.168	26.55
EVAPOTRANSPIRATION	26.001	94383.047	68.39
PERC./LEAKAGE THROUGH LAYER 2	2.945121	10690.788	7.75
AVG. HEAD ON TOP OF LAYER 2	30.8105		
PERC./LEAKAGE THROUGH LAYER 5	2.922953	10610.319	7.69
AVG. HEAD ON TOP OF LAYER 4	0.0459		
CHANGE IN WATER STORAGE	-0.997	-3619.931	-2.62
SOIL WATER AT START OF YEAR	140.455	509852.750	
SOIL WATER AT END OF YEAR	140.129	508667.094	
SNOW WATER AT START OF YEAR	0.671	2434.265	1.76
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.001	0.00

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ANNUAL TOTALS FOR YEAR 50

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.29	153512.672	100.00
RUNOFF	15.182	55109.699	35.90
EVAPOTRANSPIRATION	22.468	81558.594	53.13
PERC./LEAKAGE THROUGH LAYER 2	2.948253	10702.157	6.97
AVG. HEAD ON TOP OF LAYER 2	30.8602		
PERC./LEAKAGE THROUGH LAYER 5	2.933469	10648.491	6.94
AVG. HEAD ON TOP OF LAYER 4	0.0460		
CHANGE IN WATER STORAGE	1.707	6195.902	4.04
SOIL WATER AT START OF YEAR	140.129	508667.094	
SOIL WATER AT END OF YEAR	140.492	509986.906	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.343	4876.084	3.18
ANNUAL WATER BUDGET BALANCE	0.0000	-0.008	0.00

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ANNUAL TOTALS FOR YEAR 51

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.69	151334.703	100.00
RUNOFF	12.910	46865.105	30.97
EVAPOTRANSPIRATION	27.228	98836.852	65.31
PERC./LEAKAGE THROUGH LAYER 2	2.894984	10508.791	6.94
AVG. HEAD ON TOP OF LAYER 2	30.0206		
PERC./LEAKAGE THROUGH LAYER 5	2.959051	10741.354	7.10
AVG. HEAD ON TOP OF LAYER 4	0.0465		
CHANGE IN WATER STORAGE	-1.407	-5108.664	-3.38
SOIL WATER AT START OF YEAR	140.492	509986.906	
SOIL WATER AT END OF YEAR	140.428	509754.344	
SNOW WATER AT START OF YEAR	1.343	4876.084	3.22
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	0.059	0.00

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ANNUAL TOTALS FOR YEAR 52

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.42	161244.656	100.00
RUNOFF	16.488	59849.629	37.12
EVAPOTRANSPIRATION	24.692	89632.281	55.59
PERC./LEAKAGE THROUGH LAYER 2	2.967976	10773.754	6.68
AVG. HEAD ON TOP OF LAYER 2	31.0607		
PERC./LEAKAGE THROUGH LAYER 5	2.934898	10653.681	6.61
AVG. HEAD ON TOP OF LAYER 4	0.0459		
CHANGE IN WATER STORAGE	0.306	1109.086	0.69
SOIL WATER AT START OF YEAR	140.428	509754.344	
SOIL WATER AT END OF YEAR	140.453	509844.719	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.281	1018.691	0.63
ANNUAL WATER BUDGET BALANCE	0.0000	-0.031	0.00

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ANNUAL TOTALS FOR YEAR 53

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.86	133801.781	100.00
RUNOFF	14.377	52189.898	39.01
EVAPOTRANSPIRATION	20.254	73523.023	54.95
PERC./LEAKAGE THROUGH LAYER 2	2.880142	10454.915	7.81
AVG. HEAD ON TOP OF LAYER 2	29.8047		
PERC./LEAKAGE THROUGH LAYER 5	2.940653	10674.569	7.98
AVG. HEAD ON TOP OF LAYER 4	0.0462		

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CHANGE IN WATER STORAGE	-0.712	-2585.692	-1.93
SOIL WATER AT START OF YEAR	140.453	509844.719	
SOIL WATER AT END OF YEAR	139.567	506629.937	
SNOW WATER AT START OF YEAR	0.281	1018.691	0.76
SNOW WATER AT END OF YEAR	0.454	1647.800	1.23
ANNUAL WATER BUDGET BALANCE	0.0000	-0.010	0.00

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ANNUAL TOTALS FOR YEAR 54

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.09	123746.687	100.00
RUNOFF	6.972	25308.742	20.45
EVAPOTRANSPIRATION	24.294	88187.891	71.26
PERC./LEAKAGE THROUGH LAYER 2	2.887208	10480.565	8.47
AVG. HEAD ON TOP OF LAYER 2	29.9231		
PERC./LEAKAGE THROUGH LAYER 5	2.932053	10643.352	8.60
AVG. HEAD ON TOP OF LAYER 4	0.0460		
CHANGE IN WATER STORAGE	-0.108	-393.261	-0.32
SOIL WATER AT START OF YEAR	139.567	506629.937	
SOIL WATER AT END OF YEAR	139.895	507819.875	
SNOW WATER AT START OF YEAR	0.454	1647.800	1.33
SNOW WATER AT END OF YEAR	0.018	64.609	0.05
ANNUAL WATER BUDGET BALANCE	0.0000	-0.040	0.00

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ANNUAL TOTALS FOR YEAR 55

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.22	153258.578	100.00

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RUNOFF	16.094	58420.086	38.12
EVAPOTRANSPIRATION	22.771	82658.844	53.93
PERC./LEAKAGE THROUGH LAYER 2	2.912431	10572.125	6.90
AVG. HEAD ON TOP OF LAYER 2	30.2833		
PERC./LEAKAGE THROUGH LAYER 5	2.924783	10616.961	6.93
AVG. HEAD ON TOP OF LAYER 4	0.0459		
CHANGE IN WATER STORAGE	0.430	1562.677	1.02
SOIL WATER AT START OF YEAR	139.895	507819.875	
SOIL WATER AT END OF YEAR	140.344	509447.156	
SNOW WATER AT START OF YEAR	0.018	64.609	0.04
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.015	0.00

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ANNUAL TOTALS FOR YEAR 56

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.78	162551.375	100.00
RUNOFF	19.218	69759.586	42.92
EVAPOTRANSPIRATION	22.453	81505.578	50.14
PERC./LEAKAGE THROUGH LAYER 2	2.960515	10746.670	6.61
AVG. HEAD ON TOP OF LAYER 2	30.9286		
PERC./LEAKAGE THROUGH LAYER 5	2.886071	10476.437	6.45
AVG. HEAD ON TOP OF LAYER 4	0.0451		
CHANGE IN WATER STORAGE	0.223	809.805	0.50
SOIL WATER AT START OF YEAR	140.344	509447.156	
SOIL WATER AT END OF YEAR	140.378	509573.094	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.188	683.849	0.42
ANNUAL WATER BUDGET BALANCE	0.0000	-0.028	0.00

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ANNUAL TOTALS FOR YEAR 57

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.04	141715.234	100.00
RUNOFF	14.704	53377.020	37.66
EVAPOTRANSPIRATION	21.721	78848.445	55.64
PERC./LEAKAGE THROUGH LAYER 2	2.906587	10550.910	7.45
AVG. HEAD ON TOP OF LAYER 2	30.2178		
PERC./LEAKAGE THROUGH LAYER 5	2.929231	10633.110	7.50
AVG. HEAD ON TOP OF LAYER 4	0.0460		
CHANGE IN WATER STORAGE	-0.315	-1143.360	-0.81
SOIL WATER AT START OF YEAR	140.378	509573.094	
SOIL WATER AT END OF YEAR	140.252	509113.594	
SNOW WATER AT START OF YEAR	0.188	683.849	0.48
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.016	0.00

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ANNUAL TOTALS FOR YEAR 58

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.71	176817.281	100.00
RUNOFF	22.360	81167.922	45.90
EVAPOTRANSPIRATION	23.264	84446.852	47.76
PERC./LEAKAGE THROUGH LAYER 2	2.946118	10694.409	6.05
AVG. HEAD ON TOP OF LAYER 2	30.8275		
PERC./LEAKAGE THROUGH LAYER 5	2.887171	10480.432	5.93
AVG. HEAD ON TOP OF LAYER 4	0.0452		
CHANGE IN WATER STORAGE	0.199	722.170	0.41
SOIL WATER AT START OF YEAR	140.252	509113.594	

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SOIL WATER AT END OF YEAR	140.378	509573.281	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.072	262.493	0.15
ANNUAL WATER BUDGET BALANCE	0.0000	-0.094	0.00

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ANNUAL TOTALS FOR YEAR 59

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.52	176127.578	100.00
RUNOFF	17.335	62926.273	35.73
EVAPOTRANSPIRATION	27.816	100972.656	57.33
PERC./LEAKAGE THROUGH LAYER 2	2.947793	10700.488	6.08
AVG. HEAD ON TOP OF LAYER 2	30.8549		
PERC./LEAKAGE THROUGH LAYER 5	2.902655	10536.638	5.98
AVG. HEAD ON TOP OF LAYER 4	0.0455		
CHANGE IN WATER STORAGE	0.466	1692.006	0.96
SOIL WATER AT START OF YEAR	140.378	509573.281	
SOIL WATER AT END OF YEAR	140.469	509903.344	
SNOW WATER AT START OF YEAR	0.072	262.493	0.15
SNOW WATER AT END OF YEAR	0.448	1624.434	0.92
ANNUAL WATER BUDGET BALANCE	0.0000	0.001	0.00

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ANNUAL TOTALS FOR YEAR 60

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.33	164547.906	100.00
RUNOFF	15.670	56883.770	34.57
EVAPOTRANSPIRATION	27.322	99177.508	60.27

PERC./LEAKAGE THROUGH LAYER 2	3.004945	10907.949	6.63
AVG. HEAD ON TOP OF LAYER 2	31.6342		
PERC./LEAKAGE THROUGH LAYER 5	2.915721	10584.066	6.43
AVG. HEAD ON TOP OF LAYER 4	0.0456		
CHANGE IN WATER STORAGE	-0.578	-2097.404	-1.27
SOIL WATER AT START OF YEAR	140.469	509903.344	
SOIL WATER AT END OF YEAR	140.339	509430.375	
SNOW WATER AT START OF YEAR	0.448	1624.434	0.99
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.029	0.00

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ANNUAL TOTALS FOR YEAR 61

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.36	164656.828	100.00
RUNOFF	12.077	43838.273	26.62
EVAPOTRANSPIRATION	30.255	109826.562	66.70
PERC./LEAKAGE THROUGH LAYER 2	2.934951	10653.871	6.47
AVG. HEAD ON TOP OF LAYER 2	30.6605		
PERC./LEAKAGE THROUGH LAYER 5	2.961194	10749.133	6.53
AVG. HEAD ON TOP OF LAYER 4	0.0465		
CHANGE IN WATER STORAGE	0.067	242.827	0.15
SOIL WATER AT START OF YEAR	140.339	509430.375	
SOIL WATER AT END OF YEAR	140.406	509673.187	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.036	0.00

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ANNUAL TOTALS FOR YEAR 62

	INCHES	CU. FEET	PERCENT
PRECIPITATION	29.57	107339.133	100.00
RUNOFF	7.490	27187.506	25.33
EVAPOTRANSPIRATION	19.360	70278.250	65.47
PERC./LEAKAGE THROUGH LAYER 2	2.812814	10210.516	9.51
AVG. HEAD ON TOP OF LAYER 2	28.7274		
PERC./LEAKAGE THROUGH LAYER 5	3.046052	11057.168	10.30
AVG. HEAD ON TOP OF LAYER 4	0.0480		
CHANGE IN WATER STORAGE	-0.326	-1183.838	-1.10
SOIL WATER AT START OF YEAR	140.406	509673.187	
SOIL WATER AT END OF YEAR	140.080	508489.344	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.048	0.00

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ANNUAL TOTALS FOR YEAR 63

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.07	141824.094	100.00
RUNOFF	14.084	51123.758	36.05
EVAPOTRANSPIRATION	21.813	79180.766	55.83
PERC./LEAKAGE THROUGH LAYER 2	2.912035	10570.688	7.45
AVG. HEAD ON TOP OF LAYER 2	30.2805		
PERC./LEAKAGE THROUGH LAYER 5	2.900635	10529.305	7.42
AVG. HEAD ON TOP OF LAYER 4	0.0455		
CHANGE IN WATER STORAGE	0.273	990.245	0.70
SOIL WATER AT START OF YEAR	140.080	508489.344	
SOIL WATER AT END OF YEAR	140.315	509342.562	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.038	137.026	0.10
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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ANNUAL TOTALS FOR YEAR 64

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.03	152568.828	100.00
RUNOFF	8.778	31862.879	20.88
EVAPOTRANSPIRATION	27.787	100868.320	66.11
PERC./LEAKAGE THROUGH LAYER 2	2.924899	10617.383	6.96
AVG. HEAD ON TOP OF LAYER 2	30.3892		
PERC./LEAKAGE THROUGH LAYER 5	2.877441	10445.109	6.85
AVG. HEAD ON TOP OF LAYER 4	0.0449		
CHANGE IN WATER STORAGE	2.587	9392.606	6.16
SOIL WATER AT START OF YEAR	140.315	509342.562	
SOIL WATER AT END OF YEAR	140.180	508853.375	
SNOW WATER AT START OF YEAR	0.038	137.026	0.09
SNOW WATER AT END OF YEAR	2.760	10018.832	6.57
ANNUAL WATER BUDGET BALANCE	0.0000	-0.091	0.00

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ANNUAL TOTALS FOR YEAR 65

	INCHES	CU. FEET	PERCENT
PRECIPITATION	35.34	128284.203	100.00
RUNOFF	9.040	32816.840	25.58
EVAPOTRANSPIRATION	25.262	91700.289	71.48
PERC./LEAKAGE THROUGH LAYER 2	2.923834	10613.518	8.27
AVG. HEAD ON TOP OF LAYER 2	30.4732		

PERC./LEAKAGE THROUGH LAYER 5	2.911888	10570.152	8.24
AVG. HEAD ON TOP OF LAYER 4	0.0457		
CHANGE IN WATER STORAGE	-1.874	-6803.030	-5.30
SOIL WATER AT START OF YEAR	140.180	508853.375	
SOIL WATER AT END OF YEAR	140.243	509082.844	
SNOW WATER AT START OF YEAR	2.760	10018.832	7.81
SNOW WATER AT END OF YEAR	0.823	2986.324	2.33
ANNUAL WATER BUDGET BALANCE	0.0000	-0.050	0.00

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ANNUAL TOTALS FOR YEAR 66

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.30	124509.039	100.00
RUNOFF	10.975	39839.266	32.00
EVAPOTRANSPIRATION	21.269	77205.805	62.01
PERC./LEAKAGE THROUGH LAYER 2	2.846421	10332.508	8.30
AVG. HEAD ON TOP OF LAYER 2	29.2688		
PERC./LEAKAGE THROUGH LAYER 5	2.950057	10708.706	8.60
AVG. HEAD ON TOP OF LAYER 4	0.0463		
CHANGE IN WATER STORAGE	-0.894	-3244.771	-2.61
SOIL WATER AT START OF YEAR	140.243	509082.844	
SOIL WATER AT END OF YEAR	140.172	508824.406	
SNOW WATER AT START OF YEAR	0.823	2986.324	2.40
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.035	0.00

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ANNUAL TOTALS FOR YEAR 67

	INCHES	CU. FEET	PERCENT

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PRECIPITATION	41.94	152242.234	100.00
RUNOFF	11.379	41307.504	27.13
EVAPOTRANSPIRATION	27.072	98270.867	64.55
PERC./LEAKAGE THROUGH LAYER 2	2.931018	10639.595	6.99
AVG. HEAD ON TOP OF LAYER 2	30.6077		
PERC./LEAKAGE THROUGH LAYER 5	2.865418	10401.467	6.83
AVG. HEAD ON TOP OF LAYER 4	0.0448		
CHANGE IN WATER STORAGE	0.623	2262.368	1.49
SOIL WATER AT START OF YEAR	140.172	508824.406	
SOIL WATER AT END OF YEAR	140.154	508759.281	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.641	2327.506	1.53
ANNUAL WATER BUDGET BALANCE	0.0000	0.035	0.00

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ANNUAL TOTALS FOR YEAR 68

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.28	113546.414	100.00
RUNOFF	9.567	34727.512	30.58
EVAPOTRANSPIRATION	18.877	68522.664	60.35
PERC./LEAKAGE THROUGH LAYER 2	2.854515	10361.891	9.13
AVG. HEAD ON TOP OF LAYER 2	29.2687		
PERC./LEAKAGE THROUGH LAYER 5	2.974133	10796.104	9.51
AVG. HEAD ON TOP OF LAYER 4	0.0466		
CHANGE IN WATER STORAGE	-0.138	-499.879	-0.44
SOIL WATER AT START OF YEAR	140.154	508759.281	
SOIL WATER AT END OF YEAR	140.088	508518.937	
SNOW WATER AT START OF YEAR	0.641	2327.506	2.05
SNOW WATER AT END OF YEAR	0.570	2067.961	1.82
ANNUAL WATER BUDGET BALANCE	0.0000	0.017	0.00

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ANNUAL TOTALS FOR YEAR 69

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.29	135362.719	100.00
RUNOFF	10.340	37535.738	27.73
EVAPOTRANSPIRATION	23.542	85458.187	63.13
PERC./LEAKAGE THROUGH LAYER 2	2.871667	10424.150	7.70
AVG. HEAD ON TOP OF LAYER 2	29.6539		
PERC./LEAKAGE THROUGH LAYER 5	2.894984	10508.794	7.76
AVG. HEAD ON TOP OF LAYER 4	0.0454		
CHANGE IN WATER STORAGE	0.512	1860.057	1.37
SOIL WATER AT START OF YEAR	140.088	508518.937	
SOIL WATER AT END OF YEAR	139.868	507722.219	
SNOW WATER AT START OF YEAR	0.570	2067.961	1.53
SNOW WATER AT END OF YEAR	1.302	4724.739	3.49
ANNUAL WATER BUDGET BALANCE	0.0000	-0.057	0.00

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ANNUAL TOTALS FOR YEAR 70

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.63	176526.922	100.00
RUNOFF	20.728	75243.742	42.62
EVAPOTRANSPIRATION	24.013	87165.461	49.38
PERC./LEAKAGE THROUGH LAYER 2	2.982357	10825.955	6.13
AVG. HEAD ON TOP OF LAYER 2	31.4128		
PERC./LEAKAGE THROUGH LAYER 5	2.800123	10164.445	5.76
AVG. HEAD ON TOP OF LAYER 4	0.0437		

CHANGE IN WATER STORAGE	1.089	3953.214	2.24
SOIL WATER AT START OF YEAR	139.868	507722.219	
SOIL WATER AT END OF YEAR	140.271	509185.312	
SNOW WATER AT START OF YEAR	1.302	4724.739	2.68
SNOW WATER AT END OF YEAR	1.988	7214.842	4.09
ANNUAL WATER BUDGET BALANCE	0.0000	0.054	0.00

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ANNUAL TOTALS FOR YEAR 71

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.75	126142.531	100.00
RUNOFF	8.463	30719.400	24.35
EVAPOTRANSPIRATION	24.982	90685.039	71.89
PERC./LEAKAGE THROUGH LAYER 2	2.924197	10614.836	8.41
AVG. HEAD ON TOP OF LAYER 2	30.4728		
PERC./LEAKAGE THROUGH LAYER 5	2.915056	10581.651	8.39
AVG. HEAD ON TOP OF LAYER 4	0.0457		
CHANGE IN WATER STORAGE	-1.610	-5843.555	-4.63
SOIL WATER AT START OF YEAR	140.271	509185.312	
SOIL WATER AT END OF YEAR	140.386	509602.750	
SNOW WATER AT START OF YEAR	1.988	7214.842	5.72
SNOW WATER AT END OF YEAR	0.263	953.873	0.76
ANNUAL WATER BUDGET BALANCE	0.0000	-0.011	0.00

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ANNUAL TOTALS FOR YEAR 72

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.03	174348.891	100.00
RUNOFF	15.580	56556.039	32.44

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EVAPOTRANSPIRATION	29.629	107553.273	61.69
PERC./LEAKAGE THROUGH LAYER 2	2.912525	10572.467	6.06
AVG. HEAD ON TOP OF LAYER 2	30.1839		
PERC./LEAKAGE THROUGH LAYER 5	2.922355	10608.148	6.08
AVG. HEAD ON TOP OF LAYER 4	0.0457		
CHANGE IN WATER STORAGE	-0.102	-368.598	-0.21
SOIL WATER AT START OF YEAR	140.386	509602.750	
SOIL WATER AT END OF YEAR	140.267	509169.750	
SNOW WATER AT START OF YEAR	0.263	953.873	0.55
SNOW WATER AT END OF YEAR	0.281	1018.254	0.58
ANNUAL WATER BUDGET BALANCE	0.0000	0.029	0.00

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ANNUAL TOTALS FOR YEAR 73

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.55	132676.469	100.00
RUNOFF	11.626	42202.758	31.81
EVAPOTRANSPIRATION	22.225	80677.359	60.81
PERC./LEAKAGE THROUGH LAYER 2	2.885559	10474.579	7.89
AVG. HEAD ON TOP OF LAYER 2	29.8847		
PERC./LEAKAGE THROUGH LAYER 5	2.959599	10743.343	8.10
AVG. HEAD ON TOP OF LAYER 4	0.0465		
CHANGE IN WATER STORAGE	-0.261	-946.968	-0.71
SOIL WATER AT START OF YEAR	140.267	509169.750	
SOIL WATER AT END OF YEAR	140.287	509241.031	
SNOW WATER AT START OF YEAR	0.281	1018.254	0.77
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.025	0.00

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ANNUAL TOTALS FOR YEAR 74

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.70	162261.016	100.00
RUNOFF	13.635	49495.664	30.50
EVAPOTRANSPIRATION	26.872	97544.023	60.12
PERC./LEAKAGE THROUGH LAYER 2	2.965667	10765.370	6.63
AVG. HEAD ON TOP OF LAYER 2	31.1310		
PERC./LEAKAGE THROUGH LAYER 5	2.850212	10346.270	6.38
AVG. HEAD ON TOP OF LAYER 4	0.0446		
CHANGE IN WATER STORAGE	1.343	4875.018	3.00
SOIL WATER AT START OF YEAR	140.287	509241.031	
SOIL WATER AT END OF YEAR	140.441	509801.812	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.189	4314.255	2.66
ANNUAL WATER BUDGET BALANCE	0.0000	0.043	0.00

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ANNUAL TOTALS FOR YEAR 75

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.26	153403.750	100.00
RUNOFF	14.725	53451.289	34.84
EVAPOTRANSPIRATION	26.159	94957.789	61.90
PERC./LEAKAGE THROUGH LAYER 2	2.975757	10801.999	7.04
AVG. HEAD ON TOP OF LAYER 2	31.2968		
PERC./LEAKAGE THROUGH LAYER 5	2.903312	10539.024	6.87
AVG. HEAD ON TOP OF LAYER 4	0.0455		
CHANGE IN WATER STORAGE	-1.527	-5544.233	-3.61
SOIL WATER AT START OF YEAR	140.441	509801.812	

SOIL WATER AT END OF YEAR	140.102	508571.844	
SNOW WATER AT START OF YEAR	1.189	4314.255	2.81
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.118	0.00

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ANNUAL TOTALS FOR YEAR 76

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.54	168940.203	100.00
RUNOFF	16.959	61560.586	36.44
EVAPOTRANSPIRATION	25.228	91577.375	54.21
PERC./LEAKAGE THROUGH LAYER 2	3.004861	10907.646	6.46
AVG. HEAD ON TOP OF LAYER 2	31.6247		
PERC./LEAKAGE THROUGH LAYER 5	2.927335	10626.227	6.29
AVG. HEAD ON TOP OF LAYER 4	0.0458		
CHANGE IN WATER STORAGE	1.426	5176.003	3.06
SOIL WATER AT START OF YEAR	140.102	508571.844	
SOIL WATER AT END OF YEAR	140.576	510290.406	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.952	3457.436	2.05
ANNUAL WATER BUDGET BALANCE	0.0000	0.014	0.00

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ANNUAL TOTALS FOR YEAR 77

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.15	171154.484	100.00
RUNOFF	14.573	52898.375	30.91
EVAPOTRANSPIRATION	30.530	110822.820	64.75
PERC./LEAKAGE THROUGH LAYER 2	2.984121	10832.357	6.33

AVG. HEAD ON TOP OF LAYER 2	31.4348		
PERC./LEAKAGE THROUGH LAYER 5	2.953479	10721.130	6.26
AVG. HEAD ON TOP OF LAYER 4	0.0464		
CHANGE IN WATER STORAGE	-0.906	-3287.778	-1.92
SOIL WATER AT START OF YEAR	140.576	510290.406	
SOIL WATER AT END OF YEAR	140.623	510460.062	
SNOW WATER AT START OF YEAR	0.952	3457.436	2.02
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.059	0.00

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ANNUAL TOTALS FOR YEAR 78

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.56	139972.812	100.00
RUNOFF	11.446	41547.770	29.68
EVAPOTRANSPIRATION	22.547	81846.531	58.47
PERC./LEAKAGE THROUGH LAYER 2	2.928321	10629.805	7.59
AVG. HEAD ON TOP OF LAYER 2	30.5479		
PERC./LEAKAGE THROUGH LAYER 5	2.999163	10886.963	7.78
AVG. HEAD ON TOP OF LAYER 4	0.0472		
CHANGE IN WATER STORAGE	1.568	5691.529	4.07
SOIL WATER AT START OF YEAR	140.623	510460.062	
SOIL WATER AT END OF YEAR	140.476	509927.750	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.715	6223.821	4.45
ANNUAL WATER BUDGET BALANCE	0.0000	0.010	0.00

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ANNUAL TOTALS FOR YEAR 79

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.89	126650.727	100.00
RUNOFF	14.076	51095.484	40.34
EVAPOTRANSPIRATION	19.850	72055.391	56.89
PERC./LEAKAGE THROUGH LAYER 2	2.837978	10301.858	8.13
AVG. HEAD ON TOP OF LAYER 2	29.1431		
PERC./LEAKAGE THROUGH LAYER 5	3.013328	10938.381	8.64
AVG. HEAD ON TOP OF LAYER 4	0.0474		
CHANGE IN WATER STORAGE	-2.049	-7438.622	-5.87
SOIL WATER AT START OF YEAR	140.476	509927.750	
SOIL WATER AT END OF YEAR	140.141	508712.969	
SNOW WATER AT START OF YEAR	1.715	6223.821	4.91
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.093	0.00

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ANNUAL TOTALS FOR YEAR 80

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.38	190139.391	100.00
RUNOFF	17.456	63364.273	33.33
EVAPOTRANSPIRATION	30.619	111148.578	58.46
PERC./LEAKAGE THROUGH LAYER 2	2.960054	10744.995	5.65
AVG. HEAD ON TOP OF LAYER 2	30.9126		
PERC./LEAKAGE THROUGH LAYER 5	2.885147	10473.085	5.51
AVG. HEAD ON TOP OF LAYER 4	0.0451		
CHANGE IN WATER STORAGE	1.420	5153.489	2.71
SOIL WATER AT START OF YEAR	140.141	508712.969	
SOIL WATER AT END OF YEAR	140.310	509327.062	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	1.251	4539.387	2.39
ANNUAL WATER BUDGET BALANCE	0.0000	-0.039	0.00

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ANNUAL TOTALS FOR YEAR 81

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.28	142586.391	100.00
RUNOFF	10.727	38938.684	27.31
EVAPOTRANSPIRATION	21.344	77476.969	54.34
PERC./LEAKAGE THROUGH LAYER 2	2.887737	10482.485	7.35
AVG. HEAD ON TOP OF LAYER 2	29.9160		
PERC./LEAKAGE THROUGH LAYER 5	2.963518	10757.571	7.54
AVG. HEAD ON TOP OF LAYER 4	0.0466		
CHANGE IN WATER STORAGE	4.246	15413.197	10.81
SOIL WATER AT START OF YEAR	140.310	509327.062	
SOIL WATER AT END OF YEAR	140.304	509304.969	
SNOW WATER AT START OF YEAR	1.251	4539.387	3.18
SNOW WATER AT END OF YEAR	5.503	19974.684	14.01
ANNUAL WATER BUDGET BALANCE	0.0000	-0.026	0.00

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ANNUAL TOTALS FOR YEAR 82

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.41	139428.297	100.00
RUNOFF	21.648	78580.445	56.36
EVAPOTRANSPIRATION	19.860	72090.742	51.70
PERC./LEAKAGE THROUGH LAYER 2	2.910541	10565.263	7.58
AVG. HEAD ON TOP OF LAYER 2	30.2668		
PERC./LEAKAGE THROUGH LAYER 5	2.902496	10536.061	7.56

AVG. HEAD ON TOP OF LAYER 4	0.0455		
CHANGE IN WATER STORAGE	-6.000	-21778.969	-15.62
SOIL WATER AT START OF YEAR	140.304	509304.969	
SOIL WATER AT END OF YEAR	139.755	507311.875	
SNOW WATER AT START OF YEAR	5.503	19974.684	14.33
SNOW WATER AT END OF YEAR	0.052	188.793	0.14
ANNUAL WATER BUDGET BALANCE	0.0000	0.022	0.00

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ANNUAL TOTALS FOR YEAR 83

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.11	163749.281	100.00
RUNOFF	16.112	58486.676	35.72
EVAPOTRANSPIRATION	25.501	92568.406	56.53
PERC./LEAKAGE THROUGH LAYER 2	2.929774	10635.079	6.49
AVG. HEAD ON TOP OF LAYER 2	30.5693		
PERC./LEAKAGE THROUGH LAYER 5	2.905955	10548.617	6.44
AVG. HEAD ON TOP OF LAYER 4	0.0456		
CHANGE IN WATER STORAGE	0.591	2145.594	1.31
SOIL WATER AT START OF YEAR	139.755	507311.875	
SOIL WATER AT END OF YEAR	140.398	509646.281	
SNOW WATER AT START OF YEAR	0.052	188.793	0.12
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

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ANNUAL TOTALS FOR YEAR 84

	INCHES	CU. FEET	PERCENT

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PRECIPITATION	40.69	147704.703	100.00
RUNOFF	16.861	61206.910	41.44
EVAPOTRANSPIRATION	20.878	75788.281	51.31
PERC./LEAKAGE THROUGH LAYER 2	2.929846	10635.340	7.20
AVG. HEAD ON TOP OF LAYER 2	30.4576		
PERC./LEAKAGE THROUGH LAYER 5	2.927456	10626.664	7.19
AVG. HEAD ON TOP OF LAYER 4	0.0458		
CHANGE IN WATER STORAGE	0.023	82.914	0.06
SOIL WATER AT START OF YEAR	140.398	509646.281	
SOIL WATER AT END OF YEAR	140.410	509687.531	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.011	41.649	0.03
ANNUAL WATER BUDGET BALANCE	0.0000	-0.065	0.00

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ANNUAL TOTALS FOR YEAR 85

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.61	143784.297	100.00
RUNOFF	13.223	47999.535	33.38
EVAPOTRANSPIRATION	22.560	81894.211	56.96
PERC./LEAKAGE THROUGH LAYER 2	2.966126	10767.037	7.49
AVG. HEAD ON TOP OF LAYER 2	31.1424		
PERC./LEAKAGE THROUGH LAYER 5	2.891983	10497.897	7.30
AVG. HEAD ON TOP OF LAYER 4	0.0453		
CHANGE IN WATER STORAGE	0.935	3392.650	2.36
SOIL WATER AT START OF YEAR	140.410	509687.531	
SOIL WATER AT END OF YEAR	140.464	509883.844	
SNOW WATER AT START OF YEAR	0.011	41.649	0.03
SNOW WATER AT END OF YEAR	0.892	3238.000	2.25
ANNUAL WATER BUDGET BALANCE	0.0000	0.010	0.00

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ANNUAL TOTALS FOR YEAR 86

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.64	136633.219	100.00
RUNOFF	13.913	50505.805	36.96
EVAPOTRANSPIRATION	21.127	76692.133	56.13
PERC./LEAKAGE THROUGH LAYER 2	2.893009	10501.622	7.69
AVG. HEAD ON TOP OF LAYER 2	30.0047		
PERC./LEAKAGE THROUGH LAYER 5	2.940020	10672.271	7.81
AVG. HEAD ON TOP OF LAYER 4	0.0462		
CHANGE IN WATER STORAGE	-0.341	-1236.987	-0.91
SOIL WATER AT START OF YEAR	140.464	509883.844	
SOIL WATER AT END OF YEAR	140.327	509386.219	
SNOW WATER AT START OF YEAR	0.892	3238.000	2.37
SNOW WATER AT END OF YEAR	0.688	2498.631	1.83
ANNUAL WATER BUDGET BALANCE	0.0000	0.003	0.00

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ANNUAL TOTALS FOR YEAR 87

	INCHES	CU. FEET	PERCENT
PRECIPITATION	28.33	102837.891	100.00
RUNOFF	4.876	17698.588	17.21
EVAPOTRANSPIRATION	21.975	79770.617	77.57
PERC./LEAKAGE THROUGH LAYER 2	2.835896	10294.303	10.01
AVG. HEAD ON TOP OF LAYER 2	29.0954		
PERC./LEAKAGE THROUGH LAYER 5	2.964024	10759.406	10.46
AVG. HEAD ON TOP OF LAYER 4	0.0466		
CHANGE IN WATER STORAGE	-1.485	-5390.733	-5.24

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SOIL WATER AT START OF YEAR	140.327	509386.219	
SOIL WATER AT END OF YEAR	139.530	506494.125	
SNOW WATER AT START OF YEAR	0.688	2498.631	2.43
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.016	0.00

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ANNUAL TOTALS FOR YEAR 88

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.15	167524.484	100.00
RUNOFF	18.456	66996.344	39.99
EVAPOTRANSPIRATION	23.608	85697.977	51.16
PERC./LEAKAGE THROUGH LAYER 2	2.987589	10844.947	6.47
AVG. HEAD ON TOP OF LAYER 2	31.3417		
PERC./LEAKAGE THROUGH LAYER 5	2.875708	10438.820	6.23
AVG. HEAD ON TOP OF LAYER 4	0.0449		
CHANGE IN WATER STORAGE	1.210	4391.386	2.62
SOIL WATER AT START OF YEAR	139.530	506494.125	
SOIL WATER AT END OF YEAR	140.397	509639.969	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.343	1245.545	0.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.033	0.00

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ANNUAL TOTALS FOR YEAR 89

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.20	116886.047	100.00
RUNOFF	9.122	33112.055	28.33

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EVAPOTRANSPIRATION	20.938	76005.047	65.02
PERC./LEAKAGE THROUGH LAYER 2	2.885270	10473.529	8.96
AVG. HEAD ON TOP OF LAYER 2	29.8668		
PERC./LEAKAGE THROUGH LAYER 5	2.949852	10707.964	9.16
AVG. HEAD ON TOP OF LAYER 4	0.0463		
CHANGE IN WATER STORAGE	-0.810	-2939.076	-2.51
SOIL WATER AT START OF YEAR	140.397	509639.969	
SOIL WATER AT END OF YEAR	139.930	507946.437	
SNOW WATER AT START OF YEAR	0.343	1245.545	1.07
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.051	0.00

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ANNUAL TOTALS FOR YEAR 90

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.93	137685.922	100.00
RUNOFF	12.301	44652.797	32.43
EVAPOTRANSPIRATION	19.996	72586.773	52.72
PERC./LEAKAGE THROUGH LAYER 2	2.900648	10529.354	7.65
AVG. HEAD ON TOP OF LAYER 2	30.1090		
PERC./LEAKAGE THROUGH LAYER 5	2.931873	10642.700	7.73
AVG. HEAD ON TOP OF LAYER 4	0.0460		
CHANGE IN WATER STORAGE	2.701	9803.630	7.12
SOIL WATER AT START OF YEAR	139.930	507946.437	
SOIL WATER AT END OF YEAR	140.325	509379.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.306	8370.817	6.08
ANNUAL WATER BUDGET BALANCE	0.0000	0.024	0.00

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ANNUAL TOTALS FOR YEAR 91

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.83	155472.906	100.00
RUNOFF	16.166	58684.105	37.75
EVAPOTRANSPIRATION	25.779	93576.539	60.19
PERC./LEAKAGE THROUGH LAYER 2	2.942623	10681.721	6.87
AVG. HEAD ON TOP OF LAYER 2	30.7708		
PERC./LEAKAGE THROUGH LAYER 5	2.876863	10443.014	6.72
AVG. HEAD ON TOP OF LAYER 4	0.0451		
CHANGE IN WATER STORAGE	-1.992	-7230.776	-4.65
SOIL WATER AT START OF YEAR	140.325	509379.250	
SOIL WATER AT END OF YEAR	140.271	509183.312	
SNOW WATER AT START OF YEAR	2.306	8370.817	5.38
SNOW WATER AT END OF YEAR	0.368	1335.953	0.86
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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ANNUAL TOTALS FOR YEAR 92

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.17	193007.078	100.00
RUNOFF	16.692	60591.766	31.39
EVAPOTRANSPIRATION	32.976	119704.617	62.02
PERC./LEAKAGE THROUGH LAYER 2	3.026955	10987.847	5.69
AVG. HEAD ON TOP OF LAYER 2	31.9718		
PERC./LEAKAGE THROUGH LAYER 5	2.841173	10313.458	5.34
AVG. HEAD ON TOP OF LAYER 4	0.0443		
CHANGE IN WATER STORAGE	0.660	2397.218	1.24
SOIL WATER AT START OF YEAR	140.271	509183.312	
SOIL WATER AT END OF YEAR	140.451	509836.187	

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SNOW WATER AT START OF YEAR	0.368	1335.953	0.69
SNOW WATER AT END OF YEAR	0.849	3080.297	1.60
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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ANNUAL TOTALS FOR YEAR 93

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.59	136451.687	100.00
RUNOFF	12.097	43912.277	32.18
EVAPOTRANSPIRATION	22.911	83167.766	60.95
PERC./LEAKAGE THROUGH LAYER 2	2.911781	10569.766	7.75
AVG. HEAD ON TOP OF LAYER 2	30.2809		
PERC./LEAKAGE THROUGH LAYER 5	3.004411	10906.012	7.99
AVG. HEAD ON TOP OF LAYER 4	0.0473		
CHANGE IN WATER STORAGE	-0.423	-1534.357	-1.12
SOIL WATER AT START OF YEAR	140.451	509836.187	
SOIL WATER AT END OF YEAR	140.460	509869.062	
SNOW WATER AT START OF YEAR	0.849	3080.297	2.26
SNOW WATER AT END OF YEAR	0.417	1513.093	1.11
ANNUAL WATER BUDGET BALANCE	0.0000	-0.010	0.00

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ANNUAL TOTALS FOR YEAR 94

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.08	145490.406	100.00
RUNOFF	13.256	48119.742	33.07
EVAPOTRANSPIRATION	24.336	88339.648	60.72
PERC./LEAKAGE THROUGH LAYER 2	2.925119	10618.181	7.30

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AVG. HEAD ON TOP OF LAYER 2	30.4912		
PERC./LEAKAGE THROUGH LAYER 5	2.944040	10686.865	7.35
AVG. HEAD ON TOP OF LAYER 4	0.0462		
CHANGE IN WATER STORAGE	-0.456	-1655.843	-1.14
SOIL WATER AT START OF YEAR	140.460	509869.062	
SOIL WATER AT END OF YEAR	140.376	509565.406	
SNOW WATER AT START OF YEAR	0.417	1513.093	1.04
SNOW WATER AT END OF YEAR	0.044	160.895	0.11
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

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ANNUAL TOTALS FOR YEAR 95

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.71	136887.266	100.00
RUNOFF	8.993	32644.047	23.85
EVAPOTRANSPIRATION	25.747	93462.219	68.28
PERC./LEAKAGE THROUGH LAYER 2	2.943124	10683.541	7.80
AVG. HEAD ON TOP OF LAYER 2	30.7822		
PERC./LEAKAGE THROUGH LAYER 5	2.927481	10626.755	7.76
AVG. HEAD ON TOP OF LAYER 4	0.0459		
CHANGE IN WATER STORAGE	0.042	154.188	0.11
SOIL WATER AT START OF YEAR	140.376	509565.406	
SOIL WATER AT END OF YEAR	140.408	509679.344	
SNOW WATER AT START OF YEAR	0.044	160.895	0.12
SNOW WATER AT END OF YEAR	0.055	201.147	0.15
ANNUAL WATER BUDGET BALANCE	0.0000	0.061	0.00

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ANNUAL TOTALS FOR YEAR 96

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.31	160845.297	100.00
RUNOFF	17.268	62683.309	38.97
EVAPOTRANSPIRATION	24.132	87598.789	54.46
PERC./LEAKAGE THROUGH LAYER 2	2.929476	10633.996	6.61
AVG. HEAD ON TOP OF LAYER 2	30.4452		
PERC./LEAKAGE THROUGH LAYER 5	2.953911	10722.697	6.67
AVG. HEAD ON TOP OF LAYER 4	0.0463		
CHANGE IN WATER STORAGE	-0.044	-159.494	-0.10
SOIL WATER AT START OF YEAR	140.408	509679.344	
SOIL WATER AT END OF YEAR	140.419	509721.000	
SNOW WATER AT START OF YEAR	0.055	201.147	0.13
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.015	0.00

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ANNUAL TOTALS FOR YEAR 97

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.32	139101.594	100.00
RUNOFF	13.746	49897.965	35.87
EVAPOTRANSPIRATION	22.119	80293.445	57.72
PERC./LEAKAGE THROUGH LAYER 2	2.908087	10556.355	7.59
AVG. HEAD ON TOP OF LAYER 2	30.2397		
PERC./LEAKAGE THROUGH LAYER 5	2.922574	10608.943	7.63
AVG. HEAD ON TOP OF LAYER 4	0.0458		
CHANGE IN WATER STORAGE	-0.468	-1698.793	-1.22
SOIL WATER AT START OF YEAR	140.419	509721.000	
SOIL WATER AT END OF YEAR	139.951	508022.187	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

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ANNUAL WATER BUDGET BALANCE	0.0000	0.042	0.00

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ANNUAL TOTALS FOR YEAR 98

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.10	131042.992	100.00
RUNOFF	9.427	34218.937	26.11
EVAPOTRANSPIRATION	23.018	83556.828	63.76
PERC./LEAKAGE THROUGH LAYER 2	2.922088	10607.179	8.09
AVG. HEAD ON TOP OF LAYER 2	30.4495		
PERC./LEAKAGE THROUGH LAYER 5	2.939848	10671.647	8.14
AVG. HEAD ON TOP OF LAYER 4	0.0462		
CHANGE IN WATER STORAGE	0.715	2595.610	1.98
SOIL WATER AT START OF YEAR	139.951	508022.187	
SOIL WATER AT END OF YEAR	140.368	509537.094	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.298	1080.710	0.82
ANNUAL WATER BUDGET BALANCE	0.0000	-0.028	0.00

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ANNUAL TOTALS FOR YEAR 99

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.28	131696.391	100.00
RUNOFF	10.246	37191.500	28.24
EVAPOTRANSPIRATION	23.445	85105.062	64.62
PERC./LEAKAGE THROUGH LAYER 2	2.949297	10705.947	8.13
AVG. HEAD ON TOP OF LAYER 2	30.8842		
PERC./LEAKAGE THROUGH LAYER 5	2.903200	10538.616	8.00

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AVG. HEAD ON TOP OF LAYER 4	0.0455		
CHANGE IN WATER STORAGE	-0.314	-1138.814	-0.86
SOIL WATER AT START OF YEAR	140.368	509537.094	
SOIL WATER AT END OF YEAR	140.352	509479.000	
SNOW WATER AT START OF YEAR	0.298	1080.710	0.82
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.029	0.00

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ANNUAL TOTALS FOR YEAR 100

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.26	146143.797	100.00
RUNOFF	10.148	36837.992	25.21
EVAPOTRANSPIRATION	27.807	100939.320	69.07
PERC./LEAKAGE THROUGH LAYER 2	2.882704	10464.215	7.16
AVG. HEAD ON TOP OF LAYER 2	29.7278		
PERC./LEAKAGE THROUGH LAYER 5	2.955715	10729.247	7.34
AVG. HEAD ON TOP OF LAYER 4	0.0463		
CHANGE IN WATER STORAGE	-0.651	-2362.746	-1.62
SOIL WATER AT START OF YEAR	140.352	509479.000	
SOIL WATER AT END OF YEAR	139.701	507116.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.025	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.39	2.44	3.60	3.54	3.82	4.19
	4.36	3.73	3.06	2.52	3.01	3.15
STD. DEVIATIONS	1.13	1.25	1.72	1.59	1.65	2.25
	2.07	2.09	1.72	1.52	1.34	1.44
RUNOFF						
TOTALS	1.385	2.172	2.772	0.657	0.301	0.608
	0.453	0.602	0.492	0.596	1.109	1.686
STD. DEVIATIONS	1.246	1.458	2.458	0.957	0.555	1.022
	0.696	0.945	0.844	0.927	1.200	1.143
EVAPOTRANSPIRATION						
TOTALS	0.484	0.425	1.523	3.024	3.451	3.465
	3.583	2.911	2.051	1.380	1.043	0.670
STD. DEVIATIONS	0.172	0.196	0.644	0.878	1.301	1.443
	1.352	1.205	0.889	0.458	0.209	0.167
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.2406	0.2109	0.2428	0.2437	0.2471	0.2367
	0.2436	0.2432	0.2360	0.2522	0.2517	0.2644
STD. DEVIATIONS	0.0261	0.0135	0.0152	0.0096	0.0072	0.0065
	0.0073	0.0076	0.0089	0.0125	0.0130	0.0111
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.2068	0.2023	0.2383	0.2243	0.2243	0.2184
	0.2280	0.2293	0.2229	0.2317	0.2193	0.2177
STD. DEVIATIONS	0.0628	0.0608	0.0697	0.0669	0.0659	0.0631
	0.0652	0.0654	0.0632	0.0650	0.0625	0.0625

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AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	29.2147	27.3374	29.4620	31.1512	30.2737	29.8190
	29.6253	29.5516	29.6772	31.2140	32.6646	33.4626
STD. DEVIATIONS	3.4347	2.7097	2.8319	1.8374	1.3384	1.2471
	1.3542	1.4217	1.7024	2.3228	2.4774	2.0411

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0378	0.0409	0.0442	0.0429	0.0413	0.0416
	0.0421	0.0423	0.0425	0.0428	0.0418	0.0400
STD. DEVIATIONS	0.0116	0.0124	0.0131	0.0130	0.0123	0.0122
	0.0122	0.0122	0.0122	0.0122	0.0121	0.0116

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 100

	INCHES		CU. FEET	PERCENT
PRECIPITATION	39.79	(5.386)	144453.7	100.00
RUNOFF	12.832	(3.5783)	46580.87	32.246
EVAPOTRANSPIRATION	24.010	(3.0916)	87155.74	60.335
PERCOLATION/LEAKAGE THROUGH LAYER 2	2.91286	(0.07077)	10573.699	7.31978
AVERAGE HEAD ON TOP OF LAYER 2	30.288	(1.024)		
PERCOLATION/LEAKAGE THROUGH LAYER 5	2.66341	(0.76562)	9668.193	6.69294
AVERAGE HEAD ON TOP OF LAYER 4	0.042	(0.012)		
CHANGE IN WATER STORAGE	0.289	(1.6246)	1048.84	0.726

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 100

	(INCHES)	(CU. FT.)
PRECIPITATION	4.55	16516.500
RUNOFF	5.048	18323.8125
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.008974	32.57656
AVERAGE HEAD ON TOP OF LAYER 2	36.000	
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.010065	36.53725
AVERAGE HEAD ON TOP OF LAYER 4	0.059	
SNOW WATER	8.98	32609.9863

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4710
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.2100

****

****

FINAL WATER STORAGE AT END OF YEAR 100

LAYER	(INCHES)	(VOL/VOL)
1	16.2605	0.4517
2	0.0000	0.0000
3	92.2651	0.2563
4	0.0000	0.0000
5	25.0200	0.4170
SNOW WATER	0.000	

****
****

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SEE LARGE FORMAT MAP OR PLAN SHEET

DESCRIPTION:

Site #: W0330100003
Cat #: 06L
Date: 02/26/2015
Permit #: N/A
Log #: N/A
Keyword: N/A
Comment: N/A

	Type or Description	SEE COLOR	Date of Plan	Figure/Diagram
1.	CD-Groundwater Model & Simulation of Closure	N/A	09/03/2014	None
2.				
3.				
4.				
5.				
6.				
7.				

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[redacted]

Ash Ponds Closure

Groundwater Management Zone Application

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

September 8, 2014

NATURAL RESOURCE TECHNOLOGY

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Illinois EPA

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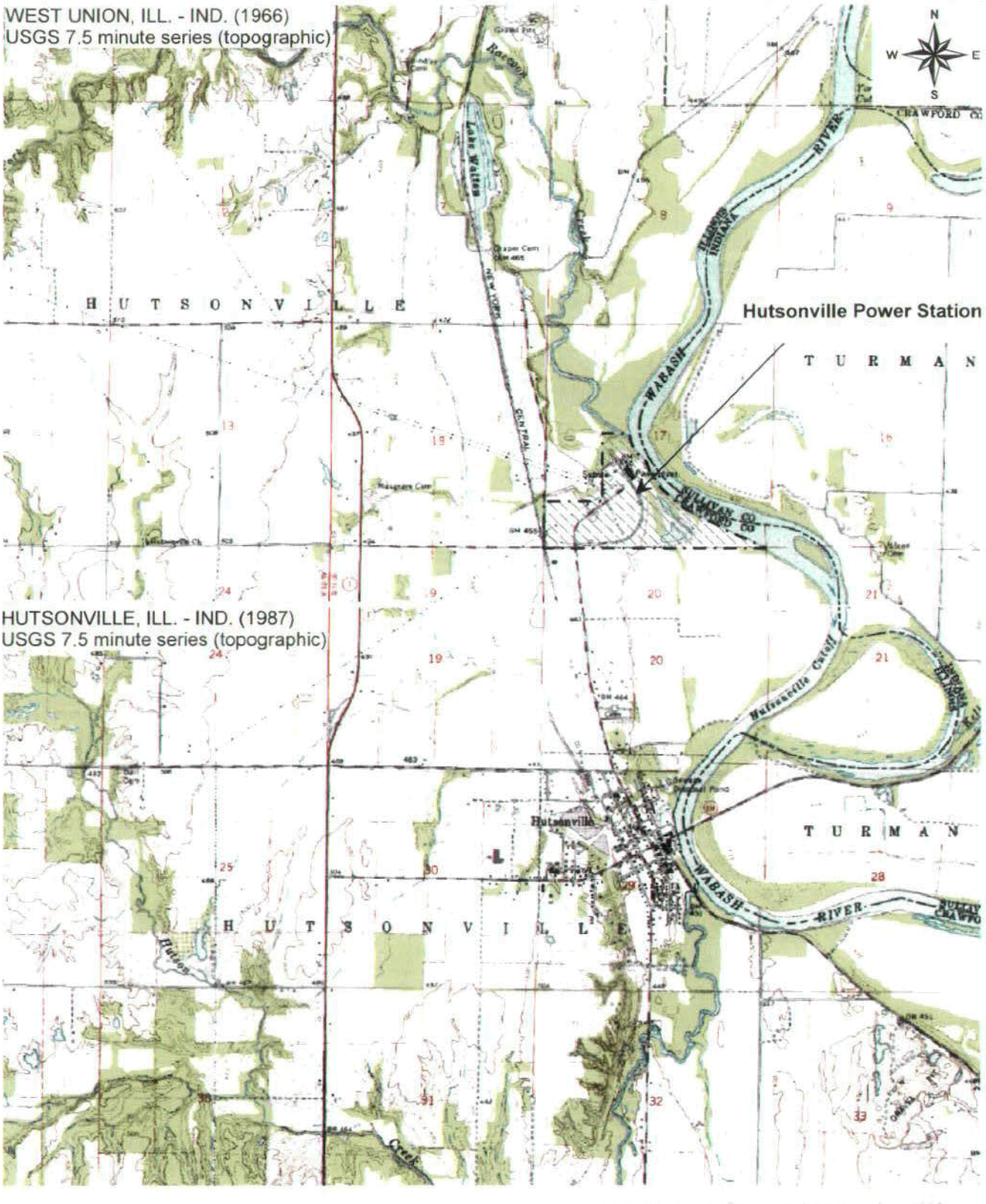

EXPLANATION

Property limits (approximate)

SCALE: 1 in. = 1,000 ft.

0 ft. 500 ft. 1,000 ft.

SOURCE: http://www.isgs.uiuc.edu/nsdihome/webdocs/drgs/

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SITE LOCATION MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 1

I:\14jobs\14E0014\Admin\14-Reports\HydroGeo\Figure1_SiteLocationMap.srf

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1. Background

AmerenEnergy Generating Company, pursuant to 35 IAC 840, closed the Ash Pond D Coal Combustion Waste (CCW) pond at the Hutsonville Power Station in 2012. AmerenEnergy Medina Valley Cogen, L.L.C. (AmerenEnergy Generating Company successor, and hereafter referred to as Ameren), is submitting a Closure Plan for the remaining CCW ponds: Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond. The operation of the ash ponds are regulated under Title 35 Illinois Administrative Code, Part 309 (35 IAC 309), and they will be closed in compliance with the requirements of 35 IAC 620. The proposed Closure Plan for the remaining ash ponds at the Hutsonville Power Station was developed to generally conform to the Ash Pond D site-specific rule 35 IAC 840, and where judged appropriate, elements of the proposed 35 IAC 841 rules, currently under development, both of which include provisions for GMZs.

Ameren requests establishment of a Groundwater Management Zone (GMZ) pursuant to 35 IAC 620.250(a)(2) as a three-dimensional region containing groundwater being managed to mitigate impairments caused by a potential release of leachate from the facilities.

The boundary of the GMZ is approximated, in map view, from a starting point at the intersection of the entrance road and the south property line follow the inboard-side (Ash Pond A side) of the entrance road to MW5, then south-southeast to MW4, then east to MW12. From MW12 go east-southeast to a point near the south-side of Ash Pond C and the centerline of the roadway between Ash Pond B and Ash Pond D. Follow the centerline of the roadway south between Ash Pond B and Ash Pond D to a point of intersection with the south property line, and then west, following the property line, to the point of beginning.

A legal description and map of the proposed GMZ is provided in Appendix A. The GMZ will extend vertically through all water-bearing strata to the top of the shale bedrock that underlies the unlithified glacial and alluvial deposits at the site.

1.1 Technical Support Documents

Ameren has prepared, coincident with this document, the Hydrogeologic Site Investigation, Groundwater Model Report, Groundwater Monitoring Plan, and Closure Plan for Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond. Upon approval of the Closure Plan and after receiving any required permits, Ameren will begin closing these facilities.

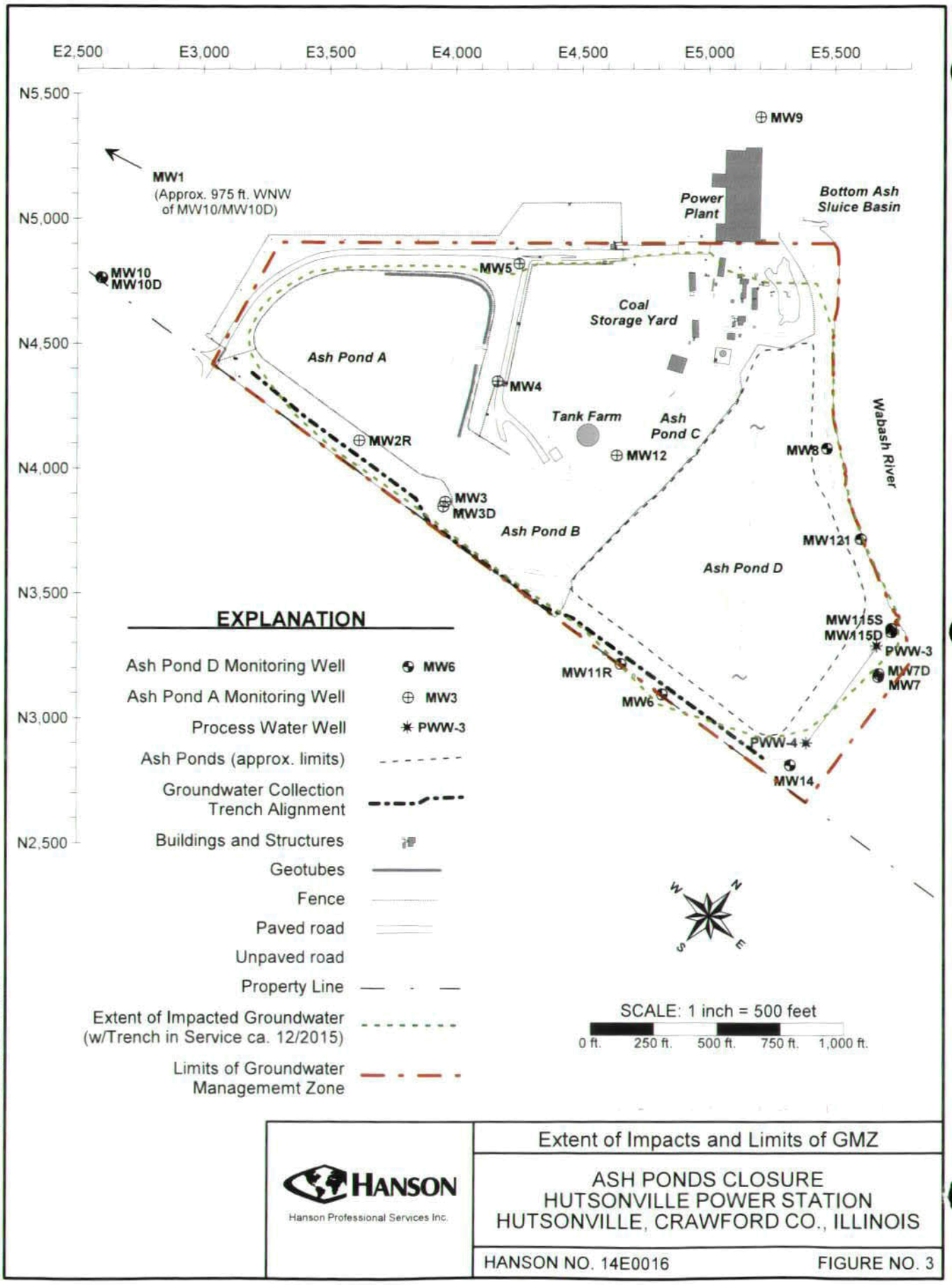
Ameren submitted the following technical support documents prior to this request:

- Closure Plan, Ash Pond D, Hutsonville Power Station, July 26, 2011 (Hanson, 2011a).
- Groundwater Monitoring Plan, Ash Pond D, Hutsonville Power Station, July 26, 2011 (Hanson, 2011b).

1.2 Site Background

The Hutsonville Power Station (Site) is located on the west bank of the Wabash River, and approximately one and one-half miles north of the Village of Hutsonville in Crawford County, Illinois. The Site is located generally in the Southwest ¼ of Section 17, Township 8 North, Range 11 West of the Second Principal Meridian (see Figure 1).

All ash ponds at the Site (see Figure 2) are now out-of-service. Ash Pond D, the largest and oldest of the four ash ponds at the Site, was covered and closed in 2012 under the 35 IAC Part 840 rules. The remaining impoundments, including Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Pond, will be closed following approval of the Closure Plan.



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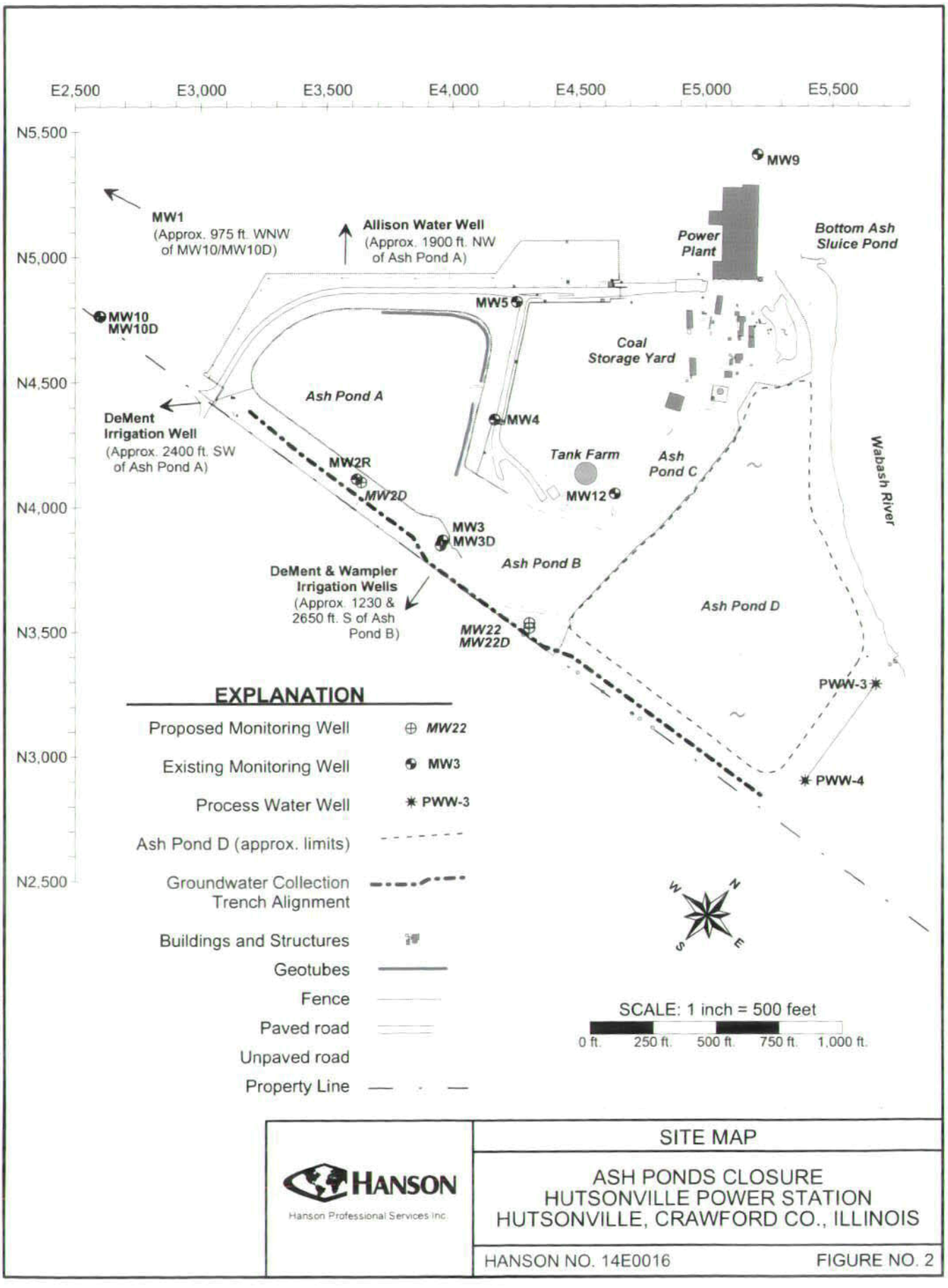
Extent of Impacts and Limits of GMZ

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 3



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SITE MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 2

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1.3 Geologic and Hydrogeologic Summaries

1.31 Geology

The Site topography consists of generally flat agricultural land with shallow, entrenched drainage. Based on information from the Site subsurface investigations and published reports (Willman et al., 1975; Hansel & Johnson, 1996; Fafalios & Hensel, 1999) the geology consists primarily of Wisconsinan Stage fluvial deposits with some Illinoian Stage diamictons overlying Pennsylvanian bedrock. There are various fill materials along with three surficial (unlithified) units identified at the Site (youngest to oldest):

- Fine-grained fluvial deposits classified as Cahokia Alluvium. Primarily silts, clays, and clayey sands with localized, and not laterally extensive, sand lenses. Thickness typically ranges from 0 to 15 feet, but can reach 25 feet in the bedrock valley.
- Poorly sorted outwash sand and gravels of the Henry Formation. The predominant unit in the upland ash pond areas and deep portions of the Wabash River bedrock valley. The Henry Formation was not observed in the northern portion of the Site near the Plant.
- Silty and clayey diamictons of the Glasford Formation. Intermittent due to post-glacial erosion. Predominantly located in the southern portion of Site and can be found in excess of 5 feet thick to a few inches in thickness.

Earthen Fill is present across much of the Site and consists of sandy silts and silty sands most likely created from on-site or nearby excavations. Fill has been used to elevate depressions and construct berms around the various ash ponds and structures at the Site. Where present, the earthen fill can range from less than 2 to more than 10 feet thick.

Coal Combustion Wastes (CCW) at Hutsonville consists of bottom ash and fly ash and is primarily found in the Site's ash ponds. Thickness of CCW in Ash Pond D ranges from 12 to 31 feet. CCW is also present in lined Ash Ponds A and B. Prior to construction of Ash Pond B, the area was the CCW laydown location, and ash could have been up to 12 feet thick. However, all CCW was reportedly excavated prior to construction of the liner for Ash Pond B.

Bedrock at the Site is composed of Pennsylvanian Age rock of the Missourian Series Mattoon Group. Two lithologies are present at the Site. To the west, the upper bedrock is composed of sandstone of the Merom Sandstone Member (Willman et al., 1975), with a base elevation that rests on shale at an approximate elevation of 405 to 410 feet National Geodetic Vertical Datum (NGVD). Closer to the Wabash River there is a well-incised bedrock valley. In the bedrock valley (below elevation 405 ft.), post-glacial erosion has exposed the lithified silts and clays of an undifferentiated shale of the Mattoon Formation. Bedrock depths in the uplands on the western portion of the Site are 10 to 15 feet below ground surface (bgs) to over 90 feet bgs in the southeast corner of the Site. There are no active geologic structures or faults in the vicinity of the Site (Nelson, 1995).

1.32 Hydrogeology

Shallow groundwater in the surficial deposits and the upper bedrock are controlled by the Wabash River, a regional groundwater sink or discharge zone. There are two identified groundwater zones at the Site, shallow and deep. The shallow groundwater zone is comprised of the surficial and shallow materials and the upper, permeable portions of the sandstone bedrock. The deep groundwater zone is defined as the outwash found in the Wabash River valley.

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Groundwater flow within the shallow zone generally flows from west to east. Horizontal hydraulic gradients in the shallow zone range from 0.01 to 0.02, with an average gradient of 0.016. Groundwater in the deep zone generally flows from southwest to northeast, almost perpendicular to the banks of the Wabash River. Gradients in the deep zone are from 0.007 to 0.015, with an average gradient of 0.011.

Based on field testing of 11 monitoring wells at the Site, hydraulic conductivity ranges from a minimum of 2.6×10^{-4} cm/sec to a maximum of 4.8×10^{-2} cm/sec (Fafalios & Hensel, 1999). The calculated geometric mean of the hydraulic conductivity of the unlithified materials is 6.5×10^{-3} cm/sec, and the arithmetic mean of the two sandstone bedrock tests is 4.7×10^{-4} cm/sec.

1.33 Groundwater Monitoring Activities

Groundwater monitoring locations for Ponds A, B, C and the Bottom Ash Pond are displayed on Figure 2. Boron and sulfate are the primary indicators for coal ash leachate at this facility; both exceed Part 620 Class I groundwater quality standards at some monitoring points, and both are mobile in most hydrogeologic environments. As documented in the Hydrogeologic Site Investigation (Hanson, 2014), wells MW2(R), MW3, and MW3D have had concentrations of boron and sulfate higher than Class I groundwater quality standards attributed to Ponds A, B, or C, indicating that groundwater quality at the facility has been impacted by leachate from the ash ponds. Iron, manganese, and TDS concentrations are also higher than Class I standards in some monitoring wells, and pH has been less than the lower Class I standard. Other parameters which have had occasional exceedances of their respective Class I standards in downgradient wells since monitoring for them began in 2011 are arsenic, lead, nickel, nitrate, and thallium.

2. Groundwater Impairments and Control Options

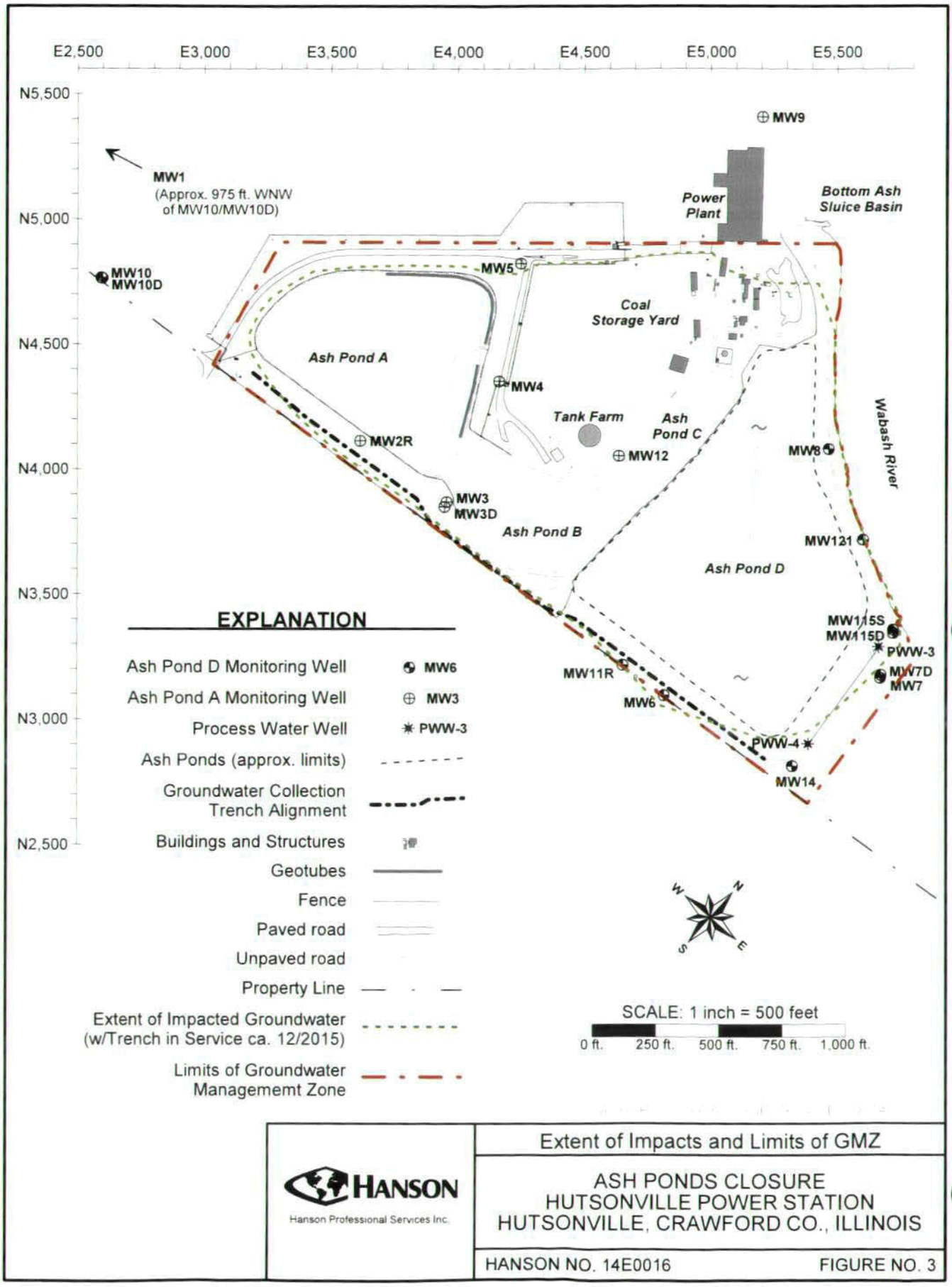
2.1 Extent of Groundwater Impairments Associated with Ash Impoundments

Groundwater downgradient of Ponds A, B, and C had concentrations of boron, sulfate, manganese, and TDS higher than Class I groundwater quality standards at multiple locations during the period of 2011 through 2014. The coal ash indicator parameter boron had the greatest extent of Class I exceedances attributable to coal ash leachate, and was used to define the extent of these impacts. The estimated extent of impacts, based on observed concentrations and a calibrated fate and transport model, which will be submitted to IEPA with the Closure Plan for the Ash Ponds, is shown on Figure 3.

Based on the maximum modeled boron plume extent, exceedance of the Class I groundwater quality standard will occur just south of monitoring well MW4 to the north and to the west of MW12, which will continue to meet the Class I standard for boron. Monitoring wells MW2R / MW2D and MW3 / MW3D, located along the property line to the south, are predicted to have boron impacts above the boron standard initially, but eventually decreasing to below the standard by 2017 and 2025, respectively.

2.2 Impairments to Groundwater Usage

There are currently no impairments to groundwater usage at the site, nor will there be impairments to groundwater usage resulting from establishment of the proposed GMZ. A water well survey was performed in conjunction with this application and is being submitted to the IEPA in accordance with the "Right to Know" Potable Water Well Survey procedures of 35 Illinois Administrative Code 1600.210(b)(1) and 1600.210(b)(2). The purpose of this survey was to identify water wells located within 2,500 feet of the Site's ash ponds. This data was included with the Hydrogeologic Site Investigation associated with this application (Hanson, 2014).



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Extent of Impacts and Limits of GMZ

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 3

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The water well survey was conducted for a 2,500-foot radius around the Site's four ash ponds (Ash Pond A, Ash Pond B, Ash Pond C, Ash Pond D) and Bottom Ash Pond. Based on visual surveys and State of Illinois records obtained from the Illinois EPA, Illinois State Geological Survey (ISGS), and Illinois State Water Survey (ISWS) there were no Community Water System (CWS) or non-Community Water System (non-CWS) wells, 2 industrial/commercial wells (Site's water supply wells), three irrigation wells, and one farm/domestic water well located within the 2,500-foot radius of the Site's ash ponds†. The only known potable well verified to be in existence within a 2,500-foot radius of the ash ponds is the Allison water well located 1,900 feet northwest of Ash Pond A (see Figure 2). This well is located upgradient of the ash ponds. There are no potable-use water wells in the downgradient groundwater flow direction from any of the ash ponds of the Hutsonville Power Station.

2.3 Treatment or Control Options

2.31 Closure of Ash Pond D

Ash Pond D, the largest and oldest of the four ash sluice ponds at the Site, was covered and closed in 2012 under the Title 35, IAC Part 840 rules (Illinois PCB, 2011). Closure activities included placement of a 40-mil thick textured high density polyethylene (HDPE) geomembrane with a three-foot thick protective soil cover with a vegetated surface. Surface water management features incorporated into the final cover design included intermediate berms and ditches to direct runoff to rip-rap-lined chutes running off the ash pond to surrounding areas. Details of the closure are provided in the Project Plans and Specifications (Hanson, 2011c).

2.32 Groundwater Collection Trench

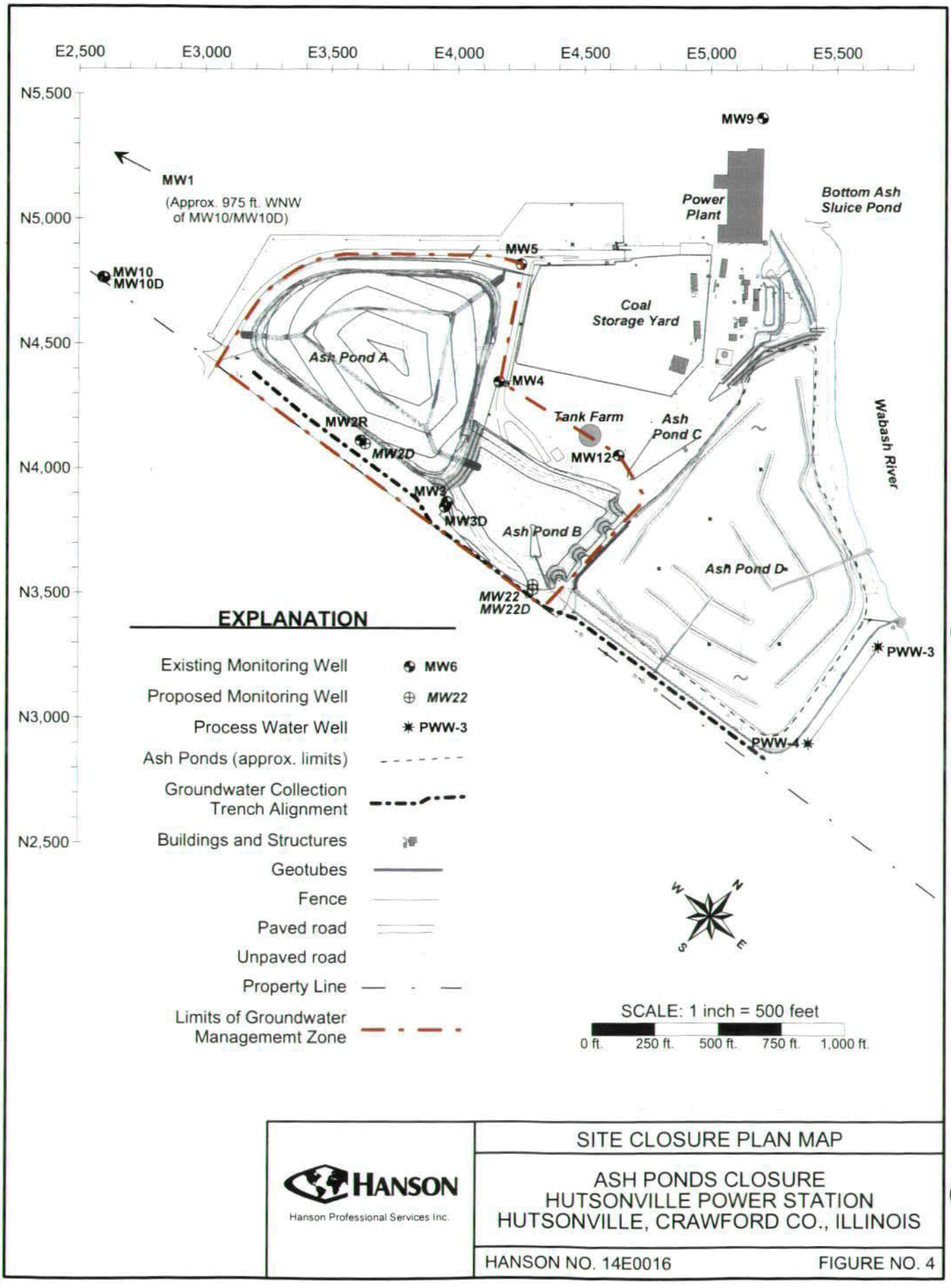
A groundwater collection trench (Trench) was installed between the outside south toe of Ash Ponds A, B, and D and the south property line, as shown on Figure 2. The Trench, which will become operational in late 2014 or early 2015 after a NPDES permit is approved for the discharge, is designed to intercept groundwater that may migrate to the south from the ash ponds. The Trench runs from the southwest corner of Ash Pond A to the southeast corner of Ash Pond D and extends to bedrock for most of its length (except at the extreme east end). The Trench is designed to collect groundwater at four separate sumps: a pair in the east portion of the Trench adjacent to Ash Pond D, and a pair in the west portion of the Trench adjacent to Ash Pond A. Details are provided in the Ash Pond D closure plan (Hanson, 2011a) and Project Plans and Specifications (Hanson, 2011c).

The groundwater collection trench is designed to continuously withdraw groundwater to control the gradient and flow direction of potentially impacted groundwater. Water captured by the Trench will be pumped from the four sumps to a central catch basin located adjacent to the existing Ash Pond D outlet structure along the mid-east side of the pond, from which it will then discharge to the Wabash River in accordance with the Station's NPDES permit.

2.33 Closure of Ash Ponds A, B, C, and Bottom Ash Pond

A Closure Plan is being prepared for the closure of Ash Ponds A, B, C and the Bottom Ash Pond. The Closure Plan, to be submitted by Ameren in the Fall of 2014, will include the following ash pond closure elements, preliminary designs of which are shown on Figure 4:

† Well records were not reviewed for State of Indiana wells. The Wabash River is a groundwater (discharge) divide, and waters from the Site are unlikely to influence groundwater on the opposite bank of the river.



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SITE CLOSURE PLAN MAP

ASH PONDS CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 14E0016 FIGURE NO. 4

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- Ash Pond A will be the depository for disposal of materials from Pond B, Pond C, and the Bottom Ash Pond. It will then be graded to drain surface water using a uniform 5% slope toward the outside berm. The cover drainage is split into three collection areas. Drainage off the western-most third of the cover will collect in a rock chute at the northwest corner, where it is free to discharge toward the northeast using the existing roadside ditch and then out through an existing culvert beneath the north plant access road. Drainage from the eastern-most third of the cover will collect in a similar rock chute at the northeast corner, where it also discharges out through the same culvert. Drainage from the southern-most third of the cover will collect in a rock chute at the southeast corner, where it will discharge into a storm water detention pond in the area where Pond B is currently located.
- Pond B will be clean-closed and the berms removed to be re-used as cover material for Ash Pond A. The pond bottom will then be graded to drain to the southeast through a culvert and into the existing paved ditch along the south side of Ash Pond D. Storm water tributary to this pond will be detained for intermediate to large rain events to elevation 446.00 by under sizing the outlet culvert.
- Pond C and the Bottom Ash Pond will be clean-closed and graded to drain to the northeast through an open cut channel through the original east perimeter berm of Ash Pond D and discharged towards the Wabash River.

3. Application for Groundwater Management Zone

3.1 Environmental Impact of Proposed Groundwater Management Zone

Establishment of this GMZ will have a positive environmental impact. The fate and transport modeling predicted boron concentrations will eventually decrease to levels lower than the Class I standard at all monitoring wells inside of the proposed GMZ boundary. Boron concentrations in groundwater at wells MW2R / MW2D and MW3 / MW3D are predicted to decrease to below groundwater standards by 2020 and 2030, respectively. Approximately 15 years following closure of Ash Ponds A, B, C and the Bottom Ash Pond, all monitoring wells within the GMZ that previously had exceedances of the Class I groundwater standard for boron are predicted to meet the standard. Furthermore, as a result of the cap and closure of Ash Pond A and the clean closure of Ponds B, C and the Bottom Ash Pond, all of the groundwater quality parameters impacted by coal ash leachate will continue to decrease as mass loading of CCW residuals to groundwater continues to dissipate.

3.2 Proposed Groundwater Management Zone

The proposed GMZ covers a larger area than the maximum predicted area of impacted groundwater associated with Ponds A, B, and C. A legal description and map depicting the proposed groundwater management zone is provided in Appendix A. The approximate boundary of the proposed GMZ is depicted in Figure 3. The GMZ will extend vertically through the unlithified deposits and sandstone bedrock, with the base of the GMZ coincident with the bottom of the sandstone, which rests on top of the shale bedrock at an approximate elevation of 405 to 410 feet NGVD within the boundaries of the GMZ. The GMZ does not extend beyond the Station's property boundary to the south, although an agreement[‡] exists between Ameren and Margaret R. DeMent regarding shallow well drilling. This restriction covers the first 25 ft. of the water table and lies within a 500 ft. offset south of the southern property boundary of the Site.

[‡] Available at: http://www.ipcb.state.il.us/documents/dsweb/Get/Document-65177 as Chapter 9 of the Rulemaking Technical Support Documents.

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4. Proposed Groundwater Monitoring Plan

Upon approval of this GMZ, groundwater monitoring will be performed according to the groundwater monitoring plan, incorporated by reference, in the accompanying report:

- Ash Ponds Closure, Groundwater Monitoring Plan, Hutsonville Power Station, Ameren Energy Generating Company, Crawford County, Illinois. Hanson Professional Services Inc., Springfield, IL; Natural Resource Technology, Inc., Milwaukee, WI (Hanson and NRT, 2014).

The elements of the groundwater monitoring plan include:

- Groundwater monitoring system with designation of background and compliance monitoring wells along with monitoring well depths and construction.
- Groundwater monitoring parameters.
- Groundwater monitoring frequency and sampling schedule, along with statistical basis for reduction of monitoring frequency.
- Groundwater sample collection protocol with standard operating procedures.
- Laboratory analysis by a state-certified laboratory and listing of methods and reporting limits.
- Quality Assurance Program for field collection of samples and laboratory analysis of samples.
- Groundwater monitoring system maintenance, including schedule of inspections and methods for inspection of monitoring wells.
- Data reporting schedule and content of reports.
- Demonstration of compliance. Statistical methods for evaluating groundwater quality data. Included is a notification schedule with actions to be taken in cases of non-compliance.

5. Licensed Professional Acknowledgement

The geological work product contained in this document has been prepared under my personal supervision and has been prepared and administered in accordance with the standards of reasonable professional skill and diligence.

Bruce R. Hensel, P.G.
Natural Resource Technology, Inc.
234 W Florida St
Milwaukee, WI 53204
(414) 837-3607
Registration No. 196-000703

Seal:



Expires 3/31/2015

Signature: _____ Date: 9/9/2014

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6. References

Fafalios, S.L. and B.R. Hensel, 1999. "Hutsonville Power Station, Hutsonville, Illinois, Hydrogeologic Assessment Final Report". Natural Resource Technology, Inc., Pewaukee, WI. 44 pp. + App.

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Hanson and NRT, 2014. "Ash Ponds Closure, Groundwater Monitoring Plan, AmerenEnergy Medina Valley Cogen, L.L.C., Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL; Natural Resource Technology, Inc., Milwaukee, WI.

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Illinois PCB, 2013. Rulemaking R2014-10 "Coal Combustion Waste Surface Impoundments at Power Generating Facilities: Proposed New 35 Ill. Adm. Code Part 841 – Statement of Reason". Illinois Pollution Control Board, Springfield, IL, 305 pp + Appendices.

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Appendix A

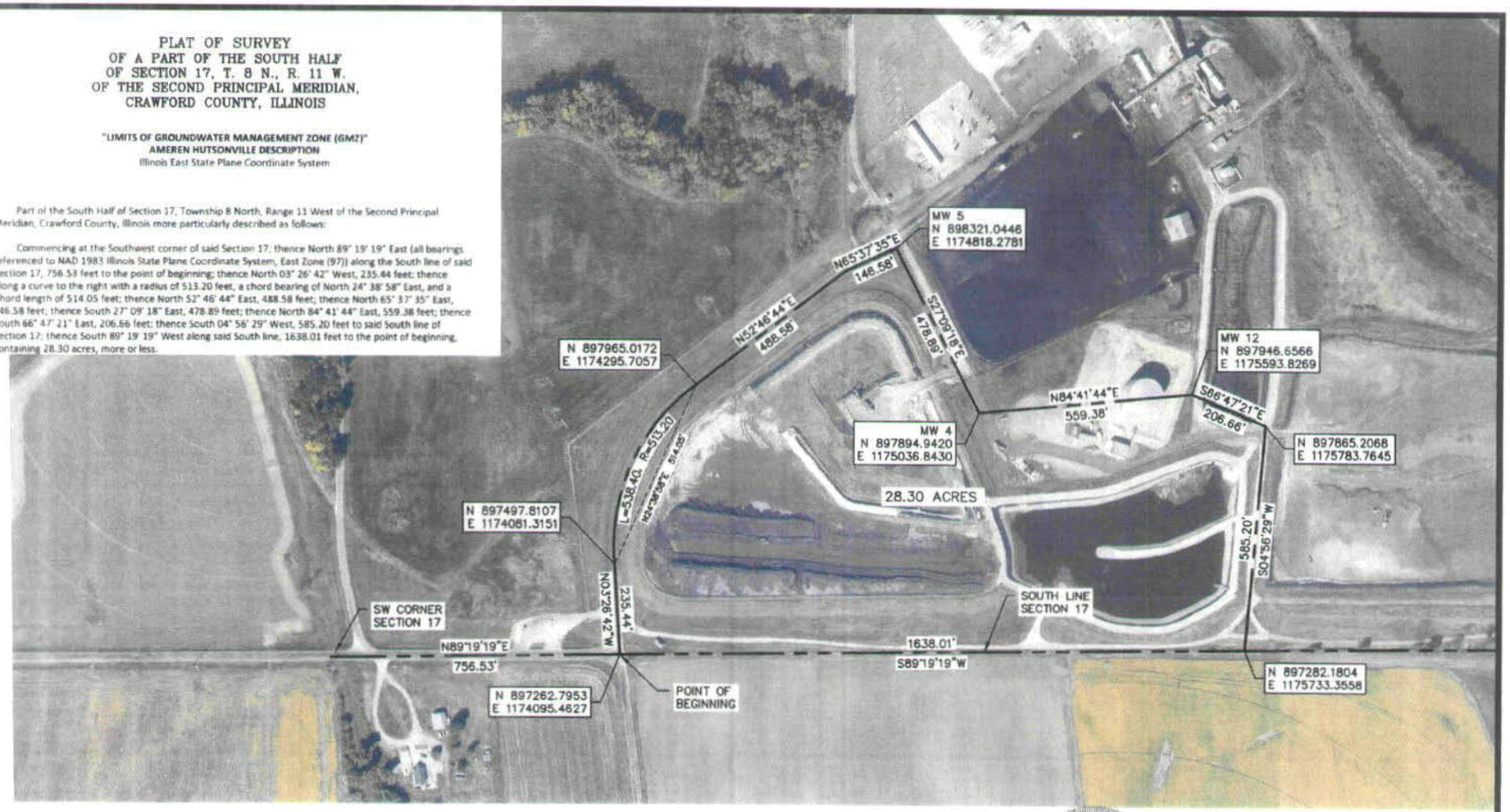
Groundwater Management Zone Map & Legal Description

PLAT OF SURVEY
OF A PART OF THE SOUTH HALF OF SECTION 17, T. 8 N., R. 11 W. OF THE SECOND PRINCIPAL MERIDIAN, CRAWFORD COUNTY, ILLINOIS

"LIMITS OF GROUNDWATER MANAGEMENT ZONE (GMZ)"
AMEREN HUTSONVILLE DESCRIPTION
Illinois East State Plane Coordinate System

Part of the South Half of Section 17, Township 8 North, Range 11 West of the Second Principal Meridian, Crawford County, Illinois more particularly described as follows:

Commencing at the Southwest corner of said Section 17; thence North 89° 19' 19" East (all bearings referenced to NAD 1983 Illinois State Plane Coordinate System, East Zone (97)) along the South line of said Section 17, 756.53 feet to the point of beginning; thence North 03° 26' 42" West, 235.44 feet; thence along a curve to the right with a radius of 513.20 feet, a chord bearing of North 24° 38' 58" East, and a Chord length of 514.05 feet; thence North 52° 46' 44" East, 488.58 feet; thence North 65° 37' 35" East, 146.58 feet; thence South 27° 09' 18" East, 478.89 feet; thence North 84° 41' 44" East, 559.38 feet; thence South 66° 47' 21" East, 206.66 feet; thence South 04° 56' 29" West, 585.20 feet to said South line of Section 17; thence South 89° 19' 19" West along said South line, 1638.01 feet to the point of beginning, containing 28.30 acres, more or less.



LAMAC JOB NO. 814IL111HV	ILLINOIS OFFICE	INDIANA OFFICE
LAMAC ENGINEERING CO. Professional Design Firm Land Survey & Prof. Eng. Corp. #184-000687	323 W. 3RD ST. P.O. BOX 160 MT. CARMEL, IL 62863 PHONE: (618)-262-5661 FAX: (618)-263-3327	P.O. BOX 555 PRINCETON, IN 47670 PHONE: (812)-386-7611
SHEET 01 of 01	Drawn By: SWT Checked By: JBL Date: 08/04/2014	SCALE: 1"=250'

BEARINGS BASED ON NAD83 ILLINOIS EAST STATE PLANE COORDINATE SYSTEM

0' 125' 250' 375'

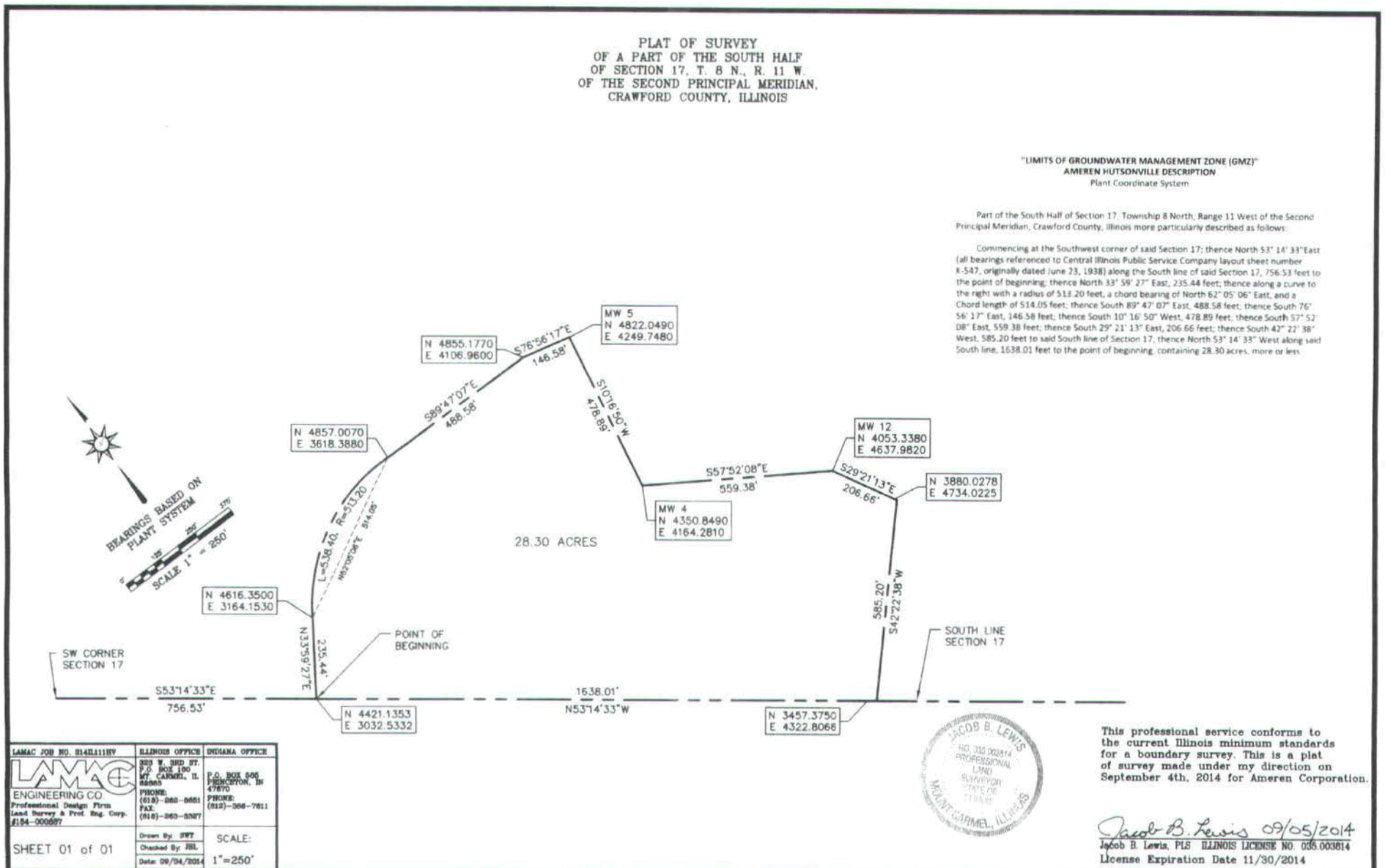
SCALE 1" = 250'

JACOB B. LEWIS
NO. 035.003814
PROFESSIONAL LAND SURVEYOR
MOUNT CARMEL, ILLINOIS

This professional service conforms to the current Illinois minimum standards for a boundary survey. This is a plat of survey made under my direction on September 4th, 2014 for Ameren Corporation.

Jacob B. Lewis 09/05/2014
Jacob B. Lewis, PLS ILLINOIS LICENSE NO. 035.003814
License Expiration Date 11/30/2014

PLAT OF SURVEY
OF A PART OF THE SOUTH HALF
OF SECTION 17, T. 8 N., R. 11 W.
OF THE SECOND PRINCIPAL MERIDIAN,
CRAWFORD COUNTY, ILLINOIS



"LIMITS OF GROUNDWATER MANAGEMENT ZONE (GMZ)"
AMEREN HUTSONVILLE DESCRIPTION
Plant Coordinate System

Part of the South Half of Section 17, Township 8 North, Range 11 West of the Second Principal Meridian, Crawford County, Illinois more particularly described as follows:

Commencing at the Southwest corner of said Section 17; thence North 53° 14' 33"East (all bearings referenced to Central Illinois Public Service Company layout sheet number K-547, originally dated June 23, 1938) along the South line of said Section 17, 756.53 feet to the point of beginning; thence North 33° 59' 27" East, 235.44 feet; thence along a curve to the right with a radius of 513.20 feet, a chord bearing of North 62° 05' 06" East, and a Chord length of 514.05 feet; thence South 89° 47' 07" East, 488.58 feet; thence South 76° 56' 17" East, 146.58 feet; thence South 10° 16' 50" West, 478.89 feet; thence South 57° 52' 08" East, 559.38 feet; thence South 29° 21' 13" East, 206.66 feet; thence South 42° 22' 38" West, 585.20 feet to said South line of Section 17; thence North 53° 14' 33" West along said South line, 1638.01 feet to the point of beginning, containing 28.30 acres, more or less.

LAMAC JOB NO. H14IL111HV	ILLINOIS OFFICE	INDIANA OFFICE
LAMAC ENGINEERING CO. Professional Design Firm Land Survey & Prof. Eng. Corp. #184-000687	323 W. 3RD ST. P.O. BOX 160 MT. CARMEL, IL 62863 PHONE: (618)-262-8651 FAX: (618)-263-3327	P.O. BOX 595 PRINCETON, IN 47670 PHONE: (812)-386-7611
SHEET 01 of 01	Drawn By: SWT Checked By: JBL Date: 09/04/2014	SCALE: 1"=250'

This professional service conforms to the current Illinois minimum standards for a boundary survey. This is a plat of survey made under my direction on September 4th, 2014 for Ameren Corporation.

Jacob B. Lewis 09/05/2014
Jacob B. Lewis, PLS ILLINOIS LICENSE NO. 035.003614
License Expiration Date 11/30/2014

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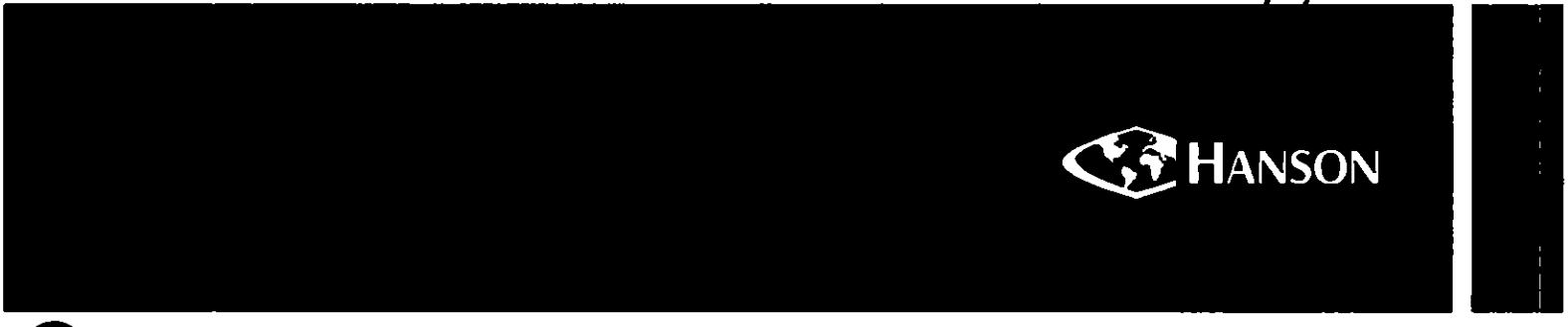
Appendix B

Section 620.Appendix D – Confirmation of an Adequate Corrective Action, Parts I, II, and III



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Part I. Facility Information

Facility Name *Hutsonville Power Station*

Facility Address *15142 East 1900th Avenue, Hutsonville, IL 62433*

County *Crawford*

Standard Industry Code (SIC) *formerly 4911*

1. Provide a general description of the type of industry, products manufactured, raw materials used, location and size of the facility. *The Hutsonville Energy Center is a former coal-fired power generating facility.*

2. What specific units (operating or closed) are present at the facility which are or were used to manage waste, hazardous waste, hazardous substances or petroleum?

	YES	NO
Landfill		X
Surface Impoundment	X	
Land Treatment		X
Spray Irrigation		X
Waste Pile		X
Incinerator		X
Storage Tank (above ground)	X	
Storage Tank (underground)		X
Container Storage Area		X
Injection Well		X
Water Treatment Units	X	
Septic Tanks		X
French Drains		X
Transfer Station		X
Other Units (please describe)		

3. Provide an extract from a USGS topographic or county map showing the location of the site and a more detailed scaled map of the facility with each waste management unit identified in Question 2 or known/suspected source clearly identified. Map scale must be specified and the location of the facility must be provided with respect to Township, Range and Section.
See Figure 1 and Figure 2 of the Groundwater Management Zone (GMZ) Application.

4. Has the facility ever conducted operations which involved the generation, manufacture, processing, transportation, treatment, storage or handling of "hazardous substances" as defined by the Illinois Environmental Protection Act? YES ☒ NO ☐ if the answer to this question is "yes" generally describe these operations. *The Hutsonville Energy Center stored and used various hazardous substances as commercial chemical products, including: chlorine gas, hydrazine, nitrogen gas, sodium hydroxide, sulfur, and sulfuric acid.*

Part I. Facility Information (continued)

5. Has the facility generated, stored or treated hazardous waste as defined by the Resource Conservation and Recovery Act? YES ☒ NO ☐ if the answer to this question is "yes" generally describe these operations. *The Hutsonville Energy Center is registered as a Small Quantity Generator.*

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6. Has the facility conducted operations which involved the processing, storage or handling of petroleum? YES ☒ NO ☐ If the answer to this question is "yes" generally describe these operations. *Fuel oil was used for boilers stored on site at Tank Farm Identified in Figure 2 in the GMZ Application. Tank has since been converted to water storage.*

7. Has the facility ever held any of the following permits?

   a. Permits for any waste storage, waste treatment or waste disposal operation. YES ☐ NO ☒ If the answer to this question is "yes", identify the IEPA permit numbers.

   b. Interim Status under the Resources Conservation and Recovery Act (filing of a RCRA Part A application). YES ☐ NO ☒ If the answer to this question is "yes", attach a copy of the last approved Part A application.

   c. RCRA Part B Permits. YES ☐ NO ☒ If the answer to this question is "yes", identify the permit log number.

8. Has the facility ever conducted the closure of a RCRA hazardous waste management unit? YES ☐ NO ☒

9. Have any of the following State or Federal government actions taken place for a release at the facility?

   a. Written notification regarding known, suspected or alleged contamination on or emanating from the property (e.g., a Notice pursuant to Section 4(q) of the Environment Protection Act)? YES ☐ NO ☒ If the to this question is "yes", identify the caption and date of issuance.

   b. Consent Decree or Order under RCRA, CERCLA, EPAct Section 22.2 (State Superfund), or EPAct Section 21(f) (State RCRA). YES ☐ NO ☒

   c. If either of Items a or b were answered by checking "yes", is the notice, order or decree still in effect? YES ☐ NO ☐

10. What groundwater classification will the facility be subject to at the completion of the remediation? Class I ☒ Class II ☐ Class III ☐ Class IV ☐ If more than one Class applies, please explain.

11. Describe the circumstances which the release to groundwater was identified. *See Section 1.33 in the GMZ Application.*

Based on my inquiry of those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true and accurate.

Hutsonville Energy Center	[signature]
Facility Name	Signature of Owner/Operator
15142 E. 1900th Ave., Hutsonville, IL 62433	*Mark Birk, President of AmerenEnergy Medina Valley Cogen, LLC*
Location of Facility	Name of Owner/Operator
170000066210	2/23/15
EPA Identification Number	Date

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PART II: Release Information

1. Identify the chemical constituents release to the groundwater. Attach additional documents as necessary.
   See Section 1.33 in the GMZ Application.

Chemical Description	Chemical Abstract No.

2. Describe how the site will be investigated to determine the source or sources of the release.
   The site investigation is complete. See Hydrogeologic Site Investigation document in Appendix A of the Closure Plan.
3. Describe how groundwater will be monitored to determine the rate and extent of the release.
   Quarterly groundwater monitoring is ongoing. See the Groundwater Monitoring Plan in Appendix B of the Closure Plan.
4. Has the release been contained on-site at the facility? *A groundwater collection trench was installed as part of on-site control. The NPDES permit was recently renewed authorizing discharge from the groundwater collection trench. The trench will be placed into service in the near future.*
5. Describe the groundwater monitoring network and groundwater and soil sampling protocols in place at the facility. *The groundwater monitoring network and sampling protocols are described in the Groundwater Monitoring Plan in Appendix B of the Closure Plan.*
6. Provide the schedule for investigation and monitoring. *The groundwater investigation is complete. See the Groundwater Monitoring Plan in Appendix B of the Closure Plan for schedule.*
7. Describe the laboratory quality assurance program utilized for the investigation. *See Groundwater Monitoring Plan in Appendix B of the Closure Plan for laboratory QA.*
8. Provide a summary of the results of available soil testing and groundwater monitoring associated with the release at the facility. The summary or results should provide the following information: dates of sampling; types of samples taken (soil or water); locations and depths of samples; sampling and analytical methods; analytical laboratories used; chemical constituents for which analyses were performed; analytical detection limits; and concentrations of chemical constituents in ppm (levels below detection should be identified as "ND").
   All data is available in the Hydrogeologic Site Investigation document in Appendix A of the Closure Plan.

Based on my inquiry of those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of knowledge and belief, true and accurate and confirm that the actions identified herein will be undertaken in accordance with the schedule set forth herein.

Hutsonville Energy Center Facility Name	Mark Birk Signature of Owner/Operator
15142 E. 1900th Ave., Hutsonville, IL 62433 Location of Facility	*Mark Birk, President of AmerenEnergy Medina Valley Cogen, LLC* Name of Owner/Operator
170000066210 EPA Identification Number	2/23/15 Date

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Part III: Remedy Selection Information

1. Describe the selected remedy. *See 2.3 Treatment or Control Options of the GMZ Application.*
2. Describe other remedies which were considered and why they were rejected. *Various remedies were evaluated as part of the Title 35, Illinois Admin. Code, Part 840 rules for Ash Pond D, but proved to be cost-prohibitive. The same evaluation is appropriate to the Ash Pond A closure.*
3. Will waste, contaminated soil or contaminated groundwater be removed from the site in the course of this remediation? YES ☒ NO ☐ If the answer to this question is "yes", where will the contaminated material be taken? *Groundwater discharge proposed under NPDES permit.*
4. Describe how the selected remedy will accomplish the maximum practical restoration of beneficial use of groundwater. *The remedy is to clean-close Ash Ponds B, C, and Bottom Ash then cap Ash Pond A with a composite liner system. The GW trench will help ensure groundwater standards and prevent off-site migration as described in Section 2.32 of the GMZ Application.*
5. Describe how the selected remedy will minimize any threat to public health or the environment. *The risk assessment is addressed in Section 2.32 of the GMZ Application.*
6. Describe how the selected remedy will result in compliance with the applicable groundwater standards. *The remedy should bring about based on the groundwater model results (Groundwater Modeling Report in Appendix C of the Closure Plan and in Section 2.32 of the GMZ Application).*
7. Provide a schedule for design, construction and operation of the remedy, including dates for the start and completion. *Construction complete, but need approval of NPDES permit for operation.*
8. Describe how the remedy will be operated and maintained. See *Section 2.32 of the GMZ Application and the documents referenced therein.*
9. Have any of the following permits been issued for the remediation?
   a. Construction or Operating permit from the Division of Water Pollution Control. YES ☒ NO ☐
   b. Land treatment permit from the Division of Water Pollution Control. YES ☐ NO ☒
      If the answer to this question is "yes", identify the permit number.
   c. Construction or Operating permit from the Division of Air Pollution Control.
      YES ☐ NO ☒ If the answer to this question is "yes", identify the permit number.
10. How will groundwater at the facility be monitored following completion of the remedy to ensure that the groundwater standards have been attained? *See Groundwater Monitoring Plan (Appendix B of the Closure Plan).*

Based on my inquiry of those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true and accurate and confirm that the actions identified herein will be undertaken in accordance with the schedule set forth herein.

Hutsonville Energy Center	Mark C Birk
Facility Name	Signature of Owner/Operator
15142 E. 1900th Ave., Hutsonville, IL 62433	*Mark Birk, President of AmerenEnergy Medina Valley Cogen, LLC*
Location of Facility	Name of Owner/Operator
170000066210	2/23/15
EPA Identification Number	Date

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[redacted]

Ash Ponds Closure

Post-Closure Care Plan

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

September 8, 2014

NATURAL RESOURCE TECHNOLOGY

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1. Introduction

The Post-Closure Care Plan (Plan) for the AmerenEnergy Medina Valley Cogen, L.L.C. Hutsonville Power Station (Site) water treatment devices known as Ash Pond A, Ash Pond B, Ash Pond C and the Bottom Ash Sluice Pond, presented herein, are to be closed in compliance with the requirements of Title 35 Illinois Administrative Code, Part 620 (35 IAC 620), and elements of this Plan have been prepared to generally conform with the Ash Pond D site-specific rule at 35 IAC 840, and where judged appropriate, elements of the proposed 35 IAC 841 rules, currently under development (Illinois PCB, 2013). Concurrently submitted supporting documents are cited within this Plan and listed in Section 9 of this report.

2. Post-Closure Maintenance Program

Post-closure activities will continue for a minimum of ten years following the completed closure activities, as defined in the Closure Plan (Hanson and NRT, 2014a) and acceptance of the Site's closure by the Illinois Environmental Protection Agency (EPA). The post-closure maintenance program will include the following:

2.1 Site Inspections

Inspection of the facility will be conducted on a quarterly basis until completion of the post-closure period. Site inspections must also be performed after storm events. For purposes of this Plan, an "Inspection Storm Event", for purposes of this Plan, is defined as a 25-year, 24-hour event (Huff & Angel, 1989), or approximately 5.37 inches of precipitation.

Termination of the site inspections will occur after Illinois EPA approval of the certified Post-Closure Care Report, as discussed herein.

Written record of the inspection(s) will be made and retained at the Site or the Site operator's office. The inspector will assess the condition and need for repair of final cover and vegetation, as well as fencing, monitoring points, and surface water control features.

2.2 Erosion Control Maintenance

During the post-closure care period, repairs and maintenance, including repair of rills and gullies will be undertaken if ponding is observed, or gullies 6-inches or deeper have formed, or if vegetative or vector problems arise. Areas that have been identified by the inspector as particularly susceptible to erosion will be re-contoured and reseeded as necessary.

2.3 Drainage Channel Maintenance

All eroded and scoured drainage channels will be repaired, and the lining material replaced, if necessary. All vegetated areas and associated structures will be inspected as part of the site inspection.

2.4 Final Cover Maintenance

Residual settlement and erosion may require minor final cover repairs. If ponding occurs or depressions appear, the areas will be repaired in order to maintain the integrity of the final cover. Areas of settlement will be repaired with additional cover soils, as required, to maintain drainage.

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2.5 Vegetation Repair

Areas repaired as noted above will require re-establishment of vegetative cover. Areas of sparse or failed vegetation in-excess of 100 square feet (ft^2) will be re-vegetated.

2.6 Geosynthetic Liner

During the post-closure time period all rips, tears, punctures, or other damage to the geosynthetic liner system will be repaired. Construction Quality Assurance (CQA) methods in accordance with the project CQA Plan (Hanson 2014a) will be followed during the repair process.

2.7 Vegetation Mowing

The vegetation will be mowed annually. During mowing and site inspections, if any woody growth is found in the vegetative areas it will be removed promptly.

2.8 Miscellaneous Repairs

Minor repairs may be required to ensure the integrity and proper function of fencing, surface water drainage structures, monitoring points, and groundwater monitoring wells. Repairs will be made as warranted.

3. Groundwater Monitoring System

See Section 2 in the Groundwater Monitoring Plan Report (Hanson 2014b). A list of monitoring wells/piezometers are shown in Figure 1 and further identified in Table 2 of the Hanson (2014b) report. A monitoring system maintenance plan is included at the end of Section 2.2 of the Hanson (2014b) report.

4. Groundwater Monitoring Program

Requirements for the Groundwater Monitoring Program may be found in Section 3 and Appendix C of the Groundwater Monitoring Plan (Hanson 2014b). Quality Assurance requirements may be found in Section 6 of the Hanson (2014b) report.

5. Annual Statistical Analysis

The statistical methodology for the annual review may be found in Appendix A of the Groundwater Monitoring Plan (Hanson 2014b).

6. Groundwater Management Zone (GMZ)

A proposal for a Groundwater Management Zone pursuant to 35 IAC 620.250 for the Site is included in the Groundwater Management Zone Application (Hanson and NRT, 2014b).

7. Mitigation of Statistically Significant Increasing Concentrations

See Section 7.2 in the Groundwater Monitoring Plan (Hanson 2014b) list the steps to demonstrate compliance with the pertinent regulations.

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8. Licensed Professional Signature/Seal

I hereby affirm that all information and design contained in this Post-Closure Care Plan is true and accurate to the best of my knowledge and belief in accordance with good engineering practice.

Steven M. Bishoff, P.E.
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703-2886
(217) 788-2450
Registration No. 062-040449

Seal:



Expires 11/30/2015

Signature: _____ Date: 9-9-2014

9. References

Hanson, 2014a. "Ash Pond Closure, Hutsonville Power Station, Construction Quality Assurance Plan, AmerenEnergy Medina Valley Cogen, L.L.C., Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson, 2014b. "Ash Pond Closure, Hutsonville Power Station, Groundwater Monitoring Plan, AmerenEnergy Medina Valley Cogen, L.L.C., Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson, 2014c. "Ash Pond Closure, Hutsonville Power Station, Plans and Specifications, AmerenEnergy Medina Valley Cogen, L.L.C., Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson and NRT, 2014a. "Ash Pond Closure, Hutsonville Power Station, Closure Plan, AmerenEnergy Medina Valley Cogen, L.L.C., Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL and Natural Resource Technology, Inc., Milwaukee, WI.

Hanson and NRT, 2014b. "Ash Pond Closure, Hutsonville Power Station, Groundwater Management Zone Application, AmerenEnergy Medina Valley Cogen, L.L.C., Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL and Natural Resource Technology, Inc., Milwaukee, WI.

Huff, F.A. and J.R. Angel, 1989. "Frequency Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois, Bulletin 70. Illinois State Water Survey, Champaign, IL, 177 pp.

Illinois PCB, 2013. Rulemaking R2014-10 "Coal Combustion Waste Surface Impoundments at Power Generating Facilities: Proposed New 35 Ill. Adm. Code Part 841 – Statement of Reason". Illinois Pollution Control Board, Springfield, IL, 305 pp + Appendices.

Ash Ponds Closure

Construction Quality Assurance Plan

Hutsonville Power Station
AmerenEnergy Medina Valley Cogen, L.L.C.
Crawford County, Illinois

October 2, 2014

NATURAL RESOURCE TECHNOLOGY

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1. INTRODUCTION

This document describes the Construction Quality Assurance (CQA) program for the closure of Ash Ponds A, B, C and the Bottom Ash Sluice Pond at the Hutsonville Power Station near Hutsonville, Crawford County, Illinois.

This program includes documentation of CQA monitoring, inspection, sampling and testing to verify compliance with project plans and specifications. The goal of this program is to achieve a reasonable degree of certainty that the construction of the facility meets the specified designs.

Appendix A lists the testing methods, acceptance requirements and testing frequencies that shall guide the implementation of this plan. The plan includes oversight by the CQA Officer for all testing carried out by the geosynthetic installers.

The CQA Plan also requires submittal of an acceptance report that certifies the facility has been constructed in accordance with the construction documents.

This Plan is intended to supplement the project plans and specifications. Where a conflict exists, the approved CQA Plan will govern. Please see Table A-1 for testing methods, acceptance requirements, and testing frequency that guide implementation of this Plan.

2. RESPONSIBILITY AND AUTHORITY OF PROJECT PERSONNEL

The project participants involved in the construction and quality assurance oversight of the construction are shown in Figure 1. The Owner is AmerenEnergy Medina Valley Cogen, L.L.C. (Ameren) who will retain a General Contractor to construct the facility and a CQA Officer to provide the quality assurance oversight services. The following list the responsibilities and authority of each of the participants shown in Figure 1. Table 1 lists the testing/documentation required and the party responsible for generating /maintaining the documentation.

2.1 Owner (Ameren)

Ameren is responsible for obtaining all necessary permits for construction and operation of the facility. Ameren retains under contract all parties for the construction including the General Contractor, the Design Engineer, the CQA Officer, and any CQA testing and monitoring firms.

The Ameren Construction Supervisor will be in charge of coordinating overall construction activities and will act as Ameren's primary interface with the General Contractor. The Construction Supervisor coordinates all matters involving contract issues, including approving field changes to the project plans and specifications.

2.2 Design Engineer

The Design Engineer is responsible for development of plans and specifications that fulfill the needs of the Owner and meet the requirements of the regulatory agencies. The Design Engineer is also responsible for responding to contractor requests for information (RFIs) during the construction process as may be required to clarify the plans and specifications or to address identified conflicts in the documents. The Design Engineer is further responsible for developing any modifications to the plans and specifications as may be required to address changed field conditions, field cost savings, design improvements or other necessary or desired modifications as approved by the Owner.

Figure 1. Project Organization Chart

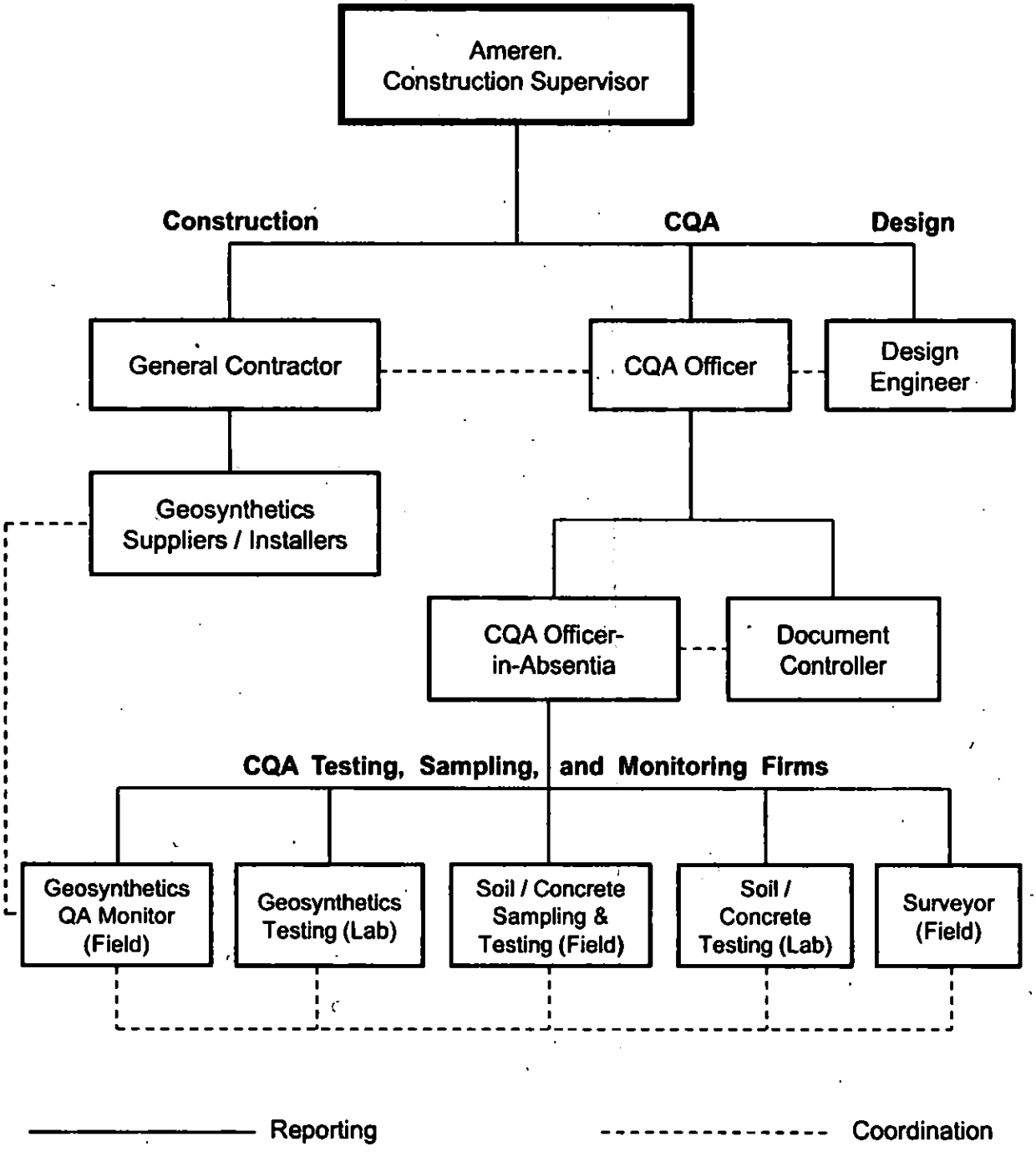

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Table 1. Summary of CQA Documentation

Submittal	Initiating Party
Request for Information	General Contractor
Field Change Orders	General Contractor
Log of Authorized Field Change Orders	General Contractor
Shop Drawing Submittals	General Contractor
Calibration Forms	Soil Testing and Surveying Firms
Chain of Custody	Sampling Personnel
Laboratory Test Results	As appropriate
CQA Subgrade Certification Points	CQA Officer's Surveyor
"As-built" Surface Water Management System/Final Grade	General Contractor's Surveyor
Manufacturer's Guaranteed Properties for Geosynthetics	Geosynthetic Manufacturer
Geosynthetic Roll Inventory	Geosynthetic Manufacturer
Geosynthetic Manufacturer's Guarantee of Product	Geosynthetic Manufacturer
Certificates of Acceptance	Geosynthetic Installer
"As-built" Drawing of Exposed Geomembrane Installation	Geosynthetic Installer
Non-Destructive Field Testing Results	Geosynthetic Installer
Destructive Field Testing Results	Geosynthetic Installer
Meeting Summaries	CQA Officer
Daily Reports	CQA Officer
Weekly Summary Reports	CQA Officer
Photographs	CQA Officer
CQA Certification Form	CQA Officer
CQA Acceptance Report	CQA Officer

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2.3 CQA Personnel

2.3.1 CQA Officer

Ameren will retain a CQA Officer for the project who will report directly to Ameren's Construction Supervisor (see Figure 1). The CQA Officer shall be a Professional Engineer registered in the State of Illinois, who is a person other than the Owner or an employee of the Owner, and who will supervise and be responsible for all inspection, testing, and other activities required to be implemented as part of the CQA program. The CQA Officer will also be responsible for, and will provide direct supervision to, any testing and monitoring firms shown in Figure 1 who will perform the monitoring, testing, sampling, and inspections required by the CQA program as described more specifically in Section 5. The CQA Officer will be present at the outset of major undertakings and at critical times during the construction. The time that the CQA Officer must be at the project site will be dependent upon the type of construction being conducted. The CQA Officer will exercise his/her own professional judgment to be present at the project site as required to assume full responsibility for the inspection and testing performed by those persons under his/her direct supervision. The CQA Officer shall have sufficient on-site staff to adequately carry out the quality assurance activities specified herein.

If the CQA Officer is unable to be present to perform duties as outlined below, then the CQA Officer will provide a designated CQA Officer-in-Absentia. A signed statement shall be provided and recorded that the CQA Officer assumes full responsibility for all inspections performed and reports prepared by the designated CQA Officer-in-Absentia during any absence of the CQA Officer.

The CQA Officer (or his designated representative), shall provide oversight of the monitoring, inspection, testing and/or sampling of the following construction activities for the facility:

- Compaction of the subgrade and foundation to design parameters,
- Application of final cover, including installation of the geomembrane, and
- Construction of ponds, ditches, lagoons and berms.

The CQA Officer (or his designated representative) must certify that the sampling, inspection and test results for the major elements of the construction are in compliance with established design requirements before subsequent sequential items of the construction can be initiated. The major elements of work requiring compliance certification include:

- Base Grade prior to placement of the geomembrane,
- Geomembrane prior to placement of the protective soil cover,
- Geomembrane installation in anchor trenches prior to backfilling,
- Construction of surface water control features; and
- Placement of the protective soil cover,

Certification will require a review of all inspection, sampling and testing completed for the work item to ensure that all design requirements have been met, a visual inspection of the work item, and the completion and signing of form CQAP-2.1 *CQA Certification* by the CQA Officer (or his designated representative). The contractor or installer for the immediately following item of work shall not be allowed to initiate work until completion of the signed form by the CQA Officer (or his designated representative).

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The elements of work requiring compliance assurance include:

1. Bedding material contains no undesirable objects;
2. The closure plan has been followed;
3. The anchor trench and backfill are constructed to prevent damage to the geosynthetic membrane;
4. All tears, rips, punctures, and other damage are repaired;
5. All geosynthetic membrane seams are properly constructed and tested in accordance with manufacturer's specifications;

The completed and signed forms CQAP-2.1 shall be filed as project records in accordance with the provisions of Section 10.

2.3.2 Document Controller

The staff of the CQA Officer shall include a Document Controller who will be responsible for: (1) control of the CQA Plan to ensure that only current documents are being employed by the CQA staff and (2) filing of all CQA records related to the monitoring, sampling, inspecting and testing specified in the CQA Plan.

Requirements for control of the CQA Plan and for filing of project records are presented in Section 10.

2.4 Testing and Monitoring Firms

The testing and monitoring firms, under the direction of the CQA Officer (see Figure 1), shall be responsible for conducting the quality assurance sampling (where appropriate), inspection and testing required by Section 5 of the CQA Plan except that only monitoring and limited (independent) sampling and testing shall be required for the geosynthetics (i.e., geomembrane). The suppliers and installers shall be responsible for all the sampling and testing required by Section 5 for the geosynthetics (see Section 2.5).

Testing and monitoring firms may be one or several, as long as each firm (or firms) is qualified in accordance with Section 2.4.

2.4.1 Soil/Concrete Testing (Lab and Field)

One or more soil/concrete testing firms that has been qualified by the Illinois Department of Transporation (IDOT) will be retained to perform the laboratory testing required by the CQA Plan. Materials will be sampled by the testing firm or by persons designated by the CQA Officer. Materials sampled and tested will include fine-grained soils, coarse-grained soils, aggregates, rip rap and concrete.

Each firm shall be required to provide "certificates of calibration" (or other proof of calibration) to the CQA Officer for each of the measuring and/or test equipment used in the laboratory or field; except that such certificates are not required for commercial grade equipment such as rulers, tape measures or other devices that provide adequate accuracy for their intended purpose.

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Field and laboratory forms proposed for collection of data shall be subject to review by Ameren prior to use. Incomplete or otherwise unacceptable forms will be modified by the testing firm to meet the intent of the CQA Plan.

2.4.2 Surveyor

One or more surveyors will survey specified elevations, slopes and grades as required by the CQA Plan. The firm(s) selected will complete all work by or under the supervision of an Illinois Professional Land Surveyor.

Each surveyor will be required to provide proof of calibration (not more than one (1) year since the last calibration) to the CQA Officer for each surveying device used. Proof of calibration for commercial grade equipment such as rulers, tape measures or other devices that provide adequate accuracy for their intended purpose, is not required.

2.4.3 Geosynthetics Monitor and Geosynthetics Testing Laboratory

A geosynthetic monitoring firm may be retained to conduct oversight of the quality assurance inspections, testing and sampling carried out in the field by the suppliers and installers of the geosynthetic (see Section 2.5) to ensure that the requirements of the CQA Plan are met including directing additional inspection, sampling and testing as may be deemed necessary by the monitoring firm and/or the CQA Officer. The monitoring firm may also collect representative samples of the geosynthetic for independent testing by a geosynthetic testing laboratory as directed by the CQA Officer.

The geosynthetic testing laboratory will be independent of both the manufacturer and the installer of the geosynthetic and will be required to have its own quality assurance (QA) plan for the project work. The QA Plan shall be subject to review by Ameren prior to start of services.

Field and laboratory forms proposed for collection of data shall be subject to review by Ameren prior to use. Incomplete or otherwise unacceptable forms will be modified by the testing firm to meet the intent of the CQA Plan.

2.5 Contractors, Suppliers and Installers

The contractor, subcontractors, suppliers and installers are responsible for completing their portions of the work within specified schedules and in accordance with the requirements of the contract documents. They additionally shall accommodate the monitoring, sampling, inspections and testing that are the responsibility of the CQA Officer under the CQA Plan.

The geosynthetic suppliers and installers shall provide the quality assurance inspection, sampling and testing as required by Section 5 of the CQA Plan. Additionally, the geosynthetic suppliers shall be required to submit "certificates of acceptance" for certain items of work that precede their construction activities. The "certificates of acceptance" are more specifically discussed in Section 4.

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3. PROJECT MEETINGS

Periodic meetings will be held during the life of the project to enhance coordination among the various parties involved. Meetings will include preconstruction meetings, routine progress meetings and as needed, problem or work deficiency meetings.

3.1 Preconstruction Meetings

Preconstruction meetings shall be held at the site for the major earthwork items and geosynthetic installations. At a minimum, the Ameren Construction Supervisor, the CQA Officer, representatives of the testing firms, and the earthwork contractor or geosynthetic installer shall attend. In addition to the topics for discussion as listed in the project specifications, the following CQA items will be covered:

- Discuss the established protocol for inspections, tests and sampling including use of form CQAP-7.2 *Daily Inspection Report* (see Section 7),
- Discuss items of work requiring CQA Officer certification or installer acceptance before subsequent work items can be initiated (see Section 4), and
- Discuss the established protocol for handling construction deficiencies, corrective measures, and retesting (see Section 6).

The meeting shall be conducted by the Ameren Construction Supervisor or the CQA Officer and will be documented by CQA personnel with distribution to all attendees. Meeting minutes will be filed as project records in accordance with Section 10.

3.2 Progress Meetings

At the discretion of the Ameren Construction Supervisor or the CQA Officer, progress meetings will be scheduled to discuss on-going and up-coming construction activities. The meeting will be attended by the Ameren Construction Supervisor, the CQA Officer, and the appropriate site foreman (i.e. when earthwork is being performed, the earthwork foreman will be present; when geosynthetic are being installed, the installer foreman will be present, etc.). In addition to the topics of discussion regarding progress, the following CQA items shall be reviewed:

- Discuss the established protocol for inspections, tests and sampling including use of form CQAP-7.2 *Daily Inspection Report* (see Section 7),
- Discuss items of work requiring CQA Officer certification or installer acceptance before new work items can be initiated (see Section 4), and
- Discuss the established protocol for handling construction deficiencies, corrective measures, and retesting (see Section 6).

These meetings will be documented by the CQA Officer with distribution to all attendees including the Ameren Construction Supervisor. Meeting minutes will be filed as project records in accordance with Section 10.

3.3 Problem or Work Deficiency Meetings

Special meetings will be convened by the CQA Officer when a problem or work deficiency is present (or anticipated) that is (or could be) of a serious nature. At a minimum, the meeting should be attended by the Ameren Construction Supervisor, earthwork or installer foremen as appropriate, and the CQA

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Officer. The purpose of these meetings is to define and resolve the problem or work deficiency in the following manner:

- Define the problem or deficiency and its probable causes,
- Discuss alternative actions to address the problem or deficiency,
- Implement the selected action to resolve the problem or deficiency, and
- Verify that the implemented action has been effective.

The meeting will be documented by the CQA Officer with distribution to all attendees including the Ameren Construction Supervisor. Meeting minutes will be filed as project records in accordance with Section 10.

4. IN-PROGRESS ACCEPTANCE OF WORK

4.1 Introduction

It is very important during placement of the geosynthetic not to entrap fugitive clay, stones, sand, etc. that could damage the geosynthetic, cause clogging of drains or filters, or hamper seaming of the geosynthetic. The geosynthetic installers shall accept responsibility for inspecting the substrate (on a daily basis) to ensure such entrapments are not present within the substrate area to be covered each day. When found acceptable, the installer shall complete and sign form CQAP-4.1 Installer Certificate of Acceptance that documents (on a daily basis) acceptance of the substrate for geosynthetic placement. The installer shall provide the original signed document to the CQA Officer (or his designated representative) for his signature of receipt.

Completed and signed forms CQAP-4.1 shall be filed as project records in accordance with the provisions of Section 10.

4.2 Elements of Work Requiring Prior Acceptance

Table 2 cites the elements of work that shall require daily "certificates of acceptance" for the substrate including the installer responsible for providing the certification. Any other areas of geosynthetic installation not included in the table shall still be subject to the requirements of this section.

Table 2. Installer Certifications for Acceptance of Work

Substrate to Be Accepted by Installer	Installer
1. Surface of Base Grade/Subgrade	Geomembrane Installer
2. Surface of Geomembrane	Vegetative Cover Installer

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5. SAMPLING AND TESTING REQUIREMENTS

5.1 Introduction

Prequalification and placement sampling/testing requirements for the various materials and construction activities are summarized in Table A-1. Frequencies for material placement testing listed in Table A-1 are based on the volume of material used in construction and are to be considered minimums. The CQA Officer shall select the specific locations for testing on a random basis exercising professional judgment to ensure that testing and sampling fairly represent the construction.

The testing firms under the direction of the CQA Officer shall be responsible for the sampling (as applicable) and testing listed in Table A-1 for: (1) the Soils Prequalification and Placement Testing, (2) the Coarse Aggregate Prequalification Testing, and (3) the Other Material Placement Testing. The geosynthetic installers shall be responsible for the sampling listed in Table A-1 for the Geosynthetics Prequalification and Placement Testing. Independent laboratory testing will be coordinated through the geosynthetic monitoring firm and/or the CQA Officer.

Custody of samples and transfer from the sampling location to the test facility shall be established and documented through the use of form CQAP-5.1 *Chain of Custody Record*. The sampling party shall enter sample descriptions (including proposed use), sampling dates and times, and types/quantities of samples on the form, including methods or types of testing to be carried out, and relinquish custody of the samples to the testing firm by signing and dating the form at the bottom. The samples shall be shipped or delivered to the testing firm with the original signed copy of form CQAP-5.1. The sampling party shall retain a copy for its records.

The testing firm shall document receipt of the samples by signing and dating the form at the bottom and retaining a copy for its records. The testing firm shall return the original signed copy of form CQAP-5.1 to the Document Controller with the submittal of test results. The return of any samples by the testing firm shall be documented by signing and dating relinquishment at the bottom of the form and identifying the returned samples in the "Remarks or Observations" column. The Document Controller shall document receipt of any returned samples by signing and dating the form at the bottom. The Document Controller shall retain the original signed copy of the form as a project record in accordance with Section 10.

The results of the sampling and testing shall be documented on a daily basis by each testing firm or installer providing the quality assurance activities, and the originals of the sampling and testing results shall be provided to the CQA Officer. The CQA Officer shall complete form CQAP-7.2 Daily Inspection Report (see Section 7) for each of the testing firms or installer approving results and attach the results to the form. The completed form CQAP-7.2 and attached results shall be incorporated into the form CQAP-7.1 Weekly Summary Report (see Section 7).

5.2 Soils

5.2.1 Base Grade (Subgrade) Materials

Foundation (top ash/fill surface) materials shall be used to develop a stable foundation for the ash pond cover and provide positive drainage. The CQA Officer shall make a foundation inspection with the soil testing firm and identify areas requiring reworking. The CQA Officer shall inform the earthwork contractor of unsuitable areas requiring reworking of the materials. The CQA Officer may direct the

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surveying firm to determine the locations and extent of areas of unsuitable and reworked material placement and to document all such information on "as built" drawings to be furnished to the CQA Officer.

All fill materials shall be placed in loose lifts no thicker than 12-inches. The material should be placed such that the in-place density limits settlement, and the moisture regime is not so dry as to cause the material to create dust and not so wet as to have obvious (free) moisture or cause the material to pump when driven over. Once grade is reached, the final lift will be smooth rolled using a vibratory, self-propelled roller. The final surface of the ash pond will be inspected for material that could damage the geosynthetic liner. Only ash or fill materials that are free of rock, gravel, or debris (larger than 0.75 inches in any dimension), frozen materials, or other deleterious matter may be placed in the final surface lift. Vegetation may be included in the fill materials, but should be well incorporated into the ash or fill materials placed in Ash Pond A. No large masses of plants or roots should exist that could cause settlement of the cover system.

The CQA Officer shall review the placement and confirm the final grades of the ash/fill and, if found in agreement with the specifications, provide certification for the work using form CQAP 2.1.

5.2.2 Base Grade (Subgrade) Verification

The CQA Officer shall direct the surveyor to verify that actual grades of the Base Grade are in accordance with the plans and specifications. Elevations shall be surveyed on a 100 ft. grid pattern for the surface of the Base Grade. In addition, all breaks in grade at slopes shall be surveyed. Base grading shall meet a control tolerance requirement of 0 ft. to -0.4 ft. or as approved by the CQA Officer. The measured grades shall be documented on "as-built" drawings furnished to the CQA Officer by the surveyor.

The CQA Officer shall review the survey data for conformance to requirements and, if found in agreement with requirements, provide certification for the work using form CQAP-2.1. The Geosynthetic Installer shall accept the subgrade surface as suitable for the geomembrane installation using CQAP-4.1.

5.2.3 Final Cover

5.2.3a Prequalification Testing

Prequalification testing for borrow material sources shall meet the requirements in Table A-1.

Table A-1 requires that prequalification testing for each borrow source being used for the construction of the 3-ft. thick final cover layer include chemical analysis and soil classification testing to determine suitability of the source and to prevent the use of contaminated soil. The results will serve as the major control for material placement during construction.

The laboratory test reports and completed chain of custody records will be filed as a project record in accordance with Section 10.

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5.2.3b Material Thickness Testing

The CQA Officer shall direct the survey firm to determine elevations at the foundation of the final cover and at the final constructed surface using the same 100 ft. grid pattern as was established in Section 5.2.1 (and the break points in slope) to verify attainment of the plan grades and elevations. To verify thickness, all horizontal survey coordinates shall be the same for the base and final constructed surface.

The measured depths and grades shall be documented on "as-built" drawings furnished to the CQA Officer by the surveyor.

5.3 Geomembrane

5.3.1 Prequalification Testing

The contractor shall direct the geomembrane manufacturer to supply an inventory list of rolls to the Owner's geosynthetic QA monitor firm and/or the CQA Officer, who will select rolls to be prequalified for the type and frequency of prequalification testing listed in Table A-1.

The geomembrane manufacturer shall procure and submit samples from the designated prequalification rolls to the independent geosynthetic laboratory (see Section 2.4.3) for verification of selected manufacturer's guaranteed properties. Such samples shall be 3 ft. long by the entire width of the roll.

In addition, the manufacturer shall submit documentation that the materials supplied have been tested for the parameters listed in the manufacturers list of guaranteed properties at the frequency stated in the list of guaranteed properties. The results of such testing, including identification of all individual rolls tested, shall be submitted to the CQA Officer for review. The manufacturer shall certify that all rolls meet the manufacturer's guaranteed properties, in accordance with the specified testing frequency rate.

Geomembrane prequalification testing shall be completed prior to delivery.

5.3.2 Installer Certification of Placement Surface

Prior to daily geomembrane placement, the installer shall provide to the CQA Officer daily "certificates of acceptance" (form CQAP-4.1) which document the installer's inspection and acceptance of the underlying surface as being suitable for the geomembrane installation (see Section 4).

All daily "certificates of acceptance" (form CQAP-4.1) shall be filed as project records in accordance with Section 10.

5.3.3 Installer Testing for Seam Overlap

The contractor and installer shall arrange geomembrane sections such that the use of field seams is minimized. Seam overlaps shall be field measured by the installer to verify the requirement in Table A-1 is met for all seams within the geomembrane footprint. Seam overlaps shall be "shingled" in the direction of the downslope. The CQA Officer shall direct appropriate personnel to make independent measurements of a representative number of seam overlaps for additional verification of the requirement in Table A-1.

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At completion of geomembrane placement, the installer shall provide the CQA Officer with "as-built" drawings of the geomembrane installation showing all seam locations and seam measurement locations.

5.3.4 Installer Non-Destructive Testing

The installer shall conduct non-destructive testing of seams. All seams shall be nondestructively tested over their full length using a vacuum test unit, air pressure test, or other method approved by the CQA Officer. Continuity testing shall be completed as the seaming progresses.

The CQA Officer shall direct appropriate personnel to monitor all non-destructive testing carried out by the installer.

The installer shall submit all non-destructive field testing results to the CQA Officer for filing as project records in accordance with Section 10.

5.3.4a Vacuum Testing (Extruded Welds)

The following procedures are applicable to those processes which produce an extruded weld.

Equipment – The following equipment shall be used when conducting vacuum tests:

- A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, a port hole or valve assembly, and a vacuum gauge,
- A steel vacuum tank and pump assembly equipped with a pressure controller and pipe connections,
- A rubber pressure/vacuum hose with fittings and connections,
- A bucket, and
- A soapy solution.

Procedures – The following procedures will be followed:

1. Energize the vacuum pump and reduce the tank pressure to approximately 10 in. of Hg (gauge).
2. Wet a strip of geomembrane approximately 12 in. wide by 48 in. long (an area larger than the coverage size of the vacuum box) with the soapy solution.
3. Place the box over the wetted area.
4. Close the bleed valve and open the vacuum valve.
5. Verify that a leak tight seal is created.
6. For a period of not less than 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
7. If no bubble appears after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area, repeat the process.
8. All areas where soap bubbles appear will be marked and repaired and then retested until passing test results are obtained.

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5.3.4b Air Pressure Testing (For Double Fusion Seam Only)

The following procedures are applicable to those processes which produce a double seam with an enclosed space.

Equipment – The equipment will be comprised of the following:

- An air pump (manual or motor driven) equipped with pressure gauge capable of generating and sustaining a pressure between 25 psi to 30 psi and mounted on a cushion to protect the geomembrane,
- A rubber hose with fittings and connections, and
- A sharp hollow needle, or other approved pressure feed device.

Procedures – The following procedures will be observed:

1. Both ends of the seam to be tested will be sealed.
2. A needle or other approved pressure feed device will be inserted into the tunnel created by the fusion weld.
3. A protective cushion will be inserted between the air pump and the geomembrane.
4. The air pump will be energized to a pressure between 25 psi and 30 psi. The valve will be closed, and the pressure will be sustained for approximately 5 minutes.
5. If loss of pressure exceeds 3 psi or does not stabilize, the faulty area will be located, then repaired and retested until passing test results are obtained.
6. At the conclusion of a passing air pressure test, the opposite end of the seam will be slit and subsequent drop in pressure will be monitored. This will ensure that the entire seam was completely tested.
7. Remove needle or other approved pressure feed device and seal.

5.3.5 Installer Destructive Testing

5.3.5a General

Destructive seam tests shall be performed at randomly selected geomembrane locations. The purpose of these tests is to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses, not at the completion of all field seaming.

The CQA Officer shall direct appropriate personnel to monitor all destructive testing carried out by the installer.

The installer shall submit the results of all destructive testing to the CQA Officer for filing as project records in accordance with Section 10.

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5.3.5b Location and Frequency

The installer shall select locations where seam samples will be cut out for testing. Those locations shall be established as follows:

1. One (1) destructive test sample per 500 lin. ft. seam length or another predetermined length in accordance with GRI GM 19 shall be taken by the Geomembrane Installer from a location specified by the Owner's Representative. Where seaming is performed by an International Association of Geosynthetic Installers (IAGI) Certified Welding Technician using an automatic welding device, the spacing may be increased to 750 lin. ft. per GRI GM 29 (Track 2). The Geomembrane Installer shall not be informed in advance of the sample location. In order to obtain test results prior to completion of geomembrane installation, samples shall be cut by the Geomembrane Installer as directed by the Owner's Representative as seaming progresses. This minimum frequency is to be determined as an average taken throughout the entire area of placement.
2. Test locations will be determined during seaming at the installer's discretion. Selection of such locations may be prompted by suspicion of excess crystallinity, contamination, offset welds, or any other potential cause of imperfect welding.
3. All samples obtained for destruction testing shall have a 12 in. x 12 in. sample delivered to the Owner for archive storage.

The CQA Officer shall direct appropriate personnel to select and cut out a representative number of additional samples for independent laboratory testing.

5.3.5c Sampling Procedure

Samples will be cut as the seaming progresses in order to have laboratory test results before the geomembrane is covered by another material. The installer shall:

- Assign a number to each sample, and mark it accordingly,
- Record sample location on layout ("as-built") drawing, and
- Record reason for taking the sample at this location (e.g., statistical routine, suspicious feature of the geomembrane).

All holes in the geomembrane resulting from destructive seam sampling shall be immediately repaired. The continuity of the new seams in the repaired area shall be vacuum tested.

5.3.5d Field Testing

The installer shall test in the field, by tensiometer, ten 1 in. wide sample strips from the samples identified for destructive testing; five for peel and five for shear. This testing shall include the independent samples obtained as directed by the CQA Officer. Successful field testing will prequalify samples for laboratory testing. The requirements and frequency for field testing shall be as provided in Table A-1 and Table 1(a) of GRI GM19.

The installer shall conduct all field tests and mark all samples and portions with their number. The installer shall also log the date, time, ambient temperature, number of seaming unit, name of seamer, welding apparatus temperatures and pressures, and pass or fail description, and attach a copy to each sample portion.

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5.3.5e Geosynthetic Quality Assurance Laboratory Testing

Successful prequalifying field tests shall identify samples for laboratory testing. The installer's quality assurance laboratory shall be as selected by the installer with concurrence of the CQA Officer.

Testing shall include shear strength and peel adhesion. At least five specimens from each sample shall be tested by the installer's laboratory for each method. Specimens shall be selected alternately by test from the samples (i.e., peel, shear). All laboratory testing shall be accordance with ASTM D 4437. Acceptance shall be based upon the criteria outlined in GRI GM19, using the specified values given in Table 1(a) of GRI GM19.

The CQA Officer shall direct appropriate personnel to have additional samples tested for peel and shear strength by the independent geosynthetic laboratory as deemed necessary.

5.3.5f Procedures for Destructive Test Failure

The following procedures will apply whenever a sample fails a destructive test, whether the test was conducted in the laboratory or by field tensiometer. The installer has two options:

1. The installer may reconstruct the seam between any two passed test locations.
2. The installer may trace the welding path to an intermediate location at least 10 ft. from the point of the failed test in each direction, and take a small sample for an additional field test at each location. If these additional samples pass the tests, then full laboratory samples are taken. If these laboratory samples pass the tests, then the seam is reconstructed between these locations. If either sample fails, then the process is repeated to establish the zone in which the seam should be reconstructed.

All acceptable reconstructed seams must be bounded by two locations from which samples passing laboratory destructive tests have been taken. In cases exceeding 150 ft. of reconstructed seam, a sample taken from the zone in which the seam has been reconstructed must pass destructive testing.

The installer will document all actions taken in conjunction with destructive test failures.

5.4 Other Material Placement Testing

5.4.1 Placement Testing of Concrete

The CQA Officer shall direct the soil test firm to carry out placement testing for concrete in accordance with the requirements and frequency specified in Table A-1.

The contractor shall submit proposed concrete mix designs to the CQA Officer for review prior to ordering of concrete.

The CQA Officer shall review the concrete testing results and, if found in agreement with the placement requirements; provide certification for the work using form CQAP-2.1.

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5.4.2 Placement Testing of Surface Water Management System

The CQA Officer shall direct the survey firm to determine the elevations and grades of the constructed berms and channels in accordance with the requirements and frequency specified in Table A-1.

The measured elevations and grades shall be documented on "as-built" drawings furnished to the CQA Officer by the surveyor.

5.4.3 Anchor Trench and Geomembrane

The Anchor Trench shall be constructed to prevent uplift and potential damage the geomembrane cover. The trench shall be sufficiently deep and wide to prevent issues with sharp bends in the geomembrane, geomembrane pull-out, and possible tear/punctures to the geomembrane.

The Anchor trench shall be clean of any rock or gravel (larger than 0.75 inches in any dimension), debris, CCW, frozen materials, vegetation, and other deleterious matter. Back fill material shall be of soil classification CL-ML, or other material approved by the CQA Officer and also be free of any rock or gravel (larger than 0.75 inches in any dimension), debris, CCW, frozen materials, vegetation, and other deleterious matter that could damage the Geomembrane.

6. CORRECTIVE MEASURES

The CQA Officer shall reject and require replacement of all materials for which sampling, testing or inspection results show that prequalification requirements are not met. The CQA Officer shall also reject workmanship (and require corrective rework) for which sampling, testing or inspection results show that material placement requirements are not met. The lateral and/or vertical extent of corrective measures for rework shall be based on the frequency of testing and judgment of the CQA Officer.

7. DOCUMENTATION OF SAMPLING, INSPECTIONS AND TESTING

7.1 Weekly Summary Reports

A weekly summary report shall be prepared by the CQA Officer or his designated representative (i.e. CQA Officer-in-Absentia) under the direct supervision of the CQA Officer during each week of activity until construction is complete. Form CQAP-7.1 *Weekly Summary Report* shall serve as the base document to which the daily inspection reports (see Section 7.2) are to be attached.

Each report shall be signed by the CQA Officer or his designated representative (i.e., CQA Officer-in-Absentia). The original report (and attachments) shall be submitted to the Document Controller and filed as a project record in accordance with Section 10.

7.2 Daily Inspection Reports

A daily inspection report shall be prepared by the CQA Officer or his designated representative (i.e., CQA Officer-in-Absentia) under the direct supervision of the CQA Officer for each day that materials, or placement of materials, are being inspected, sampled or tested. Form CQAP-7.2 *Daily Inspection Report* shall serve as the base document to which the test data, photographic records, test results, etc. is to be attached. Such reports shall include the inspector's signature.

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Each report shall be signed by the CQA Officer or his designated representative (i.e., CQA Officer-in-Absentia). The original report (and attachments) shall be incorporated into the weekly summary report.

7.3 Photographs

Photographs may be incorporated into the daily inspection report or weekly summary report to provide a visual record of work progress, inspection/testing activity, construction work, or other items considered important to the report. The photographs, at a minimum, shall include the following information:

- The location, date and time of the photograph,
- A description of the item photographed including direction of view (N, S, E or W),
- Personnel, testing agencies, installers or contractors present, and
- Name and signature of photographer.

8. Acceptance Report

Within 30 days of final completion of construction, the CQA Officer shall submit the acceptance report to Ameren, for Ameren's submittal to the Illinois Environmental Protection Agency. The acceptance report shall contain the following:

- A certification by the CQA Officer that the construction has been prepared and constructed in accordance with the engineering design,
- "As-built" drawings as specified herein, and
- All weekly summary reports.

9. Construction Management Activities

9.1 Requests for Information (RFIs)

Refer to General and Supplemental Conditions of Contract and Project Manual for submittals of RFIs. The General Contractor or installer shall initiate the RFI in a timely manner using form CQAP-9.1 *Request for Information.*

Additional copies of the completed form shall be distributed as directed by the CQA Officer. All RFIs shall be filed as project records in accordance with Section 10.

9.2 Review of Contractor Submittals

The contractor shall submit shop drawings, product data and samples to the CQA Officer in accordance with the requirements of the project specifications and with such promptness as to cause no delay of the work.

The CQA Officer shall maintain copies of all submittals and a log documenting submittal descriptions, dates of receipt, dates of return, review personnel, and actions taken on the submittals. Copies of submittals and the log shall be filed as project records in accordance with Section 10.

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9.3 Field Change Order (FCO) Process

The contractor shall be responsible for preparing requests for FCO in accordance with Ameren procedures and submitting the FCO requests on the appropriate form.

The CQA Officer shall be responsible for reviewing the FCO, and submitting the documented decision to the contractor. Agreement to the FCO shall require signature approval of the Ameren Construction Supervisor.

Copies of the FCOs and log of authorized FCOs shall be retained as project records in accordance with Section 10.

10. Document Control and Project Records

10.1 Document Control

The CQA Officer shall control revisions to the CQA Plan and other project documents, so that correct documents are being employed by the project participants. The CQA Plan, including all changes thereto, shall be reviewed for adequacy and approved for release by Ameren.

The Document Controller shall issue controlled copies of the CQA Plan and maintain all records associated with its preparation, issue and revisions. Control paths for samples and documents falling under this Plan are shown in Figure 2.

10.2 Project Records

The maintenance of project records during construction activities shall be the responsibility of the Document Controller and shall be protected against damage, deterioration, and loss. Records shall be readily identifiable and retrievable.

Project records shall be made available to the Ameren Construction Supervisor as requested during construction and, when requested, shall be turned over to Ameren at completion of the construction contract. Ameren shall retain the weekly summary reports certified by the CQA Officer until the completion of the post-closure care period and must make those reports available at reasonable times for inspection and/or photocopying by Illinois Environmental Protection Agency.

Records shall include, but not be limited to, the following:

- CQA Plan (all revision levels),
- CQA Plan documentation (reviews, issuance and revisions),
- Meeting minutes,
- Weekly summary reports (form CQAP-7.1),
- Daily inspection reports (form CQAP-7.2),
- Manufacturer's QA results/certifications,
- Certificates of acceptance by geosynthetic installers,
- CQA certifications (form CQAP-2.1),

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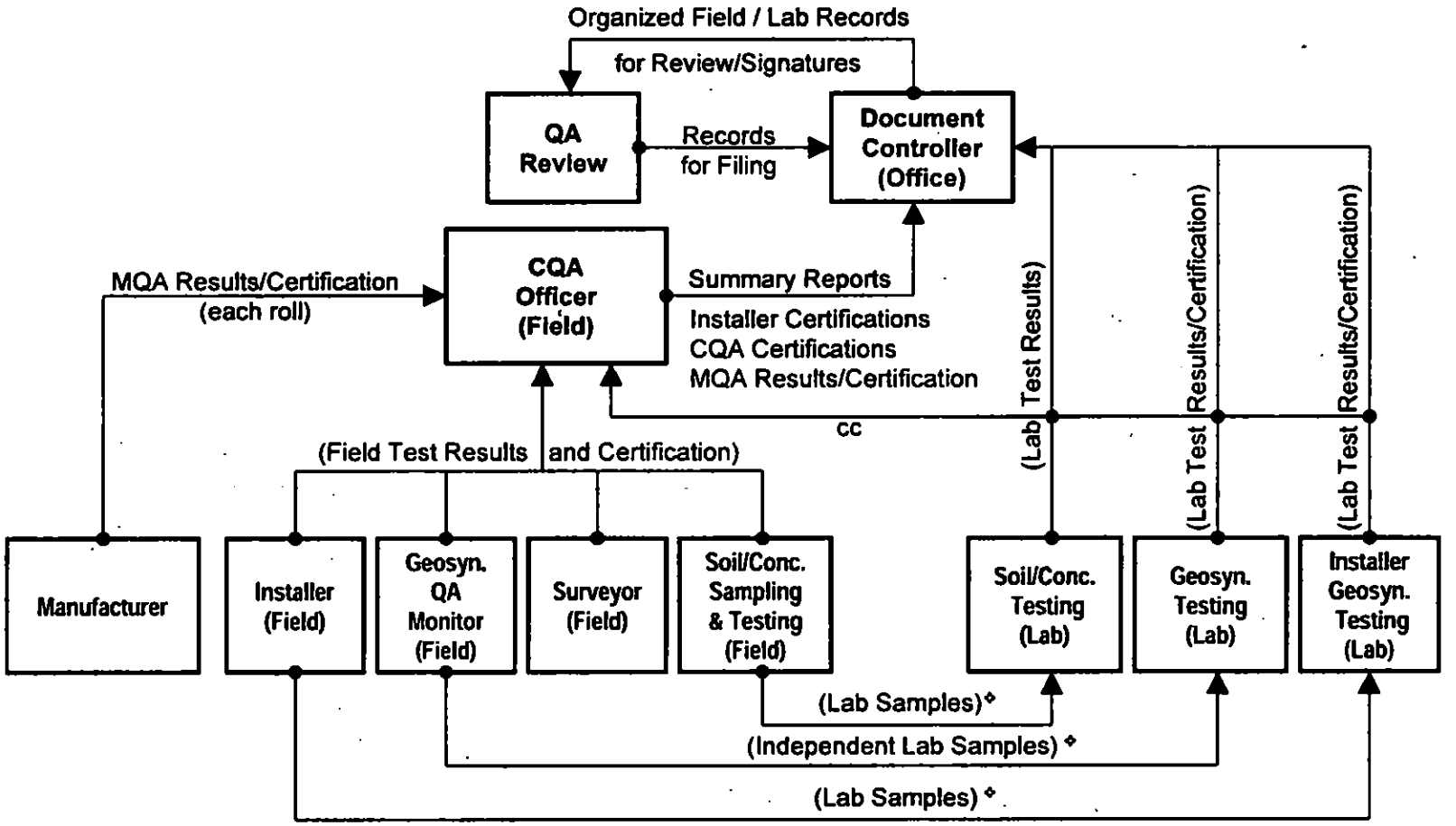
- Certificates of calibration for inspection, measuring and test equipment,
- "As-built" drawings,
- Laboratory test results and completed chain of custody records,
- Laboratory certifications of manufacturer's guaranteed properties for geosynthetic,
- Field Change Order Requests,
- Log of Authorized Field Change Orders,
- Shop drawing submittals,
- Log of shop drawing submittals,
- Requests for information (RFI) from contractor/installers,
- Responses to requests for information, and
- Acceptance report.

Figure 2. Control of CQA Documents and Samples



◆ *Transmittal letters shall direct the original lab test results/certifications to be sent to Document Controller with copies to the CQA Officer. All samples subject to chain-of-custody requirements.*

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Appendix A

Material Testing and Frequency



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Table A-1. Material Testing and Frequency

Property/Test Method	Requirement/ Specification	Frequency	Responsibility
PREQUALIFICATION TESTING 3-FT. SOIL/FINAL COVER			
Atterberg Limits - ASTM D 4318	USCS Soil Classification (Note 1)	One Test per Borrow Source	Contractor
Grain Size Analysis - ASTM D 422	USCS Soil Classification (Note 1)		
RCRA Metals (as TCLP): SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code (IAC) 620.410(a)		
CCW Ions (as total concentrations): SW 846 6010B – Boron SW 846 M4500-CLE – Chloride SW 846 9036- Sulfate	Below the Class I Groundwater Standards at 35 IAC 620.410(a)		
BETX Constituents: SW 846 8260B - Benzene, Ethylbenzene, Toluene, Xylene	Below the Class I Groundwater Standards at 35 IAC 620.410(c)		
pH - SW 846 9045C	Within the Class I Groundwater Standard range at 35 IAC 620.410(d)		
Flash Point (Pensky-Martens Closed Cup) - SW 846 1010	Ignitability characteristic as defined in 35 IAC721.121		

Note 1 - Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL-ML, or as approved by the CQA Officer. Satisfactory soil shall further be free of rock or gravel (larger than 0.75 inches in any dimension), debris, waste, frozen materials, vegetation, and other deleterious matter.

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Table A-1. Material Testing and Frequency (continued)

Property/Test Method	Requirement/ Specification	Frequency	Responsibility
SOILS - MATERIAL PLACEMENT TESTING			
BASE GRADE (SUBGRADE)			
Survey	see Note 2	100-foot grid	CQA Officer
3-FT. SOIL/FINAL COVER			
Atterberg Limits - ASTM D 4318	USCS Soil Classification (Note 1)	Every 25,000 cubic yards per borrow source	CQA Officer
Grain Size Analysis - ASTM D 422	USCS Soil Classification (Note 1)		
RCRA Metals (as TCLP): SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code [IAC] 620.410(a)		
CCW Ions (as total concentrations): SW 846 6010B - Boron SW 846 M4500-CLE - Chloride SW 846 9036 - Sulfate	Below the Class I Groundwater Standards at 35 IAC 620.410(a)		
BETX Constituents: SW 846 8260B - Benzene, Ethylbenzene, Toluene, Xylene	Below the Class I Groundwater Standards at 35 IAC 620.410(c)		
pH - SW 846 9045C	Within the Class I Groundwater Standard range at 35 IAC 620.410(d)		
Flash Point (Pensky-Martens Closed Cup) - SW 846 1010	Ignitability characteristic as defined in 35 IAC721.121		
Thickness	3 feet minimum total thickness including 1 foot of topsoil and maintain design grade	100-foot grid	
Survey	0 to -0.4 feet Design Grade (see Note 2)		

Note 1 - Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL-ML, or as approved by the CQA Officer. Satisfactory soil shall further be free of rock or gravel (larger than 0.75 inches in any dimension), debris, waste, frozen materials, vegetation, and other deleterious matter.

Note 2 - Final base grade as approved by the CQA Officer.

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Table A-1. Material Testing and Frequency (continued)

Property/Test Method	Requirement/ Specification	Frequency	Responsibility
40 MIL TEXTURED HDPE GEOMEMBRANE - PREQUALIFICATION TESTING			
Puncture Resistance - ASTM D 4833	Manufacturer's List of Guaranteed Properties	1 per 100,000 square feet or per raw material batch, whichever is greater. Sample 3 feet wide by the full roll width.	see Note 3
Tear Resistance - ASTM D 1004	Manufacturer's List of Guaranteed Properties		
Thickness - ASTM D 5994	Manufacturer's List of Guaranteed Properties		
Tensile Strength and Elongation - ASTM D 638 (Modified) or D 6693	Manufacturer's List of Guaranteed Properties		
40 MIL TEXTURED HDPE GEOMEMBRANE - MATERIAL PLACEMENT TESTING			
Seam Overlap	3" (Minimum)	All Seams	Installer/ Contractor
Non-Destructive Testing	As per Section 5.3.4 of CQA Plan	All Seams	
Destructive Testing	As per Section 5.3.5 of CQA Plan	Minimum One Every 500 Feet, or 750 Feet for IAGI Certified Welding Technicians	See Note 4

Note 3 - The Contractor and/or Manufacturer shall provide samples to the Owner for independent laboratory testing. This testing is in addition to the Manufacturer's internal QC testing.

Note 4 – Testing and sampling performed by installer/contractor. Destructive samples provided to CQA Officer for third-party testing. After field testing by the installer, samples will be delivered to the CQA Officer for laboratory testing at the Owner's designated laboratory.

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Appendix B

Forms



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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

3. NEW SEQUENTIAL WORK TO BEGIN:

By CQA Officer-In-Absentia: _____ **Date:** _____
(If applicable) (Signature)

By CQA Officer: _____ **Date:** _____
(Signature)

Distribution: Original To: Document Controller Copies To: _____

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INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: _____ **DATE :** _____

GEOSYNTHETIC MATERIAL: _____

AREA ACCEPTED:

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: _____

Printed Name of Installer's Authorized Representative: _____

Title of Installer's Authorized Representative: _____

Date: _____

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: _____

Date: _____

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

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WEEKLY SUMMARY REPORT
(Form CQAP-7.1)

1. SUMMARY OF WEATHER CONDITIONS: **Date:** _____

AM Conditions: _____

PM Conditions: _____

2. LOCATIONS WHERE CONSTRUCTION OCCURRED:

Location 1: East _____ North _____ **Location 2:** East _____ North _____

Location 3: East _____ North _____ **Location 4:** East _____ North _____

Other Description: _____

3. EQUIPMENT & PERSONNEL ON SITE:

Equipment: _____

Personnel: _____

Visitors: _____

4. SUMMARY OF MEETINGS HELD/ATTENDEES:

☐ None ☐ See Sheet 2 of 2 ☐ See Attached Meeting Minutes

5. MATERIALS USED & TESTING OR INSPECTION RESULTS:

Materials Used: ☐ Stockpiled Soil ☐ GCL ☐ Geomembrane ☐ Geotextile ☐ Drainage Layer
☐ Cushion Dirt ☐ CCB Material ☐ HDPE Pipe ☐ Riprap ☐ Foundation Fill
☐ Other: _____

Testing and/or Inspection Results: ☐ None ☐ See Attached Daily Inspection Reports

Calibration Records for Equipment: ☐ None ☐ See Attached

Prepared By: _____ _____
Signature of CQA Officer-in-Absentia (if applicable)

_____ _____
Signature of CQA Officer

Original Report/Attachments To: Document Controller **Copies to:** _____

SHEET ____ **OF** ____

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WEEKLY SUMMARY REPORT

ADDITIONAL NOTES: **Date:**_____

SHEET ____ **OF** ____

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DAILY INSPECTION REPORT
(Form CQAP-7.2)

TESTING FIRM/INSTALLER: _____ **DATE:** _____

1. LOCATION OF INSPECTION/SAMPLING/TESTING:

2. TYPE OF INSPECTION/SAMPLING/TESTING:

3. PERSONNEL INVOLVED:

4. INSPECTION/TST/SAMPLING PROCEDURE(S) USED:

5A. TEST DATA

☐ Attached ☐ None Taken

5B. PHOTOGRAPHIC RECORDS

☐ Attached ☐ None Taken

6. RESULTS OF ACTIVITY:

☐ Pass ☐ Fail ☐ Corrective Actions Required ☐ See Attached Results

☐ See Explanatory Notes on Continuation Sheet ☐ Other: _____

Prepared By: _____ _____
Signature of CQA Officer or Designated Representative

Original Report/Attachments To: Document Controller **Copies to:** _____

SHEET ____ **OF** ____

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DAILY INSPECTION REPORT

ADDITIONAL NOTES:

Date:_____

SHEET ____ **OF** ____

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REQUEST FOR INFORMATION

(Form CQAP-9.1)

RFI #: _____ **DATE:** _____

FROM: _____ **TO:** _____
COMPANY: _____ **COMPANY:** _____
PHONE: _____ **PHONE:** _____
FAX: _____ **FAX:** _____

RE: _____

CHECK CATEGORY:

☐ Information not shown on contract documents:
Contract Drawing Reference: _____
Shop Drawing Reference: _____

☐ Interpretation Requirements
Specification Reference: _____

☐ Conflict in Requirements
Possible Cost Impact: _____

☐ Coordination Problem
Possible Time Impact: _____

☐ Other Category
Describe:

DESCRIPTION (Use Attached Sheets as Necessary)

CC: File

ATTACHMENTS: ☐ Yes ☐ No

_____
_____
_____
_____

RESPONSE
(Use Attached Sheets as Necessary)

DATE: _____ **RESPONSE BY:** _____

Chain of Custody Record

(Form CQAP-5.1) **Ash Ponds Closure, Hutsonville Power Station, Crawford Co., Illinois**

			Analysis and/or Method Requested						
Client									
Address									
City, State Zip Code									
Phone / Facsimile No.									
Client Project									
Location									
Sampler(s) / Phone	/								
Turnaround Time	Standard [ ] Rush [ ] Date Required:								
P.O. # or Invoice To									
Contact Person									

Analysis and/or Method Requested

Remarks or Observations

Sample Description	Sampling		Sample Type[1]	# of Containers							
	Date	Time									

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment

Special Instructions:

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CONSTRUCTION SPECIFICATION UE-2165

FOR

CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH POND

AT

MEDINA VALLEY COGEN, LLC HUTSONVILLE POWER STATION

Prepared by HANSON PROFESSIONAL SERVICES INC.

for

Ameren MISSOURI

Rev	Date	Revisions	Originator	Reviewer	Approver
0	10.20.2014	Issued for Permit Review	D. Hoots	S. Bishoff	S. Bishoff

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X	NOT USED			
Y	NOT USED			
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SECTION 1A - SUPPLEMENTAL GENERAL CONDITIONS
FOR AMEREN MISSOURI POWER OPERATIONS

1.0 GENERAL

1.1 This section of the specification clarifies and supplements the Ameren General Conditions of Contract ("GCC") and other Contract documents. Specific duties set forth herein do not constitute an exclusive list of requirements, but complement the Ameren GCC. In the event of a conflict between this specification and the Ameren GCC, this specification shall be controlling.

1.2 Contractor shall assure that all tiers of Subcontractors comply with all requirements of Contract documents.

1.3 For any work performed for Ameren Missouri Power Operations, Contractor agrees to comply with Ameren's Supplemental Terms and Conditions, commonly referred to as Section 1A-Supplemental General Conditions for Ameren Missouri Power Operations.

2.0 DEFINITIONS

2.1 Accident/Incident An incident is defined as a near miss, vehicle accident, or property damage to Company-owned/leased equipment or facilities. Refer to OSHA 29CFR1904 for definitions of reportable incidents and injuries.

2.2 Asbestos Containing Material (ACM) Material that contains asbestos that may become airborne and must be handled according to Ameren procedures and Federal and State regulations.

2.3 Competent Person An individual, who is trained and certified in applicable standards, is capable of identifying workplace hazards relating to specific operations, performs inspections of industrial and construction jobsite equipment, and has authority to take corrective actions when needed.

2.4 Computer Based Training (CBT) Computer Based Training is used for safety and job work rules orientation of new employees before they are permitted unescorted access to Company property.

2.5 Confined Space An enclosed area that may require a permit, specialized training, and/or special equipment to enter because of atmospheric or physical entrapment hazards. See OSHA 29CFR1910.146 and Ameren Management Instruction ES-REG-209.

2.6 Hot Work Work that will generate sparks, such as; cutting, grinding, welding, and brazing. A permit may be required for hot work that is hazardous due to location or other factors.

2.7 Environmental, Safety and Health Ameren's ES&H Department sets standards for environmental, safety and health issues and monitors compliance with Ameren policies, as well as with Federal, State and Local regulations.

2.8 Extra Work is defined in Article 1 of the GCCs.

2.9 Extra Work Order (EWO) is defined in Article 1 of the GCCs.

2.10 Job Working Rules Rules of conduct for Contractors working at Ameren facilities that include various types of prohibited behavior: off-limit areas, driving and parking instructions, and safety information that may be specific for the plant, such as fire alarms and evacuation procedures.

2.11 Single Point of Contact (SPOC) is defined in Article 1 of the GCCs.

2.12 Specifications are defined in Article 1 of the GCCs.

2.13 Work is defined in Article 1 of the GCCs.

2.14 Worker's Protection Assurance (WPA) or Hold Card Procedure Ameren's equipment lock-out procedure that ensures equipment and systems are in a safe state prior to service or testing. Employees must have WPA training and adhere to WPA procedures. Contractor supervisors must have plant-specific training prior to starting jobs requiring WPA protection.

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3.0 INTENT OF SPECIFICATIONS AND DRAWINGS

3.1 The Contract Documents shall be interpreted as being complementary, requiring a complete Project. Any requirement occurring in any one of the Contract Documents is as binding as though occurring in all Contract Documents. Generally, Specifications address quality, types of materials and Contract conditions, while Plans show placement, sizes, and fabrication details of materials. Reference Article 2.01 of the GCCs.

4.0 BENCH MARKS

4.1 Company will furnish one site bench mark with its assigned elevation. Contractor shall furnish field layouts and shall be responsible for the use of field dimensions and elevations. All such Work shall be subject to approval at the discretion of the SPOC.

5.0 DRAWINGS, DETAILS & INSTRUCTIONS PROVIDED BY CONTRACTOR

5.1 Contractor shall submit to the Company copies of shop drawings, equipment details, installation, operating, and maintenance instructions, wiring diagrams, parts lists, cable termination sign-off sheets, etc. Reference Article 3.02 of the GCCs.

5.1.1 These submittals shall cause no delay in the performance of work. The minimum turn-around time for design changes shall be incorporated on drawings and shall not delay the performance of work. As-built drawings shall be submitted in accordance with Company's schedule.

5.1.2 Contractor shall submit five (5) copies of the above information, four (4) of which Company will retain. One (1) copy will be returned.

5.1.3 In addition to the copies listed above, Contractor shall submit drawings electronically in an approved CAD format. Ameren typically uses Bentley Microstation V7 or V8 (.dgn files).

5.1.4 Company will review submittals for general design features. Contractor is responsible for dimensions, quantities, accuracy, fit, adequacy of details, and coordination with other trades. Contractor must request deviations from contract documents in writing and receive written approval from Company.

5.1.5 Contractor must request field changes in writing and receive written approval from Company. Contractor shall promptly submit as-built drawings to Company.

5.2 Professional Engineering (PE) License Seals

5.2.1 All design documentation meant for fabrication, permitting, erection, or construction such as design drawings, specifications, and calculations shall have a Professional Engineering (PE) seal applied, signed and dated by Contractor's registered professional engineer(s).

5.2.1.1 The license shall be current, valid, and in good standing for the appropriate state where the work is taking place.

5.2.2 Documents where seals are not required include review items (not to be constructed), sketches, samples, design control documents, operations manuals, vendor material design documents, engineered product drawings (not related to permitting) and other documents agreed upon in writing between Ameren and Contractor.

5.2.2.1 Contractor shall be responsible to contact the main Ameren contact up-front to clarify the requirements to seal any project specific documentation.

6.0 LABOR CONDITIONS

6.1 Contractor's Work shall be performed under the National Maintenance Agreement (NMA), unless an exception is agreed upon in writing by the Construction Project Lead or his management, Contractor must furnish a copy of the site extension approval(s) granted by the International Union(s). Site extension requests for the NMA may be filed online at www.nmapc.org.

6.2 There shall be no limit on the work output of any employee, and no restrictions on what tools or equipment may safely be used to increase productivity. There shall be no minimum, other than what may be required by safety regulations, on the number of employees assigned to any crew or to any service.

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6.3 Featherbedding practices of any kind will not be tolerated.

6.4 Actual work hours will be agreed upon during pre-job conferences; lunch breaks will be an unpaid one-half hour. No additional organized breaks are allowed. There shall be no non-working stewards. If a steward is included in the labor force, the steward must be a qualified worker and shall exercise no supervisory functions.

6.5 Contractors must conform to Construction Users Round Table (CURT) Tripartite Initiative report, dated June 2004, with respect to absenteeism, excessive overtime and work disruptions.

6.6 Contractor employees must be rested and fit for duty when they report to the Company's site. Contractor employees must not work in excess of 16 consecutive hours without prior approval of Contractor's Superintendent and Company, and then only when additional steps have been taken to ensure worker safety.

6.7 Contractor shall provide break/lunch facilities at a location in close proximity to the majority of the Work such locations to be approved by the SPOC or other Ameren Management personnel.

6.8 There shall be no slowdowns, illegal strikes, or unauthorized work stoppages of any kind. Contractor understands that its work must be completed in a timely fashion notwithstanding the presence of a labor strike or any pickets at or around the job site.

6.9 In the event that Company's employees, another contractor's or subcontractor's employees or Contractor's employees engage in a strike or established pickets, Contractor is expected to continue to meet its obligations under the terms of the contract and/or obligations with Company. Any such picketing activity is not an excuse for non-performance or delay in completing the project

6.10 Medical Services provided by Ameren:

On specified projects, contractors are not to include costs within bids associated with the following medical services:

- Random and for-cause substance abuse (SA) testing,
- First-aid expenses that can be addressed by an onsite nurse, if an onsite nurse is provided.

7.0 CONTRACTOR MANAGEMENT REQUIREMENTS

7.1 Prior to mobilization, Contractor shall submit an organizational chart and resumes for the entire management team that will utilize, on or offsite, for the project.

7.2 Contractor should adhere to the Job Working Rules (Appendix B).

7.3 Contractor will be responsible to comply with the training and implementation requirements of the FERC Affiliate Restrictions procedure, AUE-ADM-5476.

7.4 Contractor supervisory employees who will be responsible for requesting and signing the WPA must receive site-specific training before working onsite. The SPOC will arrange for the required WPA supervisor training to be located at the Ameren POS Training Center training facility.

7.5 Contractor supervisor shall comply with the specific plant's WPA procedure which is included as Appendix A, Section 2 of this specification. WPA procedure provides details of program and outlines responsibilities for supervisors.

CAUTION: The presence of WPA process does not relieve workers of the responsibility to verify that equipment is actually de-energized or in the designated state. Instruct employees to walk down the job, check energy sources and isolation points such as: voltages, temperatures, pressures, etc. to confirm status.

7.6 Contractor Site Representative should read, understand, and sign the Contractor Agreement of Understanding Form (Appendix A, Attachment A18), prior to beginning work onsite.

7.7 Contractor supervisors shall instruct employees to observe WPA rules and comply with WPA tags at all times.

7.8 Contractor shall participate in individual Construction Progress meetings. The meetings are typically held weekly, but the SPOC may specify another frequency during the course of the Contract.

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7.8.1 A Contractor representative with sufficient authority to make binding work and schedule commitments shall attend these meetings.

7.8.2 The individual progress meeting will typically concentrate on safety and housekeeping, schedule and work progress, job related problems, and site coordination.

7.8.3 Contractor should come to the progress meeting with an updated schedule showing actual progress and the critical path of the work. See Contractor Schedule Requirements (Appendix D) for additional schedule requirements.

7.8.4 Contractor shall take and distribute meeting minutes within 2 working days of the meeting.

7.9 A Contractor representative with sufficient authority to make binding commitments may also be required to attend a weekly Outage Coordination Meeting.

7.10 Contractor personnel, Business agents, Vendor/Sales representatives, etc., should use the entrance designated for their Contractor, park in the Construction parking lot, and be escorted onsite unless they have a Contractor badge. Construction badge holders may use Contractor entrance or Ameren employee entrance, and park in the Construction parking lot or main parking lot depending on purpose of visit.

8.0 DELIVERY AND STORAGE

8.1 Contractor shall be responsible for receiving, unloading, inspecting and hauling materials unless otherwise stated in the Contract documents.

8.2 Contractor and the project must be indicated on materials delivered to the site.

8.3 Contractor shall provide facilities to store materials and equipment on the jobsite. The SPOC will designate storage locations that will not interfere with Company's personnel or operations.

8.4 Payment for material or equipment stored onsite will not be made to Contractor until the material or equipment is installed. Contractor may apply for early payment only if early delivery and storage of the material or equipment will benefit Ameren.

8.5 A carrier that is compliant with the Depart of Transportation's (DOT) Hazardous Materials Security Plan must be used for deliveries to Ameren. For a list of approved carriers visit http://vics.keyship.net/Ameren. Fill out the required fields & check the HazMat option. A list of qualified carriers will populate.. Any vehicle carrying hazardous materials onto Company facilities will be refused entry until proof of compliance is provided.

8.6 If materials are provided by Ameren, they will be stored by Ameren until Contractor is onsite. Contractor will be responsible for loss or damage after acceptance of equipment or material provided by Company. Contractor shall inventory and haul excess material retained by Company to designated Company storage location(s) after completion of Work.

8.7 Contractor shall restore construction storage areas to a reasonable condition that satisfies the SPOC.

8.8 Material Receipt

8.8.1 Contractor must resolve all issues with contractor-procured material.

8.8.2 Contractor must identify, inspect, test and store material to purchase order requirements.

8.8.3 Contractor must ensure all receiving quality documentation is supplied to Ameren's SPOC upon receipt.

8.8.4 Contractor must have a program in place to ensure receipted critical plant material and equipment is not relocated or improperly stored without proper authorization from Ameren's SPOC.

8.8.5 Contractor will be provided a list of critical materials and equipment during Pre-Construction Meetings.

8.8.6 Contractor must handle, store, and identify Critical Material in accordance with the paragraph below:

Ameren MISSOURI

MATERIAL HANDLING, STORAGE & IDENTIFICATION INSTRUCTIONS FOR CONTRACTORS

AUE-ADM-4203, Receiving Storage & Handling of Critical Materials

All Ameren purchased critical material received by a contractor or sub-contractor has specific requirements that must be met to comply with Ameren's Quality Management Program in accordance with AUE-ADM-4203. Contractor requirements contained in AUE-ADM-4203 are provided below. Contractors will be evaluated on their quality control and material management. A list of critical materials shall be provided to the contractor during Pre-Construction Meetings.

1) Notify Responsible Engineer (RE) of Ameren material received and the PO number. Ensure receiving documentation remains with the material until clear direction is provided by RE.

NOTE: Steps 2-5 shall be directed by Responsible Engineer (RE)

2) Receiving documentation, number of containers, and intended storage location shall be taken to Storeroom personnel.

3) Storeroom shall create a Receipt Order (RO) number for traceability and provide identification labels for attachment to each container. Information will always include the RO tracking# and may include PO #, Job #, RE, PM, Storage Level, and intended location.

4) The RO number shall be clearly marked on all boxes, containers, equipment, and packing slip(s).

5) An Ameren Material Receipt Inspection Report (MRIR) shall be printed with the inspection requirements and shall be used to document inspection results. Contractors may perform additional inspections as directed by RE.

6) After successful acceptance, MRIR Inspector(s) shall sign the MRIR and each traceable barcode label; and shall attach labels to containers.

7) Hold tags shall be attached to any materials not accepted.

WARNING: Contact Responsible Engineer or Ameren Designee immediately if unidentified material is discovered, labels become unreadable, material needs to be relocated, or if material location or storage level differs from label.

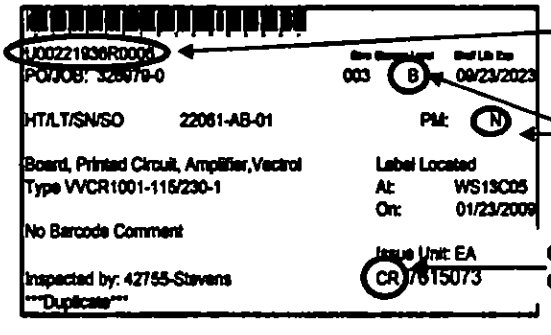
If during staging, prep work, etc., the material is repackaged or removed from labeled containers and the potential for identification or material loss exists, transfer the RO or barcode number, at a minimum, to the materials.

Storage Level B – Indoor storage. Temperatures controlled between 40°F and 140°F. This level includes the storeroom, turbine floor, or any other location inside the plant.

Storage Level C – Covered storage. Temperature control not required. These locations include secondary storerooms, covered parking areas, etc.

Storage Level D – Outside storage. Store in well drained areas in a manner allowing air circulation to minimize trapped water. Provide adequate protection from forces due to rain, wind and storms

CRITICAL MATERIAL BARCODE

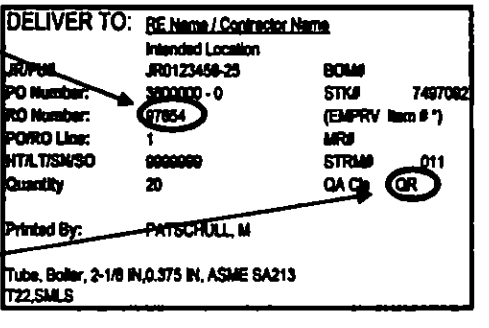


RO# (left) can be shortened to U221936R6

Storage Level & PM

Critical classes: CR, CT, EM, QR

DELIVERY MATERIAL TAG



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9.0 REMOVALS AND PREPARATORY WORK

9.1 Contractor shall cooperate with the SPOC in scheduling removal work so there is no disruption to Company's personnel or operations.

9.2 Contractor shall provide protective enclosures, covers, water stops, etc. to prevent water or other weather-related damage to facilities during construction.

9.3 Before mobilizing tools, material and equipment, Contractor will install appropriate trash cans, cigarette butt receptacles, and dumpsters in designated areas.

9.4 Materials authorized to be removed become the property of Contractor, unless otherwise specified in the Contract documents, and shall be promptly removed from the worksite. An inventory of materials being removed must be submitted to the SPOC. If materials are retained, the SPOC will designate where materials shall be stored. Retained materials shall be neatly stored and protected from the elements.

9.5 Before mobilizing tools, material and equipment, Contractor shall install protection on both sides of all walkways in work area from top rail to toe board. This protection may include, but not limited to, orange fencing, plywood and sheet metal. However, openings in fencing shall be no larger than one inch square. Contractor shall install decking on open floor work areas, seal decking along edges and install toe boards, and install debris nets to further contain fallings objects. All wood subject to ignition sources shall have fire retardant cloth or tarps installed over the wood. Cloth shall be secured to avoid tripping hazards. All safety barriers shall be removed after the completion of the project.

9.6 For additional safety guidelines to be performed prior to working on elevated platforms, walkways and scaffolds above 6 feet, refer to Safety Requirements for Working on Elevated Platforms (Appendix Y).

10.0 CUTTING & PATCHING AND TEMPORARY BUILDINGS, ETC.

10.1 Contractor shall do all cutting, fitting, or patching that may be necessary to make the several parts come together properly and fit to receive the Work of other Contractors and Subcontractors.

10.2 All temporary buildings/structures such as tool rooms, break rooms, lunch rooms, etc., shall be constructed with non-combustible materials.

11.0 TEMPORARY HEAT

11.1 Contractor shall provide temporary heat to protect Work materials against damage from dampness and cold to the satisfaction of the SPOC.

12.0 QUALITY REQUIREMENTS

12.1 The Quality Management System Manual, AUE-MAN-QMS-1001, provides the basis for the Ameren Missouri Power Operations Quality Management System (QMS) and provides the assurance that processes are in place to achieve our business objectives. The QMS performance standards and performance criteria provide requirements to achieve a controlled and systematic approach to quality management activities and promote continuous improvement. Contractors and Sub Contractors can obtain a copy of the QMS from the Ameren Missouri Project Manager.

12.2 The Contractor's quality management program and supportive procedures are subject to Ameren review and audit. Should a gap exist between the QMS, and the Contractor's quality management program and supportive procedures, the Contractor will be required to comply with the QMS.

12.3 Contractors and Sub Contractors agree to comply with the applicable QMS requirements for the work scope included in this Ameren Missouri contract. The Contractor shall provide a copy of the Contractor's quality management program and supportive procedures with the bid submittal, if the Contractor is not on the Ameren Missouri 'Generation Approved Supplier List – Critical (GASLC)'.

12.4 The QMS Application Aid (QMS-AA) per Appendix Q contains the applicable QMS requirements in this Ameren Missouri contract. The Contractor shall complete and return the QMS-AA with the bid submittal, if the Contractor is not on the Ameren Missouri GASLC.

12.5 The Contractor shall upon award develop and provide to Ameren a 'Project-specific Quality Management Plan' which is compliant with the QMS-AA.

12.6 The Contractor's awarded work scope, including that of its Sub Contractors, shall be performed to the requirements of the QMS-AA.

12.7 Ameren will be allowed to make quality inspections at Contractor's and Sub Contractor's facilities at no cost to Ameren. Ameren will be allowed to view applicable Contractor's and Sub Contractor's quality procedures and procedure generated records and documents.

12.8 Design Documents and Calculations:

12.8.1 Contractors and Sub Contractors shall meet the technical requirements included in Section 1D of this specification and the QMS-AA.

13.0 OWNER APPROVAL OF PROCEDURE

13.1 Ameren must consent to deviations from the procedures, methods and materials agreed to in the Contract. Reference Articles 2.01 and 4.01 of the GCCs.

13.2 Ameren reserves the right of approval over all procedures, methods, and materials to be employed by Contractor or its Subcontractors for this Work. Reference Articles 2.01 and 4.01 of the GCCs.

14.0 CONFIDENTIALITY

14.1 Contractor shall hold Ameren's Confidential Information confidential and shall not use or disclose to others during or subsequent to the performance of the Work (except as is necessary to perform the Work). Reference Article 9.02 of the GCCs.

14.2 Publication or advertising of information directly derived from Project or Work or data obtained in connection with services rendered under the Contract must first be approved in writing by Ameren (Ameren personnel need approval from Ameren Corporate Communications). Contractor shall not release any information for publication or advertising purposes relative to the material, equipment and/or services furnished under the Contract Documents without the prior written consent of Ameren. Ameren reserves the right to release all advertising or publicity concerning the Project or Work. Except as to signs required by building department regulations or any other governmental requirements, Contractor shall not display or permit any signs or advertisements to be displayed about the Project site nor publicize in any manner its performance of the Work without the express written permission of Ameren. Reference Article 9.02 of the GCC.

14.3 Contractor shall restrict the knowledge of all confidential information regarding the Work to as few as possible of its employees who are directly connected with performance of the Work and have a definite need for such knowledge. Upon request by Ameren's Representative, Contractor shall cause such persons or groups of persons involved in the Work on Contractor's behalf as Ameren may designate to sign individual secrecy agreements in a form satisfactory to Ameren. Reference Article 9.02 of the GCCs.

15.0 ACCOUNTING / INVOICING REQUIREMENTS / ACIP

15.1 Contractor shall furnish complete accounting information and cooperate with Ameren's accounting practices.

15.2 For Time and Material contracts prior to commencing work, Contractor shall furnish Company with a written estimate for Company approval. Once approved, Contractor shall promptly notify Company of any facts and circumstances that may adversely impact the estimate. Further, Contractor shall not exceed ninety percent (90%) of the time and materials estimate without Company approval. All overtime for Time and Material contracts shall be approved by Company in advance of working. Reference Articles 6 and 8 of the GCCs.

15.3 Company reserves the right not to honor charges associated with timesheets that are not provided daily.

15.4 Material Invoices must be submitted as Work progresses. Total cost updates will be provided on a weekly basis.

15.5 If Work indicated or specified in Contract Documents is increased, Company may have Contractor perform Extra Work.

15.5.1 Contractor must obtain written approval from the SPOC prior to performing any Extra Work. Each Extra Work Order (EWO) shall be invoiced separately and shall reference the EWO number and Purchase Order (PO) number.

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15.5.2 If work is performed on a time and material basis, then work shall be charged at the rates indicated on the Labor Rate Sheets in the Contract.

15.5.3 Ameren will pay Contractor the cost of extra work as follows:

NOTE:	Subcontractor labor and material charges shall be subject to the provisions of Items 15.5.3.1, 15.5.3.2 and 15.5.3.3 below.

15.5.3.1 Labor:

- Direct cost of payroll labor, including first line foreman, excluding job Superintendent and General Foreman
- Fringe benefits including welfare and pension
- Insurance
- Taxes including FICA, Federal, State and Local tax
- Overhead, including costs for home office, field office, consumables, and small tools with an original value under $1,200, as agreed by Company and Contractor at the award of Contract
- Profit, as agreed by Company and Contractor at the award of Contract

15.5.3.2 Material and third party rental equipment:

- Direct cost of material or rental equipment

Subcontractors:

- Direct cost of Subcontractor

Contractor-Owned Rental Equipment (excluding third party rental equipment):

- Contractor shall submit for approval an equipment rental rate schedule including all equipment, tools, and supplies required to perform the Work specified. These equipment rental rates will be used for extra work.

15.5.3.3 Ameren Coordinated Insurance Program (ACIP)

- If the project is part of the Ameren Coordinated Insurance Program (ACIP) all contractors of all tiers will be required to provide completed enrollment and monthly reporting forms for duration of their work on project. All prime contractors will be responsible for their subcontractors of all tiers with respect to compliance of enrollment and reporting requirements.
- If the project is part of the ACIP, contractors of all tiers must be enrolled and have a copy of ACIP certificate of insurance prior to mobilization onsite. Ameren will not allow non-enrolled contractors to access site prior to enrollment in ACIP.

END OF SECTION 1A

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SECTION 1B – SUMMARY OF WORK

1.0 INTRODUCTION

1.1 Definitions

1.1.1 The term "Company" means the entity identified in the Company's Purchase Order, its agents, employees, representatives, successors, and assigns. The terms "Purchaser," "Owner," and "Buyer," if used in the Contract Documents, are considered synonymous and refer to the Company.

1.1.2 The term "Engineer" means the Engineer duly appointed to represent the Company as specified from time to time by the Company who may be employed by the Company or who may be employed by others.

1.1.3 The term "Contractor" means the entity identified in the Company's Purchase Order, and its agents, employees and authorized representatives undertaking the performance of the Work as defined in this Specification. The terms "vendor," "supplier," "manufacturer," or "fabricator" if used in the Contract Documents, are considered synonymous and refer to Contractor.

1.1.4 The term "Sub Contractor" means any individual, partnership, firm, corporation or business entity, other than an employee of Contractor, who contracts or agrees with Contractor (or another Sub Contractor or any tier thereof) to furnish any services, labor, materials or equipment for, or in connection with, the performance of the Work.

1.1.5 The term "Construction Project Lead" means the Company's representative as specified from time to time and located at job site.

1.2 Location

1.2.1 Hutsonville Power Station,15142 East 1900 Avenue, Crawford County, IL 62433

1.3 Contacts

1.3.1 All commercial matters should be directed to the Ameren purchasing agent designated on the Request for Proposal or listed on the purchase order.

1.3.2 All technical and quality questions regarding this specification shall be directed to:

MICHAEL J. WAGSTAFF, P.E., PMP
Consulting Engineer
Dam Safety & Hydro Engineering
Ameren Missouri
3700 S. Lindbergh Blvd.
St. Louis, MO 63127

1.4 Background

1.4.1 All ash ponds at Hutsonville Power Station are out-of-service. Ash Pond D, the largest and oldest of the four ash ponds was covered and closed in 2012 under the 35 IAC Part 840 rules. The remaining ponds, including Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond, will be closed under this Project.

1.4.2 Description of Ash Pond D Closure

1.4.2.1 Ash Pond D was an unlined pond constructed in 1967 – 1968 and was covered with a 22 acre cap and closed in 2012 under the Title 35, IAC Part 840 rules (Illinois PCB, 2011). Closure activities included placement of a 40-mil thick textured high density polyethylene (HDPE) geomembrane with three foot protective soil cover with a vegetated surface. Surface water management features incorporated into the final cover design included intermediate berms and ditches to direct runoff to rip-rap-lined chutes running off the ash pond to surrounding areas.

1.4.3 Groundwater Collection Trench

1.4.3.1 A groundwater collection trench (trench) was installed south of Ash Ponds A, B, and D along the south property line. Operation of the trench has not yet started. The trench is designed to collect groundwater at four separate sumps. Groundwater collected by the trench will be pumped from the four sumps to a central catch basin located on the east

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side of Pond D, from which it will then discharge to the Wabash River in accordance with the Station's NPDES permit.

1.4.4 Ash Pond A

1.4.4.1 Ash Pond A was operational from 1986 until the plant ceased operations in December 2011. Fly ash from the operating units was collected by an electrostatic precipitator and sluiced to Ash Pond A. The pond was constructed with an 80 mil HDPE liner. Ash sluiced to the pond where solids were permitted to settle out and supernatant liquids were decanted. The pond contains fly ash within an area of approximately 12 acres, with an average ash depth of approximately 20 feet. It is estimated that Ash Pond A currently contains approximately 81,000 cubic yards of ash. The ash pond is contained by a 2,400 ft. long perimeter embankment approximately 15 feet high.

1.4.5 Ash Pond B

1.4.5.1 Ash Pond B, an HDPE-lined pond, was placed in service in 2000 for disposal of sluiced fly ash and bottom ash. This pond receives wastewater and/or storm water for periodic discharge and is permitted under the site's NPDES and Subpart B permits. The ash pond has a surface area of approximately 4.4 acres, with a maximum embankment height of 17 feet. It is estimated that Ash Pond B currently contains approximately 12,400 cubic yards of ash. Ash Pond B functioned as a secondary settling pond (polishing pond), receiving flow via a triplex pump station in Ash Pond C and flow from Ash Pond A before discharging to the Wabash River via NPDES-permitted outfall #002 (IL0000175).

1.4.6 Ash Pond C

1.4.6.1 Ash Pond C is an HDPE-lined pond placed in service in 2000 for disposal of sluice water from the Bottom Ash Pond. This pond receives stormwater and is permitted under the site's NPDES and Subpart B permits. Stormwater from the Bottom Ash Pond and Ash Pond C is discharged to Ash Pond B via a pump station. Ash Pond C is incised and has a surface area of approximately 2 acres. It is estimated that Ash Pond C currently contains approximately 10,000 cubic yards of ash.

1.4.7 Bottom Ash Pond

1.4.7.1 The Bottom Ash Sluice Pond was put into service in 1969 for disposal and reuse of bottom ash. This pond has a surface area of approximately 1.2 acres, with a maximum embankment height of 15 feet. It is estimated that the Bottom Ash Sluice Pond contains approximately 23,000 cubic yards of bottom ash. This pond receives stormwater for periodic discharge and is permitted under the site's NPDES and Subpart B permits.

1.4.8 Coal Yard Area

1.4.8.1 The coal storage yard encompasses an area of approximately 7.9 acres and contains an average depth of 12 inches of spoils. It is estimated that approximately 12,700 cubic yards of material will be removed.

2.0 SUMMARY OF WORK

2.1 Project Objectives

2.1.1 The intent of this specification is to obtain the services of a General Contractor to "clean close" Ash Ponds B, C and the Bottom Ash Pond and "close" Ash Pond A with a Geosynthetic Cover System at the Medina Valley Cogen, LLC (the Owner) Hutsonville Power Station located in Crawford County, Illinois.

2.1.2 The proposed Closure Plan for the remaining ash ponds was developed to generally conform with the Ash Pond D site-specific rule 35 IAC 840, and where judged appropriate, elements of the proposed 35 IAC 841 rules, currently under development. The following supporting documents were submitted for review to the IEPA on October 24, 2014:

- 2.1.2.1 Closure Plan
- 2.1.2.2 Hydrogeologic Site Investigation
- 2.1.2.3 Groundwater Monitoring Plan
- 2.1.2.4 Groundwater Management Zone Application
- 2.1.2.5 Construction Quality Assurance Plan
- 2.1.2.6 Construction Plans
- 2.1.2.7 Construction Specifications
- 2.1.2.8 Post-Closure Care Plan

2.1.3 Copies of the above documents are available electronically upon request.

2.2 General Requirements and Design Basis

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(Technical Requirements are provided in General Technical Requirements (Section 1D) of this specification.)

2.2.1 Contractor shall be responsible for furnishing all material (except those items of material specifically stated to be furnished by the Company), tools, equipment, labor, supervision and any other incidental items or services required to perform all of the work described herein.

2.2.2 Contractor shall be responsible for any and all engineering, drafting, field sketches, and field layout required for temporary supports, rigging, removals, and installation of all material.

2.2.3 Contractor shall be responsible for receiving, storage and security of all materials supplied by Contractor and material provided by Company. Contractor will be required to unload material in laydown areas as designated by the Construction Project Lead. Contractor will also be required to obtain items, where specified, from the storeroom. Contractor is responsible for developing an inventory list of material received. Contractor shall provide adequate protection for equipment/material stored outside from forces due to rain, wind and storms. As an example, material such as precipitator collector plates – which would be subject to damage during a high wind event – would require Contractor to perform analysis of potential wind loading and create a detailed storage plan. For this example, Ameren shall review and approve of specific storage plan.

2.2.4 Contractor shall be responsible for moving material supplied by the Company from the Company's storeroom or the adjacent area to the jobsite, and returning unused material back to the storeroom along with an inventory list. Attach Form 4983 "Return Material Tag" to all returned material. Form 4983 will be provided by the Company.

2.2.5 Contractor will be responsible for proper disposal of all material.

2.2.6 Explosives may only be used with written permission from the Company.

2.2.7 Contractor Design shall use the Design for Safety Guide (Appendix C).

2.2.8 Ameren **will not** provide a nurse and first aid trailer for Ameren and contractor personnel during the eight-hour day shift.

2.3 Description of Work

2.3.1 Develop, construct, and maintain a Storm Water Pollution Prevention Program (SWPPP) for the duration of the project.

2.3.2 Dewatering of Ash Ponds A, B, C and the Bottom Ash Pond, as necessary to complete Clean Closure of Ash Ponds B, C and the Bottom Ash Pond and Closure of Ash Pond A. Dewatering of the ponds shall be conducted in a manner to meet effluent guidelines prescribed in the current NPDES permit. See Specifications and the plans for dewatering details. Clean closure of the ponds will be determined and documented by the Owner's Construction Quality Assurance Officer.

2.3.3 Excavation of CCB sediment from Ash Ponds B, C and the Bottom Ash Pond and transportation to Ash Pond A for placement and closure. The sediment may include fly ash, bottom ash, slag, desulfurization by-products, bedding and earthen material, coal, and minor amounts of riprap.

2.3.4 HDPE liner and vegetative cover construction at Ash Pond A.

2.3.5 HDPE liner and vegetative cover construction along the northern end of existing Ash Pond D closure cap after clean closure of the Bottom Ash Pond.

2.3.6 Removal and off-site disposal of the ash pond outlet structures in Ash Ponds A, B, and Bottom Ash Pond.

2.3.7 Disconnecting from power source and removal of pump equipment from the Ash Pond C pump station. Abandon the wetwell structure in place.

2.3.8 Culvert installation, drainage channel excavation, and grading to prevent permanent storm water ponding in the footprint of Ash Ponds A, B, C, Bottom Ash Pond, and Coal Yard area. Seeding and mulching of all areas disturbed by construction activities. When installing the culvert across the plant

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access road (north of Ash Pond A), at least one lane of roadway access to the site must be maintained at all times. (See Paragraph 2.4 for Concurrent Work at the plant site.)

2.3.9 Construction Quality Assurance (CQA) Procedures have been developed for this project as detailed in the CQA Plan. (See CQA Plan) The testing requirements and frequency of testing in this plan will govern in instances which there may be discrepancies between the CQA Procedures and these specifications.

2.3.10 Except as specified below, CQA testing, sampling, and inspections to verify compliance with the plans and specifications are the responsibility of the Owner. The CQA testing, sampling, and inspection requirements are summarized in the CQA Plan. The General Contractor shall coordinate and cooperate with the Owner's consultant to accommodate such activities at no additional cost to the Owner.

2.3.11 The General Contractor is responsible for any testing, sampling, and inspections described in the technical specifications. The General Contractor may perform additional testing to supplement that required by the Plans and Specification and CQA Procedures to ensure the materials and workmanship comply with the contract documents.

2.3.12 Construction surveying for excavation and grading control shall be the responsibility of the General Contractor. Excavation and final grades may be surveyed by the Owner's surveyor to verify the quantity of materials handled. The General Contractor shall coordinate and cooperate with the Owner's consultant to accommodate Owner's surveyor activities at no additional cost to the Owner.

2.3.13 Sources of borrow material have not been determined by the Owner. The General Contractor shall locate and acquire borrow site(s) with a minimum volume of material as shown on the Drawings. Materials in the borrow sites shall be approved by the Owner's Geotechnical Engineer prior to delivery to the site.

2.3.14 The General Contractor shall be responsible for inspecting the site to note any and all conditions that may affect the work under the contract. The General Contractor shall satisfy himself as to the nature, extent and location of the work; the configuration of the ground; the equipment and facilities needed for construction; the general and local conditions of the area; and all other factors and conditions which can, in any way, affect the work under the contract. Any failure by the General Contractor to do so will not relieve him from responsibility for successfully performing the work without additional expense to the Owner.

2.3.15 Existing roads and traffic-ways used by the General Contractor must be maintained by the General Contractor. All roads and traffic-ways utilized during the course of this project must be returned to pre-existing grade and integrity by the General Contractor at the close of the project. In the case of shared road use by Owner's vehicles and those of the General Contractor, Owner's vehicles shall have the right of way.

2.3.16 Please note that monitoring wells and other environmental devices owned and operated by the Owner are located at or adjacent to the project location. Care must be exercised by the General Contractor to ensure damage does not occur to these items. Any damage caused shall be repaired at the sole expense of the General Contractor.

2.3.17 The General Contractor may be required to work in close harmony with other Contractors or Owner personnel who may be employed at this site. In the event of differences of opinion regarding scheduling of work, the decision of the Owner will be final and binding.

2.3.18 In general, work includes, but is not limited to:

- Erosion Control
- Clearing and Grubbing
- Removal of Fencing
- Removal of Pond Structures
- Dewatering/Surface Water Management
- Excavation, Compaction, and Grading of Ash
- Transfer of On-Site Material to Pond A
- Dust Control
- HDPE Liner

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- Placement, Compaction, and Grading of Cover Soil
- Contractor Procurement of Borrow Material
- Culvert Pipe
- Cap Vents
- Earthen/Riprap Ditches and Swales
- Chain Link Fencing
- Aggregate Roadway
- Seeding and Mulching

2.4 Concurrent Work

2.4.1 The Owner will execute a separate contract for Construction Quality Assurance (CQA) for this Project. See the CQA Plan for the CQA contractor's roles and responsibilities.

2.4.2 The Owner will execute a separate construction contract to abandon and/or install several monitoring wells located adjacent to the ash ponds during the construction of this Project.

2.4.3 A separate construction contract to remove plant structures will run concurrently with this project. Coordination between contractors is anticipated. Access to the plant structures must be maintained at all times during construction of this project.

2.4.4 An existing electrical substation is located north of the coal yard area. This substation will remain active during the construction of this project. Access to the substation must be maintained at all times during construction.

3.0 PROPOSED CONSTRUCTION SCHEDULE

3.1 Bid Documents available for distribution: **November 10, 2014**

3.2 Mandatory Pre-Bid Meeting at Hutsonville Power Station: **November 20, 2014**

3.3 Contractor shall submit a Lump Sum Firm Fixed Price Bid Proposal: **December 17, 2014.**

3.4 Issue Purchase Order to Contractor: **January 23, 2015**

3.5 Pre-Construction Meeting: **February 18, 2015**

3.6 Contractor Mobilization: **March 2, 2015**

3.7 Receipt of Approval from the Illinois Environmental Protection Agency (IEPA) and other agencies: NO WORK CAN BE STARTED UNTIL CONSTRUCTION IS AUTHORIZED. Plans and specifications were submitted to the agency on October 24, 2014.

3.8 Substantial Completion of Construction: **November 2, 2015**

4.0 COMPANY AND MANUFACTURER'S DRAWINGS

4.1 The following drawings are intended to indicate the scope of the work to be done and details necessary for the items of work set forth in this specification, and are part of this specification. These drawings in general are to scale, but figures shall always be followed and drawings are not to be scaled. Contractor shall make any requests for additional drawings in writing to the Construction Supervisor. Drawings were prepared by Hanson Professional Services, Inc. dated October 1, 2014.

4.1.1	S-XXX	000	Title and Index
4.1.2	S-XXX	001	Existing Conditions Map
4.1.3	S-XXX	002	Overall Site/Location Plan
4.1.4	S-XXX	003	Site Demolition & Dewatering Plan
4.1.5	S-XXX	004	Clean Closure - Ash Moving Plan
4.1.6	S-XXX	005	Ash Pond A Base Grading Plan
4.1.7	S-XXX	006	Ash Pond A Perimeter Profile and Details
4.1.8	S-XXX	007	Ash Pond A Cover Grading Plan
4.1.9	S-XXX	008	Ash Pond B Grading Plan
4.1.10	S-XXX	009	Grading Tables
4.1.11	S-XXX	010	Ash Pond C & Bottom Ash Pond Grading Plan
4.1.12	S-XXX	011	Site Fencing Plan
4.1.13	S-XXX	012	Typical Sections and Details
4.1.14	S-XXX	013	Typical Details
4.1.15	S-XXX	014	Temporary Erosion Control Plan
4.1.16	S-XXX	015	Temporary Erosion Control Details

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5.0 WORK, MATERIALS AND EQUIPMENT SUPPLIED BY COMPANY

5.1 None.

6.0 WORK, MATERIALS AND EQUIPMENT FURNISHED BY CONTRACTOR

All supervision, components, labor, materials, equipment, tools, and any incidental items described herein (except those specifically stated above) necessary to completely install each portion or component of the work shall be furnished by Contractor.

7.0 UTILITIES AND FACILITIES

7.1 Contractor shall supply sanitary facilities, drinking water and shower facilities (if needed) equipped with water heaters.

7.2 The Company will provide telephone, fax, and computer connections for Contractor supplied trailers. Electrical hook-up at power pole will be provided. Contractor must provide: account/meter from local utility and conduit/wiring from disconnect at pole to trailer.

7.3 Temporary lighting, wiring, plumbing, globes, guard lights, barricades or any other items required for protection, facility of work, local regulation, or by law for public protection shall be provided by Contractor.

7.4 Lay down areas for equipment and material will be designated as close to work site as possible. Areas for tool, office, and change house trailers will be designated as close to work site as possible. Contractor's lay down area will be as determined by the Construction Project Lead. See Plans for general location of lay down, staging, and trailer areas.

7.5 Non-potable (construction) water will not be provided by Ameren for Contractor for the purposes of dust control.

8.0 RECORDING OF HISTORICAL DATA

8.1 Contractor shall make provisions to record the man-hours expended by each craft on each activity during the course of the work.

8.2 Within three (3) weeks after completing the work, a report shall be submitted by Contractor summarizing the activities completed together with the man-days expended on each activity each week during the project all segregated according to craft.

9.0 CONTRACTOR'S FIELD SAFETY PROGRAM

9.1 Contractor shall comply with the Safety and Housekeeping procedures stated in Safety and Contractor Requirements (Appendix A) Attachment A18 and Attachment A19.

9.2 The Company has computerized the WPA request process. All organizations working on plant site shall be required to use the WPA computers to request WPA tags to be hung. The Company will provide training to one or two individuals per organization.

10.0 PARTICIPATION IN COORDINATION ACTIVITIES

10.1 Contractor shall provide a representative for and participate in coordination and information exchange activities with representatives of the Company and other contractors involved with the plant improvements, including the following activities:

10.1.1 Exchange of information necessary for the work specified herein to interface with other Contractors.

10.1.2 Participation in multi-contact coordination, construction, installation, and startup meetings. One construction meeting per week is anticipated during the majority of the Project

10.1.3 Participation in safety walk-down meetings. The Construction Project Lead will inform Contractor of meeting dates and times as necessary.

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11.0 GENERAL INFORMATION

11.1 Contractor shall develop and be responsible for all details, which may be required to complete the work, but which are not included in this document. The Company retains the right of approval of all such details.

11.2 Upon completion, all work defined in this document shall be of a uniformly neat and workmanlike appearance. All costs of repair to meet this condition shall be to Contractor's account.

11.3 Contractor shall follow the manufacturer's or fabricator's guidelines and requirements for installation of all materials and equipment, except as modified by this Specification.

11.4 Contractor shall not have any materials, tools, equipment, etc., fall from elevated work areas. Contractor shall be responsible for designing his own means to prevent objects from falling.

11.5 Contractor shall be aware that there will be other contractors onsite during the Work as described in this Specification as well as Company GCMS and Ameren employees. Contractor shall coordinate his work to minimize interferences with the work of other contractors and/or crafts.

11.6 Only Contractor's vehicles permanently marked with Contractor's name and displaying an Ameren Contractor Mirror Tag, shall be permitted on job site. Mirror tags are available from the Construction Project Lead only after verification of auto insurance and other criteria has been met. No personal vehicles be permitted on job site.

11.7 Upon admittance into the Plant, Contractor (including each and every employee or sub-contractor's employees) shall be subjected to a computer based training (CBT) program that describes the Plant Construction Job Work Rules. These work rules are similar to those listed in Supplemental General Conditions Section 1A, Item 2.4. The training lasts approximately ¾ hour for the average worker. Employees cannot begin work until the training is completed.

11.8 Job Working Rules

Contractor must enforce the Ameren Job Working Rules (Appendix B) as well as the Contractor's own work rules. If the rules conflict, then the more restrictive rule applies.

12.0 EXTRA WORK ORDERS

12.1 Extra work will be authorized by an approved Extra Work Order (EWO). Contractor shall not start any additional work without written approval from the Company.

12.2 Extra work may be authorized on a lump sum firm price, time and materials (T&M), or a T&M-not-to-exceed basis. The Company will select the terms of the EWO.

12.2.1 Pricing for lump sum firm price and T&M-not-to-exceed work shall be based on the Engineering Inspection Report supplied by the Construction Project Lead.

12.2.2 The Company may accept or reject Contractor's proposal for any EWO. If an EWO proposal is rejected the Company may try to negotiate the price, reduce or cancel the work scope, or obtaining pricing from another contractor.

12.2.3 If Contractor's submitted EWO proposal is acceptable to the Company an approved EWO will be issued authorizing the work.

12.3 Invoices for all approved Extra Work Orders shall reference the purchase order number of the original contract, the EWO Number, and have a copy of the approved EWO attached.

END OF SECTION 1B

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SECTION 1C – INFORMATION REQUIRED FROM BIDDERS

1.0 INFORMATION REQUIRED WITH BID PROPOSAL

1.1 Pricing

1.1.1 Having examined all Bid Documents, including the Contract Drawings and Specifications, visited the Site and examined all conditions affecting work, the undersigned proposes to furnish all labor, materials, equipment and appliances required by said Base Scope of Work summarized in Section 1B-2.3 and as further described in the Specifications and/or depicted on the Drawings for the Stipulated Sum of:

BASE LUMP SUM BID: _____

_____ DOLLARS ($_____)

1.1.2 UNIT PRICE used in BASE LUMP SUM BID (1.1.1) to obtain, haul, place, and compact general fill material (from off-site borrow area) as shown on the Plans and Specifications:

$_____ per cubic yard.

1.1.3 UNIT PRICE used in BASE LUMP SUM BID (1.1.1) to obtain, haul, place, and compact topsoil material (from off-site borrow area) as shown on the Plans and Specifications:

$_____ per cubic yard.

1.2 Offsite Borrow Sources

1.2.1 Identify all off-site borrow sources for the suitable fill material and the top soil fill. Furnish available data to demonstrate that the site(s) are likely to have sufficient quantities of suitable materials. By identifying off-site borrow sources, the Bidder is representing that the Bidder will be able to obtain in a timely manner and at no additional cost to the Company all necessary permissions and permits from all governmental agencies having jurisdiction to utilize the borrow site(s).

1.3 Project Execution Plan

1.3.1 Contractor shall submit with bid proposal a preliminary work plan describing how each individual project will be executed. Included in the work plan shall be items/details such as:

1.3.1.1 Planned access and haul route(s)

1.3.1.2 Dewatering Plan

1.3.1.3 Plan for excavation of ash from Ash Ponds B, C, and Bottom Ash Pond. Include method of ash recovery in Pond B to minimize the release of solids thru the NPDES Outfall #002.

1.3.1.4 Plan for grading and compaction of ash in Ash Pond D. The plan shall include stormwater management, erosion control, safety considerations, equipment, and subcontractors.

1.3.1.5 Method to control fugitive dust at storage site, truck route, and pond work area throughout the duration of project including the prevention of material being tracked or spilled on roadways by trucks.

1.3.1.6 A Stormwater Pollution Prevention Plan per Section 01356

1.3.1.7 Organization chart with resumes

1.3.1.8 List of subcontractors

1.3.1.9 Preliminary Project Schedule in accordance with Appendix D

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1.3 Exceptions

1.3.1 Any contract award resulting from this Specification will incorporate all provisions specified herein. It is understood that Contractor agrees to all provisions of Specification unless exceptions are specifically listed in bid proposal.

1.4 Environmental, Safety and Health

1.4.1 Contractor shall submit with bid proposal a completed Contractor Environmental, Safety & Health Data Form (Appendix A, Attachment A9).

1.5 Other Information Required with Bids

1.5.1 Contractor shall submit the following with bid:
- Insurance certification statement
- Field Construction Safety Program
- Supplier Diversity Business Plan
- Statement of Qualifications

1.5.2 Copies of the Contractor's quality management program and supportive procedures.

1.6 Diverse Supplier Business Plan

1.6.1 In order to support Ameren's policy on Supplier Diversity, Attachment A22 shall be filled out and submitted with bid. 2nd Tier Supplier shall be defined as work as set forth in bid proposal not being self-performed. Ameren does not certify Diverse Suppliers and relies upon third party certifying organization. Ameren recognizes certification from the National Minority Council (NMSDC) and its affiliate councils, the Women's Business Enterprise National Council (WBENC) and its affiliate councils, and Federal, State and Local government certifying agencies.

Note: editable versions of Attachment A22 with instructions and reporting guidelines will be sent out as part of bid package. Questions on filling out form will be directed towards Ameren Supplier Diversity professionals at (888) 256-1150 or at http://www.ameren.com/BusinessPartners/SupplierDiversity/Pages/SupplierDiversityHome.as.

2.0 INFORMATION REQUIRED AFTER CONTRACT AWARD

2.1 Schedule

2.1.1 Proposed Construction Schedule dates are listed in Section 1B-3.0.

2.2 Revised Project Execution Plan

2.2.1 Contractor shall submit after award of contract a detailed work plan describing how project will be executed. Ameren requires 5 days for review. Included in the work plan shall be items/details such as:

2.2.1.1 Planned access

2.2.1.2 Lifting and rigging, including Critical Lift Plan (Appendix A, Item 4.13.2).

2.2.1.3 Location of tool room, break room, etc.

2.2.1.4 Quality control plan

2.2.1.5 Organization chart with resumes

2.2.1.6 List of subcontractors

2.2.1.7 Site-specific safety plan. At a minimum, Attachment A21 – Site-Specific Safety Plan (SSSP), shall be filled out in its entirety. The SSSP shall be submitted to Ameren for

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review, comment and approval. Editable version of Attachment A21 is to be supplied after issuance of PO.

2.2.1.8 Site-specific demolition plan (may be incorporated into the Safety Plan)

2.3 Contractor Project Management

2.3.1 Contractor shall provide an organizational chart depicting names and roles of individuals involved with project from Project Manager to Foreman level.

2.3.2 Contractor shall provide necessary resources to provide scheduling information and updates as defined in Contractor Schedule Requirements (Appendix D).

2.3.3 Contractor shall provide a full time Project Manager onsite unless an exemption is provided in writing by the Managing Supervisor of Construction.

2.4 After contract award the Contractor may be responsible for utilizing the Ameren Contractor Cost Tracking Module (CCTM) for all lump sum and T&M work. Ameren Purchasing or Strategic Sourcing will decide whether to require CCTM or Ameren's API invoicing system. If CCTM is utilized, the Contractor's representative(s) will be trained by Ameren on the use of the CCTM program in Ameren's EMPRV computer program. The Contractor shall use the CCTM module frequently to estimate/re-estimate the job scope and record actual billing costs.

2.5 Contractor and subcontractors shall submit a Quality Plan which is in compliance with the Quality Requirement in Supplemental General Conditions Section 1A, Item 12, prior to start of work.

2.6 Contractor will be evaluated utilizing the Safety and Housekeeping Scorecards found in the Safety and Contractor Requirements (Appendix A), Attachment A19 and Attachment A20.

2.7 Diverse Supplier 2nd Tier Report

2.7.1 In accordance with Item 1.6.1 above, Attachment A23 shall be filled out with actual spent cost and issued per timeline agreed upon between Contractor and Ameren. Typical timeline for reporting will be monthly.

Note: editable version of Attachment A23 with instructions and reporting guidelines will be sent out as part of Contract Award. Questions on filling out form will be directed toward Ameren Supplier Diversity professionals at (888) 256-1150 or at http://www.ameren.com/BusinessPartners/SupplierDiversity/Pages/SupplierDiversityHome.as.

END OF SECTION 1C

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SECTION 1D – GENERAL TECHNICAL REQUIREMENTS

1.0 TECHNICAL REQUIREMENTS

1.1 This specification technical section together with attached appendices, covers the requirements for "clean closure" of Ash Ponds B, C and the Bottom Ash Pond and "closure" of Ash Pond A with a Geosynthetic Cover System at the Medina Valley Cogen, LLC (the Owner) Hutsonville Power Station.

1.2 Codes, Standards, and Regulations

1.2.1 The Contractor shall, as a minimum, perform the necessary work to meet the requirements of the codes, standards and regulations set forth in this specification. In the exercise of his experience and knowledge of the equipment, materials and work covered by this Contract, the Contractor shall perform all work and provide materials and equipment in accordance with other codes, standards and regulations consistent with providing a safe and reliable product.

1.2.2 Any deviations from this specification shall be documented by the submittal of an alternate proposal. Alternate proposal shall list exception by specification section in numerical order on the first page of the alternate proposal. Alternate proposal shall list breaker data sheets from specification after exception sheet. Manufacturing schedule, delivery date, and price shall follow the proposal data sheets. Individual manufacturer specification technical selling points shall be listed at the end of the proposal along with the terms and conditions.

1.2.3 Contractor shall plan on having one design review meeting conference call with the customer. Contractor shall send five (5) sets of drawings and documents for approval for this meeting. See submittal requirements in Information Required By Bidders (Section 1C), Item 2.0. Contractor is responsible for setting up meeting and coordinating conference call.

1.3 Equipment and materials shall be complete in all respects within the limits herein outlined. Errors or omissions required to be corrected in the field shall be done by the manufacturer or its duly authorized representative at the Vendor's expense.

1.3.1 The latest revisions or addenda to codes, standards and regulations set forth as the date of the Contract shall apply.

1.4 The following codes, standards and regulations, with the issue dates noted, shall be complied with except as modified by this Specification. Materials not specified shall be in accordance with references within the codes and standards listed, or if not listed, with the latest applicable industry standard wherever possible. Conflicts between either the codes, standards, or this Specification shall be brought to the attention of the Engineer for resolution.

a) American Society for Testing and Materials (ASTM)

b) The Basic Building Code of the Building Officials of Code Administrations International, Inc. (BOCA)

c) America Institute of Steel Construction (AISC)

d) American National Standards Institute (ANSI)

e) American Society of Mechanical Engineers (ASME)

f) Environmental Protection Agency (EPA)

g) National Fire Protection Association (NFPA)

h) Occupational Safety and Health Administration (OSHA)

i) American Welding Society (AWS)

j) American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

k) Underwriters Laboratories, (UL)

l) Institute of Electrical and Electronic Engineers (IEEE)

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2.0 DESIGN AND MATERIAL

2.1 Design change, material change/substitution or information requests require the Contractor to submit request to the Responsible Engineer for approval prior to project changes. Written approval is required from the Responsible Engineer or construction supervisor.

2.1.1 If the Responsible Engineer approves the request, he will issue an FCN (Field Change Notice) per Ameren Design Control process.

2.2 When supplying a skid of pre-assembled equipment containing valves, gauges, and other general instrumentation in addition to the main component (pump, blower, etc.) as part of the Supplier's scope of supply, the Supplier shall label all skid devices for clear identification in the field.

3.0 TECHNICAL SERVICES

3.1 The Vendor shall quote, as a separate price, the services of one or more manufacturer's technical service representative on a per diem basis. Pricing for travel and per diem rates for service time shall be provided in the Bid Forms. The service representatives shall be technically competent; factory trained; experienced in the installation and operation of the equipment; and authorized by the manufacturer to perform any work stipulated.

3.2 The manufacturer's technical service representatives shall furnish written certification to the Owner that the equipment has been field inspected and adjusted by them or under their direction and that it is ready for service, all of which shall be done before initial operation of equipment.

a. Providing technical advice to assist the installation contractor in installing the equipment.

b. Inspecting and testing the equipment after installation and directing any changes or adjustments required to assure proper operation.

c. Providing technical direction during start-up and initial operation of the equipment.

d. Directing the correction of any design or manufacturing errors.

e. Instructing/training the plant personnel in the operation and maintenance of the equipment.

f. Providing services required as a condition to providing the warranties and guarantees specified.

3.3 When, in the judgment of the Owner, a field service representative's time is required under Section 1D, Item 3.1 above, solely and expressly for the purpose of correcting design or manufacturing errors covered under warranty, no payment will be made, nor will the time spent at the site while correcting such errors apply toward the days of service or round trips specified for Section 1D, Item 3.2 (a), (b), (c), (e) and (f) above.

3.4 The per diem rates shall include all costs associated with the service representative's work at the site, including local travel, local travel time wages, and living expenses. The round trip rate shall include all expenses for the travel to and from the manufacturer's facilities and the site, including any salary costs for travel time. The Owner will not reimburse Vendor for air fare costs exceeding tourist class air fare unless unusual circumstances exist. The Vendor shall notify the Owner in advance of such circumstances.

3.5 A day of service (per diem) is defined as 10 man-hours at the site. The total number of days of service shall be defined as the total regular time man-hours at the site divided by eight.

3.6 Contractor shall provide 2 days of training for Fossil Plant personnel and 2 days of training for Callaway Plant personnel at the plant sites.

4.0 TESTING

4.1 The Owner reserves the right to observe the above tests being performed.

4.2 The Vendor shall notify the Owner of all tests not less than 14 days prior to the date of test to allow the Owner to observe testing of the equipment if so desired.

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4.3 Certified copies of inspection and test reports shall be provided by the Vendor for all test and inspections conducted on the specified equipment. One (1) copy of each report shall be submitted to the Owner within one (1) week after completion of each test or inspection as specified in Item 3.2 above.

4.4 A site acceptance test will be performed to verify voltage, current, and wattage requirements. A performance test will be performed to verify the rating after temperature compensation.

5.0 PRE-SHIPMENT INSPECTION

5.1 The Owner reserves the right to inspect the equipment prior to shipment.

5.2 The Vendor shall notify the Owner of all Shipments not less than 14 days prior to the date of shipment to allow the Owner to inspect the equipment if so desired.

6.0 SHIPPING

6.1 Shipments to the plant site shall be consigned to the shipping address as defined in Summary of Work (Section 1B), Item 1.2.1.

6.2 The vendor shall include costs of shipping all materials and associated equipment together in the price quote.

6.3 The vendor shall be responsible for delivery to the Owner's site F.O.B. This shall include special work required to support delivery of heavy and/or oversized items such as, but not limited to, road repairs, road upgrades or extensions, power line disconnections and reconnections, bridge reinforcements, grade alterations, and the like. The Vendor shall provide and coordinate all special services required to complete all deliveries based on the existing conditions surrounding the site on the Contract Date.

6.4 The Vendor shall discuss with the Owner the routing of shipments and shall reroute the same as indicated by the Owner provided the freight rates and overall costs are no greater than by other routes.

6.5 Truck shipments will be accepted weekdays only between the hours of 8:30 A.M. and 2:30 P.M. (Central time). After-hour deliveries not provided for by contract may be refused until the next regular workday. Cost incurred by the Owner for offloading prior to or after normal working hours shall be back-charged to the Vendor unless prior authorization has been approved by the Owner.

6.6 Packages shall be clearly marked with the Contract Number and Purchase Order Number where applicable. Packing lists shall identify Contract Number, Purchase Order Number and item numbers and quantities, bills of lading shall identify the Contract number and Purchase Order Number.

6.7 Equipment shall be shipped completely factory assembled. Preparation for Shipment shall be in accordance with Manufacturer's standards unless otherwise noted in this specification. The Manufacturer shall be solely responsible for the adequacy of the preparation for shipment to ensure materials are received at their destination in EX-Works (EXW) conditions when handled by commercial carriers.

6.8 Equipment shall be boxed, crated, or otherwise suitably protected during shipment, handling, and storage. Components with moving parts which might be damaged in shipment, shall have all such moving parts securely blocked and braced. All items blocked and braced for shipment must be clearly identified and tagged accordingly. Equipment having antifriction or sleeve bearings shall be protected by weather-tight enclosures.

6.9 Materials required for protection during shipping and storage shall be treated for fire resistance. Wood protection shall be Class A, fire retardant, pressure treated type.

6.10 Coated surfaces shall be protected against impact, abrasion discoloration, and other damages. Surfaces which are damaged shall be repaired.

6.11 Electrical equipment, controls, and insulations shall be protected against moisture and water damage. All external gasket surfaces and flange faces, couplings, rotating equipment shafts, bearings, and like items shall be thoroughly cleaned, coated with rust-preventive compound, and protected with suitable wood, metal, or other substantial type covering to ensure their full protection. Exposed threaded parts shall be greased and protected with metallic or other substantial type protectors. Damages due to insufficient protection shall be repaired by the Vendor.

6.12 Returnable containers and special shipping devices shall be returned by the manufacturer's field representative at the Vendor's expense.

6.13 A weatherproofed itemized list of the contents shall also be attached to the outside of each box.

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6.14 Spare parts shall be shipped separate in heavily constructed wooden boxes. The boxes shall be designed as permanent storage enclosures. Separate boxes shall be used for the spare parts for each major piece of equipment. Where applicable, boxes shall be designed and constructed for return shipment of damaged or worn components for repair.

6.15 Spare parts shall be protected from damage due to moisture and dirt accumulation during an extended storage period by use of special coatings, airtight membranes, bags of desiccant, or other means acceptable to the Owner.

6.16 All separately packaged accessory items and parts shall be shipped with the equipment. Containers for separately packaged items shall be marked so that they are identified with the main equipment. An itemized packing slip, indicating what is in that container only, shall be attached to the outside of each container used for packing. A similar list shall be inside of each container. A master packing slip, covering all accessory items for a given piece of equipment which are shipped in separate containers, shall be attached to one container.

6.17 Vendor shall provide dimensions (H" x W" x D") and weight for each shipping container with approval drawings.

6.18 If materials require special fixtures or lifting rigs for offloading, such rigs or fixtures shall be provided at no additional cost with shipment.

7.0 RECEIPT INSPECTION

7.1 Materials or equipment purchased under this contract may be inspected at the specified receiving points and there accepted or rejected. Inspection will include the necessary testing for determining compliance with the specifications. All expense of initial acceptance tests will be borne by the Owner. The expense of subsequent test due to failure of materials or equipment first offered will be charged against the Vendor. The Owner may reject damaged materials or equipment at any point along the line of shipment with the return and shipment costs to the Vendor's account.

8.0 WARRANTY

8.1 The Warranty shall be warranted by the contractor against defects in materials, performance, and workmanship for a period of 2 years from the date of acceptance by Ameren. The length of the warranty supersedes the length specified in the GCC's (General Conditions of Contract). Contractor shall include parts, contractor service engineer, and labor to remove and install the necessary parts and equipment.

Note: As used herein "Seller" means Vendor and "Buyer" means Customer.

Seller warrants that its services, including without limitation, its design, inspection, and installation services, and the equipment and materials to be supplied by Seller under this contract, shall be free of defects and shall conform to the requirements of the contract.

END OF SECTION 1D

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SECTION 01356 - STORM WATER POLLUTION PREVENTION MEASURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Requirements for Contractor compliance with Phase II of the National Pollutant Discharge Elimination System (NPDES) storm water program.
2. Construction and maintenance of existing and proposed temporary erosion control systems to control erosion and sediment damage to adjacent properties and water resources.

B. Related Sections include the following:

1. Section 02936 "Seeding and Mulching."

1.3 REFERENCES

A. The following reference, or cited portions thereof, governs the work:

Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 and Supplemental Specifications adopted January 1, 2014.

1.4 SUBMITTALS

A. Submittals shall follow the provisions of Section 1B – Summary of Work.

B. Preconstruction Submittals: A storm water best management practices (BMP) plan shall be submitted that includes the following items:

1. Inspection and record-keeping procedures; and
2. Maintenance procedures for erosion controls.

C. The Contractor shall obtain all local and/or federal stormwater permits that may be required to perform the work. Development and submission of a site-specific Storm Water Pollution Prevention Plan (SWPPP) to the state EPA, and procurement of the Notice of Intent (NOI) to discharge stormwater from construction activities will be required prior to starting the work. Offsite borrow areas larger than one acre in size will also require a site-specific SWPPP and NOI.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Temporary Erosion Control Systems

1. Materials for temporary erosion control systems shall be in accordance with Article 280.02 of the IDOT Standard Specifications and Supplemental Specifications.

PART 3 – EXECUTION

3.1 EXAMINATION

A. The site shall be examined to determine the extent of new work required.

3.2 PRECONSTRUCTION JOBSITE INSPECTION

A. The person who shall be at the jobsite during construction and who shall be responsible for insuring that erosion control work is completed in a timely manner shall be identified at the preconstruction meeting.

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B. A jobsite inspection shall be conducted with the Owner's Representative to review and designate the locations and types of erosion protection to be placed. The inspection shall be scheduled at the preconstruction conference and carried out on the job site before beginning any work that will disturb existing drainage or potentially create erodible conditions.

3.3 CONSTRUCTION

A. Temporary erosion control systems shall be constructed in accordance with IDOT Standard 280001-05 and Article 280.04 of the Standard Specifications and as directed by the Owner's Representative. Erosion control devices shall be in place and approved by the Owner's Representative prior to beginning other work.

B. Incorporate permanent erosion control features into the project at the earliest practicable time to minimize the need for temporary erosion controls.

3.4 MAINTENANCE

A. Temporary erosion control systems shall be maintained in accordance with Article 280.05 of the Standard Specifications, except that measurement and payment provisions shall not apply.

B. Temporary erosion control systems for unprotected disturbed areas shall be cleaned of trapped sediment and repaired immediately prior to project close out.

3.5 REMOVAL AND DISPOSAL

A. All temporary erosion control systems shall be removed by the Contractor upon successful completion of permanent seeding and permanent erosion control measures.

END OF SECTION 01356

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SECTION 02100 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected site elements.
2. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of selective demolition activities with starting and ending dates for each activity.

1.4 FIELD CONDITIONS

A. The Owner may have Subcontractors conducting demolition of buildings immediately adjacent to selective demolition area. Conduct selective demolition so these operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify the Owner's Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify the Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Sale or retention of removed items is not permitted. All demolished items must be disposed of in a properly licensed landfill facility.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

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1.5 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Grout Plugs: Cement-based dry-pack grout conforming to ASTM C1107, Grade B or C.

C. Controlled Low Strength Material (CLSM):

1. Unconfined compressive strength: minimum 75 psi and maximum 150 psi at 28 days.
2. Non-shrink.
3. Self-leveling
4. Air Content: 15-25%
5. Fly Ash is not permitted

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Inventory and record the condition of items to be removed and salvaged.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove piping, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and plug remaining piping with same or compatible piping material.
b. Piping to Be Abandoned in Place: Drain piping and plug piping with same or compatible piping material and leave in place.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.3 GEOMEMBRANES

A. Existing geomembranes to be removed:

1. Where shown on the Plans, excavate ash materials over-lying geomembranes designated to be removed
2. Clean the surface of the geomembrane to avoid contamination of the underlying soil materials.
3. Cut and remove the geomembrane in sections. Pull or excavate from anchor trenches completely.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain fire watch during and for at least 1 hour after flame-cutting operations.
5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
6. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.6 CLEANING

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02100

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SECTION 02140 – SURFACE WATER MANAGEMENT

PART 1. GENERAL

1.01 DESCRIPTION

Control of surface water caused by precipitation and infiltration within the construction limits shall be considered as part of the work under this specification.

The Contractor shall employ standard surface water management practices to prevent the ponding of storm water runoff and/or erosion of existing and proposed surfaces, as required to complete the work, and as directed by the Owner's Representative.

A. The work to be completed by the Contractor includes, but is not necessarily limited to, the following:

1. Maintenance of existing and implemented erosion control measures according to Section 01356; and

2. Dewatering excavations of surface water caused by precipitation and infiltration.

3. Implementation of excavation sequencing, surface water dewatering, and erosion control measures to minimize earthen and/or CCB sediment migration between areas where CCB sediment excavation has been completed and those areas where CCB sediment excavation has not been completed.

B. The Contractor shall be responsible for providing all materials, equipment, labor, and services necessary for care of surface water management and erosion control measures.

1.02 RELATED SECTIONS

The following sections contain items which are related to the work in this section:

A. Section 1B - Summary of Work

B. Section 01356 - Storm Water Pollution Prevention Measures

C. Section 02222 - Earthwork

1.03 REFERENCES

No references.

1.04 EXISTING FACILITIES

None.

1.05 SUBMITTALS

A. Submittals - A surface water management plan shall be submitted with the bid proposal that details procedures to minimize earthen and/or CCB sediment migration for each of the following activities:

1. Excavation sequencing;

2. Surface water management plan, including a pumping plan; and

3. Temporary erosion control plan.

PART 2. PRODUCTS

2.01 MATERIALS

Materials and equipment for surface water management shall be reviewed by the Owner's Representative for compatibility with future construction and operation of the facility.

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PART 3. EXECUTION

3.01 SURFACE WATER MANAGEMENT

A. The Contractor shall be responsible for providing all facilities required to divert, collect, control, and remove water caused by precipitation and infiltration from all construction work areas and excavations.

B. Drainage features shall have sufficient capacity to avoid flooding of work areas.

C. Drainage features shall be so arranged and altered, as required to avoid degradation of the final excavated surface(s).

D. The Contractor shall utilize all necessary erosion and sediment control measures to avoid construction-related sedimentation of existing and proposed facilities.

3.02 WATER DISPOSAL

A. Dispose of water removed from the excavations in such a manner as:

1. Will not endanger portions of work under construction or completed.

2. Will cause no inconvenience to Owner or to others working near site.

3. Will comply with the stipulations of Section 01356.

4. Will control runoff. The Contractor shall be responsible for control of runoff in all work areas, including, but not limited to: excavations, access roads, parking areas, stockpile, laydown, and staging areas. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas.

B. Prior to the completion of riprap and CCB sediment excavation, water must be directed to the permitted site NPDES regulated discharge point for disposal. Utilization of a "final decant basin" will be necessary to allow contaminants to settle out prior to final discharge.

1. The Owner will have CQA personnel monitoring the discharge stream for contaminants in compliance with the site NPDES Permit. The Contractor shall allow time and access for testing the "final decant basin" water prior to final discharge.

3.03 DAMAGES

Immediately repair damages to adjacent facilities caused by the surface water management facilities, as constructed by the Contractor.

3.04 CORRECTIVE ACTION

Work shall be performed as necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor to control surface water, at no additional cost to Owner.

END OF SECTION 02140

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SECTION 02222 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1 – General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Earth moving required for Base Grade preparation, construction of Vegetative Cover and miscellaneous site grading.

B. Related Sections include the following:

1. Section 01356 - Storm Water Pollution Prevention Measures.

2. Section 02936 - Seeding and Mulching.

1.3 REFERENCES

A. The following references, or cited portions thereof, govern the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 and Supplemental Specifications adopted January 1, 2014.

2. ASTM D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.4 MEASUREMENT AND PAYMENT

A. The Contractor shall be responsible for estimating the extent of excavation and fill required to complete the work, including, but not limited to, excavation and fill placement to required elevations; loading, transporting, placing, and compacting the Vegetative Layer; placement of topsoil respread; and miscellaneous site grading. The Contractor shall include the dollar amount associated with all earthwork in his Lump Sum Bid amount.

1.5 REGULATORY REQUIREMENTS

A. Codes and Standards:

1. Perform earthwork in compliance with applicable requirements of governing authorities having Jurisdiction.

1.6 COORDINATION

A. Existing utilities or other plant facilities shall not be interrupted, except when permitted in writing by the Owner's Representative and then only after acceptable temporary services have been provided. A minimum forty-eight (48) hour notice shall be provided prior to proceeding with an approved temporary interruption.

1.7 SURFACE WATER MANAGEMENT

A. Control of surface water caused by precipitation as necessary for completion of the work under this contract is the responsibility of the Contractor and shall be included in the contract lump sum price.

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1.8 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.

2. Chemical testing as enumerated in Table A.1 of the CQA Plan for each off-site borrow soil material proposed for fill and backfill.

1.9 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

B. Soil Testing Firm: An independent testing agency qualified to perform testing under EPA SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods".

PART 2 - PRODUCTS

2.1 MATERIALS

A. Material intended for import to the site must be approved by the Owner's Representative before hauling to the site. Owner's Representative may conduct chemical analysis and/or soil properties on these materials.

B. Ash Deposits:

1. The Base Grade will be constructed using the existing deposits of ash that currently occupy Ash Ponds A, B, C and Bottom Ash Pond.

C. Soil Materials:

1. The Vegetative Cover soils shall be shall be comprised of local borrow materials or borrow materials hauled in from off-site.

A. Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL & CL-ML; free of rock or gravel larger than 0.75 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

B. Where compacted fill is specified for roadways, Unsatisfactory soils include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

B. Each borrow source shall be tested to prevent contaminated borrow materials from entering the site. Individual Physical and Chemical tests that are required are listed in the project CQA Plan. Testing shall be done at the following minimum frequencies.

1. One Prequalification Test of each individual borrow source prior to use. The Contractor's Soil Testing Firm shall be responsible for this analysis.

2. One Test per every 25,000 Cubic Yards of borrow material from each source. This testing will be conducted by the CQA Officer through the Owner's Soil Testing Firm.

D. Soil Stabilizers and Moisture Conditioning Agents:

1. Additives to accelerate drying or to improve stability and workability of soil shall not be permitted unless approved in writing by the Owner's Representative.

2.2 EQUIPMENT

A. Compaction Equipment:

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1. Tamping foot rollers:

   a. Compaction equipment shall consist of tamping foot rollers which have a minimum weight of 40,000 lbs. At least one (1) tamping foot shall be provided for each 110 sq. in. of drum surface. The length of each tamping foot, measured from the outside surface of the drum, shall be at least 1 in. longer than the loose lift thickness.

2. Steel-Wheeled Rollers:

   a. Equipment used to produce a smooth compacted surface shall be a smooth, non-vibratory steel wheeled roller weighing not less than 1,000 lb. per lin. ft.

B. Scarification Equipment:

1. Discs, rotor tillers, or other equipment used to scarify the surface shall be capable of uniformly disturbing at least the upper 6 in. of surface to provide good bonding between lifts.

C. Mixing and Spreading Equipment:

1. Discs, harrows, and motor graders or other similar equipment shall be available at the site for use in spreading, mixing, and drying Soil Materials.

Part 3 - Execution

3.1 Preparation

A. Control of Work:

1. Benchmarks, monuments, and other reference points shall be maintained throughout the work area.

B. Utility Location:

1. Before starting excavation, the location and extent of underground utilities in the work area shall be established.

3.2 Excavation

A. General:

1. Excavation consists of removal and redistribution of material encountered when establishing required grade and subgrade elevations. The Contractor shall be responsible for dewatering, protection, shoring, and disposal of excavated materials as necessary to complete the excavation.

B. Procedures:

1. Excavation may be accomplished by any method and by use of any equipment that is suitable to the work, except that blasting will not be permitted.

3.3 BASE GRADE PREPARATION

A. The Base Grade shall be prepared by grading the existing ash deposits to the lines and grades shown on the Plans.

B. Existing geotubes (ash-filled socks) may be broken and spread as part of the base grade. Geotube fabric may be buried in place.

C. Ash and soil materials used to create the base grade shall be compacted to at least 90 PERCENT of the maximum dry density as determined by the Standard Proctor Test (ASTM D698).

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D. Following the Base Grading Earthwork, the Construction Quality Assurance (CQA) Officer shall direct the Owner's Field Surveyor to verify that actual Base Grades are in accordance with the plans and specifications. Elevations shall be surveyed on a 100 ft. grid pattern. In addition, all breaks in grade will be surveyed. The measured depths and grades shall be documented on "as built" drawings furnished to the CQA Officer by the surveyor agency. Final grade locations and elevations may be adjusted in the field by the CQA Officer in areas where grading of the ash deposits does not meet the design intent of the Plans. The CQA Officer shall review the final survey data for conformance to requirements and, if found in agreement with requirements, provide certification for the work in accordance with CQA Plan Procedures.

E. The Contractor shall not install Geomembrane until the Base Grade has been examined jointly with the Owner's Representative and a certificate of approval for the Base Grade has been submitted to the Owner's Representative.

3.4 VEGETATIVE COVER

A. Vegetative Cover is to be placed over High Density Polyethylene (HDPE) Geomembrane to the lines and grades shown on the Plans. The Vegetative Cover shall be placed as follows:

1. The Vegetative Cover must be at least 3 ft- thick, consisting of soil material capable of supporting vegetation.

2. Vegetative Cover shall be compacted only to the extent necessary to place and spread uniformly.

3. All drainage channels and diversion berms shown on the plans are to be built monolithically with the vegetative cover and then shaped during final grading.

4. Placement shall begin as soon as possible to protect the HDPE Geomembrane.

5. Following the Base Grading Earthwork, the CQA Officer shall direct the Owner's Field Surveyor to verify that actual Vegetative Cover Grades are in accordance with the plans and specifications. Elevations shall be surveyed on a 100 ft grid pattern. In addition, all breaks in grade will be surveyed. The measured depths and grades shall be documented on "as built" drawings furnished to the CQA Officer by the surveyor agency. Final grade locations and elevations may be adjusted in the field by the CQA Officer in areas where grading does not meet the design intent of the Plans. The CQA Officer shall review the final survey data for conformance to requirements and, if found in agreement with requirements, provide certification for the work in accordance with CQA Plan Procedures.

6. Seeding shall be installed as soon as possible to minimize wind and water erosion.

3.5 FINISH GRADING

A. All excavated and filled areas shall be fine graded and leveled to provide a smooth finish free of debris, foreign matter, objectionable stones, clods, lumps, pockets, or high spots, properly drained and true to indicated elevations. Finish grading shall be conducted only near completion of work or when requested.

3.6 CONSTRUCTION TOLERANCES

A. Elevations will be surveyed at breaks in slopes and on a 100 ft grid pattern on the Base Grade and repeated after Vegetative Cover construction to verify material thickness and to verify that proper drainage slopes are maintained. To verify material thickness, all horizontal survey coordinates will be the same for the bottom and the top of the material that is placed. A test will be considered failed if it does not meet the minimum design requirements. To obtain the specified design thickness, additional soil material will be placed and compacted in failing areas where the as-built thickness is less than the design thickness. Surveying required for verification of final construction tolerances will be performed by the Owner's Land Surveyor.

END OF SECTION 02222

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SECTION 02225 - TRENCH EXCAVATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Trench excavation and protection, including dewatering, as required to complete the work.

B. Related Sections include the following:

1. Division 2 02322 "Trench Foundation, Bedding and Backfill."

1.3 REFERENCES

A. Standard Specifications for Water and Sewer Main Construction in Illinois, 7th Addition, 2014.

B. OSHA Excavation Standards.

1.4 SUBMITTALS

A. The Contractor shall submit an excavation plan for review and approval by the Owner's Representative, including open cut slopes and depths, shoring types and specifications (trench boxes or other), depths, configurations and materials. This information shall be submitted at least two (2) weeks before start of construction.

1.5 GENERAL REQUIREMENTS

A. Open-cut trenches shall be protected in accordance with applicable rules, laws and regulations of Federal, State and municipal ordinances.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Specifications for trench boxes, sheeting or other, shall be submitted at least one (1) week prior to the work.

PART 3 – EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. The trench excavation shall be made to a minimum depth of 1 ft below the design bottom of pipe for the placement of foundation and bedding materials.

3.2 PILING EXCAVATED MATERIAL

A. All excavated material shall be piled in a manner that will not endanger the work. Excavated material suitable for backfilling shall be stockpiled separately on the site. Natural watercourses shall not be obstructed or polluted. Surplus material and excavated material unsuitable for backfilling shall be transported and disposed of in disposal areas directed by the Owner's Representative. Temporary erosion control shall be established around excavated material stockpiles.

3.3 REMOVAL OF WATER

A. The Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavation until all work to be performed therein has been completed. The proposed method for the control of groundwater shall be submitted to the Owner's Representative for approval prior to implementation.

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3.4 BARRICADES, GUARDS AND SAFETY PROVISIONS

A. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, lights and guards as required shall be placed and maintained by the Contractor at his expense during the progress of the construction work. The rules and regulations of OSHA and appropriate authorities respecting safety provisions shall be observed.

END OF SECTION 02225

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SECTION 02275 – RIPRAP

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Furnishing placing riprap for erosion control.

B. Related Sections include the following:

1. Division 2 02222 "Earthwork."

1.3 REFERENCES

A. Specified references or cited portions thereof, current at date of bidding documents unless otherwise specified, govern the work.

B. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 and Supplemental Specifications adopted January 1, 2014.

1.4 SUBMITTALS

A. Product Data: Provide quarry name and material gradation prior to delivery.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Stone Riprap materials according to Article 1005.01 of the Illinois Standard Specifications for Road and Bridge Construction.

B. All Filter Fabric used for Stone Riprap, regardless of riprap gradation, shall meet the IDOT requirements for 8 oz/sq yd. fabric listed in Article 1080.03.

C. Riprap Gradation and Quality as indicated in the drawings. Class designation callouts include both the Gradation and Quality, for Example "Riprap, Class B3" denotes Quality B, Gradation RR3 Riprap Materials.

PART 3 – EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. Stone Riprap shall be installed in accordance with Section 281 of the Illinois Standard Specifications for Road and Bridge Construction for the placement of Stone Riprap. Measurement and payment provisions of Section 281 shall not apply.

B. Filter Fabric for Stone Riprap shall be installed in accordance with Section 282 of the Illinois Standard Specifications for Road and Bridge Construction.

C. The Owner's Representative shall be allowed to visually inspect Riprap and Filter Fabric for compliance with specifications prior to placement.

END OF SECTION 02275

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SECTION 02322 - TRENCH FOUNDATION, BEDDING, HAUNCHING, AND BACKFILL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Installation of the trench foundation and bedding for piping installations, as well as the haunching around the pipe and the backfill over the pipe.

B. Related Sections include the following:

1. Division 2 02225 "Trench Excavation."

1.3 REFERENCES

A. Standard Specifications for Water and Sewer Main Construction in Illinois, 7th Addition, 2014.

B. IDOT Standard Specifications for Road and Bridge Construction, January 1, 2012 and Supplemental Specifications adopted January 1, 2014.

1.4 SUBMITTALS

A. Submit 25 lb. sample of foundation, bedding and haunching material to testing laboratory.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Foundation, Bedding and Haunching Material shall be supplied in accordance with Article 1003.04 of the Illinois Standard Specifications for Road and Bridge Construction with gradation FA 1.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. The trench shall be excavated to an elevation so that the pipe will be at the depth and grade specified after the foundation and bedding are installed. Well compacted, aggregate foundation and bedding material at least 12 in. in depth below the pipe, shall be placed the entire width of the trench and for the length of the pipe. The foundation and bedding shall be placed in 8 in. loose layers. The aggregate shall meet the material requirements and each layer shall be thoroughly compacted by ramming or tamping.

B. When pipe having bells or hubs is used, cross trenches, not more than 2 in. wider than the bell or hub, shall be excavated to provide uniform bearing along the length of the pipe.

C. If the excavation has been made deeper than necessary, the foundation shall be brought to the proper grade by the addition of well compacted bedding material.

D. As soon as the condition of the pipe will permit and testing of the pipe joints completed, the entire width of the trench shall be backfilled with haunching material specified in the material requirements to a height of at least 12 in. above the top of the pipe. The aggregate shall be placed longitudinally along the pipe. The elevation of the haunching material on each side of the pipe shall be the same. Special care shall be taken to completely fill the space under the pipe haunches. The aggregate material shall be placed in maximum 8 in. layers, loose measurement and compacted by ramming or tamping. The aggregate used for haunching shall meet the material requirements.

E. Install warning tape directly above piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

F. Final backfill shall consist of backfilling from 12 in. over the top of the pipe to the surrounding existing ground surface line. The remainder of the trench and excavation shall be backfilled to the finished surface as rapidly as the conditions will permit. The backfill material shall consist of trench excavated material, compacted to 92 percent of the maximum dry density as obtained by the Standard Proctor Compaction Test (ASTM D698).

END OF SECTION 02204

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SECTION 02373 – GEOTEXTILES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Furnishing and installing geotextile fabrics.

B. Related Sections include the following:

1. Division 2 02222 "Earthwork."
2. Division 2 02508 "Crushed Stone Surfacing."
3. Division 2 02400 "HDPE Geomembrane."

1.3 REFERENCES

A. The following references, or cited portions thereof, govern the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 and Supplemental Specifications adopted January 1, 2014.
2. American Society for Testing and Materials (ASTM):

a. ASTM 3776 (1996; R 2002) Standard Test Method for Mass per Unit Area (Weight) of Fabric.
b. ASTM D 3786 (2001) Test Method for Hydraulic Bursting Strength of Textile Fabrics – Diaphragm Bursting Strength Tester Method.
c. ASTM D 4533 (2004) Test Method for Trapezoid Tearing Strength of Geotextiles.
d. ASTM D 4632 (1991; R 2003) Test Method for Grab Breaking Load and Elongation of Geotextiles.
e. ASTM D 4751 (2004) Test Method for Determining Apparent Opening Size of Geotextile.
f. ASTM D 4833 (2000) Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
g. ASTM D 4873 (2002) Guide for Identification, Storage, and Handling of Geosynthetic Rolls.
h. ASTM D 4884 (1996; R 2003) Test Method for Strength of Sewn or Thermally Bonded Seams of Geotextiles.
i. ASTM D5261-92(2003) Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
j. ASTM D6241-04 Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.

1.4 SUBMITTALS

A. Product Data:

1. The manufacturer's list of guaranteed properties for each geotextile fabric proposed for use on the project shall be submitted to the owner's representative at least fifteen (15) days prior to placement.
2. The manufacturer's installation guidelines shall be submitted.

B. Samples:

1. Samples of geotextile fabrics shall be submitted for Construction Quality Assurance (CQA) prequalification testing. Sample size and sampling frequency are specified in the CQA Plan.

C. Inventory:

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1. A copy of the roll inventory that identifies, as a minimum, manufacturer or supplier, product or style number, roll number, width, and length of roll as identified on the roll label shall be submitted.

1.5 MEASUREMENT AND PAYMENT

A. The Contractor shall be responsible for estimating the extent of geotextile fabric required to complete the work including fabric for laps, anchorage, repairs, and samples for CQA testing.

1.6 STORAGE AND HANDLING

A. Geotextiles shall be stored and handled according to ASTM D4873.

PART 2 – Products

2.1 MATERIALS

A. Geotechnical Fabric for Ground Stabilization:

1. Geotechnical fabric for ground stabilization shall conform to Article 1080.02 of the IDOT Standard Specifications for Road and Bridge Construction.

B. Securing Devices:

1. Pins, staples, and other devices that project through the geotextile fabric are not permitted for fabrics installed above the geomembrane. Sandbags, stone, or other appropriate means approved by the Owner's Representative shall be used to prevent movement of the geotextile.

2.2 EQUIPMENT

A. Equipment for spreading and compacting granular materials shall be low ground pressure equipment to prevent damage to the underlying geosynthetic liners.

Part 3 – Execution

3.1 SAMPLES FOR CQA TESTING

A. Geotextile fabric samples shall be obtained, identified and packaged from rolls designated by the Owner's Representative according to ASTM D4873.
B. Samples shall be 3 ft- wide by the full roll width.

3.2 BASE PREPARATION

A. Surface on which the geotextile will be placed shall be prepared to a relatively smooth surface condition, and shall be free from obstruction, debris, depressions, erosion features, or any irregularities that would prevent continuous, intimate contact of the geotextile with the entire surface. Rills, gullies, and ruts must be graded out of the surface before geotextile placement. Areas on which geotextile are to be placed shall be graded and/or dressed in accordance with Section 02200 – Earthwork.
B. Do not run heavy vehicle traffic directly on the geotextile. Use vehicles and equipment as specified in paragraph 2.2 to transport and deploy fabric on the linerRoute traffic and personnel over installed cushion fabric and use the installed fabric as a working platform to the greatest extent possible.

3.3 INSTALLATION

A. General Requirements:

1. Geotextile fabric shall be unrolled and laid out following these requirements to the greatest extent practical:

a. Orient panels with the longest dimension parallel to the slope.
b. Minimize the number of seams in corners and odd-shaped areas.
c. Extend panels on slopes a minimum of 5 ft onto a horizontal surface.
d. Geotextile panels shall be unrolled using methods that will not damage the fabric and will protect underlying surface from damage. While unrolling, the geotextile fabric shall be visually

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Inspected for imperfections and faulty or suspect areas marked. Ballast shall be placed on fabric to prevent wind uplift. Expansion and contraction should be allowed for by leaving slack.

e. Heavy vehicle traffic shall not be run directly on geotextile fabric. Fabric in areas of heavy traffic shall be protected with protective cover over the fabric.

2. Laps:

a. Individual panels of geotextile fabric shall be lapped according to manufacturer's instructions and as specified herein. Provide a minimum overlap of 3 in. unless otherwise specified herein or in the plans. Shingle overlaps so that water or other material cannot run down the slope between the two (2) layers of fabric.

. Defects and Repairs:

a. Examine the installed geotextile fabric for defects, holes discontinuous seams, puckered or separated laps, etc. Repair defective laps and seams. Patch holes and defects according to manufacturer's recommendations and as directed by the Owner's Representative. Do not cover suspect or patched areas until they have been inspected and approved by the Owner's Representative.

B. Geotechnical Fabric for Ground Stabilization:

1. Install Geotechnical Fabric for Ground Stabilization in accordance with Section 210 of the IDOT Standard Specifications for Road and Bridge Construction.
2. If approved by the Owner's Representative, the Contractor may, at his own expense, install geotextile or geogrid for ground stabilization outside the limits designated by the Owner's Representative.
3. Submit as-built drawings that clearly delineate limits and type of ground stabilization.

3.4 PROTECTION

A. Protect installed fabric until it is covered by at least 1 ft. of overlying material.

B. Any damage to the geotextile during its installation or during placement of overlying materials shall be replaced by the Contractor at no cost to the Owner. Unless otherwise noted, the work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within fourteen (14) calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of overlying materials. Before placement of overlying materials, the Contractor shall demonstrate that the placement technique will not cause damage to the geotextile.

3.5 TESTING AND INSPECTION

A. Prequalification Testing:

1. Geotextiles are subject to CQA testing by the Owner's Testing Consultant to verify conformance with the manufacturer's list of guaranteed properties according to the project Construction Quality Assurance Plan, included in Appendix 2. The Contractor shall provide samples as specified herein. Any fabric that does not conform to the list of guaranteed properties shall be removed from the site.

B. Installed fabric shall be inspected by the Owner's Representative. No material shall be placed on the fabric, other than ballast, until the installation has been approved by the Owner's Representative. Ballast shall not obscure seams or significant length of unseamed laps. The Owner's Representative may require removal of ballast to inspect suspect areas.

B. If the Owner's Representative suspects that completed work has been damaged by construction methods that do not conform to the specifications, he may require removal of completed work to verify theintegrity of the underlying materials. The Contractor shall bear the cost of removal and subsequent repair as directed by the Owner's Representative, If the integrity of the underlying materials was damaged. If no damage was found, the Owner will pay the Contractor for the investigation work on a time and materials basis.

END OF SECTION 02373

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SECTION 02400 - HDPE GEOMEMBRANE

Part 1. General

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

A. This Section includes the following:

1. Manufacturing, furnishing, and installing High Density Polyethylene (HDPE) Geomembranes.
2. Removal and disposal of geomembrane materials.
3. The work includes furnishing all equipment and materials and providing all labor, supervision, administration and management necessary to perform the work as shown on the plans.

B. Related Sections include the following:

1. Division 02 02222 "Earthwork."

1.3 REFERENCES

A. The following references, or cited portions thereof, govern the work:

1. American Society for Testing and Materials (ASTM):

a. D 638, Standard Test Method for Tensile Properties of Plastics.
b. D 751, Standard Test Methods for Coated Fabrics.
c. D 792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
d. D 1004, Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
e. D 1204, Standard Test Method for Linear Dimensional Changes of Non Rigid Thermoplastic Sheeting or Film at Elevated Temperature.
f. D 1238, Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
g. D 1505, Standard Test Method for Density of Plastics by Density-Gradient Technique.
h. D 1603, Standard Test Method for Carbon Black in Olefin Plastics.
i. D 3895, Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis.
j. D 4218, Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
k. D 4437, Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
l. D 4833, Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
m. D 5199, Standard Test Method for Measuring Nominal Thickness of Smooth Geomembranes.
n. D 5397, Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefins using Notched Constant Tensile Load Test.
o. D 5596, Standard Practice for Microscopical Examination of Pigment Dispersion in Plastic Compounds.
p. D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
q. D 5721, Practice for Air-Oven Aging of Polyolefin Geomembranes.
r. D 5820, Test Method for Air Testing.
s. D 5885, Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry.
t. D 5994, Standard Test Method for Measuring Nominal Thickness of Textured Geomembranes
u. D 6365, Standard Practice for the Nondestructive Testing of Geomembrane Seams using The Spark Test

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2. Geosynthetic Research Institute (GRI), the most current edition of the following specifications shall be used:

   a. GRI Test Method GM6: Pressurized Air Channel Test for Dual Seamed Geomembranes.
   b. GRI Test Method GM9: Cold Weather Seaming of Geomembranes.
   c. GRI Test Method GM10: Specification for Stress Crack Resistance of HDPE Geomembrane Sheet.
   d. GRI Test Method GM13: Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.
   e. GRI Test Method GM14: Test Frequencies for Destructive Seam Testing.
   f. GRI Test Method GM19: Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes.
   g. GRI Test Method GM29: Field Integrity Evaluation of Geomembrane Seams (and Sheet) Using Destructive and/or Nondestructive Testing.

1.4 SUBMITTALS

A. Submit the following to the Engineer or Owner, for review and approval, within a reasonable time so as to expedite shipment or installation of the Geomembrane:

1. Documentation of manufacturer's qualifications as specified in subsection 1.5A of this Section.
2. Manufacturer's Quality Control program manual or descriptive documentation.
3. A material properties sheet, including at a minimum all properties specified in GRI GM 13, including test methods used.
4. Sample of the material.
5. Documentation of Installer's qualifications, as specified below and in subsection 1.5B of this Section:
   a. Submit a list of at least ten (10) completed facilities. For each facility: provide name and type of facility; its location; the date of installation; phone number of contact at the facility; type and thickness of geomembrane and; surface area of the installed geomembrane.
   b. Submit resumes or qualifications of the Installation Supervisor, Master Seamer and Technicians to be assigned to this project.
   c. Quality Control Program.
6. Example Material Warranty and Liner Installation Warranty complying with subsections 1.8 and 1.9 of this Section.
7. Resin Supplier's name, resin production plant identification, resin brand name and number, production date of the resin, resin Manufacturer's quality control certificates, and certification that the properties of the resin meet the requirements of these specifications.

B. Shop Drawings:

1. Submit copies of shop drawings for engineer's approval within a reasonable time so as not to delay the start of geomembrane installation. Shop drawings shall show the proposed panel layout identifying seams and details. Seams should generally follow direction of the slope. Butt seams or roll-end seams should not occur on a slope unless approved by the Owner's Representative. Butt seams on a slope, if allowed, should be staggered.
2. Placement of geomembrane will not be allowed to proceed until Owner's Representative has received and approved the shop drawings.

C. Additional Submittals (In-Progress and at Completion):

1. Manufacturer's warranty (refer to subsection 1.8).
2. Geomembrane installation warranty (refer to subsection 1.9).
3. Daily written acceptance of subgrade surface (refer to subsection 3.1.B).
4. Low-temperature seaming procedures if applicable (refer to subsection 3.3.A).
5. Prequalification test seam samples (refer to subsection 3.5.A.1.f).
6. Field seam non-destructive test results (refer to subsection 3.5.B.1).
7. Field seam destructive test results (refer to subsection 3.5.C.6).
8. Daily field installation reports (refer to subsection 3.5.G).
9. Installation record drawing, as discussed in subsection 3.5.G).

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1.5 QUALITY CONTOL

A. Manufacturer's Qualifications:

1. The manufacturer of geomembrane of the type specified or similar product shall have at least five (5) years experience in the manufacture of such geomembrane. In addition, the geomembrane manufacturer shall have manufactured at least 10,000,000 sq. ft of the specified type of geomembrane or similar product during the last five (5) years.

B. Installer's Qualifications:

1 The Geomembrane Installer shall be the Manufacturer, approved Manufacturer's Installer or a contractor approved by the Owner's Representative to install the geomembrane.

2 The Geomembrane Installer shall have at least three (3) years experience in the installation of the specified geomembrane or similar. The Geomembrane Installer shall have installed at least ten (10) projects involving a total of 5,000,000 sq. ft of the specified type of geomembrane or similar during the last three (3) years.

3 Installation shall be performed under the direction of a Field Installation Supervisor who shall be responsible throughout the geomembrane installation for geomembrane panel layout, seaming, patching, testing, repairs, and all other activities of the Geomembrane Installer. The Field Installation Supervisor shall have installed or supervised the installation and seaming of a minimum of ten (10) projects involving a total of 5,000,000 sq. ft of geomembrane of the type specified or similar product.

4 Seaming shall be performed under the direction of a Master Seamer (who may also be the Field Installation Supervisor or Crew Foreman) who has seamed a minimum of 3,000,000 sq. ft of geomembrane of the type specified or similar product, using the same type of seaming apparatus to be used in the current project. The Field Installation Supervisor and/or Master Seamer shall be present whenever seaming, patching, other welding operations, and testing are performed.

5 All seaming, patching, other welding operations, and testing shall be performed by qualified technicians employed by the Geomembrane Installer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Each roll of geomembrane delivered to the site shall be labeled by the manufacturer. The label shall be firmly affixed and shall clearly state the manufacturer's name, product identification, material thickness, roll number, roll dimensions and roll weight.

B. Geomembrane shall be protected from mud, dirt, dust, puncture, cutting or any other damaging or deleterious conditions.

C. Rolls shall be stored away from high traffic areas. Continuously and uniformly support rolls on a smooth, level prepared surface.

D. Rolls shall not be stacked more than three (3) high.

1.7 PROJECT CONDITIONS

A. Geomembrane shall not be installed in the presence of standing water, while precipitation is occurring, during excessive winds, or when material temperatures are outside the limits specified in Section 3.03.

1.8 MATERIAL WARRANTY

A. Material shall be warranted, on a pro-rata basis against Manufacturer's defects for a period of five (5) years from the date of Geomembrane installation.

1.9 GEOMEMBRANE INSTALLATION WARRANTY

A. The Geomembrane Installer shall guarantee the Geomembrane installation against defects in the installation and workmanship for one (1) year commencing with the date of final acceptance.

1.10 GEOMEMBRANE PRE-CONSTRUCTION MEETING

A. Geomembrane Pre-Construction Meeting shall be held at the site prior to installation of the geomembrane. At a minimum, the meeting shall be attended by the Geomembrane Installer, Owner, Owner's representative (Engineer and/or CQA Firm), and the General Contractor.

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B. Topics for this meeting shall include:

1. Responsibilities of each party.
2. Lines of authority and communication. Resolution of any project document ambiguity.
3. Methods for documenting, reporting and distributing documents and reports.
4. Procedures for packaging and storing archive samples.
5. Review of time schedule for all installation and testing.
6. Review of panel layout and numbering systems for panels and seams including details for marking on geomembrane.
7. Procedures and responsibilities for preparation and submission of as-built panel and seam drawings.
8. Temperature and weather limitations. Installation procedures for adverse weather conditions. Defining acceptable subgrade, geomembrane, or ambient moisture and temperature conditions for working during liner installation.
9. Subgrade conditions, dewatering responsibilities and subgrade maintenance plan.
10. Deployment techniques including allowable subgrade for the geomembrane.
11. Plan for controlling expansion/contraction and wrinkling of the geomembrane.
12. Covering of the geomembrane and cover soil placement.
13. Measurement and payment schedules.
14. Health and safety.

C. The meeting shall be documented by the Owner's Representative and minutes shall be transmitted to all parties.

Part 2 - Products

2.1 SOURCE QUALITY CONTROL

A. Manufacturing Quality Control:

1. The test methods and frequencies used by the manufacturer for quality control/quality assurance of the above geomembrane prior to delivery, shall be in accordance with GRI GM13, or modified as required for project specific conditions.
2. The manufacturer's geomembrane quality control certifications, including results of quality control testing of the products must be supplied to the Owner's Representative within a reasonable time prior to installation. The certification shall be signed by a responsible party employed by the manufacturer, such as the QA/QC Manager, Production Manager, or Technical Services Manager. Certifications shall include lot and roll numbers and corresponding shipping information.
3. The Manufacturer will provide Certification that the geomembrane and welding rod supplied for the project have the same base resin and material properties.

2.2 GEOMEMBRANE

A. The geomembrane shall consist of new, first quality products designed and manufactured specifically for the purpose of this work which shall have been satisfactorily demonstrated by prior testing to be suitable and durable for such purposes. The geomembrane rolls shall be seamless, high density polyethylene (HDPE-Density >0.94g/cm) containing no plasticizers, fillers or extenders and shall be free of holes, blisters or contaminants, and leak free verified by 100 percent in line spark or equivalent testing. The geomembrane shall be supplied as a continuous sheet with no factory seams in rolls. HDPE Geomembranes shall meet the property requirements shown in Table 2(a) of the GRI GM13 Specifications.

B. Material shall be reviewed for conformance to the project specifications by the Owner's Representative.

Part 3 - Execution

3.1 SUBGRADE PREPARATION

A. The area to be covered with geomembrane shall be prepared in accordance with the Section 02200 – Earthwork. The surface shall be smooth and free of ruts and holes, rocks, stones, sticks, sharp objects and debris of any kind.

B. The Geomembrane installer shall provide daily, a certificate of acceptance for the surface to be covered by the geomembrane in that day's operations. The surface shall be maintained in a manner, during geomembrane installation, to ensure subgrade suitability.

C. All subgrade damaged by construction equipment and deemed unsuitable by the Owner's Representative for geomembrane deployment shall be repaired prior to placement of the geomembrane. All repairs shall be reviewed by the Owner's Representative and approved by the Geomembrane Installer. This damage, repair, and the responsibilities of the contractor and Geomembrane Installer shall be defined in the preconstruction meeting.

3.2 GEOMEMBRANE PLACEMENT

A. No geomembrane shall be deployed until the applicable certifications and quality control certificates listed in subsection 1.4 of this Section are submitted to and approved by the Owner's Representative. Should geomembrane material be deployed prior to approval by the Owner's Representative it will be at the sole risk of the Geomembrane Installer and/or Contractor. If the material does not meet project specifications it shall be removed from the work area at no cost to the owner.

B. The geomembrane shall be installed to the limits shown on the project drawings and essentially as shown on approved panel layout drawings.

C. No geomembrane material shall be unrolled and deployed if the material temperatures are lower than 0°C . Temperature limitations should be defined in the preconstruction meeting. Typically, only the quantity of geomembrane that will be anchored and seamed together in one (1) day should be deployed.

D. No vehicular traffic shall travel on the geomembrane other than an approved low ground pressure All Terrain Vehicle or equivalent.

E. Sand bags or equivalent ballast shall be used as necessary to temporarily hold the geomembrane material in position under the foreseeable and reasonably - expected wind conditions. Sand bag material shall be sufficiently close- knit to prevent soil fines from working through the bags and discharging on the geomembrane.

F. Geomembrane placement shall not be done if moisture prevents proper subgrade preparation, panel placement, or panel seaming. Moisture limitations will be defined in the preconstruction meeting.

G. Damaged panels or portions of the damaged panels which have been rejected shall be marked and their removal from the work area recorded.

H. The geomembrane shall not be allowed to "bridge over" voids or low areas in the subgrade. In these areas, the subgrade shall be prepared to allow the geomembrane to rest in intimate contact with the subgrade.

I. Wrinkles caused by panel placement or thermal expansion should be minimized in accordance with section 1.10 B11.

J. Considerations on Site Geometry: In general, seams shall be oriented parallel to the line of the maximum slope. In corners and odd shaped geometric locations, the total length of field seams shall be minimized. Seams shall not be located at low points in the subgrade.

K. Overlapping: The panels shall be overlapped prior to seaming to whatever extent is necessary to affect a good weld and allow for proper testing. In no case shall this overlap be less than 3 in.

3.3 SEAMING PROCEDURES

No geomembrane material shall be seamed when liner temperatures are less than 0°C.

A. No geomembrane material shall be seamed when the sheet temperature is above 75°C as measured by an infrared thermometer or surface thermocouple.

B. Seaming shall primarily be performed using automatic fusion welding equipment and techniques. Extrusion welding shall be used where fusion welding is not possible such as at pipe penetrations, patches, repairs and short (less than a roll width) runs of seams.

C. Fishmouths or excessive wrinkles at the seam overlaps, shall be minimized and when necessary cut along the ridge of the wrinkles back into the panel so as to effect a flat overlap. The cut shall be terminated with a keyhole cut (nominal 1/2 in.- diameter hole) so as to minimize crack/tear propagation. The overlay shall subsequently be seamed. The key hole cut shall be patched with an oval or round patch of the same base geomembrane material extending a minimum of 6 in. beyond the cut in all directions.

3.4 PIPE AND STRUCTURE PENETRATION SEALING SYSTEM

A. Provide penetration sealing system as shown in the Project Drawings.

B. Penetrations shall be constructed from the base geomembrane material, flat stock, prefabricated boots and accessories as shown on the Project Drawings. The pre-fabricated or field fabricated assembly shall be field welded to the geomembrane as shown on the Project Drawings so as to prevent leakage. This assembly shall be tested as outlined in section 3.5.B. Alternatively, where field non destructive testing cannot be performed, attachments will be field spark tested by standard holiday leak detectors in accordance with

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ASTM 6365. Spark testing should be done in areas where both air pressure testing and vacuum testing are not possible:

1. Equipment for Spark testing shall be comprised of but not limited to: A hand held holiday spark tester and conductive wand that generates a high voltage.
2. The testing activities shall be performed by the Geomembrane Installer by placing an electrically conductive tape or wire beneath the seam prior to welding. A trial seam containing a non welded segment shall be subject to a calibration test to ensure that such a defect (non welded segment) will be identified under the planned machine settings and procedures. Upon completion of the weld, enable the spark tester and hold approximately 1 in. above the weld moving slowly over the entire length of the weld in accordance with ASTM 6365. If there is no spark the weld is considered to be leak free.
3. A spark indicates a hole in the seam. The faulty area shall be located, repaired and retested by the Geomembrane Installer.
4. Care should be taken if flammable gases are present in the area to be tested.

3.5 FIELD QUALITY CONTROL

A. The Owner's Representative shall be notified prior to all pre qualification and production welding and testing, or as agreed upon in the pre construction meeting:

1. Prequalification Test Seams:

   a. Test seams shall be prepared and tested by the Geomembrane Installer to verify that seaming parameters (speed, temperature and pressure of welding equipment) are adequate.
   b. Test seams shall be made by each welding technician and tested in accordance with ASTM D 4437 at the beginning of each seaming period. Test seaming shall be performed under the same conditions and with the same equipment and operator combination as production seaming. The test seam shall be approximately 10 ft- long for fusion welding and 3 ft- long for extrusion welding with the seam centered lengthwise. At a minimum, tests seams should be made by each technician one (1) time every four to six (4–6) hours; additional tests may be required with changes in environmental conditions.
   c. Two (2) 1 in.- wide specimens shall be die-cut by the Geomembrane Installer from each end of the test seam. These specimens shall be tested by the Geomembrane Installer using a field tensiometer testing both tracks for peel strength and also for shear strength. Each specimen shall fail in the parent material and not in the weld, "Film Tear Bond" (F.T.D. failure). Seam separation equal to or greater than 10 percent of the track width shall be considered a failing test.
   d. The minimum acceptable seam strength values to be obtained for all specimens tested are listed in Subsection 3.5.C.4 of this Section. All four (4) specimens shall pass for the test seam to be a passing seam.
   e. If a test seam fails, an additional test seam shall be immediately conducted. If the additional test seam fails, the seaming apparatus shall be rejected and not used for production seaming until the deficiencies are corrected and a successful test seam can be produced.
   f. A sample from each test seam shall be labeled. The label shall indicate the date, geomembrane temperature, number of the seaming unit, technician performing the test seam and pass or fail description. The sample shall then be given to the Owner's Representative for archiving.

B. Field Seam Non-destructive Testing:

1. All field seams shall be non-destructively tested by the Geomembrane Installer over the full seam length before the seams are covered. Each seam shall be numbered or otherwise designated. The location, date, test unit, name of tester and outcome of all non-destructive testing shall be recorded and submitted to the Owner's Representative.
2. Testing should be done as the seaming work progresses, not at the completion of all field seaming. All defects found during testing shall be numbered and marked immediately after detection. All defects found should be repaired, retested and remarked to indicate acceptable completion of the repair.
3. Non-destructive testing shall be performed using vacuum box, air pressure or spark testing equipment.
4. Non-destructive tests shall be performed by experienced technicians familiar with the specified test methods. The Geomembrane Installer shall demonstrate to the Owner's Representative all test methods to verify the test procedures are valid.
5. Extrusion seams shall be vacuum box tested by the Geomembrane Installer in accordance with

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ASTM D 4437 and ASTM D 5641 with the following equipment and procedures:

a. Equipment for testing extrusion seams shall be comprised of but not limited to: a vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the base, port hole or valve assembly and a vacuum gauge; a vacuum pump assembly equipped with a pressure controller and pipe connections; a rubber pressure/vacuum hose with fittings and connections; a plastic bucket; wide paint brush or mop; and a soapy solution.
b. The vacuum pump shall be charged and the tank pressure adjusted to approximately 5 psig.
c. The Geomembrane Installer shall create a leak tight seal between the gasket and geomembrane interface by wetting a strip of geomembrane approximately 12 in. by 48 in. (length and width of box) with a soapy solution, placing the box over the wetted area, and then compressing the box against the geomembrane. The Geomembrane Installer shall then close the bleed valve, open the vacuum valve, maintain initial pressure of approximately 5 psig for approximately ten (10) seconds. The geomembrane should be continuously examined through the viewing window for the presence of soap bubbles, indicating a leak. If no bubbles appear after ten (10) seconds, the area shall be considered leak free. The box shall be depressurized and moved over the next adjoining area with an appropriate overlap and the process repeated.
d. All areas where soap bubbles appear shall be marked, repaired and then retested.
e. At locations where seams cannot be non destructively tested, such as pipe penetrations, alternate nondestructive spark testing (as outlined in section 3.4.B) or equivalent should be substituted.
f. All seams that are vacuum tested shall be marked with the date tested, the name of the technician performing the test and the results of the test.

6. Double Fusion seams with an enclosed channel shall be air pressure tested by the Geomembrane Installer in accordance with ASTM D 5820 and ASTM D 4437 and the following equipment and procedures:

a. Equipment for testing double fusion seams shall be comprised of but not limited to: an air pump equipped with a pressure gauge capable of generating and sustaining a pressure of 30 psig, mounted on a cushion to protect the geomembrane; and a manometer equipped with a sharp hollow needle or other approved pressure feed device.
b. The Testing activities shall be performed by the Geomembrane Installer. Both ends of the seam to be tested shall be sealed and a needle or other approved pressure feed device inserted into the tunnel created by the double wedge fusion weld. The air pump shall be adjusted to a pressure of 30 psig, and the valve closed. Allow two (2) minutes for the injected air to come to equilibrium in the channel, and sustain pressure for five (5) minutes. If pressure loss does not exceed 3 psig after this five (5) minute period the seam shall be considered leak tight. Release pressure from the opposite end verifying pressure drop on needle to ensure testing of the entire seam. The needle or other approved pressure feed device shall be removed and the feed hole sealed.
c. If loss of pressure exceeds 3 psig during the testing period or pressure does not stabilize, the faulty area shall be located, repaired and retested by the Geomembrane Installer.
d. Results of the pressure testing shall be recorded on the liner at the seam tested and on a pressure testing record.

C. Destructive Field Seam Testing:

1. One (1) destructive test sample per 500 lin. ft seam length or 750 lin. ft., where seaming is performed by an International Association of Geosynthetic Installers (IAGI) Certified Welding Technician using an automatic welding device per GRI GM 29 (Track 2) shall be taken by the Geomembrane Installer from a location specified by the Owner's Representative. The Geomembrane Installer shall not be informed in advance of the sample location. In order to obtain test results prior to completion of geomembrane installation, samples shall be cut by the Geomembrane Installer as directed by the Owner's Representative as seaming progresses.
2. All field samples shall be marked with their sample number and seam number. The sample number, date, time, location, and seam number shall be recorded. The Geomembrane Installer shall repair all holes in the geomembrane resulting from obtaining the seam samples. All patches shall be vacuum box tested or spark tested. If a patch cannot be permanently installed over the test location the same day of sample collection, a temporary patch shall be tack welded or hot air welded over the opening until a permanent patch can be affixed.
3. The destructive sample size shall be 12 in.- wide by 36 in.- long with the seam centered lengthwise. The sample shall be cut into three (3) equal sections and distributed as follows: one (1) section given to the Owner's Representative as an archive sample; one (1) section given to the Owner's Representative for laboratory testing as specified in paragraph 5 below; and one (1) section retained

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by the Geomembrane Installer for field testing as specified in paragraph 4 below.

4. For field testing, the Geomembrane Installer shall cut ten (10) identical 1 in.- wide replicate specimens from his sample. The Geomembrane Installer shall test five (5) specimens for seam shear strength and five (5) for peel strength. Test results shall be assessed in accordance with Section 6.1 of GRI GM19 to the values shown in Table 1(a) of GRI GM19.
5. If independent seam testing, where required by the specifications, shall be conducted in accordance with ASTM 5820 or ASTM D4437 or GRI GM 6.
6. Reports of the results of examinations and testing shall be prepared and submitted to the Owner's Representative.
7. For field seams, if a laboratory test fails, that shall be considered as an indicator of the possible inadequacy of the entire seamed length corresponding to the test sample. Additional destructive test portions shall then be taken by the Geomembrane Installer at locations indicated by the Engineer, typically 10 ft on either side of the failed sample and laboratory seam tests shall be performed. Passing tests shall be an indicator of adequate seams. Failing tests shall be an indicator of non-adequate seams and all seams represented by the destructive test location shall be repaired with a cap-strip extrusion welded to all sides of the capped area. All cap-strip seams shall be non-destructively vacuum box tested until adequacy of the seams is achieved. Cap strip seams exceeding 150 ft in shall be destructively tested.

D. Identification of Defects:

1. Panels and seams shall be inspected by the Installer and Owner's Representative during and after panel deployment to identify all defects, including holes, blisters, undispersed raw materials and signs of contamination by foreign matter.

E. Evaluation of Defects: Each suspect location on the liner (both in geomembrane seam and non-seam areas) shall be non-destructively tested using one (1) of the methods described in Section 3.05.B. Each location which fails non-destructive testing shall be marked, numbered, measured and posted on the daily "installation" drawings and subsequently repaired:

1. If a destructive sample fails the field or laboratory test, the Geomembrane Installer shall repair the seam between the two (2) nearest passed locations on both sides of the failed destructive sample location.
2. Defective seams, tears or holes shall be repaired by reseaming or applying an extrusion welded cap strip.
3. Reseaming may consist of either:
   a. Removing the defective weld area and rewelding the parent material using the original welding equipment; or
   b. Reseaming by extrusion welding along the overlap at the outside seam edge left by the fusion welding process.
4. Blisters, larger holes, and contamination by foreign matter shall be repaired by patches and/or extrusion weld beads as required. Each patch shall extend a minimum of 6 in. beyond all edges of the defects.
5. All repairs shall be measured, located and recorded.

F. Verification of Repairs on Seams: Each repair shall be non-destructively tested using either vacuum box or spark testing methods. Tests which pass the non-destructive test shall be taken as an indication of a successful repair. Failed tests shall be reseamed and retested until a passing test results. The number, date, location, technician and test outcome of each patch shall be recorded.

G. Daily Field Installation Reports: At the beginning of each day's work, the Installer shall provide the Engineer with daily reports for all work accomplished on the previous work day. Reports shall include the following:
1. Total amount and location of geomembrane placed;
2. Total length and location of seams completed, name of technicians doing seaming and welding unit numbers;
3. Drawings of the previous day's installed geomembrane showing panel numbers, seam numbers and locations of non-destructive and destructive testing;
4. Results of pre-qualification test seams;
5. Results of non-destructive testing; and
6. Results of vacuum testing of repairs.

H. Destructive test results shall be reported prior to covering of liner and within forty-eight (48) hours.

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3.6 LINER ACCEPTANCE

A. Geomembrane liner will be accepted by the Owner's Representative when:

1. The entire installation is finished or an agreed upon subsection of the installation is finished;
2. All Installer's QC documentation is completed and submitted to the owner
3. Verification of the adequacy of all field seams and repairs and associated geomembrane testing is complete.

3.7 GEOMEMBRANE ANCHOR

A. Construct as specified on the project drawings.

3.8 DISPOSAL OF SCRAP MATERIALS

A. Upon completion of installation, the Geomembrane Installer shall dispose of all trash and scrap material in a location designated by the Owner's Representative, remove equipment used in connection with the work herein, and shall leave the premises in a neat acceptable manner.

END OF SECTION 02400

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SECTION 02508 – CRUSHED STONE SURFACING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Furnishing and installing materials for gravel roadbed construction for proposed access roads and embankment crests.

B. Related Sections include the following:

1. Division 2 02222 "Earthwork."
2. Division 2 02373 "Geotextiles."

1.3 REFERENCES

A. The following references, or cited portions thereof, govern the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 and Supplemental Specifications adopted January 1, 2014.
2. American Society for Testing and Materials (ASTM):

a. ASTM D 75 (2003) Practice for Sampling Aggregates.
b. ASTM D 422 (1963; R 2002) Test Method for Particle-Size Analysis of Soils.

3. American Geological Institute (AGI). Geoscience handbook AGIi data sheets, 4th edition.

1.4 SUBMITTALS

A. Product Data:

1. Aggregate source list: submit a list of proposed aggregate sources.
2. Shipping Tickets: Submit shipping tickets for the granular materials delivered to the site. Shipping tickets shall be according to paragraph 1004.01f of the IDOT Standard Specifications.

B. Test Reports.

1. Submit results of grain size analysis (ASTM D422). Test results are required for each proposed source and gradation. Submit test results for each source, demonstrating compliance with aggregate quality requirements specified herein.

C. Samples:

1. Submit one (1) sample per source for each gradation proposed for use on the project. Samples shall be at least 1 lb. and shall be obtained and shipped according to ASTM D75.

1.5 STORAGE AND HANDLING

A. Storage and handling of granular materials shall be according to paragraph 1004.01e of the IDOT Standard Specifications.

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PART 2 – PRODUCTS

2.1 MATERIALS

A. General:

1. Aggregate Surface Course, Type B:

a. Aggregate Surface Course, Type B used for surface material for all new access roads and impoundment crests shall be IDOT Gradation CA 6, in accordance with Section 1004.04 of the IDOT Standard Specifications for Road and Bridge Construction.

PART 3 – EXECUTION

3.1 ROADWAY CONSTRUCTION

A. Prepare the roadway subgrade as shown on the plans, in accordance with Section 02200 – Earthwork.

B. Furnish and Install Geotechnical Fabric for Ground Stabilization in accordance with Section 02373 – Geotextiles.

C. Furnish and Install Aggregate Surface Course, Type B in accordance with Article 402 of the IDOT Standard Specifications for Road and Bridge Construction.

3.2 TESTING

A. Independent gradation tests will be made by the Owner's Testing Lab during the progress of the work at frequencies as required in the project Construction Quality Assurance (CQA) Plan. The Contractor shall cooperate with the Testing Lab and allow such tests to be performed.

B. If tests indicate that an area of granular material or coarse aggregate does not meet the specified requirements of the project CQA Plan, then the Contractor shall remove the material and replace it with suitable material.

END OF SECTION 02508

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SECTION 02730 – STORM DRAINAGE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Furnishing and installing pipe, manholes and end sections for pipe culverts and storm sewers.
2. Storm Drainage installation shall include incidental related work such as topsoil removal, trench excavation, backfill, compaction, tie-in of existing system, etc..

B. Related Sections include the following:

1. Division 02 02222 "Earthwork."

1.3 REFERENCES

A. The following reference, or cited portions thereof, governs the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 and Supplemental Specifications adopted January 1, 2014. Payment provisions shall not apply.

PART 2 - PRODUCTS

2.1 PIPE

A. HDPE Pipe shall be Dual-Wall Corrugated PE (Polyethylene) with a Smooth Interior, in accordance with AASHTO M 294-Type S.

B. Reinforced Concrete Pipe (RCP) shall be constructed in accordance with Article 1042.06(a). All pipe shall be strength Class V per AASHTO M 170.

2.2 PRECAST REINFORCED FLARED END SECTIONS

A. Precast Reinforced Flared End Sections shall be constructed in accordance with Article 1042.07 of the Standard Specifications and IDOT Standard Drawing 542301-03.

2.3 PRECAST CONCRETE MANHOLES

A. Precast Concrete Manholes shall be constructed in accordance with Article 1042.10 of the Standard Specifications and IDOT Standard Drawing 602401-03.

B. Manhole steps shall be copolymer polypropylene plastic with a continuous 1.5-inch steel reinforcement as manufactured by M.A. Industries Inc. or an approved equal.

2.4 CASTINGS

A. Castings are to be made of gray cast iron.

B. Frame & Lids Type 1 shall be cast according to IDOT Standard Drawing 604001-03.

PART 3 – EXECUTION

3.1 STORM DRAINAGE PIPING INSTALLATION

A. Install piping in accordance with the Article 542 of the Standard Specifications. Bedding and Haunching shall be IDOT CA-6 Gradation. Trench excavations are to be backfilled with trench excavated materials.

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Compact backfill to 95 percent of the maximum dry density as determined by the Standard Proctor test – ASTM D-698.

3.2 END SECTION INSTALLATION

A. End Treatments shall be installed according to Article 542.07 of the Standard Specifications.

3.3 MANHOLE INSTALLATION

A. Manholes shall be installed according to Article 602 of the Standard Specifications.

END OF SECTION 02730

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SECTION 02831 – CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Fence framework, fabric, and accessories.
2. Gates.
3. Fence post foundations.

B. Related Sections include the following:

2. Division 02 02222 "Earthwork."

PART 2 – PRODUCTS

2.1 MATERIALS

A. Chain Link Fabric: In accordance with ASTM Standard A491, latest revision; 7'-0" high, made of No. 9 gauge steel wire, woven in a 2 inch mesh and coated with a Class II aluminum coating of 0.4 oz/sf. Top and bottom selvages shall have a twisted and barbed finish.

B. Fabric Ties: Fabric shall be fastened to the line posts with aluminum tie wires spaced 24 inches apart. Standard fabric stretcher bars and stretcher bar bands shall be furnished where required.

C. Posts: Posts shall be made of galvanized steel pipe, sized as follows:

Line Posts	2.375" OD (3.65#/ft)
Terminal (end/corner/pull) Posts	2.875" OD (5.79#/ft)
Gate Posts	SEE PLANS

Posts shall be evenly spaced, but in no instance should spacing greater than 10 feet be used.

D. Gates: Gates shall be constructed of 2.0" O.D. (minimum) galvanized steel pipe (2.72#/ft.), 8 feet high overall complete with malleable iron ball and socket hinges, stops, and center rest. The hinges shall permit the gate to swing open over 90 degrees in both directions. Provide latch with integral eye opening for padlocking; padlock accessible from both sides of gate.

E. Braces: Galvanized standard construction braces shall be provided between each terminal and gate posts and the first adjacent post.

F. Top Rails: The top rail shall be made of galvanized steel pipe 1 5/8" O.D. 2.27#/ft., provided with couplings approximately every 20 feet. Couplings shall be outside sleeve type and at least 7" long. One coupling in every five shall have a heavy spring to take up expansion and contraction of the top rail. The rail shall pass through the base of line post tops and form a continuous brace from end to end of each stretch of fence. The top rail shall be securely fastened to terminal posts by means of malleable iron or pressed steel clamps.

G. Barbed Wire: Barbed wire shall be United States Alumoweld Co. "Alumoweld" Four Point Type Light Weight (two 0.080" diameter strands). If Alumoweld barbed wire is not available, two 12.5 gage strands, with an aluminum coating equal to that specified per the fence fabric may be substituted.

H. Extension Arms: For fences with 7 foot fabric, galvanized standard construction extension arms arranged to carry three strands of barbed wire shall be provided for line posts. The topmost strand shall be approximately 12" above the fence. Extension arms shall be 45 degrees to the outside. The three strands of barbed wire on terminal and gate posts and gates shall be attached directly to the vertical post or gate frame.

I. Galvanizing: Galvanized steel pipe for posts, gates, top rail and removable panels shall be in

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accordance with ASTM Standard A120, latest revision. No used, re-rolled, or open seam material will be permitted. Other fittings and hardware shall be galvanized according to ASTM Standard A153, latest revisions.

J. Bottom Tension Wire: The bottom tension wire should be No. 7 gauge aluminum coated spring coil or crimped wire. Minimum weight of coating shall be 0.40 oz/sf of wire surface. Tension wire shall be stretched taut from terminal post to terminal post and evenly fastened to each intermediate post 6 inches above the grade line. Tension wire shall be attached to the fence fabric with aluminum hog rings every 24 inches.

K. Footing Concrete: Ultimate strength of 3,000 psi at 28 days; 5.5 sacks (minimum) of cement per cubic yard; 6.5 gallons (maximum, including free moisture on aggregate) per sack of cement; 3/4" maximum aggregate size; 3%-5% air entrainment; mixed per ASTM C94.

PART 3 – EXECUTION

3.1 CONSTRUCTION

A. The fence shall follow the ground line unless otherwise specified. It shall be neat, plumb, aligned true, stretched taut, and free from sags and bellies. Sufficient terminal posts must be provided to insure that bottom closure shall be within one inch of the ground surface elevation.

B. Terminal Posts (end, corner, pull, brace) and Gate Posts shall be set in concrete footings as shown on the plans. The top of the footing shall be sloped away from the post to drain moisture. In most instances, fence posts are installed before yard rock is placed. The installer shall make sure that the concrete footing extends above earth subgrade a sufficient amount so that the footing will be 1 inch above finished rock surface after the rock is placed.

C. Line Posts shall be driven to a minimum depth of 60" below the finished earth grade.

D. Provide at least one electrical ground for each 1,000 ft. of fence, located near the center of the run. Provide additional grounds directly under each point where power lines pass over the fence. Vertically drive or drill the grounding rod until the top of the rod is approximately 12 in. below the top of the ground. Connect a No. 8 solid copper conductor to the rod and to the fence by a UL-listed method so that each element of the fence is grounded.

END OF SECTION 02831

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SECTION 02936 – TOPSOIL, SEEDING AND MULCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1-General Requirements, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes the following:

1. Seeding and placing mulch, turf reinforcement mat (TRM), or erosion control blanket (ECB) over seeded areas.

B. Related Sections include the following:

2. Division 02 02222 "Earthwork."

1.3 REFERENCES

A. The following reference or cited portions thereof, current at date of bidding documents unless otherwise specified, governs the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2012, and Supplemental Specifications, adopted January 1, 2014.

1.4 SPECIFICATIONS

A. Work shall conform to the applicable requirements of Sections 250 and 251 of Standard Specifications for Road and Bridge Construction and to the requirements hereinafter specified.

B. Exceptions: All references in the IDOT specifications to methods of measurement and payment shall not apply.

1.5 WARRANTY

A. Warranty for one (1) year plus one growing season from date of substantial completion shall be provided.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil: Topsoil shall be loam texture soils from the A horizon of soil profiles of local soils, as defined in the USDA Soil Texture Triangle. The soil shall have an organic content between one and ten percent according to AASHTO T 194. It shall be relatively free from large roots, sticks, weeds, brush, or stones larger than 3/4 in. in diameter, or other litter and waste products. At least 90 percent shall pass the No. 10 sieve according to Illinois Modified AASHTO T 27, and the pH shall be between 5.0 and 8.0 according to ASTM D 4972. Topsoil shall be capable of supporting and germinating vegetation.

B. Seed: Seed mixture shall IDOT Class 1B Low Maintenance Lawn Mixture per Article 250 of the IDOT Standard Specifications, and composed as follows:

Seed Type	Pounds/Acre
Fine-Leaf Turf-Type Fescue	150
Perennial Ryegrass	20
Red Top	10
Creeping Red Fescue	20

B. Hydraulic Mulch material shall conform to Article 1081.06(a)(2) of the IDOT Standard Specifications.

C. Erosion Control Blanket (ECB) shall be Bionet SC150BN as produced by North American Green or an Engineer approved equal.

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D. Turf Reinforcement Mat (TRM) shall be VMAX SC250 as produced by North American Green or an Engineer approved equal.

E. Fertilizer and agricultural ground limestone may be used.

PART 3 – EXECUTION

3.1 CONSTRUCTION

A. The upper 6-inches of all earth fill placement, including the vegetative cover, shall be comprised of topsoil.

B. Seed bed preparation and seeding methods shall conform to Section 250 of the IDOT Specifications. Seeding of areas disturbed by construction activities after September 30, 2015 may be deferred until Spring 2016 at no additional cost to the Owner.

B. Seeded areas shall be hydraulically mulched concurrently with seeding at a rate of 1 ton or Hydraulic Mulch per acre.

C. Turf Reinforcement Mat (TRM) and Erosion Control Blanket (ECB) shall be installed per the manufacturers published guidelines at locations shown on the plans.

3.2 MAINTENANCE OF COMPLETED WORK

A. All areas seeded by the Contractor shall be maintained by the Contractor during the period between completion of such work and final completion and acceptance of the Contractor's work by the Owner. This maintenance shall be such that the completed work, at time of acceptance, complies in all respects with the requirements herein specified.

B. The areas seeded will be required to germinate. If the seed does not germinate, the Contractor will be required to regrade and reseed at no additional cost to the Owner.

END OF SECTION 02936

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APPENDIX A - SAFETY AND CONTRACTOR REQUIREMENTS

1.0 GENERAL CONTRACTOR SAFETY REQUIREMENTS

Contractor and their employees are responsible for their safety.

1.1 Contractor General Requirements

1.1.1 Contractor supervision and personnel shall obtain site-specific training. This will include, but not be limited to:

- Workman's Protection Assurance (WPA) / Hold Tag Equipment Lock-out
- Hot Works
- Confined Spaces
- Commissioning WPA Procedure
- Other Safety Requirements listed in this specification

Note: Contractor employees may be barred from Ameren property for failure to comply with WPA procedures. Contract may be terminated or Contractor may lose future work for failure to enforce WPA. See the following WPA Authorization Form (Attachment A5) for sign-on access to the Ameren automated WPA system at each plant site.

1.1.2 Contractor administers appropriate disciplinary action if their employees violate Job Working Rules.

1.1.3 Contractor must hold daily job briefings.

1.1.4 All rolling equipment must be inspected prior to use.

1.1.5 Ameren reserves the right to bar any individual from Company property.

1.2 Rules to Live By

Rules to Live By is focused on activities that have the potential to produce a fatality or serious injury. While there are many hazards that can produce serious injuries, the items listed below are so significant that a single violation warrants immediate intervention by the Contractor. Actions determined to be in violation of these rules may result in permanent barring from all Ameren facilities. Ameren may conduct an independent investigation as necessary.

- Fall Protection – Failure to use proper fall protection when there is a risk of a fall that is greater than 6 feet
- WPA (Lock Out / Tag Out) – Violation of a tag, lock or tag-out device that is used for employee and contractor protection.
- Electrical Safety – Failure to follow the proper procedures and wear proper personal protective equipment when working on energized equipment.
- Confined Space Entry – Failure to evaluate a confined space and perform air monitoring checks prior to entry.
- Rigging / Hoisting – Walking or working under a suspended load.
- Trenching and Shoring – Entering an excavation greater than 5 feet deep that has not been properly sloped or shored.

1.2.1 It is the expectation that the Contractor will enforce our RTLB program and discipline the RTLB violators. All violators will be removed immediately from the site, after which the Contractor will be required to formally submit on their letterhead a detailed report on the incident, noting internal meeting(s), additional training that was conducted, and what will be done to prevent a reoccurrence, prior to return of the employee.

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1.2.2 Violations of other safe work practices also may result in permanent barring from all Ameren Facilities.

1.2.3 Contractors will be assessed $2,000 per RTLB violation that Ameren personnel find during the project. Contractor is to donate assessment to a mutually agreed-upon charity.

1.3 Safe Work Practices

1.3.1 Hard hats with bill facing forward, appropriate safety shoes and foam-lined safety glasses with side shields **must be worn at all times in all locations** past the Construction Gate. Safety shoes must be compliant with ANSI Z41 effective January 2008. Safety glasses must be compliant with ANSI Z87.1 or equivalent. Supervisors may permit the removal of hard hats and safety glasses in areas such as trailers, or training rooms.

1.3.2 Wear a hardhat, safety glasses, and a welding hood when welding.

1.3.3 Wear foam-lined safety goggles over non-safety rated prescription eyewear.

1.3.4 Foam-lined safety glasses shall be worn at all times. Contractor employees who wear prescription safety eyewear shall also have the foam-lined feature.

1.3.5 Face shields must be worn over safety glasses when grinding, chipping, jack hammering, power sawing, handling hazardous chemicals, or performing other tasks that could result in a face or eye injury.

1.3.6 Wear appropriate gloves to protect hands from cuts, burns, temperature extremes, chemicals, biological agents or other hazards.

1.3.7 Wear hearing protection when performing noisy work, such as jack-hammering, or where posted.

1.3.8 Hair must be cut or contained above shoulder length and must not interfere with protective headgear.

1.3.9 Shorts, shirts without sleeves or with sleeves rolled up above the shoulder are not permitted.

1.3.10 Gas bottles must be secured to prevent tipping. Gas bottles must be capped or have a regulator installed. Oxy/acetylene bottles must be separated by at least 20-foot or a 5-foot barrier with a one-hour fire rating while in storage.

1.3.11 During welding or "burning":

- Use temporary shielding to protect personnel beside, above and below the work; free falling of sparks below a cutter/welder's feet is not allowed
- Contain slag, sparks, etc.
- Place weld rod stubs in containers after removal from stingers, and place all other trash in appropriate containers.

1.3.12 Safety harnesses are required when working on surfaces over six (6) feet high that do not have guardrails or other fall protection. Attach lanyards and lifelines to structural members capable of supporting the load requirement (5000 lbs. anchor point).

1.3.13 On portable man lifts, fall protection is required per manufacturer's instructions. The lift must be secure and stable prior to use.

1.3.14 For overhead work rolling scaffolds, mechanical lift platforms are preferred over ladders.

1.3.15 If straight or extension ladders must be used, one worker must hold the ladder until another worker has tied the top to a substantial anchor point. Prior to working above 6 feet off the straight or extension ladder, worker is to don fall protection harness with lifeline, using or establishing an anchor point overhead for clip attachment, as required by Rules to Live By.

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1.3.16 If a step ladder must be used when the worker's feet are on or above the fifth rung, the top of the ladder must be tied to a substantial anchor or a second worker must hold the ladder. Prior to working above 6 feet off the step ladder, worker is to don fall protection harness with lifeline, using or establishing an anchor point overhead for clip attachment, as required by Rules to Live By.

1.3.17 Daily clean-up of the work area is required. Keep stairways and aisles clear at all times. Tie extension cords, welding leads, air hoses, etc., to middle rail of the handrail and/or route overhead.

1.3.18 Barricade at least 6 feet from the hole or edge if grating or handrail sections are being removed or installed.

1.3.19 Barricade below lifting/hoisting activities, including both critical and non-critical lifts.

1.3.20 All electrical junction boxes, duct panels, etc., are to be kept closed whenever possible.

1.3.21 Vent gas-powered equipment, such as welders, generators, compressors or power tools, to the outdoors. Exhaust from equipment near doors must not enter the plant when the doors are opened.

1.3.22 Plant Fire System Equipment is NOT for routine work unless specifically authorized by the Plant.

1.3.23 If the plant allows Contractor employees to use elevators, observe the following rules:

- No equipment on elevators may extend through the roof access opening.
- Transport bulk materials in freight elevators and obey the posted weight limits.
- Only tools and materials that can be carried by hand are allowed on passenger elevators.

1.3.24 Qualified electricians are required to wear fire-retardant (FR) clothing or 100% natural fibers when working on exposed, energized circuits. FR clothing must meet arc flash labels and be appropriate for the tasks being performed.

1.3.25 Reflective safety vests must be worn by all personnel who work on or near active highways, roads, or parking lots. Vests are also required for other work that places personnel near motor vehicles such as flaggers, riggers, survey crews, etc. ANSI/ISEA 107, Class III high-visibility reflective safety vests shall be worn for maximum visibility. Ameren may require vests on other projects.

1.3.26 Ground Fault Circuit Interrupters (GFCI's) shall be used to protect all 120 VAC electrical equipment including electric hand tools and cord sets. The use of 480 VAC GFCI's is required when working in wet locations.

1.3.27 Adding slugs within electrical devices requires written approval by Ameren representative. Equipment rated fuses and/or circuit breakers shall not be removed and replaced with ones of different set parameters without written approval by an Ameren representative

1.3.28 Contractor shall follow safety requirements for working on elevated platforms per Elevated Platform Safety Requirements (Appendix Y).

1.3.29 We want this to be a SAFE job. YOU CAN HELP. Report all unsafe acts and conditions to your Supervisor. Consult a Contractor or Ameren Supervisor if there are any questions about work rules or safety requirements.

1.4 Other Safety Requirements

1.4.1 If outages are required, the Contractor shall coordinate with the SPOC to obtain lock-outs and releases in accordance with the Plant's WPA/Hold Card procedures and operating practices. Equipment with a WPA/Hold Card tag shall never be serviced or removed.

1.4.2 Contractors must comply with all Federal, State and Local laws, regulations and ordinances for work in permit-required confined spaces. Contractors shall obtain information from the plant designee on the location and other pertinent information regarding confined space entry. Any entry involving both Contractor and Ameren employees shall be coordinated through the SPOC. For reference, review

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Appendix Z for a list of identified confined spaces at the different Energy Centers. Appendix Z shall be used as a guide and not be considered a complete list.

1.4.3 Only qualified and authorized persons should work on energized electrical equipment as per Ameren procedure AUE-ADM-5002, Energized Equipment Electrical Safety Program. If applicable to specified work scope, the SPOC will supply a copy of AUE-ADM-5002.

Contractor shall not work on energized equipment without the express, written consent of the SPOC. In no case shall the Contractor work on or near (within reach of) energized equipment without the use of appropriate insulated tools to perform the work. Violators of this policy will be subject to disciplinary action, including a minimum $10,000 fine, and up to and including termination of employment.

1.4.4 All lifting/hoisting activities near overhead, high tension power lines must include awareness of and observance of the following safe working clearances:

13.8 kV	10 feet
69 kV	11 feet
138 kV	13 feet
161 kV	14 feet
230 kV	16 feet
345 kV	29 feet

1.4.5 Ameren must review contractor qualifications before contractor employees may work in high voltage areas.

1.4.6 Contractor shall coordinate hot work, (i.e., welding, brazing, heating and cutting), with Company personnel to assure that Ameren safety requirements are met as outlined on Hot Work Permit (Attachment A8).

1.4.6.1 A Hot Work Checklist/Permit must be utilized when performing hot work such as welding, cutting, grinding, or any other activity that produces sparks. Contractor may use their own forms or Ameren's but work should be coordinated through the SPOC.

1.4.7 Plant equipment identified with a nuclear radiation symbol (as seen below) is NOT to be serviced by unauthorized personnel):



1.4.8 All equipment on the project shall be used in accordance with Federal, State, and Local ES&H requirements in addition to the manufacturer's instructions and guidelines. Equipment shall not be modified in any way for use other than what the manufacturer intended.

1.4.8.1 Any alterations must be approved by the manufacturer in writing. Only trained and authorized persons shall operate machinery or equipment.

1.4.8.2 Use hand-held power tools only for their intended purpose. Do not use tools that are broken, have dull blades, dull bits, have damaged cords, or have damaged/missing

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guards. Hand-held power tool switches should not be modified by any means to maintain power without constant trigger pressure. (Ref. OSHA 29CFR1910.243.

1.4.8.3 All Grinders guards/handles must remain on grinders at all times. If a guard or handle is required to be removed because of a tight work area, a permit must be completed and maintained at work location. See Grinder Plan (Attachment A6).

1.4.9 Ameren expects that all Electrical Contractors will follow the common work practice that a check of all wires being demoed is performed to ensure that all wires are dead and de-terminated before wrecking. If wires are found live, verification will be made prior to wires being terminated or cut.

1.4.10 Barricades

NOTE: Do not rely on barricade tape and flags to prevent a fall that is more than 6 feet.

- **When attended, install barricade tape no less than 6 feet from opening.**
- **Use fall protection if personnel are working closer than 6 feet to the opening.**
- **When unattended, cover the floor opening with a temporary cover, or temporary handrails 42 inches in height that include a mid-rail and toe board. Temporary covers must be able to support at least twice the load to which they will be subjected (including people, equipment and/or vehicle traffic).**
- **Temporary covers must be secured when installed in such a way as to prevent accidental movement by wind, traffic, or employees.**

1.4.10.1 Barricades must be used to warn employees about a hazard or restrict employees' access to a hazardous area. Barricades must have an information tag listing the responsible person, date of erection, and purpose. Barricade signs should indicate the Contractor, reason, and expiration date/time. Remove the barricade when work is completed. See Barricade Tag (Attachment A4).

1.4.10.2 Any employee may erect a barricade. The person responsible for the barricade must remove it when the hazard no longer exists.

NOTE: Any time red Barricade tape is to be used, the Contractor must inform the Construction Project Lead/SPOC, who in turn will notify the Shift Supervisor.

- **Red barricade tape** shall be used to warn personnel DO NOT ENTER dangerous areas. These areas may only be entered with authorization from the person who erected the barricade.
- **Yellow and magenta tape** shall be used to warn personnel DO NOT ENTER an area because radiography is creating a radiation hazard.
- **Yellow barricade tape** shall be used to warn personnel of immediate hazards that have the potential to cause injury. Areas barricaded with yellow may be entered once the hazard is identified and can be avoided.
- **Green barricade tape** shall be used to warn personnel of possible exposure to hexavalant chromium. Respiratory protection is required in these areas.

Contractors are responsible for compliance with the OSHA Regulation on Hexavalant Chromium. "Regulated Areas" should be clearly demarcated with Green barricade tape with a caution tag that clearly states the hazard in the work area (e.g., "Hex Chrome Exposure – Respiratory Protection Required"). In general, regulated areas should be established a minimum distance from the activity as described below;

1. 5 Feet – Welding on boiler tubes, steam piping and other materials that contain 2.5% chromium or less

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2. 10 Feet – Welding on Stainless steel and other materials that contain more than 2.5% chromium.

3. 20 Feet and/or Visible plume – Plasma arc cutting, air arc cutting, chamfer-trodes, cut-trodes and other processes lacking sufficient air monitoring data by Ameren for the protection of our employees.

Contractors are responsible for air monitoring as required for their employee protection and validation of engineering controls. The guidelines for barricading are based on employee exposures based on collection of data by Ameren. These distances are guidelines and may be increased or decreased based on air monitoring data. Ameren Safety Department will request air monitoring data at the beginning of each job, especially if the process is new or not sufficiently monitored in the past.

- A Nuclear Radiation Sign (see Item 1.4.7 above) is used to warn unauthorized personnel not to tamper with or remove instruments or equipment.

- Flashing yellow lights may be used with barricades.

- Other barricades may be used for roadwork and for other special situations.

1.4.10.3 When determining and setting overhead load path barricade boundaries, Contractors shall include within the boundary the potential for dropping load during load swing (failed load path). All elevations affected per this potential 'failed load path' shall be barricaded.

1.4.11 Incident/Accident Reporting

1.4.11.1 In the event of a incident/injury to a Contractor or Subcontractor employee, the SPOC shall be notified ASAP, and a written report provided no later than 24 hours after the incident/injury.

1.4.11.1.1 This notification shall include a detailed description of the accident or injury, including the names of those involved. (Incident/Accident Investigation Report (Attachment A1)) and (Witness Statement (Attachment A2)) must be utilized to provide the required notification.

1.4.11.1.2 OSHA Recordable injuries and minor injuries requiring first aid must be recorded using the First Aid Register (Attachment A3), which must be forwarded to the SPOC.

1.4.11.1.3 On Ameren Coordinated Insurance Program (ACIP) projects, copies of all first reports of injury and supporting investigation information should be faxed to the designated claims manager and ACIP broker (see Ameren Safety Supv. for contact numbers).

1.4.11.2 **For any serious incident or injury:**

- **First — Notify the Plant Shift Supervisor or designee immediately.** The Shift Supervisor will make the Emergency call and implement appropriate Plant Emergency Response procedures.

- **Second — Provide First Aid for the injured** as required until professional Emergency Responders arrive.

- **Third — Secure the area** to ensure safety of other personnel.

- **Fourth — Notify the SPOC** via phone, PA, radio, or in person.

1.4.11.3 The accident scene must be secured for the accident investigation. Equipment or material can only be moved to prevent further injury until a review of the accident is completed.

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1.4.11.4 Follow up verbal messages to the SPOC with written notifications within 24 hours as directed in Item 1.4.11.1.

1.4.12 Imminent Danger Situations

1.4.12.1 Contractor must suspend work immediately upon discovery of any situation that may, in their opinion, reasonably be expected to cause serious physical harm, illness, death, or significant environmental or equipment damage.

1.4.12.2 ES&H concern(s) must be corrected, to the satisfaction of the Contractor and Company, before work may resume.

1.4.12.3 Examples of "imminent danger" situations may include, but are not limited to the following:

- Falls from elevations
- Excavations not properly sloped or shored
- Radiation hazards
- Electrocution hazards
- Injury to the public
- Unsafe operation of vehicles, machinery or heavy equipment
- Improper or non-existent WPA/Hold Card equipment lockout
- Release of hazardous substances (OSHA 40CFR Part 302) into the environment in excess of the reportable quantity

1.4.13 Abandoned Piping and Demolishing Abandoned Piping

Ameren expects all Contractors to follow the Guidelines for Abandoned Piping and Demolishing Abandoned Piping (Attachment A20), while performing work on piping and/or utilities which are considered to be abandoned or will be abandoned in place.

1.4.14 Excavations

1.4.14.1 Contractor shall non-destructive excavate all underground construction activities, unless given approval by the SPOC to do otherwise.

1.4.14.2 High Suction Vacuum Contractors working at the Ameren site must have a vacuum relief valve located within equipment, a vacuum break at the point of operation, along with equipment that is grounded while operating.

2.0 WORKERS PROTECTION ASSURANCE PROCEDURE FOR OUTSIDE CONTRACT OR CONSTRUCTION PERSONNEL

GENERAL

It is necessary to assure the safety of outside contract personnel and Ameren personnel throughout construction of new system equipment and/or modification of existing system equipment. The following is a brief outline of procedures, to guide outside contract personnel in dealing with Ameren operating authorities to obtain Worker's Protection Assurances (WPA).

2.1 Definition

2.1.1 Worker's Protection Assurance:

WPA is the name given to the process used by Ameren to ensure the safety of those who work on generation, transmission and substation equipment.

2.1.1.1 Its primary purpose is to ensure the SAFETY of the worker.

2.1.1.2 The Ameren WPA system uses a series of Tags and a Sign-On procedure.

2.1.1.3 The reliability and integrity of the WPA process relies upon all persons on the plant site understanding and honoring the WPA Tags and Sign-On procedure.

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2.1.1.4 WPA is the Operating Authority's assurance to the person obtaining Worker's Protection Assurance that: (see Operating Authority below)

Either 1) The equipment covered by the Worker's Protection Assurance has been completely isolated from energy sources (see Out of Service below)

Or 2) The equipment is placed in a special status requested by the person receiving the Worker's Protection Assurance (see Local Control below)

2.1.2 Types of WPA Authorities

2.1.2.1 Custody Authority

2.1.2.1.2 The Custody Authority is the person who is responsible for and "in charge" of all of the equipment in a system or power plant (usually the Plant Manager).

2.1.2.2 Jurisdictional Authority

2.1.2.2.1 The Jurisdictional Authority is the individual or group of individuals, responsible for the overall direction and coordination of the Ameren system equipment.

2.1.2.2.2 The Jurisdictional Authority of Plant Equipment (coal pile to turbine) is the Plant Operating Supervisor.

2.1.2.2.3 The Jurisdictional Authority (generator to Electrical System) is the Transmission Dispatcher / Power Dispatcher.

2.1.2.3 Functional Authority

2.1.2.3.1 The Functional Authority is the individual or group of individuals, who perform or direct someone else to perform detailed operations, such as switching or valving.

2.1.2.3.2 The Functional Authority of Most Plant Equipment (coal pile to turbine) is the Operating Supervisor.

2.1.2.3.3 The Functional Authority (Electrical System) is the Transmission Dispatcher.

In a power plant, one person, the Operating Supervisor in the Control Room, approves and issues the WPA.

2.1.2.4 Functional Agents

2.1.2.4.1 One type of Functional Agent is the Unit Operating Engineer (UOE) He creates the documentation.

2.1.2.4.2 Another type of Functional Agent is the Plant Operating Engineer (POE). He performs the work and hangs the tags.

The Plant's UOE and the POE always perform the above duties, never Contractor personnel.

2.1.3 WPA Isolation Point:

2.1.3.1 A WPA Isolation Point may be any of the following energy-isolating devices:

- Switch
- Circuit Breaker
- Valve
- Coupling
- Drive Belt

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- Chain

2.1.4 Boundary:

2.1.4.1 A Boundary is a collection of energy-isolation devices that form a "zone of protection or control" around the equipment to be serviced.

- The status of equipment within a WPA Boundary can only be changed after the Holder has Signed-Off the WPA and the WPA tag(s) have been removed.

2.2 Equipment Covered By Worker's Protection Assurances

2.2.1 All system equipment under the jurisdiction of an Operating Authority must be covered by Worker's Protection Assurance when it is to be worked on or tested.

2.2.2 The only equipment that can be covered by Worker's Protection Assurance is equipment under an Operating Authority's jurisdiction.

2.2.2.1 Equipment connected to energy sources but not released to the jurisdiction of an Operating Authority can only be protected by Worker's Protection Assurance on the isolating device (or devices) between the energy source and the equipment.

In this case it is only possible for the Operating Authority to assure the person receiving Worker's Protection Assurance that the particular isolating device (or devices) connecting the new equipment to his energy sources is protected and he cannot assure the person receiving the Worker's Protection Assurance that the equipment is completely isolated. Therefore, it is better for all new equipment to be released to the jurisdiction of an Operating Authority as soon as possible.

2.3 Description and Purpose of Tags

2.3.1 General Notes:

2.3.1.1 When you see a WPA tag on equipment, it is telling you to stay clear of the equipment and keep hands off (violating WPA tags will result in disciplinary action up to and including termination).

2.3.1.2 Only the Functional Authority of the equipment may order tags to be placed or removed.

2.3.1.3 Tags will ordinarily be executed and attached by an Operator or his agent.

2.3.1.4 Tags, record sheets and WPA sheets will have the equipment name, etc., along with the serial number of the WPA record.

2.3.2 Function Authority's Hold Off Tag

2.3.2.1 Definition:

2.3.2.1.1 The Hold Off is an inviolable order of a Functional Authority that the disconnect device(s) which it is intended to cover must not be closed (or opened in the case of valves) under any circumstances unless definitely ordered or approved by him and then only if the Hold Off tag is first ordered removed.

2.3.2.2 Issued to:

2.3.2.2.1 Only to the Functional Authority (never to a worker).

2.3.2.3 Usage:

2.3.2.3.1 The Hold Off is an Operating Authority's tool which he may choose to use any time he feels it would contribute to a safer working environment.

2.3.2.3.2 To properly isolate equipment from all sources of normal energy and tag them with Hold Off tags so the Functional Authority may issue an Out of Service or Restraint to a supervisor or workman so work on designated equipment may proceed.

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2.3.2.4 Equipment Status:

2.3.2.4.1 Operator must obtain the approval of, or be acting under the orders of, his Functional Authority before changing the status of, or working on any equipment bearing a Hold Off tag.

2.3.3 Worker's Hold Off Tag

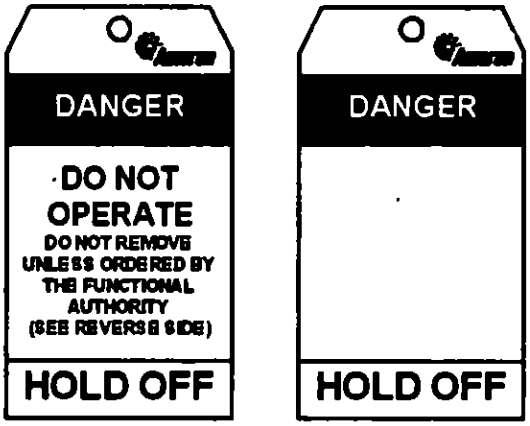
2.3.3.1 Definition:

The Worker's Hold Off is the method by which the Holder of a Local Control isolates equipment he is working on under the Local Control.

2.3.3.2 Workers will create their own Worker's Hold Off tag by legibly signing a blank Power Plant Hold Off Tag. If the Holder of a Local Control wants to work on the equipment, it must first be isolated from its energy supplies. The Holder would open the breaker, close the valves, etc. to isolate the equipment. The Holder must then hang a Worker's Hold Off on top of the Local Control to ensure the breaker or valves remain in the de-energized position. A Worker's Hold Off tag when placed has the same meaning as a Functional Authority's Hold Off. The Holder would need to remove the Worker's Hold Off prior to closing the breaker or opening the valves and operating the equipment.

2.3.3.3 A Worker's Hold Off can only be placed over a Local Control Tag. It cannot be placed by itself.

EXAMPLE OF HOLD OFF TAG



EXAMPLE OF WORKER'S HOLD OFF TAG



Worker's Hold Off

Worker's Hold Off tag to be placed over plant-issued Local Control

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2.4 Types of Worker's Protection Assurances

The following types of Worker's Protection Assurances are issued during construction at power plants:

2.4.1 Out of Service (Issued under Hold Off Tag)

2.4.1.1 Definition:

- The Operating Authority's assurance that the equipment designated is properly isolated from all known energy sources and is appropriately tagged so that it will remain de-energized until the Out of Service is released.

2.4.1.2 Energy Status:

- Isolated from all normal sources and emergency back-up energy sources.
- This does not relieve the person obtaining the protection of the responsibility of making prescribed tests or observations to assure himself that the equipment is safe to work on. Points of isolation and points not to be changed are tagged, where possible, and those points cannot be changed while the Out of Service is in effect. However, equipment inside the zone of protection and not tagged, may be manually operated or tested, since it is in a de-energized state.

2.4.1.3 Usage:

- Maintenance, including complete removal and disassembly.

2.4.1.4 Issued to:

- Supervisors or Workers when authorized by Custody Authority.

2.4.1.5 Persons Covered:

- Holder and anyone working directly for or with the Holder.

2.4.1.6 Physical Location of Holder:

- Does not have to remain on Plant property.

2.4.1.7 Duration:

- No time limitations. Remains in effect until equipment is ready to be restored to service.

2.4.1.8 Predominance:

- Unlimited number of Out of Services may be issued on a single piece of equipment by various people for various reasons. Multiple tags may be required for isolation.

2.4.2 Restraint

2.4.2.1 Definition:

- The Restraint, which is issued on the Functional Authority's Hold Off, is an assurance given by the Functional Authority to the person to whom it is issued that the equipment it covers has been properly isolated from its energy sources and that normal voltage will not be applied while the Restraint is in effect.

2.4.2.2 Energy Status:

- Isolated from all normal sources and emergency back-up energy sources.

2.4.2.3 Usage:

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- The person to whom the Restraint is issued shall have control of the application of test energy in that his consent must be obtained before applying external energy of any magnitude, and he must be informed when the test is completed. Thus, the person should be familiar with the status of the equipment at all times, and to this extent the person shall be responsible for seeing that other persons working on the equipment with that person or under that person's specific direction are protected against the application of test energy.

- The operator of the high-energy source will direct test and connections required following established standards or procedures or in special cases, specific instructions of the Functional Authority. The operator of the high-energy test source will communicate directly with the person who has the Restraint, but the operator may at no time apply energy until the Holder of the Restraint has given the operator permission to proceed.

2.4.2.4 Issued to:

- Supervisors or Workers when authorized by Custody Authority. In cases where several workers will work on the equipment tested, a qualified worker or supervisor shall be designated to act a coordinator on the job, and that person shall obtain the Restraint.

2.4.2.5 Persons Covered:

- Holder and anyone working directly for and with the Holder.

2.4.2.6 Physical Location of Holder:

- Must remain on Plant property and in control of the job. If the Holder leaves the site of the test, he must remain "on-call." The Holder shall not release the Restraint until all persons are removed from the equipment and informed of the intended release.

- The performance of maintenance will be permitted simultaneously with testing on equipment, provided that adequate safety can be maintained between the two jobs.

- If electrical testing is required, the procedures set forth in the System Operating Manual under Restraint, Item 207, will be followed.

2.4.2.7 Duration:

- Released before Holder goes off duty for the day.

2.4.2.8 Predominance:

- Only one Restraint and no other WPA.

2.4.3 Local Control

2.4.3.1 Definition:

- An authority granted to a person (other than a regular operator) that permits him to operate or direct operation of equipment and gives him the assurance that no operations will be performed on the equipment unless requested or personally approved by him.

2.4.3.2 Energy Status:

- May or may not be de-energized. This is why different tags are used. The Functional Authority's Hold Off is not in place for this type of WPA.

2.4.3.3 Usage:

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- Short duration maintenance or troubleshooting.

2.4.3.4 Issued to:

- Supervisors or Workers when authorized by Custody Authority. Worker must give the reason for the request. Worker must specify if equipment is to be energized or isolated for him.

2.4.3.5 Persons Covered:

- Holder and anyone working directly for or with the Holder.

2.4.3.6 Physical Location of Holder:

- Must remain on Plant property and in direct control of the job since he is responsible for the safety of his workers.

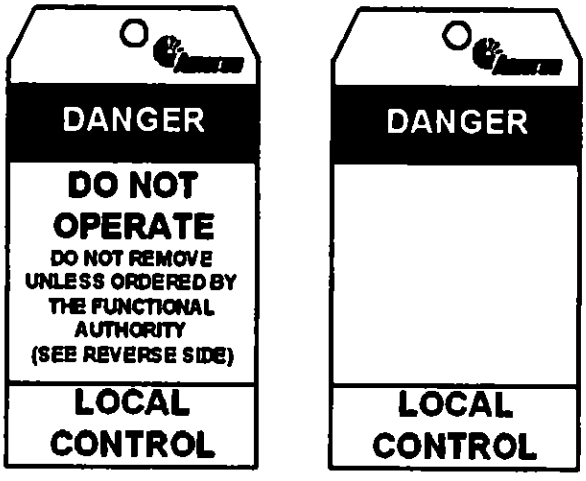
2.4.3.7 Duration:

- Released before Holder goes off duty. New equipment before acceptance has no time limit.

2.4.3.8 Predominance:

- Only one Local Control and no other WPA.

EXAMPLE OF LOCAL CONTROL TAG



2.4.4 Clearance

2.4.4.1 Definition:

- A Clearance is the assurance to the Holder that the system or equipment for which it is issued has been properly isolated from its normal energy sources (including any emergency back-up energy sources) and will remain isolated as long as the Clearance is in effect.

2.4.4.2 Usage:

- It is used whenever it is necessary to completely isolate a system or a piece of equipment from its normal energy sources (including any emergency back-up energy sources) to perform the desired work.

2.4.4.3 Issued to:

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- Supervisors or Workers when authorized by Custody Authority.

2.4.4.4 Persons Covered:

- Holder and anyone working directly for or with the Holder

2.4.4.5 Physical Location of Holder:

- Must remain on Plant property and in direct control of the job since he is responsible for the safety of his workers.

2.4.4.6 Duration:

- Released before Holder goes off duty.

2.4.4.7 Predominance:

- None. An unlimited number of Clearances may be issued concurrently on a system or a piece of equipment. Clearances may also be issued concurrently with Out of Services.

2.5 Exception

2.5.1 If a person holding Worker's Protection Assurance on a piece of equipment is not available and it is necessary because of plant or system emergency to place that piece of equipment in service, the Worker's Protection Assurance can be released to the Operating Authority by a person designated by the Holder of the Worker's Protection Assurance provided:

2.5.1.1 Every attempt has been made to contact the holder of the Worker's Protection Assurance and

2.5.1.2 A thorough examination by the person releasing the equipment reveals the equipment to be in proper operating order.

3.0 COMMISSIONING JURISDICTIONAL CONTROL AND EQUIPMENT TAGGING

3.1 Commissioning Team Leader, Commissioning Engineer and Specialist

3.1.1 Ensure the following once Construction Turnover Acceptance Form is signed by commissioning team leader.

- Any activities on the turned over system not authorized by a member of the Commissioning Team will promptly cease.
- Any Construction Cards within the boundaries of the turnover are promptly removed.

> **NOTE**
>
> Plant based WPA will be used if commissioning an existing system in the plant or if the new system is tied to existing plant systems. The sole WPA authority would be the control room.

3.1.2 Request "System Under Test" card or applicable WPA based on boundaries turned over to commissioning.

> **NOTE**
>
> In case the new system is independent of the existing plant. "System Under Test" card will be used and administered by commissioning.

3.1.3 Maintain GEN-FRM-ADM-2155-07, *System Under Test Card Log.*

3.1.4 In the event that a positive isolation device does not exist in a system being turned over, that system's boundary will be extended into the adjacent system to the first point of positive isolation.

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4.0 ENVIRONMENTAL, SAFETY AND HEALTH

4.1 Contractor shall ensure worker and public safety during the course of this project.

4.1.1 Contractors must comply with all applicable Company, Federal, State, and Local health, safety and environmental regulations including, but not limited to, those concerning:

- Safety & Contractor Requirements (Appendix A) and Job Working Rules (Appendix B)
- Public and worker health and safety
- Public's "Right to Know"
- Fire safety
- Air and water quality
- Flammable materials storage
- Spill control, response and cleanup
- Hazardous and non-hazardous waste handling, identification and disposal

NOTE: Ameren's policies and procedures applicable to Contractors are available on www.ameren.com under Business Partners Suppliers / Standard Contracts

4.1.2 Refer to Ameren's Contractor's Substance Abuse Policy AUE-07-01 (Attachment A15) for minimum substance abuse testing requirements.

4.2 Contractor must have a full-time company corporate Safety Director who oversees and maintains the site safety program and site safety personnel, unless waived by the Ameren Managing Supervisor of Construction. This person must also be available for safety related questions and concerns. A full time company safety personnel must also be onsite for each shift for the entire duration of the project. The cost for the safety personnel shall be broken out in the bids. Resumés of the safety personnel who will be associated with the project must be submitted with the bid.

4.2.1 Ameren reserves the right to request the safety representative be removed from the project and be replaced with a more competent individual, if they are not fulfilling expectations.

4.3 With contract bid, Contractors shall submit:

- Contractor Environmental, Safety & Health Data Form (Attachment A9) (unless specifically exempted from this provision by Company).
- Their company's ES&H program manual

4.4 After award, Contractor shall submit:

- A project-specific ES&H Action Plan, including an Emergency Response Action Plan that is in accordance with Ameren, Federal, State & Local requirements.
- At a minimum, Attachment A21 – Site-Specific Safety Plan (SSSP), shall be filled out in its entirety. The SSSP shall be submitted to Ameren for review, comment and approval. Editable version of Attachment A21 is to be supplied after issuance of PO.

4.5 At mobilization, Contractor shall:

- Appoint a competent onsite ES&H representative who will coordinate Contractor ES&H activities, hazardous material and waste handling. The ES&H representative will work with Ameren personnel on ES&H related issues, and implement ES&H rules necessary for safe execution of the project.
- Supply to the SPOC the frequencies of all walkie-talkie 2-way radios they intend to use. Frequencies must be listed to four (4) decimal places. Authorization for Two-Way Radios (Attachment A14) must be submitted to the designated SPOC.

4.6 Contractor shall be responsible for tool inspection/maintenance in accordance with the requirements of OSHA standards and manufacturer's recommendations/instructions.

4.7 Handling of Materials and Waste

4.7.1 If project involves use or presence of chemicals or products that are regulated under Section 112 (r) of the Clean Air Act, Sections 302 & 304 of Emergency Planning & Community Right to Know Act, OSHA 29CFR1926.65 or 29CFR1910.120, then Contractor has the choice of adopting the plant's Health and Safety Plan (HSP) or developing a similar plan that is at least as protective and compliant

If Contractor is responsible for arranging to dispose of a hazardous or otherwise regulated waste where Ameren is identified as the generator of the waste, Company shall review, and approve or reject the waste disposal method and/or facility.

Contractor site personnel shall read and acknowledge by signature that they will comply with the applicable HSP.

Certification of individual training is required prior to hazardous waste operations as defined by OSHA 29CFR1910.120 or equivalent applicable state regulations.

4.7.2 Contractor shall identify as part of the bid, and be prepared to discuss upon award of Contract, the quantities, timetables and characterization, of wastes generated during project.

4.7.3 Contractor shall minimize amount of waste generated and shall discuss waste handling, manifest preparation, record keeping, and disposal with the SPOC in advance of these activities. Contractor should coordinate waste handling Vendors/Subcontractors with Company personnel.

4.7.4 Contractor shall handle, package, label and store wastes in accordance with Ameren, Federal, State and Local requirements.

4.7.5 Contractor shall remove such wastes from the premises in a timely manner for treatment, storage, and/or disposal in full compliance with applicable laws, regulations and ordinances, including documentation requirements.

4.7.6 If Contractor is considered the sole generator of waste, then, such waste is sole responsibility of Contractor and Ameren assumes no responsibility for Contractor's compliance with applicable regulations.

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4.7.7 Contractor shall notify the SPOC before using chemical/material that could create noxious or toxic fumes.

4.7.8 For materials brought onto jobsite, Contractor shall make copies available (upon request) of the Material Data Safety Sheets (MSDS) to the appropriate personnel on the worksite.

Contractor shall provide written notification to the SPOC of any material requiring an MSDS that is brought onsite by Contractor in quantities in excess of that material's Superfund Amendments and Reauthorization Act (SARA) Threshold Planning Quantity. Such notification is required for SARA Tier II reporting purposes. Chemical of Interest Reporting (Appendix I) in this specification must be filled out and submitted to the SPOC.

4.7.9 Contractor shall ensure that hazardous chemicals or materials are properly contained and labeled, and that employees are adequately trained to recognize, handle and use hazardous chemicals safely

Small quantities (i.e., <10 gal.) of hazardous liquids, such as gasoline, diesel fuels or solvents, brought onto site shall be stored in properly labeled safety containers with flame arrestors and self-closing lids. All container labels must include contents information and display hazard symbols clearly on exterior of each container in accordance with NFPA 704M, OSHA 29CFR1910.1200 or other applicable standard.

4.8 Asbestos-Containing Material (ACM) and Lead

4.8.1 In structures built prior to 1981, thermal system insulation, sprayed-on surfacing, and vinyl or asbestos floor tile shall be presumed to be ACM.

- Non-ACM will be labeled as such or otherwise identified by the SPOC and communicated to Contractor.
- Areas containing abatement activities will have warning signs, be barricaded, and access will be limited.

4.8.2 Ameren ES&H Management Instruction Asbestos Exposure Controls and Work Practices, ES-REG-203, specifies policies and procedures for contractors performing asbestos abatement work. Hardcopies may be requested from the SPOC.

Proposals for an ACM abatement project must designate:

- Scaffolding needs
- Glove bag and containment areas
- Potable water and shower requirements and locations
- Methods to protect scaffolding tubing from contamination after containment is removed
- Methods to minimize non-ACM dust outside the containment areas
- Methods to move ACM bags from containment areas to ACM receptacles

4.8.3 Ameren ES&H Lead Management Instruction, ES-REG-211, specifies policies and procedures for Contractors performing lead abatement work. Hardcopies may be requested from the SPOC.

4.9 ES&H Training Requirements

4.9.1 Documentation of OSHA training for Contractor craft workers and supervisors must be maintained onsite and made available to Ameren. Effective September 1, 2006, the minimum training standard is OSHA 10 for Contractor craft workers and OSHA 30 for Contractor supervisors.

4.9.2 Contractor will maintain documentation of ES&H training on project and must provide requested documentation of training to Company. Contractor shall retain verification of satisfactory training for as long as required by law or six months after completion of contract, whichever is greater.

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4.9.3 Job safety awareness meetings will be held with Company and applicable contractors on a frequency determined by Company. The meetings will address industrial safety issues from Contractor job safety reviews.

4.10 Environmental, Safety & Health Surveys

4.10.1 The SPOC and Ameren ES&H personnel will conduct periodic ES&H surveys of the project. Any discrepancies will be reported to Contractor management for immediate correction.

4.10.2 These ES&H surveys do not relieve Contractors of their responsibility to self-inspect their work and equipment and to conduct their work in a safe and environmentally compliant manner.

4.11 Reporting and Investigating Incidents/Accidents

4.11.1 Contractor shall make an immediate report by telephone to the SPOC of any accident involving injury, death, fire, spill, mishandling of oil, regulated/hazardous waste spill, or any other emergency.

4.11.2 In the event of an emergency, Company has authorized the Plant Shift Supervisor and the SPOC to act as emergency coordinators. Contractor shall proceed with appropriate emergency response measures as directed by Plant Shift Supervisor and the SPOC, and take full responsibility for clean-up and disposal of any wastes or materials.

4.11.3 Contractor shall indemnify Company for all related costs and liabilities.

4.11.4 Contractor shall submit a Monthly Contractor Accident Statistics Report (Attachment A10) by the second day of each month for the preceding month's activities.

4.11.5 Contractor shall investigate all types of events listed in above Item 1.4.11 Incident/Accident Reporting, whether they result in an injury or not, and provide the results of said investigation to Company. An accident investigation does not assign blame; it does determine how to eliminate similar accidents in the future. Company reserves the right to monitor Contractor's investigation, and Contractor shall provide the SPOC with all necessary information to all required Company personnel to perform this monitoring function.

4.11.6 Ameren reserves the right to investigate any accidents that occur on its property or in completing work being performed by a Contractor's employee whether they result in an injury or not. Ameren will conduct further investigations for accidental environmental releases or spills, etc.

4.11.7 A signed Witness Statement (Attachment A2) must be completed by each witness providing factual observations.

4.11.8 An Incident/Accident Investigation Report (Attachment A1) must be submitted to the SPOC within 24 hours to document the investigation. Accident facts, causes, and corrective action should be documented and communicated to employees through ES&H meetings.

4.12 Certifications, Inspections, and Permits

4.12.1 Operations may require a Company permit. Such activities may include but are not limited to: hot work, confined space/vessel entry, excavations, asbestos abatement, lead abatement, etc. Contractor shall determine from the SPOC if any of Contractor's activities require a Company permit or Contractor permit.

4.12.2 Some states and local authorities require permits for activities such as: excavations, heavy lifts, asbestos/lead abatement, air permits, water permits, hazardous waste generation, etc.

4.12.3 Contractors shall be responsible to secure and comply with these permits, unless the SPOC has delegated this to others in writing.

4.12.4 A third-party-certified Competent Person shall make a thorough annual inspection of cranes and powered hoisting equipment. Cranes shall be inspected and have deficiencies corrected prior to being put into service. Documentation of crane inspections must be maintained onsite by Contractor.

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- Crane hooks should be inspected by a Competent Person prior to use. Rigging should be inspected by a Competent Person before each shift. Defective components shall be removed from service immediately. Anti-Two-Block devices, that automatically disengage crane hoist/boom functions when the hook or block approaches the jib or boom tip, shall be used on all cranes.

- All outriggers on mobile cranes must be fully extended and fully deployed when crane is used to lift or support a load.

- If, due to configuration or physical location, all outriggers cannot be fully deployed, calculations must be made from the "on-rubber" section of the load chart. A certified crane specialist must have written calculations and lift instructions reviewed by Ameren. The SPOC may make an exception for light-weight, lift-and-carry operations.

4.12.5 Operators of forklifts, boom lifts, buses, and other mobile equipment must be trained and certified on the operation of the specific equipment.

4.12.6 Operators of cranes must be trained and certified by National Commission for Certification of Crane Operators (CCO), or Operating Engineers Certification Program (OECP). Crane operators must be qualified on each crane type and rating they operate.

4.12.7 Operators of cranes are responsible for completing the Crane Maintenance Safety Checklist (Attachment A16).

4.12.8 A Competent Person shall design and a Competent Person shall erect scaffolding. Only the authorized scaffolding erector can make changes to scaffolding.

4.12.9 A Competent Person must inspect and tag scaffolding prior to initial use, before each work shift, and after any event that could affect its structural integrity. Untagged scaffolds must not be used.

4.13 Critical Lifts

4.13.1 Critical Determination

Contractor shall submit a Critical Lift Plan for any critical lift. Ameren reserves the right to designate any lift as critical. A lift shall be designated as a critical lift if any one of the following conditions exists:

4.13.1.1 Lifting over 50 tons.

4.13.1.2 Lift exceeds 75% of the rated capacity of the crane.

4.13.1.3 Lift requires the use of more than one crane.

4.13.1.3.1 In no case shall a multiple crane lift be performed in excess of 75% of any one of the crane's individual load rated capacity at the planned radius.

4.13.1.4 Lifting a non-rigid object.

4.13.1.5 Lifting over equipment or material that could cause or result in a release of hazardous material to the environment.

4.13.1.6 The lifted item requires exceptional care in handling because it is being lifted above critical operating equipment or material and/or building structure.

4.13.1.7 The lifted item requires exceptional care in handling because of size, weight, close-tolerance installation, high susceptibility to damage or other unusual factor.

4.13.1.8 Lift performed in proximity of live electrical connections.

4.13.1.9 Lifting of personnel in baskets and/or personnel harnesses.

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4.13.1.10 Lifting of equipment by helicopter.

Any lifts proposed by the contractor that meet the above criteria or determined to be critical by the Project Engineer will be subject to a Critical Lift Plan. Examples of lifts that are generally considered critical are: boiler tube panels, feedwater heaters, conveyor systems, coolers and pump skids, turbines and generators.

4.13.2 Critical Lift Plan

Contractor shall provide a detailed lifting and rigging plan for all lifts identified as critical. All critical lifts will require a Professional Engineer's seal. Prior to executing lift, lift plans must be submitted to the Project Engineer, reviewed and accepted by a structural engineer in the POS Civil/Structural Group. Ameren will review submittals for general design features. Contractor is responsible for accuracy of calculations. Also prior to executing lift, any changes made in the field to the approved lift plan must be approved by the contractor's engineer and accepted by the Ameren POS Project and Structural engineers. A copy of the lift plan must be onsite during the lift and must have been reviewed with all personnel involved with the lift, including the Ameren Construction Supervisor. Ameren's Construction Supervisor shall be provided sufficient notice to allow him/her to witness the critical lift. A critical lift plan shall contain the following, as applicable:

4.13.2.1 Identify the items to be lifted.

4.13.2.2 Weight of the lifted item and total weight of the load (for mobile cranes, see the manufacturer's instructions regarding components and attachments that must be considered as part of the load).

4.13.2.3 Center of gravity location.

4.13.2.4 Documented step-by-step instructions.

4.13.2.5 Special precautions, if any (such as outrigger or track cribbing for mobile cranes).

4.13.2.6 Evaluation of hazards associated with the lift that include ground support, soil conditions, allowable soil bearing capacity, underground utilities that could be damaged or suddenly collapse, maximum permissible wind speed and any other physical obstruction.

4.13.2.7 A list of each piece of equipment (e.g., crane, hoist, fork truck), accessory, and rigging component (e.g., slings, shackles, spreader bars, yokes) to be used for the lift. (This list shall identify each piece of equipment by type and rated capacity).

4.13.2.8 Designated checkpoints, hold points and estimated instrument readings, as relevant, so that job progress can be checked against the plan.

4.13.2.9 Rigging sketch(es), which include the following:

4.13.2.9.1 Lift point identification

4.13.2.9.2 Method(s) of attachment

4.13.2.9.3 Load vectors

4.13.2.9.4 Sling angles

4.13.2.9.5 Accessories used

4.13.2.9.6 Other factors affecting the equipment capacity

4.13.2.9.7 Rated capacity of equipment in the configuration(s) in which it will be used. (For cranes, many factors affect rated capacity, including boom length, boom angle and work area.)

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4.13.2.9.8 If rigging points are attached to existing structural steel, it is the responsibility of the contractor's engineer to confirm that the additional loads do not overstress the existing structure, and to design additional bracing/reinforcement if required. Supporting calculations sealed by a Missouri Professional Engineer shall be included with the critical lift plan.

4.13.2.10 A load-path sketch that shows the load path and height at key points in the job. (For lifts with mobile cranes, include the crane position(s) relative to the load and relative to surrounding obstructions.) Where appropriate, include floor-loading diagrams.

4.13.2.11 A sketch indicating lifting and travel speed limitations. (This may be noted on the load path sketch or on a separate sketch.)

4.13.2.12 A sign-off sheet to verify that all inspections/tests required by OSHA are current for all equipment and rigging.

4.13.2.13 The lift plan shall provide specific information for each lift when multiple items of varying weights and/or shapes are included in the lift plan unless an exception is approved by the Ameren structural engineer.

4.13.2.14 With their bid proposal, Contractors shall submit a normal weather lay-down plan for each onsite lattice crane, wherein contractors specifically outline the manner in which the crane will be stored in normal weather conditions.

4.13.2.15 With their bid proposal, Contractors shall submit a severe weather lay-down plan for each onsite lattice crane, wherein contractors specifically outline the manner in which the crane will be stored in severe weather conditions.

4.13.2.16 Before construction begins, the selected Contractor shall meet with Ameren representatives and shall outline the means and methods of the Contractor's crane execution plan for each lattice crane expected to be utilized onsite. Execution plan shall include specifics about transition from normal to severe weather crane lay-down plans and critical wind speed for crane position. Cranes shall not be allowed onsite until after the crane execution plan(s) have been reviewed and approved by Ameren representatives.

4.13.2.17 Crane loading shall typically be based on 2,000 pounds per square foot ground pressure, unless known ground conditions dictate/allow otherwise. Ameren representatives shall review and approve planned crane ground loading.

4.13.2.18 When determining and setting load path barricade boundaries, Contractors shall include within the boundary the potential for dropping load during load swing (failed load path). All elevations affected per this potential 'failed load path' shall be barricaded.

4.14 Respiratory Protection

4.14.2 Contractors must provide a copy of their Respiratory Protection Program to the SPOC before they use respirators. The program must comply current Ameren, Federal, State and local requirements including OSHA 29CFR1910.134. The program must properly address the following:

- Respirator selection
- Respirator training and required test fit procedures
- Respirator cleaning, sanitizing, inspection and maintenance
- Respirator user's medical clearance

4.15 ES&H Adherence Policy

4.15.2 **Action Level One** – The SPOC will issue a written Notice of ES&H Non-Compliance (Attachment A11) and Warning Letter for ES&H Non-Compliance (Attachment A12) to Contractor's management and site ES&H representative if Contractor fails to comply with an applicable ES&H standard.

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4.15.3 **Action Level Two** – The SPOC will issue a Written Notice of Temporary Job Suspension (Attachment A13) to Contractor if ES&H non-compliance is not corrected by Action Level One, or if Contractor repeatedly fails to comply with applicable ES&H regulations. The appropriate Ameren Manager and Contractor's Division Manager, or equivalent, must meet and agree on corrective actions acceptable to Company before Work may resume. Actions may include, but are not limited to:

- Removal of certain Contractor personnel from project.
- Alteration of Contractor's job procedures.
- Having Ameren implement corrective action and backcharge Contractor.

Contractor shall not resume Work until Ameren accepts the proposed corrective actions. Ameren will retain meeting minutes documenting the agreement.

4.15.4 **Action Level Three** – Ameren Management may terminate the contract for cause, if **Action Level One** and **Action Level Two** do not result in Contractor's ES&H compliance.

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ATTACHMENT A1

INCIDENT/ACCIDENT INVESTIGATION REPORT

Date of Accident: _____ Time of Accident: _____ Job Number: _____

Contractor Company Name: _____ Date of Investigation: _____

Location of Accident: _____

Did injury result? Yes/No,: _____ Involved Employee Name(s): _____
Involved Employee SS Number _____

Employee Job Classification or Skill: _____ Years In this Skill: _____ Years With Company: _____

Describe Type of Injury: _____

Body Part(s) Involved, If applicable: _____

Injury Classification per OSHA 29CFR1904: _____

Was property damaged? , Yes/No _____ Describe damage/owner: _____

Is damaged property secured/maintained? Yes/No _____ Person Maintaining _____

Names of Witnesses/Co-workers (With Social Security No.): _____

Weather/Wind Conditions: _____

List/Describe personal Protective Equipment (PPE) in use by person exposed or injured.

_____

Chemicals Involved:

Name(s) of Chemicals Encountered: _____

_____

Form of Chemicals (Solids, Liquid, Dust, Mist Fume): _____

Describe Radiological Materials (if any): _____

Volume or Quantity Released: _____

Description of Accident: _____

_____

_____

_____

(continued on next page)

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INCIDENT/ACCIDENT INVESTIGATION REPORT (continued)

Contributing Factors: _____

What **Corrective Actions** Were Taken to Secure the Scene? _____

Corrective Actions Being Taken to Prevent Recurrence:

Action Item:	List Responsible Person & Target Date for Implementation Name:	Date:

Job being performed at time of incident/accident: _____

Was permit required for task being performed? Yes/No _____

If so, was permit issued? Yes/No _____ If yes, attach a copy of permit in effect at time of accident.

Indirect cause of accident: _____ _____ _____

Investigation Team Members:

	Name	Signature
Injured/Involved:		
Supervisor:		
Ameren SPOC		
ES&H Representative		

Name (Others)	Title	Signature

Contractor Representative(s) Contacted: _____

Ameren Representative(s) Contacted: _____

*Attach additional sheets and supplemental data & information as necessary.

**Distribution: Original must be filed on-site; 1 copy must be sent promptly to the Corporate ES&H Dept.
Must Notify: CCMI and Huntleigh McGehee

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ATTACHMENT A2

WITNESS STATEMENT

Name: _____ Title: _____

Social Security Number: _____ Date: _____ Time: _____

Temporary Address: _____ Phone: _____

_____

Permanent Address: _____ Phone: _____

_____

Location at Time of Accident: _____

Your statement shall include, to the best of your knowledge, detailed facts relative to the following five categories:

1. What happened just before, during, and just after the incident?
2. When did it happen?
3. Where did it happen?
4. Why do you think it happened?
5. Who was involved?

_____
Signature

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ATTACHMENT A3

FIRST AID REGISTER

Company: _____ Project Name /Number: _____ Jobsite Location: _____

Month /Year: _____ Site Manager: _____ Page: _____ of _____

Date	Time	Name	Supervisor/Foreman	Type of Injury, Body Part, and Brief Description of Accident	*Class

*Class = Classification FAV = First Aid Visit E1= Doctor's Visit REC – OSHA Recordable Other:

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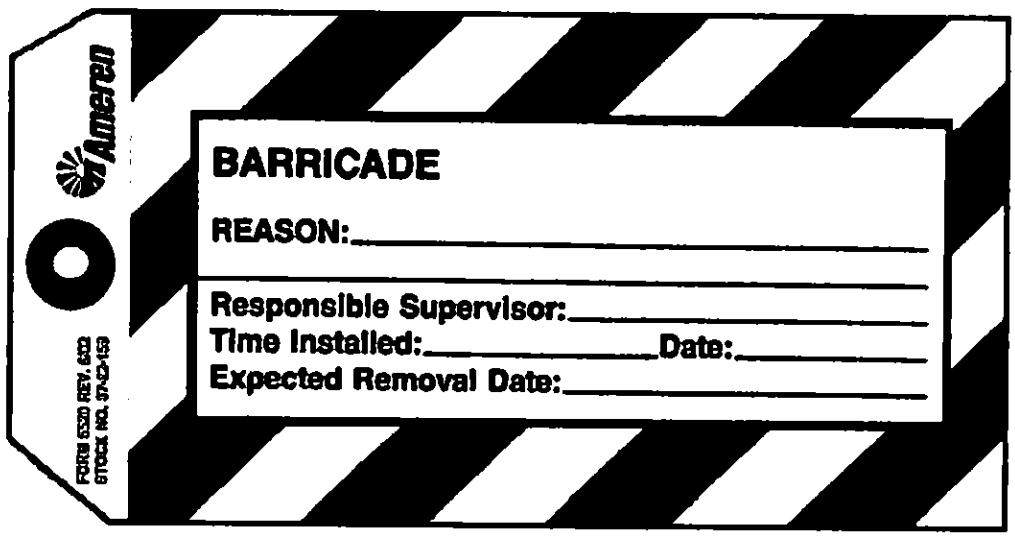
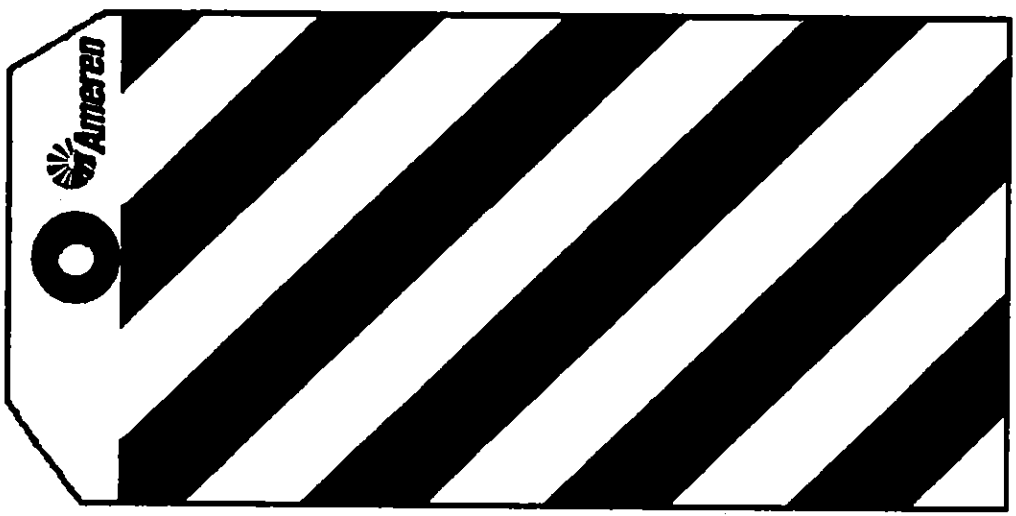
ATTACHMENT A4

BARRICADE TAG





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ATTACHMENT A5

CONSTRUCTION WORKER'S PROTECTION ASSURANCE AUTHORIZATION

Date: _____

Operating Supervisor: _____

The following person(s) has authorization to receive W.P.A.: _____

Project Name: _____

Company Name: _____

Company Address: _____

Name	Title	Office	Cell	Home	E-Mail

	Beginning		Ending	
	Date	Time	Date	Time
Expected Duration:				

Training is Required for Automated WPA System.

_____
Plant Manager or Designee

(Designee: Admin. Supt., Operations Supt., Maintenance Supt., Planning/Scheduling, or Operations Supv. (Watch))

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ATTACHMENT A6

GRINDER SAFETY PLAN

Grinder Guard and Handle Removal PRE-PLAN

Date:	**Job #:**
Customer/Site:	**Location of Work/Unit:**
Description of Task:	**Equipment Identification:**

SCOPE OF WORK AND SCHEDULE (Please list complete description of task)

HAZARD ASSESSMENT TO DETERMINE ALTERNATE TOOL

procedures require a pre-plan whenever personnel remove the guard and handle on a grinder.

Reason:

- Grinding wheel cannot access point of work with guard and handle attached due to narrow gap for welding.

Alternate Methods to Removing Guard and/or Handle:

- Rotary file and die grinder?
- Conical grind stone and pole grinder?
- Other?

SAFETY PRECAUTIONS

- ☐ Cutting wheel CANNOT be used while guard and handle are detached.
- ☐ Grinder must be unplugged when removing guard and handle and when re-attaching.
- ☐ Guard and handle are only to be removed for this specific point of work. All other grinding in the work area must have safety devices attached.
- ☐ Pre-plan will only apply until the weld depth improves to allow for standard grinding operation, i.e. all safety devices attached.
- ☐ Wear face shield and sealed eyewear.
- ☐ Maintain control of grinder at all times, use two hands when operating the grinder.
- ☐ Keep hands/fingers clear of upper portion of the grinder near the wheel.
- ☐ Be aware of body positioning.

AFFECTED PERSONNEL INVOLVED IN WORK MUST READ AND SIGN THIS PRE-PLAN

PRE-PLAN REVIEW SIGN-IN

Employee Classification/Craft	Name (Print)	Signature	Date
1.			
2.			
3.			
4.			
Supervisor/Foreman			
Safety Representative			

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ATTACHMENT A7

CONTRACTOR REDUCTION IN FORCE REPORT

Contractor Name:	
Contractor Supervisor:	
Date Submitted:	
Time Submitted:	

Name of Employee (Please Print)	Badge #	Date of Reduction	Time of Reduction

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ATTACHMENT A8

POWER OPERATIONS HOT WORK CHECKLIST
(EXAMPLE)

1. DESCRIPTION – JR#

Location _____ Elevation _____
Work to be done: Welding _____ Brazing _____ Open Flame Cutting / Heating _____
Equipment _____

NOTE: Before authorizing welding, cutting, heating, and brazing, this checklist must be completed.

2. PRE-WORK INSPECTION

Hot Work shall not be performed in the following situations:

a. In areas not authorized by Management.

b. In sprinklered buildings while such protection is impaired, unless authorized by Management.

c. In the presence of explosive atmospheres or explosive atmospheres that may develop inside unclean or improperly prepared tanks, pipes or equipment.

d. In areas near the storage of large quantities of exposed, readily ignitable materials.

Prior to welding, cutting heating, and brazing (W/C/H/B), you shall perform these basic precautions:

a. Move the object to be W/C/H/B to an area free of hazards.

b. If the object to be W/C/H/B cannot readily be moved, then you shall remove all movable fire hazards within the vicinity to a safe place.

c. If the object to be W/C/H/B cannot be moved and if all the fire hazards within 35 feet cannot be removed (including cable trays), then, immovable fire hazards shall be shielded and a fire watch provided.

IF THESE BASIC PRECAUTIONS ARE NOT FOLLOWED, WELDING, CUTTING HEATING AND BRAZING SHALL BE PERFORMED. COMPLETE CHECK LIST.

3. ADDITIONAL FIRE WATCH PROVISIONS

N/A	YES	NO		
			a.	Can more than a minor fire develop?
			b.	Are combustible materials closer than 35-ft. to the point of operations?
			c.	Are combustible materials more than 35-ft. but easily ignitable by sparks?
			d.	Do wall or floor openings with a 35-ft. radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors?
			e.	Are combustible materials adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are they likely to be ignited by conduction or radiation?

NOTE: If you answered yes to any of the above, a fire watch is required. Complete checklist. All of the following conditions must be met, if applicable.

(continued on next page)

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4. PRECAUTIONS

N/A	YES	NO		
			a.	A fire watch will be provided during and for 30 minutes following welding, cutting, heating and brazing.
			b.	The fire watch shall be supplied with a proper portable fire extinguisher in addition to installed operable plant equipment.
			c.	Cutting and welding equipment is in good condition.
			d.	Combustible materials are protected with covers, guards, or metal shields, or material is removed prior to start of work.
			e.	Nearby workers are suitably protected against heat, sparks, slag and flash.
			f.	Wall or floor openings are covered or enclosures provided. For elevated work, covers are suspended beneath to collect sparks or area below is free of combustibles.
			g.	Enclosed equipment is cleaned of all combustible material and purged of flammable vapors.
			h.	Ducts and /or conveyors are suitably protected or shutdown.
			i.	For work near walls, partitions, ceiling or roofs, proper precautions have been taken to prevent ignition of combustibles inside the barrier of adjacent areas.
			j.	For work on pipes or other metal in contact with combustible walls, partitions, ceilings, or roofs, precautions have been taken to prevent ignition by conduction of heat.
			k.	Other

PRE-WORK INSPECTION

Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		

POST-WORK INSPECTION

Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		
Supervisors Initials	_____	Date	_____	Time	_____		

DEFINITIONS

1. Combustible Material: Any material that, if in the form and under the conditions used, could ignite and burn.

2. Minor Fire: A fire which, if no action is taken to extinguish it, will self-extinguish (burn out), will not propagate (spread to other materials through the continuity of combustibles), and will not damage any permanent plant equipment.

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ATTACHMENT A9

CONTRACTOR ENVIRONMENTAL, SAFETY & HEALTH DATA FORM

1. ES&H PERFORMANCE HISTORY

A. Interstate or Intrastate Worker's Compensation Experience Modification Rate (EMR), as shown on Workers Compensation Insurance Policy for three most recent years.

Year	EMR	*WH/CL

*If self-insured, provide employee Work Hours per Claim. (WH/CL)

THE FOLLOWING DATA FOR LAST THREE (3) YEARS FROM CONTRACTOR'S OSHA LOG

		Year		
B-1.	Employee hours worked			
B-2.	Fatalities (Column G of OSHA 300 log). Attach explanation for any fatalities.			
B-3.	Cases involving days away from work (Column H of the OSHA 300 Log)			
B-4.	Job transfer or restricted duty cases (Column J of OSHA 300 log)			
B-5.	Cases defined as other recordable cases (Column J of OSHA 300 Log)			
B-6.	Total # of cases for B-2, 3, 4 & 5 above.			
B-7.	"OSHA Incidence Rate" – Formula: Total Recordable Cases x 200,000 / Total # of work hours.			
B-8.	Citations by OSHA and/or other ES&H regulatory agencies in past 3 years (provide details of each)			
C-1.	Motor vehicle accidents.			
C-2	Miles driven per year, total fleet.			

(continued on next page)

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		Yes	No
2.	Do you have a written hazard communication program?	☐	☐
	Do you have a written ES&H program?	☐	☐
	Do you have a written company substance abuse program?	☐	☐
	Do you have a written respiratory protection program?	☐	☐
3.	Do you have one or more full time:		
	A. Physicians	☐	☐
	B. ES&H Professionals	☐	☐
	C. Industrial Hygienists	☐	☐
4.	Do you have a new employee orientation program?	☐	☐
	I it include the following?		
	A. Company ES&H Policy	☐	☐
	B. Company ES&H Rules	☐	☐
	C. ES&H Meeting Attendance	☐	☐
	D. Company ES&H Record	☐	☐
	E. Hazard Recognition	☐	☐
	F. Hazard Reporting	☐	☐
	G. Injury Reporting	☐	☐
	H. Personnel Protective Equipment	☐	☐
	I. Respiratory Protection	☐	☐
	J. Fire Protection	☐	☐
	K. Housekeeping	☐	☐
	L. Toxic Substances	☐	☐
	M. Electrical Safety	☐	☐
	N. Safety Harnesses and Lifelines	☐	☐
	O. First Aid	☐	☐
	P. Driving Safety	☐	☐
	Q. Lockout/Tagout	☐	☐
	R. Ladder/Stairway Safety	☐	☐
	S. Hearing Conservation	☐	☐
	T. Trenching and Excavation	☐	☐
5.	Do you have a training program for newly hired or promoted first line supervisors?	☐	☐
	I it include the following?		
	A. Hazard Recognition	☐	☐
	B. Safe Work Practices	☐	☐
	C. ES&H Supervision	☐	☐
	D. New Employee Orientation	☐	☐
	E. Tailgate/Toolbox ES&H Meetings	☐	☐
	F. First Aid Procedures	☐	☐
	G. Emergency Procedures	☐	☐
	H. Incident Reporting	☐	☐
	I. Accident Investigation	☐	☐

(continued on next page)

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6. How often do you hold periodic ES&H meetings for your foremen/supervisors?

A. Weekly ☐ C. Bi-Weekly ☐

B. Monthly ☐ D. Less Often, As Needed ☐

7. Do you conduct field ES&H inspection of work in progress? Yes ☐ No ☐

A. If yes, who conducts the inspection? _____

B. How often? _____

		Yes	No
8.	Are accident reports circulated to your management?	☐	☐
9.	Is ES&H a (documented) weighted factor in evaluating the performance of:		
	A. Foreman	☐	☐
	B. Supervisor	☐	☐
	C. Management	☐	☐
10.	Does your firm hold "Toolbox ES&H Meetings?	☐	☐

How often?

A. Weekly ☐

B. Bi-Weekly ☐

C. Monthly ☐

D. Less Often, As Needed ☐

11. List the most senior staff ES&H professional at your company.

Name: _____ Title: _____ Phone: _____

12. List the person to contact to discuss the details of the information contained in this document.

Name: _____ Title: _____ Phone: _____

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ATTACHMENT A10

MONTHLY CONTRACTOR ACCIDENT STATISTICS REPORT

Month: _____ Project Name: _____

Contractor Name: _____

Work hours for the month: _____ Work hours year-to-date: _____

Number of First Aid only cases: _____

Number of injuries & illnesses that received treatment by a physician: _____

Total number of OSHA Recordable injuries & illnesses for the month: _____

Number of restricted duty cases: _____ Number of lost time (days away) cases: _____

Number of motor vehicle accidents: _____ Number of miles driven: _____

Please list injuries and illnesses, which have occurred to employees of your company on the above project this month. Include accident cause, injury/illness suffered and current disposition of injured/ill employee (i.e., returned to work, still off work, awaiting surgery, etc.):

_____

_____

_____

_____

_____

_____

_____

_____

_____

Person completing report: _____ Title: _____

Date: _____ Signature: _____

Please submit this report to the SPOC on above project by the second business day of each month, for the preceding month's work activities.

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ATTACHMENT A11

NOTICE OF ENVIRONMENTAL, SAFETY & HEALTH NON-COMPLIANCE

To: _____ Site Representative for: _____

Your company has been found to be in non-compliance with one or more Federal, State, or Ameren ES&H requirements as specified below. This ES&H con-compliance must be corrected immediately for your company to meet the requirements of your contract.

Item #	Item of non-compliance
_____	_____
	_____
	_____

Applicable ES&H Requirement _____

_____	_____
	_____
	_____

Applicable ES&H Requirement _____

_____	_____
	_____
	_____

Applicable ES&H Requirement _____

_____

Issued By: _____ _____
Signature of the SPOC Date

Received By: _____ _____
Signature of Representative Receiving Notice Date

cc: Superintendent-Construction Management Services
Safety Supervisor
Plant Outage Manager

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ATTACHMENT A12

WARNING LETTER OF ENVIRONMENTAL, SAFETY & HEALTH NON-COMPLIANCE

Project Name and Number _____

Your firm, _____, has been found to be in violation of your contract by non-compliance with applicable Federal, State, or Ameren ES&H requirements.

On _____ , in accordance with the Ameren ES&H Adherence Policy, your representative, _____ , was given a Notice of ES&H Non-Compliance (copy attached). This notice specifies areas where your company does not comply with Federal, State, or Ameren ES&H requirements, and requests that these items be corrected immediately. If they are not corrected, more stringent measures will be taken in accordance with Ameren ES&H Adherence Policy.

Thank you for your prompt attention to this matter.

_____ _____
Signature of the SPOC Date

cc: Superintendent-Construction Management Services
Safety Supervisor
Plant Outage Manager

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ATTACHMENT A13

WRITTEN NOTICE OF TEMPORARY JOB SUSPENSION

Your company, _____, while working on the _____ project, has been notified of ES&H performance deficiencies in accordance with Ameren's ES&H Policy. Despite these written notifications requesting that immediate corrective action be taken to improve your ES&H performance, improvement has not occurred.

Therefore, in accordance with Action Level Two of the Ameren ES&H Adherence Policy, we are hereby notifying you that after securing your equipment, job activities on the project named above are to cease. Activities on this project may be resumed only after your company meets requirements set forth in the Ameren Adherence Policy.

_____ _____ _____
Signature of the SPOC Time Date

cc: Superintendent-Construction Management Services
Safety Supervisor
Plant Outage Manager

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ATTACHMENT A14
AUTHORIZATION FOR CONTRACTOR TWO-WAY RADIOS

All frequencies must NOT fall between the two ranges of frequencies:

463.5500 to 463.5700 MHz (Plant-Specific)

464.5500 to 464.5700 MHz (Plant-Specific)

- When reporting the frequency, you must include digits four places past the decimal point (e.g., 123.4567).
- If a repeater is being used, you must report both transmit and receive frequencies.
- If no repeater is being used, receive and transmit frequencies will be the same.
- You must submit all frequencies to be used.

CONTRACTOR	
CONTRACTOR REPRESENTATIVE	Print Name
RADIO MANUFACTURER OR MAKE	
HOW MANY CHANNELS BEING USED?	
FCC License "Call Sign" e.g. WPUP269	

1			
2			
3			
4			
5			
6			
7			
8			

Ameren SPOC: _____ Contractor Rep: _____

Date: _____ Date: _____

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ATTACHMENT A15
CONTRACTOR'S SUBSTANCE ABUSE POLICY

Policy No. AUE-POL-000001, Rev. 0

Author	Sponsor	Approval
Safety Supervisor	Manager Gen Cons & Outage Mgmt	VP Power Operations
Signature on File	*Signature on File*	*Signature on File*
12-17-2007	12-17-2007	12-17-2007

1.0 INTRODUCTION

1.1 In an effort to provide a drug- and alcohol-free workplace, Ameren establishes the following policy for Contractors:

2.0 SCOPE

2.1 Working on an Ameren work site and being under the influence of drugs or alcohol creates safety risks for all personnel who work on our work sites.

2.2 The term Contractor refers to all non-Ameren personnel hired to perform a service for Ameren who will be on Ameren property and includes all Contractors, their subcontractors and all other non-Ameren persons who are employed by them with active badges for site access. Visitors and delivery drivers are excluded from these requirements.

2.3 This Policy supersedes GP-06-01, Contractor Substance Abuse Policy.

3.0 IMPLEMENTATION

3.1 Contractors shall establish and maintain a confidential drug and alcohol testing program for each of their employees assigned to work on Ameren property, which shall meet the following minimum requirements.

3.1.1 All employees of a Contractor who are assigned to an Ameren site shall be subject to Contractor's drug and alcohol testing program. Contractor's program shall prohibit employees from buying, selling, consuming, or distributing alcohol or drugs while working for Ameren or while on Ameren property. The program shall also prohibit Contractor employees from reporting to an Ameren site or being on Ameren property while under the influence of alcohol or drugs.

3.1.1.1 Contractor's program shall provide for drug testing for substances listed in Section 3.1.4 of this Policy under the following circumstances: pre-assignment testing; random testing; testing for reasonable cause based on observations by Ameren or Contractor supervisor; and testing after any accident or incident that involves injury to personnel or damage to property.

3.1.2 Contractor shall require pre-assignment drug testing, or will assure that each person who will be assigned to an Ameren location has been tested for drug use within the 120-day period immediately prior to the start of work on Ameren premises. Contractor shall provide written documentation from the testing authority to Ameren Construction Project Lead or Plant Station Point of Contact that its employees are either compliant or non-compliant with this Policy. Contractor employees, who are not in compliance with this Policy, will be subject to Section 3.1.6 of this Policy. To maintain confidentiality, Ameren will not accept actual test results. A previous random drug test or drug test conducted for another reason is sufficient to satisfy the pre-assignment testing requirement if test was conducted during the 120-day period prior to working on Ameren premises, and otherwise satisfies the drug testing requirement in Section 3.1.4 of this Policy. Contractor employees who have taken a pre-assignment drug test will be allowed to work pending test results for no more than 5 working days. Testing may be waived pending Ameren management approval for Contractor employees who are working less than 40 hours annually providing site labor.

3.1.2.1 In lieu of pre-assignment testing, Contractor may accept a certificate signed by Department of Health and Human Services (DHHS), Substance Abuse Mental Health Service Administration (SAMHSA) DHHS/SAMHSA-certified drug testing laboratory indicating the results of drug test performed within the 120-day period immediately prior to working on Ameren premises. Identification cards, which indicate employee's name and date of his/her most recent drug test, may also be accepted if they are traceable to the certification from the DHHS/SAMHSA -certified drug-testing laboratory, which performed the test, and are attested to by Contractor management.

3.1.3 Contractor shall provide site specific random substance abuse testing for each of its employees and its subcontractors' employees assigned to be on Ameren premises. The random testing shall be conducted at a frequency such that a minimum of one test is performed for hours up to the first 2,000

man-hours worked and one additional test for every 2,000 man-hours worked by Contractor, or any of its subcontractors, on Ameren premises. Contractor shall establish a random selection process to ensure that each individual will have an equal chance of being selected and tested each time a random test is scheduled. The random testing pool will include all crafts under the direction of the prime Contractor, including subcontractors. Employees selected for random testing shall not be informed of test until immediately prior to test and shall be accompanied to testing site by a responsible Contractor supervisor as soon as practical on the same day selected. Contractor shall notify Construction Project Lead or Plant Station Point of Contact of random selection results and an Ameren representative may exercise the option of being present during the selection process.

3.1.4 Samples used to comply with this policy shall be analyzed by a NIDA-certified laboratory or quick cup and/or instant cup method. Tests must screen at a minimum for the following substances and levels, however some labor consortium testing programs will be accepted for initial site access only pending Ameren approval. A confirmed positive drug testing will be considered a violation of this policy.

Substance	Initial Level	Confirmed Level
Amphetamines	500 ng/ml	250 ng/ml
Barbiturates	300 ng/ml	200 ng/ml
Benzodiazepines	300 ng/ml	200 ng/ml
Cocaine	150 ng/ml	100 ng/ml
Marijuana	50 ng/ml	15 ng/ml
Methadone	300 ng/ml	200 ng/ml
Opiates	300 ng/ml	150 ng/ml
Oxycodone	100 ng/ml	100 ng/ml
Propoxyphene	300 ng/ml	200 ng/ml
Methamphetamine	500mg/dl	250mg/dl

3.1.5 Contractor's program shall provide for alcohol testing under the following circumstances: random testing; testing for reasonable cause based on observations by Ameren or Contractor supervisor; and testing after any accident or incident that involves injury to personnel or damage to property. Pre-assignment alcohol testing shall not be required. A test result of .04% blood alcohol concentration or greater as indicated by a breathalyzer or similar test will be considered a violation of this Policy.

3.1.6 Individuals who fail a test, refuse to test or otherwise violate this Policy will be denied site access from all Ameren premises. In addition, Contractor shall notify the applicable consortium to remove employee from the active pool. A Contractor employee who is determined to have violated this policy will be denied site access for a period of one year. After a period of one year, if the individual can demonstrate successful completion of a required treatment program based on Contractor's consortium policy, the individual will be given a last-chance opportunity. However, site access will not be permitted unless the individual has a satisfactory return-to-duty drug test. If at any time an individual is found to have a second violation of this Policy, the individual will be permanently denied site access to all Ameren premises. Contractor shall document all non-compliance on a reduction force report and forward the report to Construction Project Lead or Plant Station Point of Contact. The reduction force report shall include the person's name, craft and reason stated "Non-Compliance with Ameren Substance Abuse Policy."

3.1.7 Contractors shall require all of their subcontractors to comply with all provisions of this Substance Abuse Policy. Failure of Contractor or any of its subcontractors to comply with the requirements of this Policy shall be grounds for removal from consideration for any future work and/or termination of the current contract at the discretion of Ameren. Ameren reserves the right to audit Contractor's drug and alcohol testing program at any time to verify compliance with this policy.

3.1.8 Ameren will not be responsible for any expense or loss of wages due to non-compliance with this Policy.

3.1.9 Ameren retains the right to change or modify this Policy at any time. Ameren also retains the right to waive this Policy for any Contractor that is badged as a visitor.

3.1.10 Any documents relating to this Policy will be maintained in confidence and will not be released without written authorization unless otherwise required by law.

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ATTACHMENT A16

CRANE OPERATOR SAFETY CHECKLIST

DATE: _____ CRANE: _____

JOB NUMBER/ LOCATION: _____

TASK: _____

☐ Has a Total Hazard Analysis (THA) been completed today? YES ☐ NO ☐

Comments: _____

☐ Is access to work area established? YES ☐ NO ☐

Comments: _____

☐ Is all safety equipment on hand and functioning properly? YES ☐ NO ☐

Comments: _____

☐ Have lines of communication between operator and affected employee(s) been established (visual &/or verbal)?

Comments: _____

☐ When servicing the crane (including crane lubrication), the operator must lower all loads to the ground, and move all controls to OFF. The engine MUST be stopped before the crane is serviced. The operator is to attach a WARNING sign to the engine start control to warn personnel that crane is being serviced and must not be started.

Comments: _____

☐ Do not operate crane until all safety guards and covers are securely reinstalled and all maintenance equipment is removed.

Comments: _____

☐ Before operator enters cab of crane, the affected employee(s) must be at a minimum safe distance of two feet from any moving parts.

Comments: _____

Additional Comments: _____

CREW SIGNATURES:

_____ _____

_____ _____

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ATTACHMENT A17
CONTRACTOR AGREEMENT OF UNDERSTANDING
(Form CONMGT0)

All Contractors and Subcontractors will be required to sign and submit this form prior to entering and/or starting work on any Ameren property.

- I have been informed of all expectations regarding Ameren Safety / Work rules and ZERO TOLERANCE policies and will immediately investigate and enforce all such rule and policy violations when they are reported or observed.
- I will cooperate to the fullest extent with any Ameren management or security person in investigating ZERO TOLERANCE policy violations.
- I am aware that Ameren plants contain asbestos, lead and flyash. Where necessary, I will abide by all Ameren, OSHA, State and Local policies, procedures and ordinances in all abatement, containment, waste-disposal, employee protection and reporting activities.
- I will obtain and promptly submit all of the required permits to the Ameren-designated Station Point of Contact (SPOC) prior to starting work.
- I will promptly forward all of the required submittals to the Ameren SPOC.
- I will not allow any employee to enter and / or start work on Ameren property before first conducting a Safety / Work Rules orientation and ensuring they have all required personal protective equipment.
- I will report all violations / actions taken to the Ameren SPOC, on form CONMGT1, each Friday before 9:00 AM.
- I will inform the Ameren SPOC of any sub-contractors in my employ and ensure that they are aware of and meet the conditions of this agreement before they enter and / or start work on Ameren property and will have them complete this Contractor Agreement of Understanding Form.
- Any employee found to have violated a ZERO TOLERANCE policy may be removed and barred immediately from Ameren property and will not be allowed to return to any Ameren property in the future.
- I understand that repeated violation of the Work / Safety rules or ZERO TOLERANCE policies may result in my company's removal from Ameren property.

Contractor Company (Print) _____

Contractor Representative (Print) _____

Representative's Signature _____ Date _____

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ATTACHMENT A18
HOUSEKEEPING SCORECARD

PROJECT NAME: _____

CONTRACTOR NAME: _____

DATE: _____

HOUSEKEEPING SCORECARD						
[illegible]	[illegible]					[illegible]
General Cleanup	1	2	3	4	5	
Cords & Hoses (are out of the way)	1	2	3	4	5	
Barricades & Caution Tape (used & taken down appropriately)	1	2	3	4	5	
Other (e.g., material stored/staged appropriately, no tools on running equipment, no hazardous conditions, etc.)	1	2	3	4	5	
Total Housekeeping Score:						
Total Points (Total Housekeeping Score x 4) :						

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ATTACHMENT A19
SAFETY SCORECARD

SAFETY SCORECARD

Notwithstanding the provisions below, a "work-related fatality" will result in maximum KPI reduction to the contractor regardless of any other safety criteria.

KPI payment will be based on criteria that are equally weighted as follows:	Section 1	OSHA recordable rate	33⅓ %
	Section 2	"Rules to Live By" Observations	33⅓ %
	Section 3	Safety observation cards	33⅓ %

SECTION 1 OSHA RECORDABLES

OSHA rate is calculated by the following:	2 or more =	0%
	less than 2 =	100% of Section 1

Note: Review based on specific job criteria (i.e., duration of project). Ameren POS safety supervisor has final call on OSHA recordable determination.

SECTION 2 "RULES TO LIVE BY" OBSERVATIONS

	1 or more =	$2,000 penalized assessment per Appendix A
	less than 1 =	(add)

Note: Observations that are self-reported by contractor do not apply to this. Only observations by Owner or Owner's representative apply.

SECTION 3 COMPLETED CARDS

An agreed-upon safety observation card program will be developed as part of site safety process. Observations are based on number of fully completed, meaningful cards generated by contractor's employees and submitted to Ameren designated representative. These observation cards may show positive coaching as well as corrective coaching. Observation cards completed by Ameren will not be utilized KPI of this section.	< 70 cards =	(deduction)
	70 - 90 cards =	$0
	> 90 cards =	(add)

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ATTACHMENT A20
GUIDELINE FOR ABANDONING PIPING AND DEMOLISHING ABANDONED PIPING

1.0 GENERAL GUIDELINE FOR PROPERLY ABANDONING AND/OR DEMOLISHING PIPING

The division of responsibility for the following actions to be decided at assignment of work:

1.1 A Competent Person shall pre-plan the job prior to the start of the work.

1.2 Determine pipe to be abandoned or demolished. Review P&ID's and piping isometrics to determine isolation points and material conveyed in piping.

1.3 If a JR is not already in EMPRV, Ameren Single Point of Contact (SPOC) shall create a JR in EMPRV.

1.4 Review WPA requirements with the Responsible Engineer listed on the JR. Ensure proper WPA is in place to isolate lines.

1.5 Conduct a pre-job briefing to discuss site specific safety plan and the following:

1.5.1 PPE required

- Chemical Protection
- Eye & Face Protection
- Foot Protection
- Hand Protection
- Head Protection
- Hearing Protection
- Respiratory Protection

1.5.2 Atmospheric conditions if working in enclosed spaces

1.5.3 WPA

1.6 Ensure proper WPA is in place to isolate lines. As part of WPA, drain lines and confirm all low spots have been drained.

1.7 Take special precautions to ensure environmental spills do not occur.

1.8 At extreme ends of pipe, remove at least a one foot section of pipe from equipment or process piping still in use to ensure complete isolation. Cap ends of process piping that will remain in service.

1.9 For piping that will be abandoned in place, permanently tag abandoned pipe in at least three locations (Steel or Brass tag wired to pipe). Tag shall indicate pipe to be "Abandoned in Place," applicable JR number, and material pipe conveyed.

1.10 For piping to be demolished, remove piping and dispose of properly.

1.11 Update P&ID's and piping isometrics as applicable.

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Sheet No. A - 48

ATTACHMENT A21
SITE-SPECIFIC SAFETY PLAN (SSSP)

This plan shall be completed and reviewed with the Corporate Safety Department before work commences. Completed plans shall be maintained and kept on site with the project file.

Contractor Company:	
Contractor Address:	
Project Name:	
Project Address:	
Mobilization Date:	

Project Manager			
Superintendent			
Corporate Safety Representative			
General Foreman			
Site Safety Representative(s)			
Shifts working throughout project: 1st ☐ 2nd ☐ 3rd ☐	Maximum number of workers on site per shift: 1st 2nd 3rd	Number of safety representatives on site per shift: 1st 2nd 3rd	

Job Responsibilities:

Titles:	Description of Job Duties

3.1	Identify the nearest medical facility (e.g., hospital, urgent care, occupational clinic etc.): Address: Phone # Note: Location and directions (including maps) to the nearest facility are required to be on this jobsite.	
3.2	List the local Fire & Rescue Squad Phone #	List the Police Phone #
3.3	Describe your emergency action plan for the project (e.g., response to fire, severe weather, etc.):	

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Section 5 Scope of Work

Describe the activities your company will be performing while on this project. Ensure that all activities are referenced on the AHA of this plan, see Section 13.

Section 6 Subcontractor Information

Will subcontractor(s) be used on this project? ☐ Yes ☐ No

If yes, please provide the information below (add extra copies of this page as needed):

Note: All subcontractors are required to submit a Site Specific Safety Plan.

Subcontractor(s) Name	Point of Person	Scope of Work	Phone	Email

Section 7 Safety Information

7.1	Describe how you will secure your jobsite, equipment, and materials to protect public safety and to prevent theft.
7.2	Will there be persons onsite trained in First Aid and CPR? ☐ Yes ☐ No
7.3	Will there be ANSI Z308.1 compliant First Aid Kit(s) and Bloodborne Pathogens Kit(s) located in strategic areas on this project: ☐ Yes ☐ No
7.4	Will restrooms and wash facilities be brought on site? ☐ Yes ☐ No
7.5	How will housekeeping be managed? Describe the control measures to be used and how often they will be performed.
7.6	Do you have a map of the worksite location that includes roads, waterways, railways, bridges, etc.? ☐ Yes ☐ No *Please provide a copy of the map when submitting this document*

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Owner shall have the authority to immediately stop contractor's work indefinitely for operations which, in the opinion of owner, constitute a safety concern. It is the responsibility of the contractor to adequately satisfy owner of any remediation necessary to provide a safe and healthful workplace. Contractor must have qualified and competent supervision at the site at all times to direct and observe the work.

8.1	Do you require your supervision to successfully complete the OSHA 30-Hour for Construction Training?
8.2	Do you require your employees to successfully complete the OSHA 10-Hour Construction Training?
8.3	Outline the initial employee orientation on the job site:
8.4	Describe the process that you will use to verify that training within your scope of work has successfully been completed. *Note: Employee training records do not have to be submitted. Ameren reserves the right to review training records which must be readily available upon request.*
8.5	Describe your procedures for Contractor Event Reporting (CER) to Ameren.
8.6	Describe your Job Observation Process in detail:
8.7	Describe your Job Briefing Process in detail:
8.8	Will you have a Hazard Communication Program with a chemical inventory list and Safety Data Sheets (SDS) for chemicals used onsite? ☐ Yes ☐ No NOTE: Chemical inventory list must be onsite at the beginning of the work and Safety Data Sheets (SDS) shall be kept on file at the site by the contractor. SDSs must be available for the contractor and subcontractor employees' review and for review by the owner upon request.

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Section 9 - Rules to Live By Hazards and Controls	
9.1	Explain how you will communicate Ameren "Rules to Live By" to your employees on this project and describe the procedures you will follow when a violation occurs.
9.2	Explain your company's disciplinary action protocol as it relates to jobsite safety rules:

Section 10 - Employee Engagement and Communication	
10.1	Identify steps your company is going to take to engage your workforce in safety:
10.2	Explain how your company is going to communicate safety information and expectations to your employees?

Section 11 - Personal Protective Equipment (PPE)
List the minimum PPE required to access the job site:

Section 12 - Safety and Health - Please review - Select the applicable hazards that apply to the work being performed			
Will the work scope require any traffic or pedestrian disruptions?	☐ Yes	☐ No	☐ N/A
Will your work require you to penetrate into any surface at any depth?	☐ Yes	☐ No	☐ N/A
Will your work involve any excavations/trenches?	☐ Yes	☐ No	☐ N/A
Will the work scope require work at heights greater than 6 feet?	☐ Yes	☐ No	☐ N/A
Will wire rope guardrail systems be used on this project to protect workers from fall hazards and will an inspection program be implemented to verify safe installation/condition?	☐ Yes	☐ No	☐ N/A
Will the project involve electrical line construction, maintenance or repair activities?	☐ Yes	☐ No	☐ N/A
Will the project involve substation or switchyard construction, maintenance or repair activities?	☐ Yes	☐ No	☐ N/A
Will there be worksite obstructions that may create a hazard to workers such as railroads, bridges, power lines or waterways?	☐ Yes	☐ No	☐ N/A
Will the work scope involve the need to control hazardous energy sources?	☐ Yes	☐ No	☐ N/A
Will the project include work on pressurized vessels or pipes that may affect the integrity of the system such as welding, cutting, brazing, etc.?	☐ Yes	☐ No	☐ N/A
Will steel erection be part of the scope of this project?	☐ Yes	☐ No	☐ N/A

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Will there be potential impalement hazards such as protruding reinforcing steel (rebar)?	☐ Yes ☐ No ☐ N/A
Will any roofing be performed on this project?	☐ Yes ☐ No ☐ N/A
Will earthmoving or drilling equipment be used on this project?	☐ Yes ☐ No ☐ N/A
Will cranes, derricks, or other equipment be used on this project?	☐ Yes ☐ No ☐ N/A
Will a helicopter be used on this project?	☐ Yes ☐ No ☐ N/A
Will the work scope require the need for a critical lift plan that will include the safe rigging practices and prohibit work under suspended loads?	☐ Yes ☐ No ☐ N/A
Will hoists, elevators or conveyors be used on this project?	☐ Yes ☐ No ☐ N/A
Will employees be involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold system?	☐ Yes ☐ No ☐ N/A
Will the work scope include diving?	☐ Yes ☐ No ☐ N/A
Will the work scope require you to work in a confined space?	☐ Yes ☐ No ☐ N/A
Will welding, cutting, or brazing be performed on this worksite?	☐ Yes ☐ No ☐ N/A
Will the work involve the use of chemicals such as paints, solvents, adhesives, epoxy coatings, corrosives, fuels or other hazardous materials?	☐ Yes ☐ No ☐ N/A
Will lead based materials be used or disturbed on this project?	☐ Yes ☐ No ☐ N/A
Will asbestos containing materials be disturbed on this project?	☐ Yes ☐ No ☐ N/A
Will you be working in or generating a hazardous atmosphere?	☐ Yes ☐ No ☐ N/A
Will appreciable levels of dust be generated that will require control measures?	☐ Yes ☐ No ☐ N/A
Will abrasive blasting be performed on this project?	☐ Yes ☐ No ☐ N/A
Will the work scope involve any environmental hazards that generate flying debris, excessive noise levels, or any other air contaminants not mentioned above?	☐ Yes ☐ No ☐ N/A
Do you have a heat stress prevention program in place?	☐ Yes ☐ No ☐ N/A
Will radioactive materials/sources be used on this project?	☐ Yes ☐ No ☐ N/A
Will hazardous waste (e.g., lead, asbestos, contaminated soils) be generated and properly disposed of on this project?	☐ Yes ☐ No ☐ N/A

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Specification #UE-2165
Sheet No. A - 53

[redacted]

ANTICIPATED HAZARD ANALYSIS (AHA)

Use this form to identify activities that will occur on this project. List all potential hazards associated with that activity. Use the Risk Assessment Code table to determine the risk level of the activity/hazards. Lastly, list all of the controls that will be implemented to control those hazards. When a Job Hazard Analysis is needed, it must be performed, documented, and communicated to workers prior to the start of that activity, see footnote 2.

Contractor Name: ACME Contractor	Project Name/Number: 123456		Project Location: Anywhere, Missouri
	Date Prepared: 1/1/2014	Prepared By: ACME Manager	Reviewed By: John Doe

Risk Assessment Code (RAC) Color Ratings – *include color & numeric alpha characters for rating* Red =Extremely High Risk (Critical), e.g., Red 1A Orange = High Risk (Serious), e.g., Orange 2B Yellow = Moderate Risk (Moderate), e.g., Yellow 3C Blue = Low Risk (Minor), e.g., Blue 3D Green = Extremely Low Risk (Negligible), e.g., Green 3E		PROBABILITY (how often the activity occurs)				
		Frequent (A) Occurs very often, known to happen regularly.	Likely (B) Occurs several times, a common occurrence.	Occasional (C) Occurs sporadically, but is not uncommon.	Seldom (D) Remotely possible, could occur at some time	Unlikely (E) Can assume it will not occur, but it is not impossible
Severity	Catastrophic (1) – Imminent and immediate danger of death or permanent disability to the public, employees or property.	[redacted]	[redacted]	[redacted]	[redacted]	Yellow (1E)
	Critical (2) – Permanent partial disability, hospitalized injury, temporary total disability.	[redacted]	[redacted]	[redacted]	Yellow (2D)	[redacted]
	Significant (3) – Reversible injury that would need ER care, reversible illness.	[redacted]	Yellow (3B)	Yellow (3C)	[redacted]	[redacted]
	Negligible (4) – First aid or minor medical treatment	Yellow (4A)	[redacted]	[redacted]	[redacted]	[redacted]

Activity Category	Potential Hazards	RAC Rating[1]	JHA Required[2]	Controls
Cutting on steam pipe located 15 ft. above ground	Explosion, thermal burns, fire, fall from heights, lacerations, flying debris	1B	Yes	1) Lockout equipment, bleed/cool/drain line, blow air through line 2) Use aerial lift with anchor point, full body harness, lanyard 3) Hot work permit, firewatch, fire extinguisher, no combustibles within 35 ft. 4) PPE (safety glasses, faceshield, leather gloves, hardhat)

1 RAC Rating – Risk Assessment Code Rating. Use the Risk Assessment Matrix to list the color and numeric alpha code

2 JHA required if red or orange RAC color (See sample JHA; JHA is not required to be submitted with this plan)

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JOB HAZARD ANALYSIS (JHA) FORM

JOB HAZARD ANALYSIS	COMPANY NAME:	JOB:	DATE
	JOB TITLE OF WORKERS WHO DO THIS JOB:	ANALYSIS BY:	
LOCATION:		REQUIRED PERSONAL PROTECTIVE EQUIPMENT:	

Sequence of Basic Job Steps	Critical Task	Potential Accidents or Hazards	Recommended Safe Job Procedures
	☐		
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Welding on pressurized steam pipe 1B yes d

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FOR AMEREN USE ONLY	
SAFETY HAZARDS CONTROL REVIEW OF CHECKLIST:	
DATE SUBMITTED:	
REVIEW STATUS:	
☐ UNSATISFACTORY, RESUBMITTAL REQUIRED ☐ SATISFACTORY	
This plan is considered satisfactory if there are no comments below.	
AMEREN CORPORATE SAFETY REVIEW COMMENTS:	
Sections	**Comments**
Section 1:	
Section 2:	
Section 3:	
Section 4:	
Section 5:	
Section 6:	
Section 7:	
Section 8:	
Section 9:	
Section 10:	
Section 11:	
Section 12:	
Review Date:	
Resubmit Date:	
Approved Date:	
Ameren Project Manager and Date:	

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ATTACHMENT A22
DIVERSE SUPPLIER BUSINESS PLAN

SUPPLIER / SUBCONTRACTOR BUSINESS PLAN

Note: Please list all diverse and non-diverse sub-contractors on supplier/sub-contractor business plan. Ameren will require bidders to track spend amounts when sub-contracts are awarded to Diverse Suppliers. If bidder is unable to award to Diverse Supplier indicate name of diverse supplier contacted and reason(s) why bidder was unable to award.

Please specify in the pull down below the % diverse supplier participation as part of the bid.

Enter % participation here					
Name of Sub-Contractor	Email	Business Classification of Diverse Sub-Contractor (Select from the Pull Down)	Type of Work/Services to be Provided by Sub-Contractor	Anticipated Value of Work ($) to be Performed	Reason(s) why unable to award to Diverse Sub-Contractor (Select from the Pull Down)

Please describe "Other" in this space:

Pull-Downs:

0%	African American	Supplier awarded work
5%	Asian Pacific American	Supplier declined to bid
10%	Asian Sub-Continent American	Supplier not competitive-bid high
15%	Disabled Owned Business	Supplier not competitive-bid too low
20%	Hispanic American	Other (Please provide reason below)
25%	Hub Zone Business	
30%	Native American	
35%	Service Disabled Veteran Owned Business	
40%	Small Business	
45%	Veteran Owned Business	
50%	Woman Owned Business	
	Non-Diverse	

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ATTACHMENT A23
DIVERSE SUPPLIER 2ND TIER REPORT

2nd TIER PROGRAM - DIRECT EXPENDITURES

1st Tier Supplier: _____ Report Period: _____

In accordance with Ameren's Request for Proposal/Quotation, the definitions and codes contained herein and the resulting contract/purchase order between Ameren and the Supplier, Supplier shall complete columns 1 through 9, reporting its use of Minority Business Enterprises (MBEs) and (WBEs) in direct connection with goods and services provided under the terms and conditions of said contract/purchase order. Supplier shall also include the name of the Ameren business segment in which the work is being performed.

Use this report when MBE & WBE expenditures are directly attributable to fulfilling a specific contract. You must be able to trace the expenditure directly to the specified contract.

	(1)	(2)	(3)		(4)		(5)							(6)	(7)	(8)
	SUBCONTRACTOR	BUSINESS SEGMENT	CONTACT		WORK		2ND TIER SPEND									
	2nd Tier COMPANY NAME	AMEREN BUSINESS SEGMENT	NAME	PHONE	DESCRIPTION	MBE INDIRECT	AFRICAN AMERICAN	ASIAN PAC & SUB	HISPANIC	NATIVE AMERICAN	WBE	VETERAN	LGBT	TOTAL 2ND TIER	MONTHLY PAID by AMEREN	% OF MONTHLY DIVERSE SPENDING
1														$	$	
2														$	$	
3														$	$	
4														$	$	
5														$	$	
6														$	$	
7														$	$	
8														$	$	
9														$	$	
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24														$	$	
25														$	$	
	TOTAL AMOUNT:						$ -	$ -	$ -	$ -	$ -	$ -		$ -	$0	#DIV/0!

Name _____ Phone _____ Email _____ Date _____

END OF APPENDIX A

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APPENDIX B – JOB WORKING RULES AND CONTRACT WORK LIMITATIONS
CONTRACTOR REQUIREMENTS - POWER PLANTS

1.0 JOB WORKING RULES

1.1 Contractor must enforce the Ameren Job Working Rules, included in this specification here as Appendix B, as well as the Contractor's own work rules. If the rules conflict, the more restrictive rule applies.

2.0 PLANT ACCESS, PARKING AND SECURITY

2.1 Contractor employees must enter the plant ***only*** at the entrance where their company name is posted. Security cameras monitor entrances to inform supervisors of violations.

2.2 The speed limit is 10-MPH unless otherwise posted.

2.3 Contractor personnel may not ride in the back of a truck on company property or to/from/between job sites unless properly seated with a seat belt.

2.4 Contractor employee vehicles must park in Construction Parking lot or in areas designated for Contractor use.

2.5 Contractor employees must enter and leave through the designated Construction gate.

2.6 Contractor employees must check in and out of project with their immediate Foreman or General Foreman.

2.7 Security will issue an identification badge to Contractor employees after site orientation training. Badges must be visible at all times while on the site.

2.8 If the site has an electronic badge reader, a green LED light indicates that arrival/departure times have been recorded and the gate is unlocked.

2.8.1 If a badge reader is not available, employees must sign the gate register when arriving or departing.

2.9 Lunch boxes, toolboxes, coolers and other containers are subject to inspection when entering or leaving Ameren premises.

2.10 An Ameren Material Pass (Form 5532NS) signed by the Ameren Station Point of Contact (SPOC) and a Contractor supervisor must be presented to Security when tools or materials are taken off site.

2.11 The Security Guards can:

- De-activate / activate a badge when changing plant locations
- Replace a damaged badge or lost badge
- Update the employee name, Contractor company, or craft.

2.12 Cameras and video recording devices are prohibited unless specifically authorized by Ameren management.

3.0 GENERAL REQUIREMENTS

3.1 The more restrictive rule will govern in the event of any conflict between Ameren and Contractor work rules.

3.2 All Contractor/Subcontractor employees must not leave their work areas during assigned work periods. Any reasonable break periods will be established by the Contractor/Subcontractor.

3.3 Only drink water from drinking fountains or lavatories, other outlets may contain river water.

3.4 Certain plant locations, including cafeterias, locker rooms, and washrooms, may be posted as OFF LIMITS to construction or Contractor personnel.

3.5 Written permission is required before using Ameren equipment or tools, except for public pay phones.

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3.6 Radios or "boom boxes" are not allowed because they can disrupt communication and distract workers.

3.7 Ameren's Smoking Policy
In keeping with Ameren's corporate values, Ameren strives to provide a work environment that promotes and ensures the health and safety of all employees. Smoking presents known health risks to smokers and non-smokers alike. This policy applies to cigarette, pipe, and cigar smoke, as well as e-cigarettes.

3.7.1 Persons Affected
This policy applies to all Ameren employees, vendors, contractors, and visitors at any Ameren facility.

3.7.2 Policy
Smoking is prohibited in all Ameren buildings and any outside posted areas where hazards may exist. Smoking is prohibited within 25 feet from all entrances, exits, windows that open, and ventilation intakes that serve an enclosed area for all Ameren locations. Smoking is not permitted in a multi-occupant Company vehicle or while operating motorized equipment.

3.7.3 Enforcement
Any violation of this policy may result in the individual being removed or barred from Ameren property.

3.8 Daily cleanup of the work area is required. Ameren reserves the right to clean up Contractor's area if Contractor is not fulfilling their housekeeping requirements. Any and all costs associated with the cleanup will be deducted from Contractor's base contract.

4.0 EVACUATION

4.1 If there is an emergency, an evacuation announcement may be made over the plant's public address system. The evacuation assembly area should be communicated during orientation training.

4.2 In the event of severe weather, an announcement to seek shelter may be made over the public address system. The location of the plant tornado shelter should be communicated during orientation training.

4.3 To report an emergency, contact the Shift Supervisor immediately using the plant's public address system. Do not hang up. Wait for instructions.

5.0 WORKER'S PROTECTION ASSURANCE OR HOLD CARD PROCEDURE

WARNING:	**Violation of Workers Protection Assurance (WPA) procedures can cause serious equipment damage, personal injury or death.** **When WPA is present, verify that equipment is actually de-energized or in the designated state. Always walk down the job, check voltages, temperatures, pressures, etc. to confirm status.**

5.1 WPA is Ameren's procedure to tag equipment or systems that have been de-energized or put in a specified state, to allow for service or testing. The energy in a system may be electrical, mechanical, pneumatic, hydraulic, chemical, kinetic or nuclear.

5.2 All employees should receive site-specific WPA training including descriptions of the tags and their functions. Workers must sign on and off WPA protection as directed by their supervisor.

5.3 Contractor/Subcontractor employees shall observe all WPA rules and comply with WPA tags at all times. Never use an elevator that has a WPA card on the call button.

6.0 SUBSTANCE ABUSE

ATTENTION:	**Employees who refuse to take a drug test or have been found to be non-compliant will be escorted off-site immediately and may be subject to permanent barring from Ameren facilities.**

6.1 Possession, and/or use of alcohol or drugs, is STRICTLY PROHIBITED.

6.1.1 Drugs, stimulants, "pep pills," tranquilizers, and similar substances are allowed only if prescribed by a doctor.

6.2 Ameren's Contractor's Substance Abuse Policy requires pre-employment and random drug testing of Contractor employees.

7.0 HARASSMENT AND WORKPLACE VIOLENCE POLICIES

7.1 Ameren Corporation has a zero-tolerance policy for behavior that is prohibited under Ameren's EEO & Anti-Harassment Policy and Ameren's Workplace Violence Policy Statement. These policies apply to Ameren employees and Contractor/Subcontractor employees.

7.2 Ameren intends that employees, contractors, customers, vendors, and visitors, never feel threatened, intimidated, harassed, offended or demeaned by any individual's actions, presence, conduct, or communication while they are on Ameren property.

7.3 The following behaviors and actions are **STRICTLY PROHIBITED** anywhere on Company property and may result in permanent barring from all Ameren facilities:

- Willful violation of safety rules or safe working practices
- Possession of unauthorized firearms, weapons or explosives and/or materials/components that could be used to make explosive devices
- Damaging, mutilating, or willful abuse of supplies, equipment & tools, vandalism of company property, or property of others
- Gambling or stealing
- Urinating in an undesignated area
- Harassment by anyone and in any form
    - Harassment includes, but is not limited to, unwelcome or unsolicited conduct or hostility based on or directed at a person or group because of race, color, religion, sex, national origin, ethnicity, age, disability, veteran status, pregnancy, marital status, sexual orientation or any other protected factor.
    - Conduct that may be considered offensive, hostile, demeaning, or derogatory, regardless of whether it is physical, verbal, or graphic in nature and whether it is done in person, or delivered via phone, fax, e-mail, text message, over a PA system, company mail, or by any other means.
    - Examples of Prohibited Physical Conduct:
        - → Bullying, wrestling, fighting, horseplay, or spitting on an individual,
        - → Sexual conduct such as rape, sexual battery, molestation, stalking, or attempts to commit such assaults, unwelcome touching, hugging, massaging, etc.
    - Examples of Prohibited Verbal Conduct:
        - → Threatening/intimidating someone (both explicit and implied),
        - → Verbal abuse, jokes, derogatory comments, references, or derogatory slurs of a sexual, racial, ethnic, or religious nature.
    - Examples of Prohibited Non-Verbal Conduct:
        - → Wearing of offensive clothing, hats, patches, etc.
        - → Displaying stickers, drawings, or posters that depict nooses, confederate "Rebel" flags, KKK paraphernalia, swastikas, or magazines, books, pictures or videotapes with sexual content.
        - → Drawing/displaying graffiti, specifically graffiti that is sexual, racial, or otherwise offensive, hostile, demeaning or derogatory to any individual/group or known to incite anger/violence.
        - → Using gestures that are obscene, or known to incite anger/violence.

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7.4 Other behaviors and actions, not specifically set forth in this list, may violate Ameren zero tolerance policies.

8.0 WORKPLACE HAZARDS

8.1 Work near coal dust, fly ash, lime, or ferric/lead paint removal projects can create airborne contaminates. Do not use compressed air to clean surfaces or clothing. Use properly equipped vacuum, wet methods or other approved methods for cleaning.

8.2 All plants have asbestos-containing insulation and building materials (ACM). Treat all suspect materials as if they are asbestos.

8.3 Asbestos abatement projects may be in progress. Barricades will restrict access to areas with abatement projects. Only trained personnel using Personal Protection Equipment (PPE) may handle asbestos.

8.4 Personnel who are medically required to use syringes should take them home, properly packaged for disposal. Only trained employees using PPE should handle items contaminated with blood or other body fluids. Report any bloodborne related issues to the SPOC.

9.0 FOREIGN MATERIAL EXCLUSION (FME)

9.1 Foreign Material Exclusion protects critical plant components and systems, from contamination or damage. Systems such as feed water, condensate, steam, oil, and electrical controls and motors may suffer significant damage from foreign materials. See Foreign Material Exclusion Requirements (Appendix X) for additional requirements and details.

9.2 Foreign material contamination can come from sources such as:

- Welding and gas cutting debris,
- Metal chips, shavings and filings,
- Corrosion that produces flakes of metallic substances,
- Cleaning materials, such as shot from blasting, rags & lint,
- Forgotten tools or any material that falls out of worker's pockets,
- Water leaks/spills, cutting fluids, solvents, etc.

9.3 To prevent damage from foreign objects follow these work practices:

- Clean dirt, oil and fly ash from around covers, caps and other devices before opening.
- Remove welding electrodes, stubs and broken flux coating material from internal work areas in closed systems.
- Cover openings on turbines, generators, pumps, pipes, tubes, electrical cabinets/motors and other critical components during maintenance activities.
- Track tools, parts and materials allowed in an FME work area.
- Allow only materials necessary for the task into the work area; do not allow personal items such as jewelry or change.
- Secure all tools, safety glasses, badges, gloves and other loose items with lanyards, tape or other means.
- Catch clippings from cable ties, stripped wires, etc.
- Vacuum or wipe out electrical cabinets after repairs/modifications to remove moisture, metal chips, knockouts, clippings, etc.

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I, the undersigned, have read the Job Working Rules. I have completed site orientation training and I understand:

- The Job Working Rules
- Site-specific instructions, including Worker's Protection Assurance procedures
- Safety requirements

I acknowledge that a violation of any of these provisions will be grounds for immediate removal from Ameren property and I may be subject to permanent barring from all Ameren facilities.

Date _____

Employee Name (Print) _____

Employee Signature _____

Contractor _____

END OF APPENDIX B

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APPENDIX C
DESIGN FOR SAFETY GUIDE

OBJECTIVE

Develop and maintain design guidelines to ensure engineering designs reduce safety risks for construction, operations, and maintenance of equipment and facilities.

These Guidelines reflect Ameren's commitment to incorporate safety into all designs. The designer of record is ultimately responsible for adherence to all governing Federal, State, and Local code requirements.

While attempts will be made to follow the recommendations in this guideline during the engineering phase there will be occasions where conditions and physical constraints may render some recommendations impractical or unattainable.

Several of the Design for Safety recommendations are subjective and can vary from plant to plant (i.e. serviceable access for equipment, pipe labeling, & color coding). Ameren Engineering and contracted consultants must engage plant stakeholders during the design phase to accommodate plant specific safety and operating requirements.

GENERAL FACILITY SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	General Arrangement layouts shall provide for adequate serviceable access for operation, maintenance, and replacement; i.e. personnel access, tool access, cart access, vertical lift access, fork truck access.
☐	☐	☐	Stairs shall not be used as access platforms. No valves, controls, equipment, etc., shall be positioned / designed to be accessed by personnel standing on stairs.
☐	☐	☐	Permanent, well identified and load rated fall protection tie-offs, should be incorporated into the building structure at removable handrails and access hatchways.
☐	☐	☐	Self-closing swing gates are to be used instead of chains and clips at all personnel access openings for fall protection guarding where the elevated surface is used as a work platform or walkway.
☐	☐	☐	Non-slip "Mebac" ladder rung covers should be used on all fixed access ladders.

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☐	☐	☐	All new handrails shall be fabricated utilizing 1 ½" diameter standard pipe rails and posts. Posts shall be spaced a maximum 6'-0 on centers. Rails shall include one (1) top rail (top of top rail shall be 42 inches above walking surface); **two (2) mid rails** *equally spaced to provide increased fall protection*; and a standard 4" high toeboard.
☐	☐	☐	OSHA required clearance to handrails on stairs (3") must be maintained. Structural bracing, electric conduit, or mechanical piping is not located within the required clearance space.
☐	☐	☐	No more than a 3" open gap is maintained between a walking surface and the side of a piece of equipment penetrating the walking surface.
☐	☐	☐	When practical, valves should be located to allow for ergonomically correct operation.
☐	☐	☐	When practical, provide stairs rather than ladders to equipment, valves, etc. that requires routine access for operations and/or maintenance.
☐	☐	☐	Provide chain wheel operators for valves that cannot be accessed from a permanently installed ladder or platform.
☐	☐	☐	When possible, design stairs with lower angle of stairway rise (6½" R, 11" T). Stair landings are provided every 10 to 12 treads.
☐	☐	☐	When possible, no low mounted equipment, piping, ducting, conduit, etc. in travels paths. No "duck-unders". Use a minimum design head clearance of 7'-0".

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YES	NO	N/A	
☐	☐	☐	All 90 degree corners of structural steel members and plate trimmed / clipped where close to personnel access areas.
☐	☐	☐	Maintenance and replacement access considered when locating lighting fixtures (especially on stairways, over tops of equipment and high overhead locations).
☐	☐	☐	Underground utilities should be designed and installed with warning and location indicators for future excavations in the areas of buried utilities.
☐	☐	☐	Underground utilities should be designed and installed at shallowest depth possible (while maintaining freeze protection and surface surcharge loads) to minimize deep trenching hazards.
☐	☐	☐	Thermal protection guarding incorporated into design where required.
☐	☐	☐	Utilize above ground liquid containments or rigid structural underground containment. Avoid below grade lined pits.
☐	☐	☐	Incorporate seismic shut-off valves for gas service lines entering buildings and at meter locations. (Application mostly at non-power plant, off-site buildings / facilities).
☐	☐	☐	Walkways shall be clear of protruding obstructions and bump hazards. No valves, valve stems, valve handles, controls, equipment, etc. should be positioned / designed within the normal walking path within personnel walkways. If not possible, paint or otherwise safeguard.

YES	NO	N/A	
☐	☐	☐	Utilize yellow warning striping along edges of personnel walkways to guide / warn walking personnel of potential obstructions, ramps, bump hazards, grade / slope changes.
☐	☐	☐	Provide personnel access to all roofs for inspection and maintenance purposes.
☐	☐	☐	Provide permanent fall protection tie-offs that are well identified, load rated, and incorporated into the building structure on roofs where there are no parapets or guard railing. (Review the need for fall protection tie-offs on specific roof areas on a case-by-case basis).
☐	☐	☐	To eliminate the need for fall protection tie-offs, when practical building roof parapets should be designed high enough to meet OSHA fall protection guarding requirements.
☐	☐	☐	Where possible, roof mounted equipment shall not be designed and installed closer than 15' to open, unguarded edge of roof.
☐	☐	☐	Provide fall protection guarding at edge of roof (without parapet) where roof mounted equipment is installed closer than 15' to open edge of roof.
☐	☐	☐	Provide fall protection guarding on both sides of a fixed roof access ladder onto roofs with no parapet or guard railing.
☐	☐	☐	Provide fall protection guarding or tie-off point at all personnel access roof hatches.

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YES	NO	N/A	
☐	☐	☐	Provide fall protection guarding at roof mounted sky lights (many commercial skylights are available with security grills that will act as fall protection guarding).
☐	☐	☐	Design roof mounted equipment, ducting, and piping with adequate clearance for roof maintenance and replacement. Design clearances shall meet the NRCA recommendations for equipment to roof clearances.
☐	☐	☐	Provide service power for roof mounted equipment.
☐	☐	☐	Eliminate tripping hazards on roofs / floors. No low to roof / floor mounted electric conduits and drain pipes.
☐	☐	☐	Utilize safety balls on lightning protection air terminals. Eliminate impalement hazard of pointed air terminals on roofs.
☐	☐	☐	"Roof slippery when wet" signs shall be installed at all personnel access points onto roofs.
☐	☐	☐	Provide lighting on roofs in areas of personnel access for maintenance of equipment.
☐	☐	☐	Design mechanical / electrical equipment and components to be water tight for wash down cleaning.

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Yes	No	N/A	
☐	☐	☐	Provide the proper quantity and type of fire extinguishers and hose stations.
☐	☐	☐	Provide proper washdown facilities (hose reels, supply pipes, drains) to allow facility cleaning.
☐	☐	☐	Assure proper safety signage is in place (chemicals, hearing protection, etc.).
☐	☐	☐	Assure roof drains are not placed where water will freeze and become a slipping hazard.
☐	☐	☐	Provide ice dams on sloped roofs above doorways and walkways to prevent and/or break up sliding ice.

COMMENTS TO GENERAL FACILITY SAFETY DESIGN:

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ELECTRICAL SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	Walk down conduit and cable tray routes before installation to identify hazards such as tripping, head, thermal, chemical, etc.
☐	☐	☐	The location, cable tray material, and conduit shall be designed for the identified hazards for that specific location.
☐	☐	☐	Place electrical equipment in accessible locations.
☐	☐	☐	Electrical Room Egress: Provide at least two exit paths even if Code allows one exit for "un-occupied space". These spaces frequently become temporary Control Centers during construction, commissioning, and start-up.
☐	☐	☐	Cabinet/enclosures shall be designed to allow sufficient space for maintenance if maintenance to be performed inside the cabinet/enclosure.
☐	☐	☐	Provide sufficient space to allow for cabinet / enclosure access doors to fully open.
☐	☐	☐	Provide sufficient space for electrical equipment as defined by NEC in walkways, area between cabinets, etc. for forklifts, routine maintenance, etc.
☐	☐	☐	All control switches should be accessible from outside of the cabinet.

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YES	NO	N/A	
☐	☐	☐	Provide the manufacturer's recommended spacing for equipment cooling.
☐	☐	☐	Obtain arc flash incident energy level and labels for any equipment rated 480V and higher or greater than 125KVA at 120VAC & above per NFPA 70E.
☐	☐	☐	Consider extra guarding of high voltages (Plexiglas) in electrical cabinets to reduce PPE requirements.
☐	☐	☐	Switchgear shall be specified to provide "Lock Out" capability.
☐	☐	☐	Equipment shall be designed for the ratings for which it will be subject to (i.e., maximum voltage, short circuit current, continuous current, ambient temperature, etc.).
☐	☐	☐	Equipment, cable, conduit, tray, etc. shall be labeled with the voltage level.
☐	☐	☐	Equipment shall be labeled with normal power feed and backup power feed (if applicable).
☐	☐	☐	Consider backup power feed for systems where failure of normal power feed would result in a hazardous event.

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YES	NO	NA	
☐	☐	☐	Label all equipment with appropriate equipment description (if applicable).
☐	☐	☐	When possible, critical conduits shall be installed in a duct bank rather than direct buried.
☐	☐	☐	Control cabinets and wiring termination cabinets should be accessible from platforms or at grade level. Ladders should be avoided.
☐	☐	☐	Provide fall protection tie-off points at tops of transformers.

COMMENTS TO ELECTRICAL SAFETY DESIGN:

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MECHANICAL SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	Walking or climbing surfaces are sheltered or maintained in a manner to avoid slippery surfaces from rain or ice. (Review on a case-by-case basis).
☐	☐	☐	Emergency drainage systems are provided to direct flammable liquid leakage to a safe location.
☐	☐	☐	Provide eye wash stations at locations where liquids are sampled or "open fluids" are otherwise handled.
☐	☐	☐	Stairs, ladders, or ramps are provided at all locations where equipment design or maintenance actions require personnel to abruptly change elevation by more than 12 inches.
☐	☐	☐	Fixed ladders designed with a slope of 75 degrees or more where practical.
☐	☐	☐	Whenever practical, provide adequate access for maintenance personnel to all mechanical components, small-bore piping, ducts, valves, thermowells, flow meters and other appropriate instrumentation on piping runs and equipment units which require inspecting, testing, servicing, adjusting, greasing, removal, replacement, or repair.
☐	☐	☐	When practical, locate instruments, sample points, valves, etc. that require frequent readings, calibration, operation, etc. to allow for walk-up access.

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YES	NO	NA	
☐	☐	☐	Specify equipment to include handling features that will aid in grasping, removing, and carrying equipment.
☐	☐	☐	Labeling and coding is provided for service and adjustment points to clearly identify the key aspects of the maintenance activity.
☐	☐	☐	Equipment and components shall be labeled with weights for lifting and removing for later maintenance or replacement. When modifying existing equipment, determine the weight of the existing equipment plus modifications and label or revise the existing labels accordingly. When possible, the label should include references to the calculation, project, and/or drawing number.
☐	☐	☐	Provide lifting devices (lifting lugs, beams, monorail, etc.) for maintenance and replacement of equipment. Lifting devices shall be labeled with the rated lifting capacity.
☐	☐	☐	Provide indicators for convenient and reliable determination of fluid levels.
☐	☐	☐	Drain fittings are provided to support fluid removal readily and safely.
☐	☐	☐	Ensure design basis application for failure modes on all positioned equipment. Example, loss of air, loss of DC, etc.
☐	☐	☐	Standardize parts, maintenance and adjustment points as much as possible. For example, use the same size and type of bolts to eliminate special wrenches/tools. Utilize common rigging points to minimize types of rigging connections, etc. If standardization is not possible, clearly differentiate specialized items with signs, markings, etc.

Ameren MISSOURI

YES	NO	N/A	
☐	☐	☐	Minimize steam hazards, heat hazards, sharp corners, edges, and projections on equipment.
☐	☐	☐	Equipment should be placed on concrete housekeeping pads, especially where standing water might accumulate.
☐	☐	☐	Add equipment protection features to guard against hazards that cannot be removed or designed out of the system.
☐	☐	☐	Specify that equipment vendor technical manuals deal with one specific equipment model rather than with many different equipment models.
☐	☐	☐	Valves shall be provided with "Lock Out" devices.
☐	☐	☐	Provide adequate isolation valving and venting for WPA, maintenance, etc. on piping systems and equipment. Follow applicable code/standard section requirements.

COMMENTS TO MECHANICAL SAFETY DESIGN:

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CHEMICAL SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	Insure that bulk chemical tanks have separate containment areas. Containment areas shall be washable and have the ability to be drained.
☐	☐	☐	All materials used to construct storage tanks, containment, piping, etc. must be verified to be compatible for use with the chemicals used in each specific application.
☐	☐	☐	Lengths of chemical piping runs should be minimized. Chemical supply tanks and pumps should be designed to be as close to injection points as possible. Overhead chemical piping runs should be minimized. When used, labels shall be affixed to the floor beneath the piping with proper hazard communication. Chemical lines must be labeled a minimum of every 10 feet. All PVC/CPVC chemical piping must be protected from foot traffic.
☐	☐	☐	Chemical day tanks shall be properly sized to minimize the number of drums in the work area.
☐	☐	☐	Designate storage areas for each type of chemical, taking into account compatibility of each.
☐	☐	☐	Provide sufficient room for servicing instruments around bulk chemical storage tanks.
☐	☐	☐	Drains to sump shall be located around all chemical feed equipment. Local wash down water must be provided in chemical feed area. Include hose and hose reels for local wash down water.

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☐	☐	☐	All laboratory areas must contain proper first-aid kit(s).
☐	☐	☐	Material for chemical spill control (pigs, pads, soda ash, etc.) shall be located in a designated area close to chemicals.
☐	☐	☐	Personal protective equipment shall be located in a designated area close to chemicals.
☐	☐	☐	Chemicals shall be transferred to equipment (mixing tanks or day tanks) in a way to minimize chances of contacting personnel and avoid manual dumping of bottles and drums.
☐	☐	☐	Chemical containers must be labeled with chemical names and HAZCOM placards.
☐	☐	☐	All safety showers shall be supplied with tepid water. Safety showers located outside shall also be covered and protected from the wind. Safety shower activation shall signal an alarm in the control room.
☐	☐	☐	All concrete and equipment exposed to chemicals shall be coated with an appropriate chemical-resistant coating.
☐	☐	☐	PA shall be located convenient to all chemical use areas, but beyond the area that could be engulfed by a chemical spill.

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YES	NO	N/A	
☐	☐	☐	Operating and Maintenance personnel shall be isolated from all chemical pumps and feed systems by plastic screens or curtains.

COMMENTS TO CHEMICAL SAFETY DESIGN:

END OF APPENDIX C

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APPENDIX D
STANDARD CONTRACTOR SCHEDULING REQUIREMENTS

1.0 PRE-BID/AWARD REQUIREMENTS

1.1 Contractor bids shall be rejected if they are not accompanied by a schedule. The scheduling tool shall be Primavera Enterprise (P6) unless otherwise authorized by Ameren Construction managing supervisor in writing.

1.2 Contractor's bid schedule shall reflect sufficient level of detail that effectively communicates the methodology of work/execution plan. The bid schedule shall be defined in compliance with the milestones, project constraints and deliverables required by Ameren.

1.3 Contractor shall indicate the calendar of their work schedule (days/week, shifts/day, hours/day) that is the basis for their schedule.

1.4 Contractor shall identify projected manpower required to execute project and shall also provide an assessment of labor availability based on prevailing market conditions.

1.5 Contractor shall identify the hierarchy of their project management team, including an organization chart of how they report to the Project Manager and how they report into the project management system.

1.6 The individual responsible for updating the Contractor's schedule shall be identified in the bid along with a personal resume.

1.7 Contractor's bid shall list any exceptions to the standard schedule requirements.

2.0 PRE-OUTAGE REQUIREMENTS AFTER AWARD

2.1 Contractor's point of contact for schedule submittals/updates will be the Ameren Project Scheduler. All schedule iterations and revisions shall be coordinated and approved through the Project Scheduler.

2.2 Contractor shall be required to organize the schedule according to requirements specified by Ameren's Project Scheduler, and shall include a work breakdown structure (WBS) that follows the provided sample schedule to facilitate schedule review and reporting.

2.2.1 Contractor shall develop their resource loaded schedule using Ameren's outage planning milestones within two weeks following contract award date. During this time frame, the Contractor and Project Scheduler will collaborate to develop a mutually acceptable schedule. Contractor's schedule will then be installed in the Ameren network to be used as the working schedule during pre-outage, outage execution and post outage.

2.2.2 Contractor is required to provide an onsite scheduler to provide updates to Ameren Project Scheduler for scheduling progress once installed in Ameren network.

2.2.3 Ameren will provide onsite network access to Contractor for scheduling review.

2.2.4 Ameren will make milestone to milestone ties, and other appropriate relationship ties between Contractor schedule and Ameren integrated outage schedule.

2.3 Contractor baseline shall be established after both Contractor and Project Scheduler mutually agree on schedule. This will be completed before the start of the outage. In accordance with outage planning milestones, the baseline schedule shall be compared to the actual schedule during the course of the outage.

3.0 OUTAGE EXECUTION/SUPPORT REQUIREMENTS

3.1 Contractor shall provide an onsite scheduler, unless otherwise authorized by Ameren, to provide updates to the Project Scheduler. Contractor scheduler will provide the following update information:

3.1.1 Activities worked on

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3.1.2 Actual durations and resources used

3.1.3 Remaining durations

3.1.4 Percent complete

3.1.5 Expected finish dates

3.2 Contractor shall update/analyze the schedule daily. The schedule shall provide accurate reflection of progress throughout the outage. Schedule analysis should include risk management strategies to assure that outage milestones are achieved.

3.3 Contractor shall provide updates to Project Scheduler daily by 8:00 a.m. Several iterations of schedule edits/updates may be required before the Contractor's schedule may be scheduled with the integrated outage schedule. Ameren's Project Scheduler will analyze all schedules together with the integrated outage schedule and will post the updated integrated outage schedule to outage home page by 1:30 p.m.

3.4 Contractor will supply and develop activities, resources and associated project logic for added EWO work within one day of award of contract. Ameren will update Contractor with EWO work.

3.5 Ameren Project scheduler will inform the Contractor scheduler or single point of contact, Ameren engineering and responsible plant personnel of any high-risk activities that may impact the outage schedule and milestones on the Integrated Outage Schedule as required.

3.6 If Contractor progress is not meeting or will not meet the outage milestones, Ameren will require Contractor to participate in a re-evaluation of remaining work to ensure that milestone dates will be met for outage.

4.0 POST-OUTAGE SCHEDULE REQUIREMENTS

4.1 Contractor shall attend post-outage critique meetings that include a review of schedule performance.

END OF APPENDIX D

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APPENDIX E
MATERIAL SAFETY DATA SHEETS
CONTRACTOR AFFIDAVIT PURCHASE ORDER NO.

As the responsible party for the firm of _____, I do here state that I have requested, received, read, understand, and will abide by and enforce the guidelines and conditions set forth in the Material Safety Data (MSD) Sheets provided by the product manufacturer for each hazardous chemical product delivered to and/or used in connection with the work specified in _____.

I further state that I am aware of, understand, and will fully implement the requirements of the OSHA Hazard Communication Standard (CFR 29, Part 1910.1200) and other workers' right-to-know laws.

I further state that I will maintain copies of the required MSD Sheets for each hazardous chemical in the workplace, including Company's hazardous materials, listed in this Specification; and will insure that the MSD Sheets are readily accessible during each work shift to employees when they are in their work areas.

I further state that the information contained within the MSD sheets has been disseminated to all parties who have a right or need to know; and that all workers and other effected parties have received adequate and appropriate training in the hazards, handling, and use of hazardous chemicals.

_____ _____

Contractor's Representative/Title Date

_____

Notary Public Signature & Seal

END OF APPENDIX E

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APPENDIX H
FERC STANDARDS OF CONDUCT
POLICY AUE-ADM-5476, REV. 2

Contractor and subcontractors agree to comply with Ameren's FERC Standards of Conduct per procedure AUE-ADM-5476.

This procedure can be obtained from http://www.ameren.com/BusinessPartners/Suppliers/Pages/VendorForms.aspx.

Contractor/Consultants with access to Transmission Information shall complete the appropriate Ameren training requirements related to the Standards of Conduct as determined by the Ameren manager/supervisor responsible for the consultant. Training on the Standards of Conduct is included in the "FERC Compliance Training" module. Applicable training will be identified by Engineer.

No Conduit Rule – The No Conduit rule prohibits all employees, including contractor/consultants, from acting as a conduit to provide Transmission Information to employees that are not otherwise permitted access to that information.

END OF APPENDIX H

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APPENDIX I
CHEMICAL OF INTEREST REPORTING

Contractor must complete the table below, "Department of Homeland Security Chemicals of Interest to be Brought on Site," which requires Contractor to list any materials being brought onsite which are identified in Appendix A of the DHS Chemical Facility Anti-Terrorism Standard Chemical (Facility Anti-Terrorism Standards (CFATS), 6 CFR Part 27.)

MSDS for all COI must be submitted with Contractor's bid.

During the work, Contractor must inform the SPOC of any additional COI brought onsite or if the maximum amount of any material identified in Sheet I-2 below.

AFFIDAVIT

A. AUTHORIZED REPRESENTATIVE

I HEREBY AFFIRM THAT:

I am the [title]_____ and duly authorized representative of [name of business]_____ and that I possess legal authority to make this Affidavit on behalf of the business for which I am acting.

B. CERTIFICATION OF CORPORATION REGISTRATION

I FURTHER AFFIRM THAT:

1. The business named above is a corporation registered in the state or commonwealth of _____ and is in good standing with said state or commonwealth's Department of Assessments and Taxation, and that the name and address of its resident agent is:

Name _____

Address _____

_____

C. CERTAIN AFFIRMATIONS VALID

I FURTHER AFFIRM THAT:

To the best of my knowledge, information, and belief, each of the affirmations, certifications, or acknowledgments contained in this Chemicals of Interest appendix is true and correct in all respects on the date of this Affidavit and as fully set forth herein.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

Date_____ By_____
(Authorized Representative and Affiant)

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DEPARTMENT OF HOMELAND SECURITY CHEMICALS OF INTEREST TO BE BROUGHT ON SITE

Contractor: _____ Site: _____ Project: _____

Product/Chemical	COI Identified in Product/Chemical (Appendix A, 6 CFR 27)	Maximum Amount of Product On Site at Any Time (pounds)	Weight Percent COI in Product

END OF APPENDIX I

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APPENDIX J
VENDOR DRAWING TRANSMITTAL / CAD REQUIREMENTS

The purpose of this document is to specify the procedures and method of transmittal of Computer Aided Drafting (CAD) electronic files and other design file requirements for drawings generated by vendors/architectural engineering firms working for Ameren Missouri.

PROCEDURES FOR TRANSMITTING FILES

A/E-Vendor Originated Drawings:
When engineering a project for Ameren Missouri, the Ameren engineer responsible for the project should contact Kim Jones, Drafting Supervisor of Power Operations Services, at 314-957-3394 or kjones5@ameren.com; to coordinate the transmittal of electronic CAD drawing files for the project.

CAD SOFTWARE DESIGN REQUIREMENTS

Ameren Missouri will provide a workspace to utilize when creating or modifying drawings. This can be obtained by contacting DLMODrawingControl@ameren.com. Ameren Missouri utilizes Microstation and DesCartes to create and modify both vector and hybrid CAD drawings. Ameren Missouri requires the following versions of software:

- Vector design files to be Microstation (.dgn) files.
- Raster design files to be in .tif format. Scanned file compression will be in the CCITT Group 4 format. In order to maintain minimal file size, drawings are scanned at as low a dpi as necessary to produce quality scanned drawings. The dpi is determined by the respective vendor firm in a range of 100-400dpi. The scanned files are to be cleaned-up as necessary prior to transmitting to Ameren Missouri.

DELIVERABLES

Vendor will furnish full size, as-built plots of CAD files for all projects. Quantities of copies for project drawings will be determined by the project engineer.

Ameren Missouri maintains an original of drawings in St. Louis, MO. A/E's and vendors are to furnish Ameren Missouri Power Operations Services with one full size, reproducible, 20# bond plot of all CAD generated drawings in addition to the CAD file. Plots should be transmitted to:

Nancy Underwood
Document Control Supervisor
Ameren Missouri
3700 S. Lindbergh Blvd.
St. Louis, MO 63127

Vendor will enclose all necessary documentation associated with as-built CAD files as applicable (i.e., file names, reference files and any other necessary information). All original drawings sent to vendors, all voided drawings and all manual drawings that have been redrawn are to be returned to Ameren Missouri.

Electronic files for all CAD drawings will be delivered to Kim Jones, Drafting Supervisor, by one of the following transmittal methods:

- Ameren approved file transfer protocol site – Citadon or Sharepoint (BPOS)
- CD-ROM

Virus protection is paramount with any of the above methods. All corporate procedures will be followed to ensure transmittals will be free of viruses. All files supplied to Ameren Missouri should be compatible in format and file structure as outlined in these requirements. Incompatible or incomplete files will be returned for further refinement before acceptance will be granted.

Samples of CAD files in an intermediate state can be submitted for approval of conformance to Ameren Missouri's drafting standards and is encouraged in the early stages of project development. Seed files are available and recommended to ensure compliance to Ameren Missouri drafting standards.

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RESERVING NUMBERS FOR NEW AMEREN MISSOURI DRAWINGS

Power Operations Services is responsible for reserving numbers for vendors to use for new drawings for construction projects. The drawing class will be necessary to assign new numbers. (see Attachment C) Form GEN-FRM-ADM2105-03, Drawing Number Request, should be completed and submitted to the Ameren Missouri approved File Transfer Site (i.e. Sharepoint, Citadon) One drawing number will be assigned for each class of drawing needed. Sheet numbers will utilized in lieu of additional drawing numbers in the same class up to 999 sheets.

RESERVING FOREIGN PRINT DRAWING AND FOREIGN PRINT MANUAL NUMBERS

Power Operations Services is responsible for reserving numbers for vendors to use for new foreign print drawings and manuals for construction projects. It will be necessary to request the number of foreign prints by class, drawing or manual. Form GEN-FRM-ADM2105-03, Drawing Number Request, should be completed and submitted to the Ameren Missouri approved File Transfer Site (i.e. Sharepoint, Citadon)

FILE NAMING CONVENTIONS

To properly identify files it is necessary to adhere to several rules. Most of the drawing file extensions will be **.dgn, .clt** or **.tif** as the CAD system default file extensions.

The following special characters should not be used in file names:

- ! * / ({ < > }) & ? $ # @ " ' + [ ] ~

Ameren Drawings Numbers

- The CAD file is named the drawing number followed by the sheet number indicated by three characters. Examples:
    - 123456 sh. 1 is indicated as 123456001.dgn
    - 123456 sh. 123 is indicated as 123456123.dgn

Foreign Prints Manuals:

- The CAD file is to be named the 6 digit foreign print number preceded by FPM Example:
    - FPM-123456.pdf

Foreign Prints Drawings:

- The CAD file is to be named the 6 digit foreign print number preceded by the FPD and followed by the sheet number Example:
    - FPD-123456001.dgn, and FPD-123456001.clt

DRAWING REQUIREMENTS:

Titling – The title should begin on the second line since the first line of the drawing title is the drawing classification. Abbreviations when necessary should follow the ANSI standard of abbreviations and Acronyms for Use on Drawings and Related Documents.

Fonts – Ameren Missouri uses Microstation **Fonts 1, 10 and 30 (Ameren user font)** for all CAD drawings. A copy of **uefont.rsc** is included with this procedure document. Font 10 is used for electrical and piping flow diagrams where differentiation is necessary for the letter "I" and the number "1." See Attachment B, Font Library memo, for more font information. All lettering on new drawings should be a minimum of 1/8" when plotted and weight = 0 when plotted with the following exceptions:

a. Title block lettering is TX = 3/16" and WT = 2

b. Date in drawn by block is TX = 3/32" and WT = 0

c. Date in revision block is TH = 1/8" and WT = 0 Do not use dashes between month, day and year.

d. Drawing number is TX = 3/16" and WT = 2

Working units – Microstation drawings are drawn in real-world full size working units of measurement and are scaled when plotted. Borders are scaled to the appropriate size to ensure proper scale when plotted.

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The working unit parameters in the design file settings for files should be:

	PHYSICAL DRAWINGS	
	FT 12 in	
	12	
	1000	

Fraction display – stacked (i.e., 1½")

Dimension readout – feet and inches (not metric or in decimal form)

Angular Measurement – decimal degrees

Line weight – 1, or to match existing drawing for bold lines and good drafting practice

Patterning – as specified on each drawing

Revision number and date – required in title block area of each drawing. Revisions to existing drawings are numeric and increase by one each revision (i.e., Revision 2 would increase to 3). **All new drawings are issued at zero "0", revision. New drawings when revised increase to "1" for the first revision.** For vendors wanting to do multiple revisions to drawings prior to returning to Ameren Missouri, it is acceptable to use an alphanumeric numbering series (i.e., Drawing is sent to vendor at revision "1". Vendor creates "1A", "2A" , "3A" revisions and then issues final revision of "2" to Ameren Missouri).

Scoping – All revisions to existing drawings will have a revision balloon (scoping) placed around the areas revised. Vendors are to use a stream curve, line code = 7, line weight = 3, level = 63, and color = 7.

Reference files – Vendors are requested to supply any reference file that is attached to the set of Microstation drawings to be delivered to Ameren Missouri. The reference files, except for the border files, are to be numbered in the same fashion as the drawings.

Vendors using raster reference files are required to save active layer and attach active layers in the IRAS command menu before exiting Microstation.

Graphic Scales – All drawings that are drawn to scale should have a graphic scale so that any proportional blow-back from the original can be scaled. All drawings should note the scale in the title block. "NONE" should be indicated if no scale is used.

Drawing Levels – Mechanical/Structural drawings. See Attachment D, Ameren Missouri–Power Operations Services Drafting Manual, Drawing Level Scheme for mechanical and structural drawing level schemes.

Drawing Levels – Electrical drawings. Electrical drawings shall be drawn on level 5 with the exception of the border.

Operating Diagram – See Attachment E Instructions for Operating Diagram Issuance.

BORDER FILES/CELL LIBRARIES/SEED FILES:

Electrical borders are found in the file **EABORDER.DGN** (levels 59-63). Physical drawings shall use the attached level scheme. Physical borders are found in the file **SABORDER.DGN**. Both **EABORDER.DGN** and **SABORDER.DGN** are supplied with this package. Please ensure that all elements in the files are placed between levels 1 and 63 inclusively. Do not place elements, text, cells or any other graphic information on level 0 or any level greater than level 63.

It will be necessary to place vendor proprietary information in each CAD file rather than the border file. Reference the borders to the CAD file using the file names supplied with the files (i.e., **EABORDER.DGN**).

CABLE/CONDUIT/EQUIPMENT AND VALVE INFORMATION

Cable schedule, conduit schedule, equipment and valve numbers are in databases. All new cable and conduit information should be entered into Excel or Access data files and submitted to Drawing Control. Please contact Ameren Missouri Drawing Control at DLMODrawingControl@ameren.com for equipment and valve numbers and additional questions.

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Questions concerning the transmittal of files should be directed to:

Kim Jones, Drafting Supervisor
Ameren Missouri
3700 S. Lindbergh Blvd.
St. Louis, MO 63127
314-957-3394
kjones5@ameren.com

ATTACHMENTS

A – Ameren Missouri - Power Operations Services - Border Size Chart
B – Ameren Missouri - Power Operations Services - Lettering Convention for Wire/Cable
C – Ameren Missouri - Power Operations Services - Drawing Class Types
D – Ameren Missouri - Power Operations Services - Drafting Manual, Drawing Level Scheme (mechanical/structural)
E – Ameren Missouri - Power Operations Services - Instructions of Operating Diagram Issuance

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ATTACHMENT A

Ameren Missouri – Power Operations Services

BORDER SIZE CHART

Border	(ANSI)	Drawing Size	Half Size
A	(A)	8½ x 11	X
G	(B)	11 x 17	X
J		23¼ x 11½	X
Z	(C)	17 x 22	X
O		11½ x 36	X
P		11½ x 44	X
Y		34½ x 26	17 x 22
X		44 x 26	17 x 22
XX	(E)	44 x 34	17 x 22
SY	(D)	36 x 24	17 x 22
W	(Custom)	Up to 36 x 144	X

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ATTACHMENT B
Ameren Missouri – Power Operations Services
LETTERING CONVENTION FOR WIRE/CABLE

W = White

B = Black

BR = Brown

R = Red

G = Green

BL = Blue

V = Violet

O = Orange

GR = Gray

Y = Yellow

R/B = Red – Black

G/B = Green – Black

BL/B = Blue – Black

BL/R = Blue – Red

BL/G = Blue – Green

O/G = Orange – Green

R/Y = Red – Yellow

R/BR = Red – Brown

Y/B = Yellow – Black

Y/BL = Yellow – Blue

BR/Y = Brown – Yellow

BR/G = Brown – Green

G/Y = Green – Yellow

V/Y = Violet – Yellow

BL/BR = Blue – Brown

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ATTACHMENT C

Ameren Missouri – Power Operations Services

AMEREN DRAWING CLASS TYPES

1. Building
    a. Architectural Plan
    b. Building Services
    c. Concrete, Brick, Stone and Reinforcing
    d. General
    e. Piling, Foundations, Excavation
    f. Roofing, Flashing
    g. Stairs, Walkways, Floors, Partitions, Elevators and Grating
    h. Steel Framing and Details, Column Schedules
    i. Stress, Clearance Loading Diagrams
2. Conduit; Tray Cable
    a. Boxes
    b. General
    c. Hangers
    d. Installations, Details & B/M
    e. Plan
    f. Schedules
3. Duct
    a. General
    b. Installation, Details
    c. Plans
4. Equipment
    a. Brush Specifications
    b. General
    c. Installation, Details, Assembly, B&M
    d. Plan and Arrangements
5. Foreign Print
    a. None
6. Grounding
    a. General
    b. Installation, Detail, B and M
    c. Plans
7. Line Construction
    a. Configuration Diagrams
    b. Data Sheets
    c. Foundations Concrete
    d. Foundations Steel Frame
    e. Foundations Steel Tripods
    f. General
    g. Grounding
    h. Guying/Staking
    i. Insulator and Hardware Details
    j. Maps
    k. Phasing Diagrams
    l. Plan and Profiles
    m. Steel Poles
    n. Stress Diagrams
    o. Tower Lighting and Painting
    p. Tower Steel Framing and Details
8. Panel

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a. General
b. Installation, Details and B/M
c. Layout – Front or Rear View
d. Nameplate Bill of Material

9. Piping

a. Control
b. Flow Diagrams, Isometrics, Composites, P&ID
c. General
d. Hangers, Anchors
e. Installations – Details – Air
f. Installation – Details – Misc.
g. Installation – Details – Oil
h. Installation – Details – Steam
i. Installation - Details – Water
j. Plan

10. Property Site

a. Engineering Records
b. Engineering Data
c. Organization Charts
d. Forms and General Drawings
e. Plats
f. Sewers
g. Yard Plans
h. Grading Levees
i. Roadways
j. Surveys
k. Fences

11. Schematic/Wiring

a. General
b. One Line and Meter Relay Diagrams
c. Panel Wiring Diagrams
d. Schematic Diagram – 11KV and above
e. Schematic Diagram – 2.3KV to 11KV
f. Schematic Diagram - Below 2.3KV
g. Schematic and Logic Diagrams
h. Wiring Diagram – 11KV and above
i. Wiring Diagram – 2.3KV to 11KV
j. Wiring Diagram - Below 2.3KV
k. Wiring and Interconnection Diagrams

12. Structure

a. Assembly and Details
b. Concrete, Reinforcing ad Inserts
c. General
d. Lighting, Yard Lighting, and Piping
e. Piling, Excavation
f. Plans
g. Steel Framing and Details

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ATTACHMENT D

Ameren Missouri - Power Operations Services

DRAFTING MANUAL, DRAWING LEVEL SCHEME (MECHANICAL/STRUCTURAL)

Level Class 01010 Property	1	2	3	4	5	6	7	8	9	10
Sewers	X									
Grounding		X								
Cables & Conduit			X							
Fdns Below Grade				X						
Property Lines – Street Survey					X					
Fence						X				
Grading Surfacing Contours							X			
Parking and/or Easement								X		
Common Overall Dim									X	
Drawing Title & Notes										X
Level Class 030 Building	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Heating Piping 03080	X									
Motors 03080		X								
Power & Recep. 03080			X							
Lighting 03080				X						
Arch Elevations					X					
Arch Details 03020 03090					X					
Furniture 03020						X				
Patterning							X			
Common Overall Dim (Cols)								X		
Overall Dimensions									X	
Dwg Title & Notes										X
Level Class 030 Building	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Class 05031 Steam Plan	X									
Elev. & Det.		X								
Class 05032 Water Plan			X							
Elev. & Dets				X						
Class 05033 Air Plan					X					
Elev. & Det.						X				
Class 05034 Oil Plant							X			
Elev. & Det.								X		
Level	**41**	**41**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
Class 05030 Misc. Plan	X									
Elev. & Det.		X								
Class 05040 Hangers & Anchors			X							
05050 P. & I. D.				X						
Spare Spare Spare Spare Common Dimensions									X	
Title & Notes										X

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ATTACHMENT E

Ameren Missouri – Power Operations Services

INSTRUCTIONS FOR OPERATING DIAGRAM ISSUANCE

OPERATING DIAGRAMS (Ameren Drawings and Vendor/Foreign Prints):

After field installation and drawings are corrected to an "As-Built" condition, the following classifications of drawings are designated as "Operating Diagrams."

CLASS NUMBER

09020 One Line Diagrams (Except Maximum Equipment and Relaying and Metering) (Power Plants, Substations and Customer Substations).

09030 Schematic Diagrams (Power Plants, Substations, and Customer Substations).

09010 Block Diagrams (All).

09010 Equipment Options Drawings for Load Dispatch System (LDS)

The drawings are identified with this "Operating Diagrams Sticker"

OPERATING DIAGRAM	
Issued by	Date

OPERATING DIAGRAMS – PREPARATION FOR ISSUING

1. Revise per field marked prints.
2. Add revision if drawing was changed per Note 1. Revision to read "Changed as installed on WO_____."
3. Remove circles from back of drawing for current work order (WO)/construction revision only. Before removing circles for other WO's check with Ameren Project Engineer to verify that work has been completed.

END OF APPENDIX J

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APPENDIX K
PLANT ACCESS, PARKING & SECURITY

1.0 Plant Access, Parking and Security

1.1 Contractor employees, visitors and vendors must enter the plant *only* at the entrance where their company name is posted. Security cameras monitor entrances to inform supervisors of violations.

1.2 Security will direct contractor employees to work rules training the first time employees report to the site.

1.3 Employees must document their completion of site specific work rules training before they are allowed unescorted access to the site.

1.3.1 Computer Based Training (CBT) is typically used for work rules orientation and to document training.

1.3.2 Contractor employees must read and sign a hard-copy of the Job Working Rules if an orientation video or oral presentation is used for training.

1.3.3 If alternative training has been used due to a temporary CBT malfunction, then employees must take the CBT training when the system is restored.

1.4 Contractor's Employee Identification

1.4.1 Ameren Contractor ID badges containing the Contractor employee's name and Contractor ID number are issued when work rules training is completed.

1.4.2 Security will re-activate an existing badge if the employee has completed the site work rules orientation within the last 12 months.

1.4.3 Security will de-activate badges at the end of each job.

1.4.3.1 The Contractor should inform the Single Point of Contact (SPOC) when employees will complete their work on the site using the Reduction in Force Report (Attachment A7).

1.4.4 Daily gate logs will be used to validate invoices and may be provided to the Contractor upon request. If the plant has electronic badge readers, employee arrival and departure times are automatically recorded.

1.4.5 The Contractor shall provide employees with hard hats of the same color. The hard hats must have the Contractor's name or company logo on either the sides or the front of the hard hat.

1.4.6 Security will apply labels with the employee's first and last names to the front and back of each hard hat.

1.4.7 The Contractor may provide a hard hat storage container at the Construction gate. PPE is required to access the site.

1.5 Contractor Access

1.5.1 Business agents, vendor/sales representatives, contractor executives and other contractor visitors should park in the construction parking lot and be escorted on-site.

1.5.2 Consultant badge holders may park in either the construction parking lot or the Ameren employee parking lot visitor space, depending on the purpose of the visit.

1.5.3 A contractor employee who has completed CBT/Work Rules training may escort visitors and ensure Ameren work rules are followed.

1.5.4 Contractor visitors are issued a Visitor's badge and are required to wear a hard hat and safety glasses.

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1.6 Vehicles Beyond the Security Gate

1.6.1 Only contractor work vehicles with an Ameren mirror tag are permitted beyond the security gate. The Contractor can request a mirror tag for vehicles necessary to complete the Work by submitting an Authorization for Site Vehicle Pass form.

1.6.1.1 Vehicles must have the Contractor name or Logo on each side and must have an insurance certificate verifying $1,000,000.00 minimum liability coverage.

1.6.1.2 Contractor work vehicles, commercial vehicles, or contract carrier vehicles without a mirror tag will be held at the gate until cleared by the SPOC.

1.6.2 Vehicle drivers and all passengers must swipe/sign-in at the construction gate.

1.6.3 Contractor vehicles leaving the plant will be inspected by Security.

1.6.3.1 Tools and materials being removed on Contractor vehicles must have an Ameren Material Pass (Form 5532NS) signed by the SPOC and a Contractor supervisor for Security to retain.

1.7 Use of Plant Facilities

Note: The policies are on Scholar, the Ameren intranet. Go to *Employee Center, Corporate Policies, Policies by Topic, Technology*.

1.7.1 Contractors who have Ameren computers, phones and fax machines are "Privileged Users" and must comply with the following policies.

- Electronic Mail Policy
- Facsimile Machine Usage Policy
- Information Resources Acceptable Use Policy
- Internet/Intranet Usage Policy
- System Access Control Policy
- Wireless Communication Policy

1.7.2 Work areas must be restored to a condition that is approved by the SPOC.

END OF APPENDIX K

APPENDIX L
INFORMATION ACCESS AND CYBER-SECURITY TERMS & CONDITIONS

These Terms and Conditions ("CyberSecurity Terms") are issued by Ameren and agreed to by Vendor in connection with Vendor's access to one or more of the following:

- Ameren Networks including: internal networks and VPN
- Ameren Systems including: system interfaces, critical systems and SCADA or other industrial control systems
- Sensitive Ameren data including: financial, human resources, confidential or highly confidential, or Privacy Data

In the event a Statement of Work or other Contract Document states a higher standard than that set forth in these Terms and Conditions, such higher standard shall prevail over those set forth herein.

SECTION 1: DEFINITIONS

In addition to the Definitions contained in the Contract Documents governing the performance of the Services to be performed by Vendor, the following terms shall have the meanings assigned below. Unless otherwise specifically defined, those terms, acronyms and phrases in this document that are utilized in the IT services industry or other pertinent business context shall be interpreted in accordance with their generally understood meaning in such industry or business context.

Ameren Cyber Security Vendor Questionnaire – the questionnaire provided by Ameren to Vendor, in the form set forth as Exhibit A to this document, covering Vendor's electronic and other security procedures and practices. Vendor shall not access Ameren systems or data covered by these Terms and Conditions until review and approval of such Questionnaire by Ameren. Once approved, any material changes to the information set forth in the Questionnaire must be approved by Ameren prior to implementation.

Confidential Information has the meaning set forth in the Contract Documents, including, without limitation, as specifically identified in these CyberSecurity Terms.

Continuity of Business (COB) - the establishment of processes necessary to ensure that the Vendor's performance of the Services is not interrupted for an extended period of time due to failure of equipment or other issues.

Contract Documents – means, collectively, the Ameren Purchase Order issued in connection with the performance of Vendor's Services and all other documents identified or incorporated therein as "Contract Documents", including, without limitation, these CyberSecurity Terms.

DeMilitarized Zone (DMZ) – a firewall configuration for securing local area networks (LANs) which uses a physical or logical sub-network to add an additional layer of security so that an external attacker only has access to equipment in the DMZ, rather than any other part of the network.

Factory Acceptance Test (FAT) - A test conducted at the Vendor's premise usually by a third-party to verify operability of a system according to specifications.

Fetch Protection - A system-provided restriction to prevent a program from accessing data in another user's segment of storage.

Malicious Code - Software designed to intentionally infiltrate or damage a computer system, without the owner's consent.

Malware - software used to disrupt computer operation, gather sensitive information, or gain access to computer systems. Malware is commonly taken to include computer viruses, worms, Trojan horses, Root kits, spyware and adware.

Privacy Data – means one or more of the following types of data:

1. **Cardholder data** as defined in the Payment Card Industry (PCI) standards;
2. **Electronic Protected Health Information (ePHI)** – Any protected health information (PHI) which is stored, accessed, transmitted or received electronically
3. **Energy Usage** – Electric and natural gas usage data gathered by Ameren's metering systems;

4. **Personally Identifiable Information (PII)** – Any information that can be used to uniquely identify, contact or locate a single individual. Such data includes, but is not limited to, name, address, telephone number, social security number, tax identification number, resume, financial account information, Ameren account number, birth date, driver's license number, personnel records, personal business, and transaction details;
5. **Non-public Personal Information** as defined in the Gramm-Leach-Bliley Act of 1999; or
6. **Protected Health Information (PHI)** – Any health information, as it relates to the Ameren Group Health Plan, that identifies an individual and relates to an individual's past, present or future physical or mental health, the provision of health care to an individual or the past, present or future payment for health care.

SCADA – Supervisory Control and Data Acquisition. Computer systems that monitor and control processes in electric and gas generation or distribution systems.

Services – The product, deliverables, work or services to be provided by Vendor to Ameren.

Site Acceptance Test (SAT) - A test conducted at the customer location, often by a third-party, to verify operability of a system according to specifications immediately prior to commissioning.

Vendor –The contractor, consultant or supplier identified in Ameren's purchase order which is supplying the Services.

Vendor's Representatives – means the employees, subcontractors, agents and other authorized representatives of Vendor.

Virus - Software used to infect a computer. After the virus code is written, it is buried within an existing program. Once that program is executed, the virus code is activated and attaches copies of itself to other programs in the system. Infected programs copy the virus to other programs. Also see Malware.

VPN – Virtual Private Network.

SECTION 2: VENDOR REQUIREMENTS

Vendors shall comply with the following requirements as applicable to the Services being performed by Vendor:

A. Privacy Data

Vendor may receive or have access to Privacy Data. To any extent that Vendor receives or may have access to Privacy Data, Vendor makes the following commitments:

1. Vendor shall treat all Privacy Data and all other information of a proprietary nature provided to it by Ameren as Confidential Information.

2. Upon written request from Ameren, Vendor shall return (or destroy as set forth below if directed by Ameren) all of Ameren's Confidential Information, including such Privacy Data, within thirty (30) calendar days.

   TYPE OF CONFIDENTIAL INFORMATION STORED OR USED DESTRUCTION METHOD

   Hard Copy Shredding, pulverizing, burning, or other suitable destruction method so that any Confidential Information or Privacy Data is not readable and cannot be reassembled or reconstructed in any way.

   Electronic Tangible Media, such as CDs, Disks or Tapes. Physical destruction or erasure with a standard three-pass DoD grade wipe so that any Confidential Information or Privacy Data is not readable and cannot be reassembled or reconstructed in any way.

   Hard Drive Storage or similar Computer or Device Storage. Physical destruction or erasure with a standard three-pass DoD grade wipe so that any Confidential Information or Privacy Data is not readable at all and cannot be reassembled or reconstructed in any way.

3. **Security.** Vendor will utilize security mechanisms reasonably calculated to protect the confidentiality and integrity of Privacy Data including, without limitation, the use of passwords, encryption technology, access control mechanisms and firewalls. In addition, Vendor shall:

   (i) Hold any and all Privacy Data it obtains in connection with this Contract in strictest confidence and use

and permit use of this Privacy Data solely for the purposes of this Contract;

(ii) Disclose or provide access to Privacy Data only to employees. subcontractors, vendors, service providers, employees, agents and any other third parties ("Vendor's Representatives") who have a need to have access to such information in order to provide Services hereunder and only to the extent reasonably necessary to carry out Vendor's obligations hereunder;

(iii) Have, and in the future maintain in effect and enforce, rules and policies to protect against access to or use or disclosure of Privacy Data other than in accordance with these CyberSecurity Terms including without limitation written instruction to and Contracts with Vendor's Representatives to whom Privacy Data is disclosed to ensure that Vendor's Representatives protect the confidentiality of Privacy Data;

(iv) Have, and in the future maintain in effect and enforce, commercially reasonable and appropriate physical, procedural, administrative and electronic security measures to protect Privacy Data, including encryption, which comply with all applicable legal requirements and are consistent with industry practice and standards;

(v) Immediately notify Ameren upon becoming aware of any unauthorized access to, disclosure or use of, loss or any other potential corruption, compromise or destruction of any Privacy Data and, at Vendor's cost and expense, assist and cooperate with Ameren concerning any investigation, disclosures to affected parties and other remedial measures as requested by Ameren or required under any applicable privacy laws. In the event of any such unauthorized disclosure of Privacy Data by Vendor or Vendor's Representatives, Vendor shall provide notice of such disclosure to the affected parties if required by applicable privacy laws and Vendor shall provide Ameren with a copy of such notice prior to providing it to such affected parties;

(vi) Notwithstanding any other provision of the Contract, indemnify, hold harmless and defend upon request, Ameren and its officers, directors, employees, agents, representatives, subsidiaries, affiliates, successors and assigns ("Ameren Parties") against (a) any third party claims, damages or losses sustained or incurred by Ameren Parties for any breach or nonperformance by Vendor of its obligations under this Section, and (b) claims by governmental authorities for actual or alleged failure of an Ameren Party to comply with any applicable laws, including privacy laws, by reason of any act, omission, conduct, negligence or default by Vendor. Ameren Parties' right to indemnification under this Section shall include reimbursement for reasonable costs and expenses, including without limitation, claims, internal administrative costs, third-party fees and expenses (including attorneys and consultants), and any other costs or losses related to such access, disclosure, use, loss, corruption, compromise or destruction of Privacy Data; and

(vii) Remain responsible for any breach of the obligations set forth in this Section and any violation of any applicable privacy laws by Vendor's Representatives to the same extent as if Vendor caused such breach or violation.

4. **Insurance.** In the event Vendor has use of, or access to, any Privacy Data, Vendor shall, in addition to any other insurance coverage required by the Contract, carry Cyber Liability Insurance with limits of not less than $1 million per occurrence.

B. Integrity.

Vendor shall take reasonable commercial steps to ensure that its systems: (i) do have any system interface that would allow it or a user to bypass storage or Fetch Protection, password checking, system/application security, or obtain control in any authorized state; (ii) there is nothing designed within the systems that would allow it or a user to compromise the host system's operating system; (iii) does not have any back doors to the computer system; (iv) cannot introduce Malware into Ameren's system.

In the event that Malware is introduced to Ameren's system by Vendor provided software or computers, the Vendor will promptly remove or quarantine any malware introduced by Vendor at Vendor's expense.

Vendor will consider industry-standard best practices for hardening device operating systems through a range of techniques such as disabling unqualified remote management and access tools; securing access to storage devices and peripheral ports; securing built-in accounts; configuring login and password policies; securing file system access control lists; configuring data isolation and segmentation; securing protocols, interfaces and ports; configuring necessary network services; implementing an effective anti-virus program; implementing effective patch-management; securing administrative domain trust relationships; implementing file-system integrity monitoring; and/or implementing an intrusion detection/prevention system such as firewalls or "multiple layers" of service-agnostic protection (Zero Day protection technologies).

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C. Reasonable Safeguards.

As part of its work effort, Vendor may be required to use Ameren data and IT resources in order to fulfill part of its specified tasks. For purposes of this work effort, "Ameren Data" shall mean data provided by Ameren to Vendor, which may physically reside at an Ameren or Vendor location. In connection with such data, Vendor will implement commercially reasonable safeguards necessary to:

- Prevent unauthorized access to Ameren data from any public or private network;
- Prevent unauthorized physical access to any information technology resources involved in the development effort; and
- Prevent interception and manipulation of data during transmission to and from any servers.

Vendor warrants that it has implemented and, throughout the term of these CyberSecurity Terms will maintain security measures designed to: (i) protect the security and confidentiality of Ameren Confidential Information; (ii) protect against any anticipated threats or hazards to the security or integrity of such Ameren Confidential Information; and (iii) protect against unauthorized access to or use of such Confidential Information that could result in substantial harm or inconvenience to Ameren, Ameren employees, shareholders or customers.

D. Breach Notification.

Vendor shall immediately notify Ameren of: (i) any unauthorized possession or use of the data-processing files or other Ameren Confidential Information; (ii) the effect of such use or possession; and (iii) the corrective action taken in response thereto. Vendor acknowledges that Ameren may be required to also notify its customers, regulators and/or employees of such security incidents and agrees to cooperate with Ameren in making such notification to such persons. The costs of such notifications, credit monitoring services or other corrective action provided to affected customers, and any other costs related to such unauthorized possession or use, shall be the sole responsibility of Vendor. The Information Security group will keep a database of vendor breaches and may terminate its outstanding Purchase Orders with those Vendors who experience a breach.

E. Access Control. Check box if Not Applicable: ☐

1. Vendor shall employ such systems and security measures as are reasonably necessary to prevent unauthorized access to electronic Privacy Data. Vendor shall also employ such further methods as are reasonably prudent to also prevent unauthorized physical access to any information technology resources involved in the Services.

2. Vendor will adhere to applicable regulatory requirements as outlined in Nuclear Regulatory Commission (NRC) regulations, and the NERC Cyber Security Policy to include Critical Information Protection (CIP) Standards using an information security standards-based framework such as IEC 62443 or ISO 27001-2.

3. Where applicable, Ameren may require Factory Acceptance Test Measures (FAT) to verify that security features function properly and provide the expected levels of functionality. In addition, Site Acceptance Test Measures (SAT) after system installation with additional integrated functions to validate that the site installation is equivalent to the system tested at the factory.

Network Architecture. Check box if Not Applicable: ☐

1. The Vendor shall provide and document secure network architecture where the higher-security zones originate communication to less-secure zones. The Vendor shall provide and document the design for all communication paths between networks of different security zones through a DMZ. The Vendor shall verify and document that disconnection points are established between the network partitions and provide the methods to isolate subnets to continue limited operations. The Vendor shall provide and document tailored filtering and monitoring rules for all security zones and alarm for unexpected traffic.

2. The Vendor shall provide and document a DMZ that is restricted to communications where all traffic is monitored, alarmed, and filtered. The Vendor shall provide and document outbound filtering and alarms for unexpected traffic through security zones. The Vendor shall define all sources and destinations with enforced communication origination even during restart conditions between security zones. The Vendor shall provide and document duel DMZ architectures using different products performing the same functionality running in parallel. The Vendor shall provide and document a mechanism for patching a single DMZ architecture running in a parallel configuration without disruption to the other DMZ running in parallel. Post-contract award, the Vendor shall provide network architecture documentation.

Security Features. Check box if Not Applicable: ☐

The Vendor shall provide physical and cyber security features, including but not limited to authentication, encryption, access control, event and communication logging, monitoring, and alarming to protect the device and configuration computer from unauthorized modification or use.

F. Availability and Business Continuity. Check box if Not Applicable: ☐

1. Vendor shall establish and maintain policies and procedures relevant to contingency plans, recovery plans and proper risk controls to ensure Vendor's continued performance of Services and the restoration of data. Said policies and procedures must be in place prior to electronic access of Ameren data or operating systems and shall include, but not be limited to, recovery strategy, documented recovery plans covering all areas of operations necessary to delivering Vendor's Services pursuant to this Agreement, vital records protection and recovery and testing plans. The plans shall provide, without limitation, for off-site backup of critical data files, program information, software, documentation, forms and supplies as well as alternative means of transmitting and processing program information.

2. Vendor's recovery strategy shall provide for recovery after both short and long term disruptions in facilities, environmental support and data processing equipment. Although short term outages can be protected with redundant resources and network diversity, the long term strategy must allow for total destruction of Vendor's business operations for a period of six (6) months or longer and set forth a recovery strategy.

3. Vendor shall use commercially reasonable means to establish recovery objectives (time to full restoration and amount of lost data tolerated) that do not exceed twenty-four (24) hours.

4. Vendor shall continue to provide service to Ameren if Ameren activates its contingency plan or moves to an interim site to conduct its business, including during tests of Ameren's contingency operations plans and Vendor shall be reimbursed for any additional reasonable and actual costs incurred as a result.

5. If Vendor provides electronic interchange of data with Ameren, Vendor shall participate, if requested in writing by Ameren, in an annual Ameren data center exercise to validate recovery connectivity.

6. Vendor must provide evidence of capability to meet any applicable regulatory requirements concerning business continuity.

G. Software Design Provisions

1. Code Review.

All Deliverables that include software code or applications shall follow current industry design and best practices, including, but not limited to those published by The National Institute of Standards & Technology (NIST), the SANS (SysAdmin, Audit, Network, Security (SANS) Institute), and other recognized bodies.

Vendor shall cooperate with Ameren's code review of the relevant software or application deliverables. Prior to implementation or acceptance of a deliverable, Vendor shall subject the deliverable, including software code or scripts, to independent application review by Ameren or its delegated reviewer to validate that all applicable enterprise IT standards and security policies have been met as well as other specifications as identified in this Agreement or the relevant Contract. The review shall be performed by individuals other than Vendor or Ameren's staff who developed the deliverables. For purposes of this requirement, "Independent" may include other staff of Ameren provided no direct reporting relationships exist between the development and review organizations.

2. Functionality.

Ameren and Vendor acknowledge and agree that the Software has and shall operate in accordance with the functionality as described in the documentation provided by Vendor. If Vendor: (i) reduces the functionality of the Software as described in the Documentation, or releases an option to license a future product or other release that has substantially similar functionality as a separate or renamed product, or (ii) modifies the specifications or releases a new product that operates on specifications other than as set forth in the Documentation, Ameren shall be entitled to license such product under this Agreement at no additional cost, subject to the terms and conditions of this Agreement.

3. Passwords and Login.

In the event that a login name and password is required to access the any product provided by Vendor, Vendor shall provide Ameren access to the Product using a secure login and password. Vendor shall

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coordinate with Ameren's representative to provide Ameren with predefined login and passwords, if any, upon delivery of the Product. Ameren shall have the right to assign a login name and password to any and all users in its sole discretion. Ameren shall be responsible for maintaining any and all login names and passwords during the term of the Contract Documents. Unless otherwise specifically provided in the Contract Documents, Ameren and Vendor hereby agree that the number of users permitted to access the Product (whether concurrently or not concurrently) shall be unlimited.

4. Temporary Keys.

If Vendor uses software product authorization codes ("keys") embedded in their product, Vendor agrees that these codes, upon expiration, will not result in the disruption production processing. These codes will be "soft stop" in nature (i.e.: Display warning messages only).

H. Vendor Personnel and Data Exportation.

Background checks - Vendor will conduct or cause to be conducted (by contract or otherwise) criminal background checks on Vendor personnel to be assigned responsibilities which may allow such person to compromise Ameren systems or financial, employee or customer data or as required by law.

Foreign Nationals - Vendor warrants that, in performing its obligations under this Agreement, (i) it will not employ or subcontract with any person who is a "Specially Designated National" as defined from time to time in regulations issued by the Office of Foreign Asset Control of the United States Department of the Treasury; and (ii) Vendor is not a Specially Designated National.

In the performance of the obligations under this Agreement, Vendor shall not export any data provided to it under the terms of this Agreement, to any other country outside of the United States without the prior written consent of Ameren and demonstration to Ameren's satisfaction of Vendor's capability to meet additional prudent policies and/or protocols, including but not limited to, security standards.

I. Audits and Third Party Reviews.

Vendor agrees to provide to Ameren the results of each audit or third party attestation or report of Vendor's security measures with respect to electronic data at all facilities where Ameren data is stored or accessed during the performance of the Services. Vendor shall provide Ameren with a copy of the related report promptly after receipt by Vendor and hereby consents to Ameren providing copies of such report to applicable regulators. The report or attestation shall contain Vendor's management's response to the exception comments, if any are noted, together with appropriate target dates for completion of required changes. In addition to the foregoing, Ameren may also, at Ameren's election and and its cost and expense, require Vendor to have such an audit or third party attestation performed by a mutually agreed independent, recognized accounting or consulting firm.

Vendor shall provide reasonable assistance to Ameren in meeting its audit and regulatory requirements relating to electronic data and system security, including: (i) providing access to relevant books, records and Ameren Confidential Information in Vendor's possession; (ii) permitting auditors and examiners to inspect and audit Vendor's relevant operations; and (iii) permitting auditors and examiners to conduct reviews after any security breach that has or is likely to result in an unauthorized use or disclosure of Confidential Information. All inspections, examinations and audits shall be reasonable in scope and duration, and will be conducted so as to minimize any interference with Vendor's normal business activities.

END OF APPENDIX L

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APPENDIX M
GENERAL REQUIREMENTS FOR HAULING HEAVY EQUIPMENT
POWER OPERATIONS SERVICES

1.0 INTRODUCTION

This specification outlines the requirements for moving heavy loads more commonly referred to as "Super Loads" by state transportation agencies. The specification will detail Ameren's responsibility as well as those of the hauler and rigger. The terms "bidder," "Hauling Contractor" and "Rigger Contractor" are used interchangeably.

Each bidder shall furnish with his bid the route he proposes to use, the estimated time required, and a complete description of the hauling equipment which he proposes to use for the move, including; age, number of axles and wheels, rated capacity of trailer, number, type and pulling capacity of power units, the overall height above grade of the equipment to be moved as it is carried upon the hauling rig, etc. All work required to be performed for the move must be identified prior to the awarding of the contract.

2.0 AMEREN'S RESPONSIBILITIES

Meet with rigger and hauler to review move and address questions.

Provide detailed information for the equipment to be moved. This will include:

- Complete physical information – height, width, depth, and weight of equipment to be moved. Generally, an equipment outline drawing with dimensions will be provided.
- Miscellaneous materials to be moved (fans, bushings, radiators, turrets, conservator or expansion tank, arresters, piping, hardware, etc.). A list of the miscellaneous material that shall be moved will be provided. Transformer oil will be moved by others.
- Physical drawings of the equipment and special lifting or loading manufacturer's instructions
- Any known conditions that could have an effect on moving the equipment
- Location where the equipment can be picked up
- Final destination for the equipment

Provide impact recorder mounted on equipment.

Arrange for lifting of electric utility wires for the portion of the move that is within Ameren's service territory.

Provide access to beginning and ending locations.

Provide outages to electrical facilities as required to facilitate the work.

Provide the date when the move can begin.

Provide the date the move must be completed.

In some instances the rigger and the hauler will be the same firm, but in others the two will be different. This specification divides specific responsibilities between the rigging and moving. In those cases where the two are different, the rigger and mover will coordinate and work together.

3.0 HAULER / RIGGER RESPONSIBILITIES

3.1 General

Investigate the originating location and final destinations to determine any special situations that may exist. Make Ameren aware of special situations and note any modifications to Ameren facilities that will be required to successfully complete the move.

Contractor shall provide and be responsible for all necessary cargo insurance, services, labor, equipment, trucks, tools, fuel, power, light, heat, telephone, water sanitary facilities, supervision, permits, bonds, permission to cross private property, insurance, payment of taxes and license fees, right-of-way clearances,

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and other personnel, devices & incidentals necessary to load, transport, unload and set in place the designated transformer or equipment, including accessories.

Where required, provide temporary cribbing for equipment to rest on prior to being moved to the final destination.

Secure all required permits or approvals to complete the move from federal, state, and local authorities. Where specific permitting is not required from a local authority such as a city, county, or township road commission, the Contractor shall still obtain written permission from the local authority prior to the move. A copy of all permitting including written permission from the local authority shall be provided to Ameren upon request.

Clean up as the work progresses from day to day. All litter, debris, packing materials, etc., shall be disposed of off-site at the hauler's expense.

Repair any and all damage to private, public, or Ameren property at no additional cost to Ameren.

CAUTION: Caution must be observed at all times when working in or around the existing substation/switchyard. The existing substation/switchyard is energized with exposed high voltage substation bus and equipment. Also, there are energized high voltage overhead conductors in close proximity around the substation & switchyard. Coordination with the Company Construction Supervisor to have appropriate lines and/or equipment de-energized may be necessary. All outages and releases shall be in accordance with the Company's Workman's Protection Assurance (WPA) Procedure. Personnel shall be trained, wear hard hats, protective clothing, safety glasses with side shields, safety shoes and fall protection in accordance with OSHA requirements. The operating substation shall not be left open and unsupervised, due to the common access to energized and de-energized equipment.

3.2 Hauler Specific

Determine a route and request approval from the appropriate governmental agency or agencies to cover the complete move.

Complete a route survey and contact overhead utility companies as required by the permitting authority.

Investigate all weight limitations that may affect the move. This can include but is not limited to seasonal weight requirements imposed by governmental agencies.

Make all necessary arrangements to complete the move.

Taking super loads over railroad tracks can present unique challenges. The mover will investigate any railroad crossing that can pose a problem and develop a plan that will not cause damage to the track or impede the operation of the railroad.

Coordinate any and all requirements with law officials.

Submit OEM load charts for all equipment used.

Provide a detailed Transport Plan to Ameren for review and approval before continuing with the move including but not limited to:

- The proposed route
- The estimated time required for the move
- A complete description of the proposed hauling equipment
- The overall height above grade of the equipment to be moved as it is carried upon the hauling rig
- Axle loading
- Wheel loading
- Center of Gravity of load and trailer
- Calculation
- DOT permit, if applicable

Provide a detailed Safety Plan to Ameren for review and approval before continuing with the move.

All loads that exceed 85% capacity of the hauling equipment shall be reviewed and stamped by a professional engineer.

The Hauling Contractor shall comply with all requirements prescribed by the manufacturer instruction leaflets & drawings related to moving and supporting of the transformer or equipment. No welding on or to the equipment shall be permitted without written approval by Ameren and the equipment manufacturer.

The Hauling Contractor shall also be responsible for replacing or making prompt repairs to the equipment used by the Hauling Contractor which is damaged for any reason, including, but not limited to, broken axles.

Any temporary rocking or temporary roadways that may be necessary for any portion of the move, including, but not limited to, the substation yard, shall be provided by the Hauling Contractor unless other arrangements have been made in advance and are clearly described in the contract.

Removal of temporary rocking or temporary roadways, at Ameren's discretion, will be the responsibility of the Hauling Contractor.

The Hauling Contractor shall be responsible for making arrangement for raising, removal or relocation of all telephone, TV cables and electric utility wires, traffic lights, and other similar obstructions in accordance with the following:

The Hauling Contractor shall make all arrangements directly with the involved utilities and authorities and the cost of such arrangements shall be included in the bid.

The Hauling Contractor shall, where necessary, allow a reasonable amount of time for raising these obstructions, while the move is in progress.

The Hauling Contractor shall be responsible for repairing or replacing any damaged roads or surfaces, equipment, structures, fences and fields and for the restoration of any other damage to public or private property, caused by the move, to the satisfaction of the Ameren Services Company Construction Supervisor.

Any damage done to the transformer, accessories, oil or other equipment being moved (including paint scratches which expose bare metal) by the Hauling Contractor, his employees, subcontractors, contact with trees or overhead obstructions, or any other cause during the progress of this work, shall be the responsibility of the Hauling Contractor and shall be repaired to the satisfaction of the Ameren Services Company Construction Supervisor.

The Hauling Contractor shall provide adequate cargo insurance to cover the complete replacement of the equipment being hauled.

3.3 Rigger Specific

Provide all necessary material, labor, and supervision to move the load to a place where the load can be placed on the mover's truck or rail car.

Load the item on the truck and assist the mover in securing the load to the truck or rail car.

Off load the item at the final destination and locate it as directed by Ameren personnel.

The Rigging Contractor shall comply with all requirements prescribed by the manufacturer instruction leaflets & drawings related to moving and supporting of the transformer or equipment. No welding on or to the equipment shall be permitted without written approval by Ameren and the equipment manufacturer.

The Rigging Contractor shall be responsible for having an ample supply of cables, jacks, planking and other miscellaneous equipment on hand and in good condition, so that the move can be made safely and without delay.

Unless specifically stated in this specification, no pulling anchors will be available. The equipment to be moved shall be handled and positioned solely by use of the equipment furnished by the Hauling Contractor. At no time shall the equipment to be moved, or the equipment furnished by the Hauling Contractor, make contact with or exert a force on (directly or indirectly) any building, structure, **foundation, oil pit**, other improvement, tree, natural formation or vehicle (except those furnished by the Hauling Contractor).

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4.0 SCOPE OF WORK

4.1 Ameren Company Representative

An Ameren Company representative will generally observe the move and shall have the authority to immediately stop the work because of hazardous conditions or for any other reason which he deems necessary. This shall in no way relieve the Hauling Contractor of his responsibilities for the proper performance and supervision of the move.

4.2 Inspection of Equipment to be Moved

Prior to the move, Ameren personnel will inspect the equipment. Ameren will furnish all labor and material for this inspection. The Hauling Contractor and Ameren shall coordinate their work so that no unnecessary interference or delays occur during this period.

4.3 Hauling Contractor

The Hauling Contractor shall provide and be responsible for all necessary cargo insurance, services, labor, equipment, trucks, tools, supervision, permits, bonds, permission to cross private property, insurance, payment of taxes and license fees, right-of-way clearances, and other personnel and devices necessary to load, transport, unload and set in place the designated transformer or equipment, including accessories.

END OF APPENDIX M

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APPENDIX N
PIPE AND FITTINGS: AMEREN APPROVED MANUFACTURER LIST

1.0 SCOPE

1.1 The Scope of the Ameren Approved Manufacturer's List (AML) encompasses pipe and fittings supplied to Ameren Gas and Power Generation locations.

1.2 AML applies to Critical (QR/CR) and non-Critical items.

1.2.1 Items that are "Restricted" will have manufacturers listed and they shall be supplied as stated. In some cases, manufacturers will not be on the AML.

1.2.2 "Generic" items shall be supplied from the AML regardless of what manufacturer is listed.

2.0 AML REQUIREMENTS

2.1 Ameren-AML shall be initially compiled prior to contract award, and be finalized and implemented by 5/1/2012.

2.2 All manufacturers on the Ameren-AML shall have a current/active ISO 9001 registration unless approved by Ameren.

2.3 Any new manufacturers or classes of material added to the AML must be approved by Ameren prior to manufacturer being added to the list.

2.4 Unapproved manufactures may be used in emergency situations; however, contact and approval must be obtained from Ameren end-user prior to material being purchased.

2.5 Manufacturers are classified by the following levels with corresponding QA requirements specified:

QA [illegible]	[illegible] QA Requirements
1	• CMTR required on all shipments. Documentation sent with materials as required. • Destructive and Non-Destructive Independent Testing completed once per year for each category and manufacturer on the AML (CBN Stl Pipe, Fittings, etc.). • Quality Audit performed at manufacturer once every 2 years.
2	• CMTR required on all shipments. Documentation sent with materials as required. • Destructive and Non-Destructive Independent Testing completed once per year for each category and manufacturer on the AML (CBN Stl Pipe, Fittings, etc.). • Subject to Master Import testing as required. If performed, Ameren is to receive copy of testing. • PMI Testing at Ameren on each heat/lot #.
3	• CMTR required on all shipments. Documentation sent with materials as required. • Third Party testing at Factory on each shipment. • Subject to Master Import testing as required. If performed, Ameren is to receive copy of testing. • Destructive and Non-Destructive Independent Testing completed twice per year for each category and manufacturer on the AML (CBN Stl Pipe, Fittings, etc.). • PMI Testing at Ameren on each heat/lot #.

NOTE: A destructive and non-destructive testing plan shall be finalized by 5/1/12 and fully implemented by 9/1/12.

2.6 All Gas materials must be supplied from approved domestic manufacturers.

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2.7 In cases where material must be shipped from an alternate location that does not have the testing equipment available, approval must be obtained from end-user.

2.8 Ameren will conduct yearly audits of material testing and documentation processes.

2.9 Chinese manufactured product shall be only accepted after written pre-approval per Ameren.

2.10 Receipt inspection standards for each type of material shall be created (i.e., fittings, pipe, flanges, valves). At a minimum these should include:

- Proper Identification/Markings (manufacturers markings are present and they are readable/legible and meet applicable manufacturing standards
- Verify Manufacturer is on AML
- Verify CMTRs are received and acceptable
- Check for damage/cleanliness/workmanship
- Verify material matches stock/PO description
- Any unique inspections specific to the item
- Dimensional inspection to sampling plan (to nominal sizes)

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Sheet No. N - 3

Product	Material	ASTM Spec.	Material Grade	Materials Class	Approved Manufacturers	Country	City/State	Approved For	Registrations/ Certifications	Mfr. QA Oversight Level	Comments
PIPE, SEAMLESS	Carbon Steel	A106	Grade B Grade C	Schedule 40 Schedule 80 Schedule 160 XXS	Arcelormittal	South Africa	Vereeniging,	GEN	ISO:9001	2	
					Chung Hung Steel	Taiwan	Kaohsiung City	GEN	ISO:9001	3	
					Dnepropetrovsk	Ukraine	Dneproptrovsk	GEN	ISO:9001	2	
					Hall Longmore	South Africa	Wadeville	GEN	ISO:9001	2	
					Husteel	Korea	Seoul	GEN	ISO:9001	3	
					Hyundai Hysco	Korea	Ulsan	GEN	ISO:9001	3	
					JSC	Ukraine	Dneproptrovsk	GEN	ISO:9001	3	
					Lakeside	USA	US	GEN	ISO:9001	1	
					Maharashtra	India	Raigad	GEN	ISO:9001	3	
					Sun Steel	Vietnam	Binh Duong Province	GEN	ISO:9001	3	
					US Steel	USA	Fairfield, AL	GEN	ISO:9001	1	
					Uvjerne	Croatia	Uvjerne	GEN	ISO:9001	2	
					Wheatland/Sharon	USA	Sharon, PA	GEN	ISO:9001	1	
	Ferritic Steel	A335	P11 P22	Schedule 80 Schedule 160 XXS	JFE	Japan	Chita	GEN	ISO:9001	2	
					Michigan	USA	MI	GEN	ISO:9001	1	
					Productos	Spain	Valle de Trapaga	GEN	ISO:9001	2	
					Sumitumo	Japan	Wakayama	GEN	ISO:9001	2	
					Tenaris	Argentina	Buenos Aires	GEN	ISO:9001	2	
	Austenitic Stainless Steel	A312	300 Series 304 304L 316 316L etc.	Schedule 80 Schedule 160 XXS							
					Haynes	USA	IN	GEN	ISO:9001	1	
					Kawasaki	Japan	Fukuyama	GEN	ISO:9001	2	
					Kobe	Japan	Tokyo	GEN	ISO:9001	2	
					Nippon	Japan	Yamaguchi	GEN	ISO:9001	2	
					Productos	Spain	Valle de Trapaga	GEN	ISO:9001	2	
					Pusan	Korea	Janghang	GEN	ISO:9001	3	
					Sandvik	Sweden	Sandviken	GEN	ISO:9001	2	
					Sumitumo	Japan	Kashima City	GEN	ISO:9001	2	
					TaChen	Korea	Taipei	GEN	ISO:9001	3	
					Webco	USA	OK	GEN	ISO:9001	1	
		A376	TP300 Series	Schedule 80 Schedule 160 XXS	Bristol	USA	Bristol, TN	GEN	ISO:9001	1	
					Haynes	USA	IN	GEN	ISO:9001	1	
					Outokumpu	USA	Wildwood, FL	GEN	ISO:9001	1	
					Webco	USA	OK	GEN	ISO:9001	1	

Ameren MISSOURI

Specification #UE-2165
Sheet No. N - 4

Product	Material	ASTM Spec	Material Grade	Material Class	Approved Manufacturers	Country	City/State	Approved For	Registrations/ Certifications	Mfr. QA Oversight Level	Comments
PIPE, WELDED	Austenitic Stainless Steel	A312	300 Series 304 304L 316 316L	Schedule 80 Schedule 160 XXS	Thareus	Thailand	Rayong	GEN	ISO:9001	3	
					Pantech	Malaysia	Kuantan	GEN	ISO:9001	3	
					PreStar	Malaysia	Darul Ehsan	GEN	ISO:9001	3	
					KingMaker Steel	USA	NJ	GEN	ISO:9001	1	
					Kanzen Tetsu	Malaysia	Darul Ehsan	GEN	ISO:9001	3	
					Sonah	Vietnam	Seoul	GEN	ISO:9001	3	
					Bristol Metals	USA	Bristol, TN	GEN	ISO:9001	1	
					Outokumpu	USA	Wildwood, FL	GEN	ISO:9001	1	
FITTINGS Socket Butt Threaded Reducers Unions Ells Elbows Tees Caps Plugs Bushings	Malleable Iron	A197		150# 300#	Ward Manufacturing	USA	Blossburg, PA	GAS	ISO:9001	1	
					Anvil	USA	Columbia, PA	GAS*	ISO:9001	1	*Approved for plugs, unions, elbows and tees only
					Jinan	China	Jinan	GEN	ISO:9001	3	
	Carbon Steel Forgings	A105		Socket Weld Threaded	Capitol	USA	Crowley, LA	GAS**,GEN	ISO:9001	2	** Only Plugs
					Bonney Forge	USA	Mt. Union, PN	GAS, GEN	ISO:9001	2	
	Wrought Carbon Steel/Alloy Steel	A234	W Series WPB, WPC, etc.	Butt-Weld Standard XH XXH	Arah Danang	Malaysia	Darul Ehsan	GEN	ISO:9001	3	
					Awaji	Thailand	Sumoto City	GEN	ISO:9001	3	
					Canadoil	Canada	Quebec	GEN	ISO:9001	3	
					Charming	Vietnam		GEN	ISO:9001	3	
					Erne	Austria	Hauptatasse	GEN	ISO:9001	2	
					Hackney Ladish	USA	AR, OK	GAS, GEN	ISO:9001	2	
					Pantech	Malaysia	Selannor	GEN	ISO:9001	3	
					Tenaris	Mexico	De Clorec	GEN	ISO:9001	2	
					TK	Korea	Busan	GEN	ISO:9001	3	
					Weldbend	USA	IL	GAS, GEN	ISO:9001	2	
	Wrought Austenitic Stainless Steel	A403		Butt-Weld Sch 10,40,80,160							
					Kanzen-Tetsu	Malaysia	Darul Ehsan	GEN	ISO:9001	3	
					Tru-Flo	Taiwan	Hsiang	GEN	ISO:9001	3	
					Elm	Philippines	Cavite	GEN	ISO:9001	3	
					Schutz	Brazil	Campos dos Guyacezes	GEN	ISO:9001	2	
					SPI	Malaysia	Darul	GEN	ISO:9001	3	
					SFG	USA	Travelers	GEN	ISO:9001	1	
	Forged or Rolled Alloy Stainless Steel	A182	F9 F11 F22	3000/6000# SW 3000/6000# THRD	Bonney Forge	USA	Mt. Union, PN	GEN	ISO:9001	1	
					Penn Machine	USA	PN	GEN	ISO:9001	1	
			300 Series 304/304L 316/316L	3000/6000# SW 3000/6000# THRD	Bothwell	Taiwan	Hsien	GEN	ISO:9001	3	
					ISE	Japan	Osaka	GEN	ISO:9001	2	
					Enlin Steel	Taiwan	Cavite	GEN	ISO:9001	3	

	Material	ASTM Spec.	Material Grade	Material Class	Approved Manufacturers	Country	City/State	Approved For	Registrations/ Certifications	Mfr. QA Oversight Level	Comments
PIPE NIPPLES	Carbon Steel	A106 A733	Grade B Grade C	Standard (40) Schedule 80 Schedule 160 XXS	Westbrook	USA	Houston, TX	GAS, GEN	ISO:9001	2	
					Wisconsin	USA	Milwaukee, WI	GAS, GEN	ISO:9001	2	
	Austenitic Stainless Steel	A106 A733	300 Series 304/304L, 316/316L, etc.	Standard (40) Schedule 80 Schedule 160 XXS	Westbrook	USA	Houston, TX	GEN	ISO:9001	1	
					Merit Brass	USA	Cleveland, OH	GEN	ISO:9001	1	
FLANGE, PIPE	Carbon Steel Forgings	A105	Grade B Grade C	150# 300# 600# 900#	Ameri-Forge	USA	TX	GEN	ISO:9001		
					Balkrishna	India	Gujarat	GEN	ISO:9001	3	
					Bebitz	Germany	Lebendorter	GEN	ISO:9001	2	
					Boltex	USA	Houston, TX	GAS, GEN	ISO:9001	2	
					Galperti	USA	Houston, TX	GAS, GEN	ISO:9001	2	
					Hind	India	Ghaziabad	GEN	ISO:9001	3	
					Metalfar	Italy	Brianza	GEN	ISO:9001	2	
					Munish	India	Ludhiana	GEN	ISO:9001	3	
					Norma	India	Sahibabad	GEN	ISO:9001	3	
					Rangani	India	Gujarat	GEN	ISO:9001	3	
					RNG	India	Ludhiana	GEN	ISO:9001	3	
					Trupati	India	Ghaziabad	GEN	ISO:9001	3	
					Trilad	USA	Houston, TX	GEN	ISO:9001	1	
					Weldbend	USA	Chicago, IL	GAS, GEN	ISO:9001	2	
	Stainless Steel	A182	300 Series 304/304L, 316/316L, etc.	150# 300#	Enlin	Philippines	Cavite	GEN	ISO:9001	3	
					Viraj	India	Maharashtra	GEN	ISO:9001	3	
					Hilton Metal	Mumbai	Ghonsai	GEN	ISO:9001	3	
	Forged or Rolled Alloy	A182	F9 F11 F22	150# 300# 600#	Ameri-Forge	USA	TX	GEN	ISO:9001	1	
					Maas Flange	USA	TX	GEN	ISO:9001	1	
SWAGE NIPPLES and BULL PLUGS	Carbon and Stainless Steel	A234			Capitol Manufacturing	USA	Crowley, LA	GAS	ISO:9001	2	Approved for Weld X Thread
					Westbrook	USA	Houston, TX	GAS	ISO:9001	2	Approved for Thread X Thread

END OF APPENDIX N

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APPENDIX Q
QUALITY MANAGEMENT SERVICES APPLICATION AID FOR CONSTRUCTION SERVICES

This document is an Application Aid for Construction Service organizations to outline the Bidder/Contractor's Quality Management Program and demonstrate how it meets the requirements of Ameren Missouri's Quality Management System (QMS). This Aid is not a substitute for, nor does it replace AUE-MAN-QMS-1001, *Quality Management System* and its requirements.

DO YOU HAVE A WRITTEN QUALITY MANAGEMENT PROGRAM (QMP)?

If NO, how do you intend to meet the QMS requirements?
Click here to enter response.

If YES, what is the basis of your QMP (e.g., ISO 9000, NQA-1) and how does it meet the QMS requirements as outlined below?
Click here to enter QMP Basis.

1.0 GENERAL REQUIREMENTS

1.1 Direct and indirect activities are performed and controlled by written instructions, procedures and drawings, as appropriate. (QMS 1.2.1, 3.2.1, 17.2.4)
Click here to enter response.

1.2 Quality programs of suppliers are approved and audited to ensure they meet applicable QMS requirements. (QMS 1.2.3)
Click here to enter response.

1.3 The roles and responsibilities of supporting organizations are well defined and coordinated to achieve desired results. (QMS 1.2.4, 18.2.5)
Click here to enter response.

1.4 The QMP is revision controlled and approved by Senior Leadership. (QMS 1.2.5)
Click here to enter response.

1.5 Quality expectations are reviewed as part of job briefings. (QMS 17.2.3)
Click here to enter response.

2.0 DESIGN CONTROL

2.1 Field change notices are reviewed and approved with the same level of review as the original design change. (QMS 2.2.8)
Click here to enter response.

3.0 DOCUMENT CONTROL AND RECORDS

3.1 Processes are in place to ensure current revisions of control documents are readily accessible. (QMS 3.2.6, 7.2.9, 13.2.1)
Click here to enter response.

3.2 Records are legible, identifiable, and stored such that they can be retrieved for the durations of the retention time. Record retention times storage requirements are commensurate with importance to safety, quality and regulatory compliance. (QMS 13.2.2)
Click here to enter response.

4.0 INSPECTION AND TESTING

4.1 Inspections and tests are performed by qualified personnel in accordance with written procedures, plans, instructions, or work documents. (QMS 7.2.1, 7.2.2, 7.2.3)
Click here to enter response.

4.2 Test plans and instructions are risk assessed, independently reviewed, and approved prior to use. Changes or deviations to test plans and instructions are documented and receive the same review and approval. Design basis, codes and standards, and regulatory requirements that need to be verified and documented are incorporated into test procedures and instructions. (QMS 7.2.4, 7.2.5, 7.2.6)
Click here to enter response.

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4.3 Test results are evaluated and approved to ensure the design/project and acceptance criteria have been met before equipment or system is released to operations. Test or inspection results that do not meet acceptance criteria are documented and dispositioned. Records of inspection and tests results are maintained in accordance with approved procedures. (QMS 7.2.7, 7.2.8, 7.2.9)
Click here to enter response.

5.0 MEASURING AND TEST EQUIPMENT (M&TE)

5.1 M&TE is uniquely identified, clearly labeled and controlled in accordance with written procedures. (QMS 8.2.1)
Click here to enter response.

5.2 Calibrations are performed and documented in accordance with written procedures; calibration data is readily retrievable. Calibration standards are traceable to national standards. Where national standards do not exist or are not readily available, the basis for calibration is documented. (QMS 8.2.2, 8.2.3)
Click here to enter response.

5.3 Handling and storage of M&TE is controlled to ensure accuracy is maintained. M&TE is sealed / secured after calibration to prevent unauthorized adjustments. M&TE is checked for calibration whenever damage is suspected. (QMS 8.2.4, 8.2.6, 8.2.7)
Click here to enter response.

5.4 M&TE found outside calibration limits requires affected systems and components to be identified and evaluated for adverse impact. M&TE used on critical components is recorded to provide traceability. (QMS 8.2.8, 8.2.9)
Click here to enter response.

5.5 Inspection and test software is validated prior to use. Process controllers, microprocessors and software, when used as an integral part of the M&TE, are not interchanged without recalibration of the test system. (QMS 8.2.10, 8.2.11)
Click here to enter response.

6.0 CONTROL OF NON-CONFORMANCE

6.1 Procedures are established for identifying, documenting, controlling, and dispositioning non-conformances. (QMS 9.2.1)
Click here to enter response.

7.0 CORRECTIVE ACTION (CAP)

7.1 Procedures provide for the prompt identification and documentation of events and conditions adverse to quality, ensure assigned corrective actions are implemented and trended to identify opportunities for continuous improvement. (QMS 10.2.1, 10.2.3, 10.2.8)
Click here to enter response.

7.2 Lessons learned from internal and external operating experience are captured and evaluated by the corrective action process and communicated to appropriate personnel. (QMS 10.2.7, 18.2.18)
Click here to enter response.

8.0 MATERIAL HANDLING AND STORAGE

8.1 Materials, equipment and components are stored in accordance with specified requirements in an environment that preserves their integrity and usability including any preventive maintenance activities. Materials with shelf life limitations are identified and monitored; expired items are dispositioned. Storage areas are periodically inspected to verify the integrity of the facility and that material storage requirements are being met. (QMS 12.2.7, 12.2.8, 12.2.9, 12.2.12)
Click here to enter response.

8.2 Materials, equipment and components are packaged, shipped, received, handled, stored and issued in accordance with written procedures. (QMS 12.2.1)
Click here to enter response.

8.3 Material handling, rigging and lifting is controlled and performed in a manner to prevent damage or injury. (QMS 12.2.6)
Click here to enter response.

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8.4 Hazardous materials and chemicals are labeled, stored, maintained, packaged and shipped offsite in accordance with regulatory requirements and manufacturer recommendations. (QMS 12.2.10, 12.2.11)
Click here to enter response.

9.0 INTERNAL ASSESSMENTS

9.1 Internal assessments are performed by qualified personnel to evaluate the effectiveness of implementation of procedures and programs with findings documented in Corrective Action Program. (QMS 14.2.1, 14.2.2)
Click here to enter response.

10.0 TRAINING

10.1 Training standards and requirements are identified and documented for each functional position. (QMS 15.2.1)
Click here to enter response.

10.2 Initial and ongoing training is provided to employees to meet training standards and requirements. Lessons learned and industry best practices are incorporated in the initial and ongoing training programs. (QMS 15.2.2, 15.2.3, 18.2.6)
Click here to enter response.

11.0 SPECIAL PROCESSES

11.1 Special processes are performed using approved procedures, and qualified personnel and equipment to ensure critical process results. (QMS 16.2.1, 16.2.2, 16.2.3)
Click here to enter response.

12.0 PROJECT MANAGEMENT

12.1 Projects are managed in accordance with written policies and procedures. (QMS 18.2.3, 18.2.13, 18.2.14)
Click here to enter response.

12.2 Key stakeholders are identified and involved throughout the development and implementation of projects. Performance metrics for safety, quality, cost, earned value and schedule are established, monitored and communicated to all stakeholders to ensure sufficient resources are provided to complete the project. Project objectives and results are compared to determine the success of each project. (QMS 18.2.7, 18.2.8, 18.2.9, 18.2.12)
Click here to enter response.

12.3 Project risks are identified and evaluated in terms of probability of occurrence and impact; recovery strategies are prepared for significant risks and risks are monitored; and recovery strategies are revised, as necessary, throughout the project. Emergent risks are evaluated and added to the risk management plan. (QMS 18.2.10, 18.2.11)
Click here to enter response.

13.0 PLANT SECURITY

13.1 Supervisors are trained to recognize unusual human behavior and suspicious conditions. (QMS 22.2.4)
Click here to enter response.

13.2 Supervisors are accountable for headcount in the event of an emergency. (QMS 22.2.7)
Click here to enter response.

END OF APPENDIX Q

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Summary for Reach 175R: North Ditch (west)

Inflow Area = 7.707 ac, 0.00% Impervious, Inflow Depth = 4.48" for 100yr-24hr Huff 3Q event
Inflow = 4.96 cfs @ 15.69 hrs, Volume= 2.878 af
Outflow = 4.94 cfs @ 15.79 hrs, Volume= 2.878 af, Atten= 0%, Lag= 6.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.18 fps, Min. Travel Time= 7.9 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 13.5 min

Peak Storage= 2,346 cf @ 15.79 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 77.11 cfs

4.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 1,032.0' Slope= 0.0038 '/'
Inlet Invert= 451.96', Outlet Invert= 448.00'



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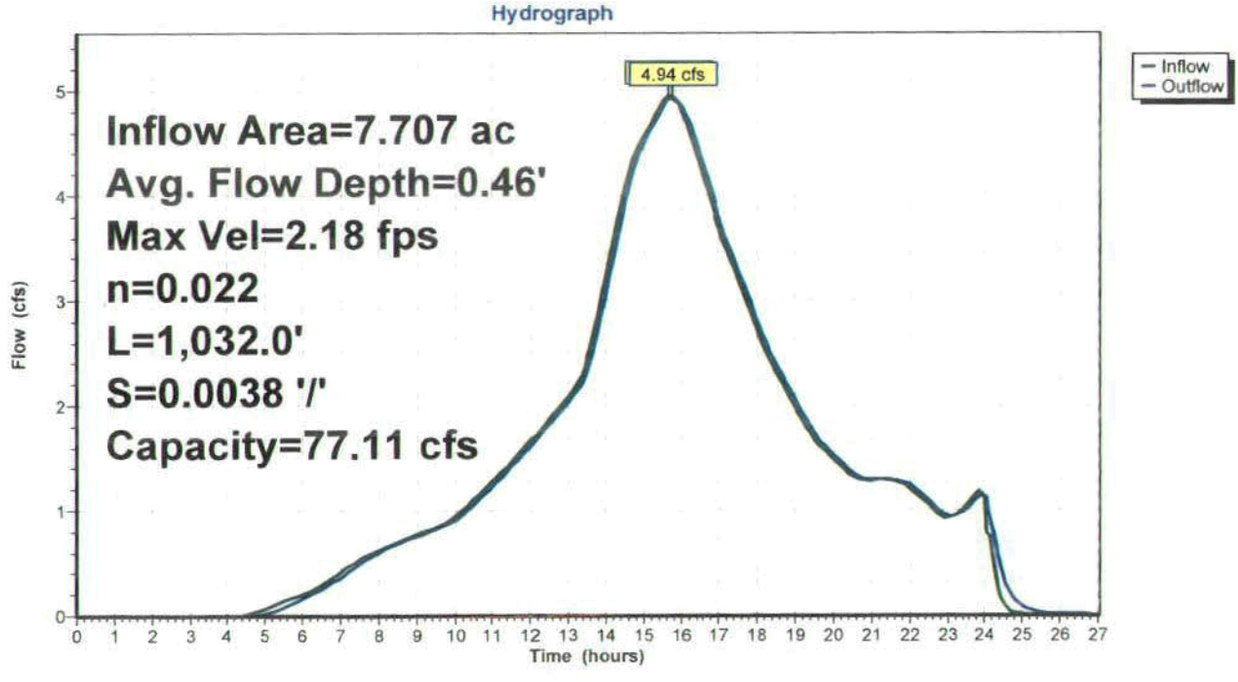
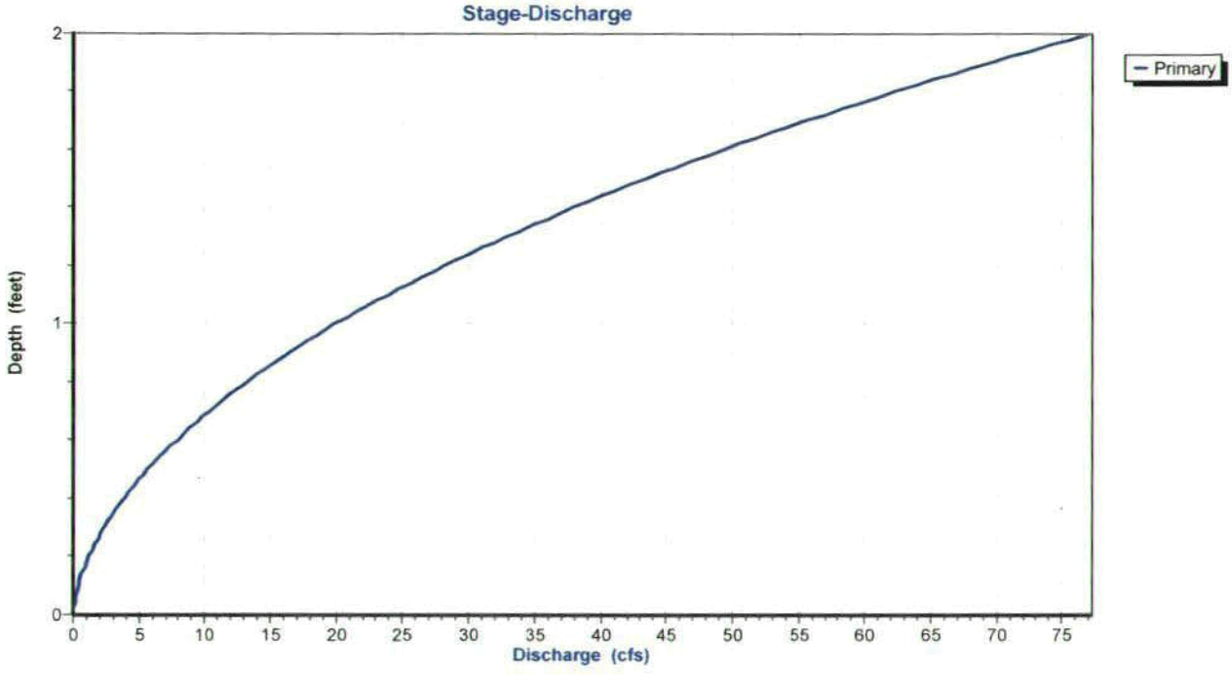
Reach 175R: North Ditch (west)

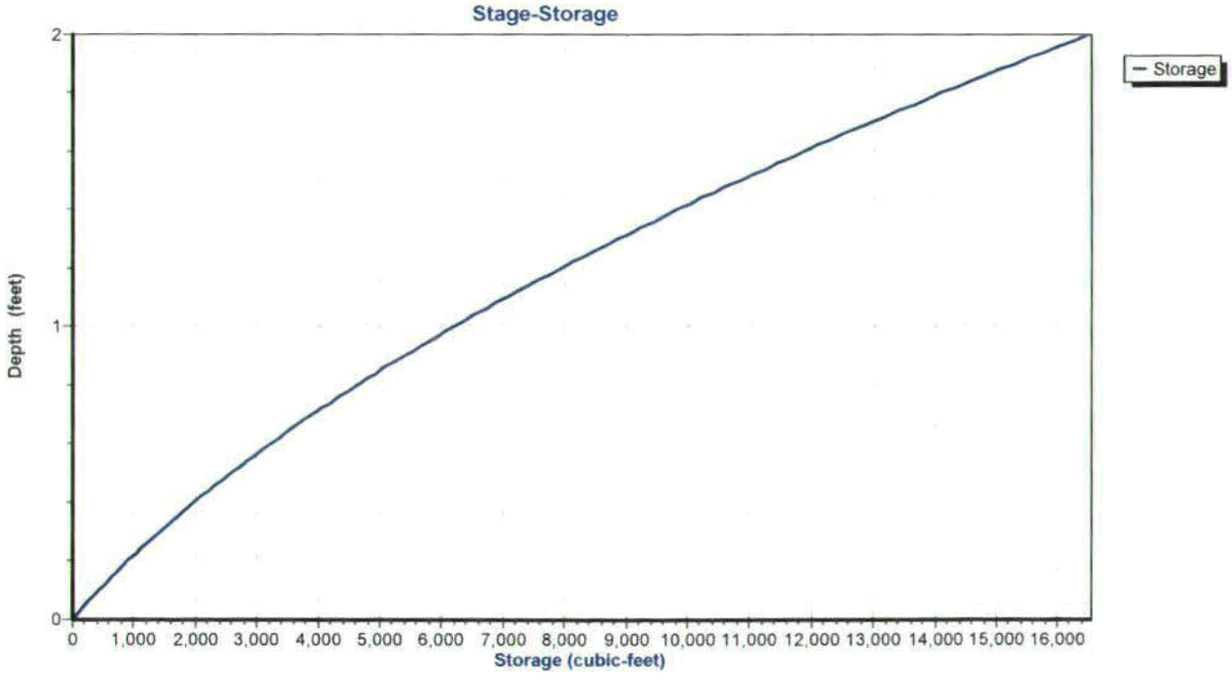


Electronic Filing: Received, Clerk's Office 09/28/2020

Reach 175R: North Ditch (west)



Reach 175R: North Ditch (west)



Electronic Filing: Received, Clerk's Office 09/28/2020

Hydrograph for Reach 175R: North Ditch (west)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	451.96	0.00
1.00	0.00	0	451.96	0.00
2.00	0.00	0	451.96	0.00
3.00	0.00	0	451.96	0.00
4.00	0.00	0	451.96	0.00
5.00	0.07	56	451.97	0.02
6.00	0.21	266	452.02	0.17
7.00	0.42	433	452.06	0.36
8.00	0.63	590	452.09	0.60
9.00	0.78	683	452.11	0.75
10.00	0.94	769	452.13	0.91
11.00	1.28	936	452.17	1.23
12.00	1.67	1,117	452.20	1.61
13.00	2.09	1,299	452.24	2.04
14.00	3.26	1,711	452.31	3.09
15.00	**4.57**	**2,202**	**452.40**	**4.50**
16.00	**4.81**	**2,322**	**452.42**	**4.87**
17.00	3.67	1,956	452.36	3.78
18.00	2.69	1,600	452.29	2.79
19.00	1.96	1,300	452.24	2.04
20.00	1.49	1,079	452.19	1.53
21.00	1.29	966	452.17	1.29
22.00	1.22	944	452.17	1.25
23.00	0.92	788	452.14	0.94
24.00	1.03	899	452.16	1.15
25.00	0.01	168	452.00	0.08
26.00	0.00	52	451.97	0.02
27.00	0.00	18	451.96	0.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Stage-Discharge for Reach 175R: North Ditch (west)

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
451.96	0.00	0.00
451.98	0.31	0.02
452.00	0.48	0.08
452.02	0.63	0.15
452.04	0.75	0.25
452.06	0.87	0.36
452.08	0.97	0.50
452.10	1.07	0.64
452.12	1.16	0.80
452.14	1.25	0.98
452.16	1.33	1.17
452.18	1.41	1.38
452.20	1.49	1.60
452.22	1.56	1.83
452.24	1.63	2.08
452.26	1.70	2.34
452.28	1.76	2.62
452.30	1.83	2.91
452.32	1.89	3.21
452.34	1.95	3.52
452.36	2.00	3.85
452.38	2.06	4.19
452.40	2.12	4.54
452.42	2.17	4.91
452.44	2.22	5.29
452.46	2.27	5.69
452.48	2.33	6.09
452.50	2.37	6.51
452.52	2.42	6.95
452.54	2.47	7.40
452.56	2.52	7.86
452.58	2.56	8.33
452.60	2.61	8.82
452.62	2.65	9.32
452.64	2.70	9.83
452.66	2.74	10.36
452.68	2.78	10.90
452.70	2.83	11.46
452.72	2.87	12.02
452.74	2.91	12.61
452.76	2.95	13.20
452.78	2.99	13.81
452.80	3.03	14.44
452.82	3.07	15.08
452.84	3.10	15.73
452.86	3.14	16.40
452.88	3.18	17.08
452.90	3.22	17.77
452.92	3.25	18.48
452.94	3.29	19.21
452.96	3.32	19.95
452.98	3.36	20.70
453.00	3.40	21.47
453.02	3.43	22.25
453.04	3.46	23.05
453.06	3.50	23.86
453.08	3.53	24.69
453.10	3.57	25.53
453.12	3.60	26.39
453.14	3.63	27.26
453.16	3.67	28.15
453.18	3.70	29.05
453.20	3.73	29.97
453.22	3.76	30.91
453.24	3.79	31.86
453.26	3.83	32.82
453.28	3.86	33.81
453.30	3.89	34.80
453.32	3.92	35.82
453.34	3.95	36.85
453.36	3.98	37.89
453.38	4.01	38.95
453.40	4.04	40.03
453.42	4.07	41.12
453.44	4.10	42.24
453.46	4.13	43.36
453.48	4.16	44.51
453.50	4.19	45.67
453.52	4.22	46.84
453.54	4.25	48.04
453.56	4.27	49.25
453.58	4.30	50.47
453.60	4.33	51.72
453.62	4.36	52.98
453.64	4.39	54.26
453.66	4.42	55.55
453.68	4.44	56.87
453.70	4.47	58.20
453.72	4.50	59.54
453.74	4.53	60.91
453.76	4.55	62.29
453.78	4.58	63.69
453.80	4.61	65.11
453.82	4.63	66.55
453.84	4.66	68.00
453.86	4.69	69.47
453.88	4.71	70.96
453.90	4.74	72.47
453.92	4.77	74.00
453.94	4.79	75.54
453.96	**4.82**	**77.11**

Electronic Filing: Received, Clerk's Office 09/28/2020

Stage-Area-Storage for Reach 175R: North Ditch (west)

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
451.96	0.0	0	452.98	6.2	6,358
451.98	0.1	83	453.00	6.3	6,526
452.00	0.2	168	453.02	6.5	6,695
452.02	0.2	255	453.04	6.7	6,866
452.04	0.3	343	453.06	6.8	7,038
452.06	0.4	433	453.08	7.0	7,212
452.08	0.5	525	453.10	7.2	7,388
452.10	0.6	618	453.12	7.3	7,566
452.12	0.7	713	453.14	7.5	7,745
452.14	0.8	810	453.16	7.7	7,926
452.16	0.9	908	453.18	7.9	8,108
452.18	1.0	1,008	453.20	8.0	8,292
452.20	1.1	1,110	453.22	8.2	8,478
452.22	1.2	1,213	453.24	8.4	8,665
452.24	1.3	1,318	453.26	8.6	8,855
452.26	1.4	1,424	453.28	8.8	9,045
452.28	1.5	1,532	453.30	9.0	9,238
452.30	1.6	1,642	453.32	9.1	9,432
452.32	1.7	1,754	453.34	9.3	9,627
452.34	1.8	1,867	453.36	9.5	9,825
452.36	1.9	1,981	453.38	9.7	10,024
452.38	2.0	2,098	453.40	9.9	10,224
452.40	2.1	2,216	453.42	10.1	10,427
452.42	2.3	2,336	453.44	10.3	10,630
452.44	2.4	2,457	453.46	10.5	10,836
452.46	2.5	2,580	453.48	10.7	11,043
452.48	2.6	2,705	453.50	10.9	11,252
452.50	2.7	2,831	453.52	11.1	11,463
452.52	2.9	2,959	453.54	11.3	11,675
452.54	3.0	3,089	453.56	11.5	11,889
452.56	3.1	3,220	453.58	11.7	12,104
452.58	3.2	3,353	453.60	11.9	12,321
452.60	3.4	3,487	453.62	12.2	12,540
452.62	3.5	3,624	453.64	12.4	12,760
452.64	3.6	3,761	453.66	12.6	12,983
452.66	3.8	3,901	453.68	12.8	13,206
452.68	3.9	4,042	453.70	13.0	13,432
452.70	4.1	4,185	453.72	13.2	13,659
452.72	4.2	4,329	453.74	13.5	13,887
452.74	4.3	4,476	453.76	13.7	14,118
452.76	4.5	4,623	453.78	13.9	14,350
452.78	4.6	4,773	453.80	14.1	14,583
452.80	4.8	4,924	453.82	14.4	14,819
452.82	4.9	5,077	453.84	14.6	15,056
452.84	5.1	5,231	453.86	14.8	15,294
452.86	5.2	5,387	453.88	15.1	15,534
452.88	5.4	5,545	453.90	15.3	15,776
452.90	5.5	5,704	453.92	15.5	16,020
452.92	5.7	5,865	453.94	15.8	16,265
452.94	5.8	6,028	453.96	**16.0**	**16,512**
452.96	6.0	6,192			

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Summary for Reach 176R: North Ditch (east)

Inflow Area = 6.106 ac, 0.00% Impervious, Inflow Depth = 4.48" for 100yr-24hr Huff 3Q event
Inflow = 3.94 cfs @ 15.77 hrs, Volume= 2.280 af
Outflow = 3.94 cfs @ 15.78 hrs, Volume= 2.280 af, Atten= 0%, Lag= 0.5 min

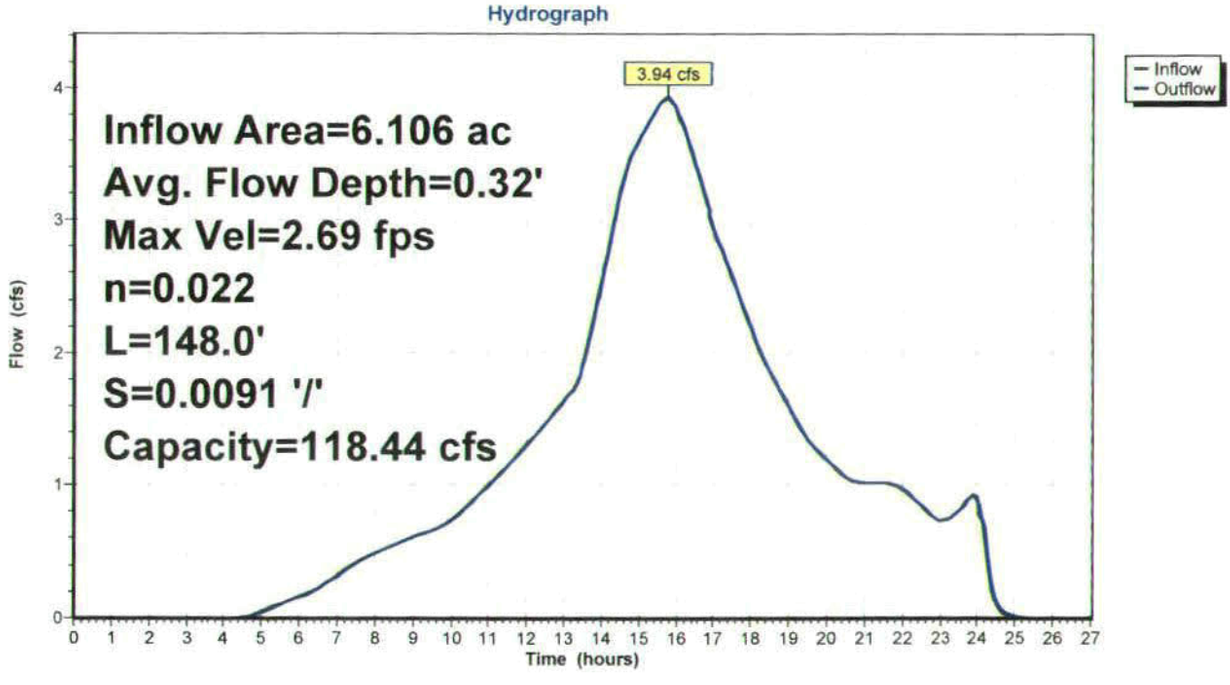
Routing by Dyn-Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.69 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 1.6 min

Peak Storage= 217 cf @ 15.78 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 118.44 cfs

4.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 148.0' Slope= 0.0091 '/'
Inlet Invert= 449.34', Outlet Invert= 448.00'

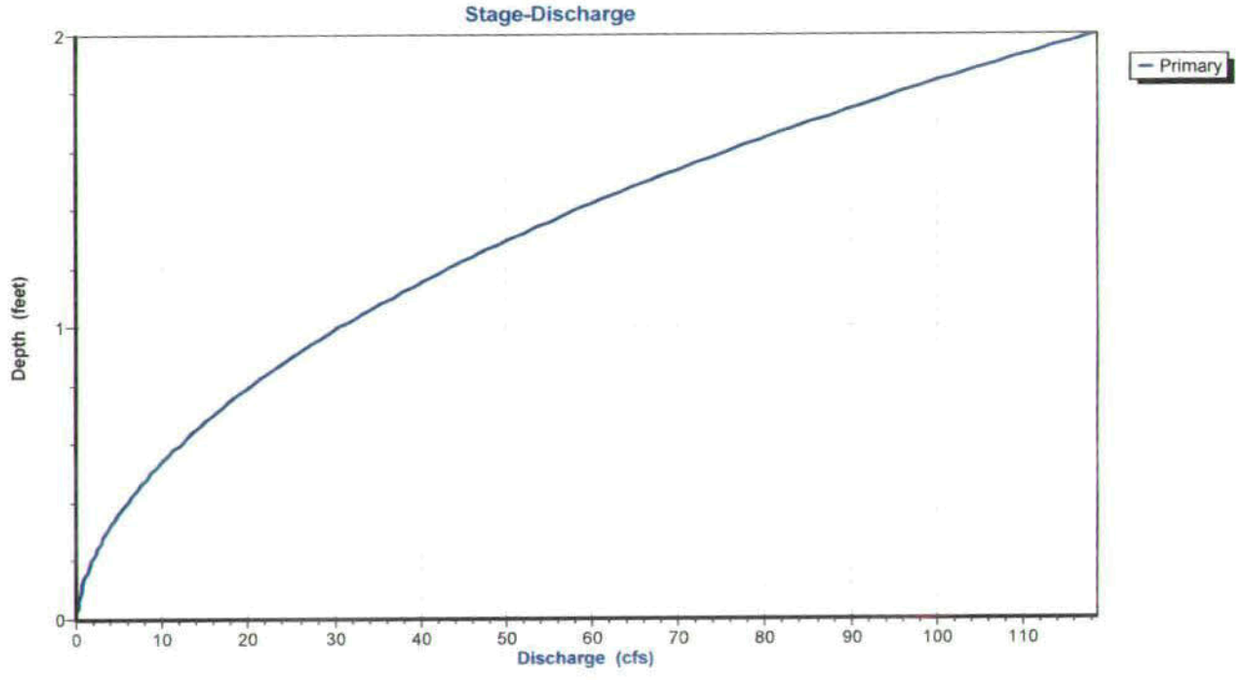


Reach 176R: North Ditch (east)

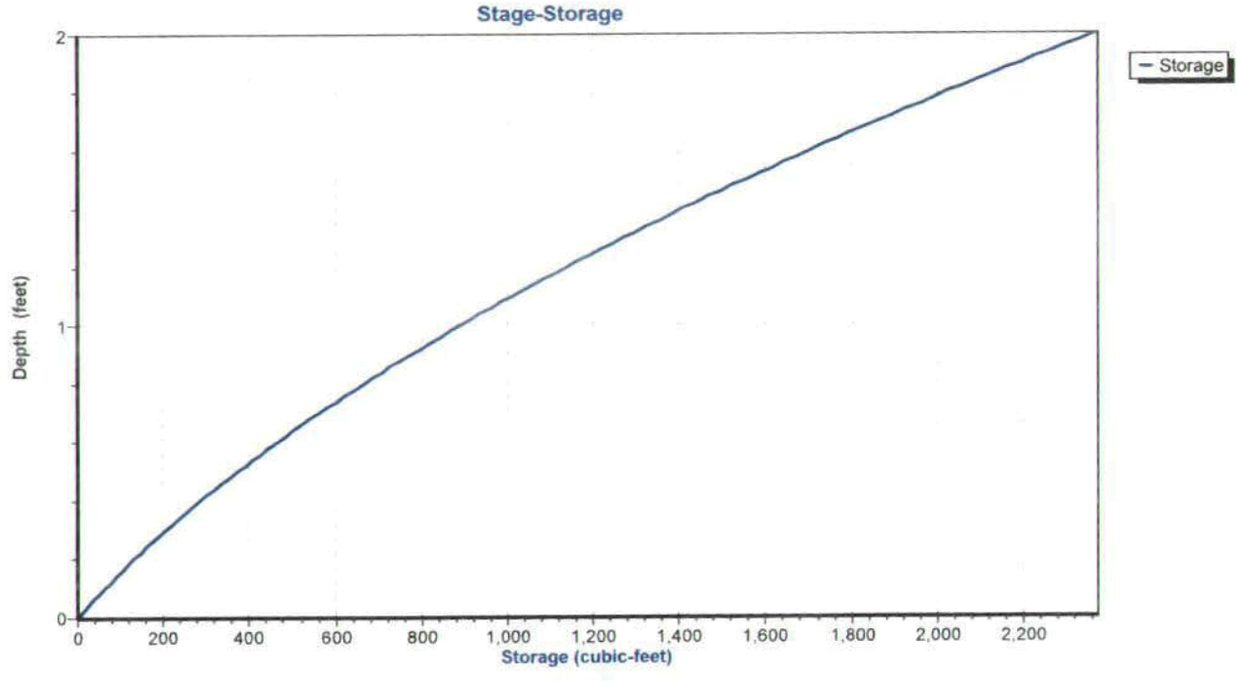


Electronic Filing: Received, Clerk's Office 09/28/2020

Reach 176R: North Ditch (east)



Reach 176R: North Ditch (east)



Electronic Filing: Received, Clerk's Office 09/28/2020

Hydrograph for Reach 176R: North Ditch (east)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	449.34	0.00
1.00	0.00	0	449.34	0.00
2.00	0.00	0	449.34	0.00
3.00	0.00	0	449.34	0.00
4.00	0.00	0	449.34	0.00
5.00	0.05	12	449.36	0.04
6.00	0.16	28	449.39	0.16
7.00	0.32	43	449.41	0.32
8.00	0.49	57	449.43	0.49
9.00	0.61	65	449.44	0.61
10.00	0.74	73	449.46	0.73
11.00	1.00	89	449.48	1.00
12.00	1.31	106	449.50	1.30
13.00	1.64	122	449.53	1.64
14.00	2.53	162	449.58	2.52
15.00	**3.60**	**204**	**449.64**	**3.59**
16.00	**3.84**	**213**	**449.65**	**3.85**
17.00	2.94	179	449.61	2.95
18.00	2.16	147	449.56	2.17
19.00	1.58	120	449.53	1.58
20.00	1.19	100	449.50	1.19
21.00	1.02	91	449.48	1.02
22.00	0.97	88	449.48	0.98
23.00	0.72	73	449.46	0.73
24.00	0.88	84	449.47	0.91
25.00	0.01	3	449.35	0.01
26.00	0.00	0	449.34	0.00
27.00	0.00	0	449.34	0.00

Electronic Filing: Received, Clerk's Office 09/28/2020

Stage-Discharge for Reach 176R: North Ditch (east)

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
449.34	0.00	0.00	450.36	5.16	31.80
449.36	0.47	0.04	450.38	5.22	32.98
449.38	0.74	0.12	450.40	5.27	34.18
449.40	0.96	0.24	450.42	5.32	35.40
449.42	1.16	0.39	450.44	5.37	36.65
449.44	1.33	0.56	450.46	5.43	37.92
449.46	1.49	0.76	450.48	5.48	39.22
449.48	1.65	0.99	450.50	5.53	40.54
449.50	1.79	1.24	450.52	5.58	41.88
449.52	1.92	1.51	450.54	5.63	43.24
449.54	2.05	1.80	450.56	5.68	44.63
449.56	2.17	2.12	450.58	5.73	46.04
449.58	2.28	2.46	450.60	5.78	47.48
449.60	2.40	2.82	450.62	5.83	48.94
449.62	2.50	3.20	450.64	5.88	50.42
449.64	2.61	3.60	450.66	5.92	51.93
449.66	2.71	4.02	450.68	5.97	53.46
449.68	2.80	4.46	450.70	6.02	55.02
449.70	2.90	4.93	450.72	6.07	56.60
449.72	2.99	5.41	450.74	6.11	58.20
449.74	3.08	5.91	450.76	6.16	59.83
449.76	3.17	6.44	450.78	6.21	61.49
449.78	3.25	6.98	450.80	6.25	63.17
449.80	3.33	7.55	450.82	6.30	64.88
449.82	3.42	8.13	450.84	6.34	66.61
449.84	3.49	8.74	450.86	6.39	68.36
449.86	3.57	9.36	450.88	6.43	70.15
449.88	3.65	10.01	450.90	6.48	71.95
449.90	3.72	10.67	450.92	6.52	73.79
449.92	3.80	11.36	450.94	6.57	75.65
449.94	3.87	12.07	450.96	6.61	77.53
449.96	3.94	12.80	450.98	6.65	79.44
449.98	4.01	13.54	451.00	6.70	81.38
450.00	4.08	14.31	451.02	6.74	83.34
450.02	4.14	15.10	451.04	6.78	85.33
450.04	4.21	15.91	451.06	6.83	87.35
450.06	4.28	16.74	451.08	6.87	89.39
450.08	4.34	17.60	451.10	6.91	91.46
450.10	4.40	18.47	451.12	6.95	93.56
450.12	4.47	19.37	451.14	6.99	95.68
450.14	4.53	20.28	451.16	7.04	97.84
450.16	4.59	21.22	451.18	7.08	100.01
450.18	4.65	22.18	451.20	7.12	102.22
450.20	4.71	23.16	451.22	7.16	104.45
450.22	4.77	24.16	451.24	7.20	106.72
450.24	4.83	25.19	451.26	7.24	109.00
450.26	4.88	26.23	451.28	7.28	111.32
450.28	4.94	27.30	451.30	7.32	113.67
450.30	5.00	28.39	451.32	7.36	116.04
450.32	5.05	29.50	451.34	**7.40**	**118.44**
450.34	5.11	30.64			

Electronic Filing: Received, Clerk's Office 09/28/2020

Stage-Area-Storage for Reach 176R: North Ditch (east)

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
449.34	0.0	0	450.36	6.2	912
449.36	0.1	12	450.38	6.3	936
449.38	0.2	24	450.40	6.5	960
449.40	0.2	37	450.42	6.7	985
449.42	0.3	49	450.44	6.8	1,009
449.44	0.4	62	450.46	7.0	1,034
449.46	0.5	75	450.48	7.2	1,060
449.48	0.6	89	450.50	7.3	1,085
449.50	0.7	102	450.52	7.5	1,111
449.52	0.8	116	450.54	7.7	1,137
449.54	0.9	130	450.56	7.9	1,163
449.56	1.0	145	450.58	8.0	1,189
449.58	1.1	159	450.60	8.2	1,216
449.60	1.2	174	450.62	8.4	1,243
449.62	1.3	189	450.64	8.6	1,270
449.64	1.4	204	450.66	8.8	1,297
449.66	1.5	220	450.68	9.0	1,325
449.68	1.6	235	450.70	9.1	1,353
449.70	1.7	251	450.72	9.3	1,381
449.72	1.8	268	450.74	9.5	1,409
449.74	1.9	284	450.76	9.7	1,437
449.76	2.0	301	450.78	9.9	1,466
449.78	2.1	318	450.80	10.1	1,495
449.80	2.3	335	450.82	10.3	1,525
449.82	2.4	352	450.84	10.5	1,554
449.84	2.5	370	450.86	10.7	1,584
449.86	2.6	388	450.88	10.9	1,614
449.88	2.7	406	450.90	11.1	1,644
449.90	2.9	424	450.92	11.3	1,674
449.92	3.0	443	450.94	11.5	1,705
449.94	3.1	462	450.96	11.7	1,736
449.96	3.2	481	450.98	11.9	1,767
449.98	3.4	500	451.00	12.2	1,798
450.00	3.5	520	451.02	12.4	1,830
450.02	3.6	539	451.04	12.6	1,862
450.04	3.8	559	451.06	12.8	1,894
450.06	3.9	580	451.08	13.0	1,926
450.08	4.1	600	451.10	13.2	1,959
450.10	4.2	621	451.12	13.5	1,992
450.12	4.3	642	451.14	13.7	2,025
450.14	4.5	663	451.16	13.9	2,058
450.16	4.6	684	451.18	14.1	2,091
450.18	4.8	706	451.20	14.4	2,125
450.20	4.9	728	451.22	14.6	2,159
450.22	5.1	750	451.24	14.8	2,193
450.24	5.2	773	451.26	15.1	2,228
450.26	5.4	795	451.28	15.3	2,263
450.28	5.5	818	451.30	15.5	2,297
450.30	5.7	841	451.32	15.8	2,333
450.32	5.8	864	451.34	**16.0**	**2,368**
450.34	6.0	888			

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Hutsonville Ash Pond ABC Closure

Prepared by Hanson Professional Services Inc. Printed 2/13/2015

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Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	177P	447.75	447.15	64.5	0.0093	0.012	24.0	0.0	0.0

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Summary for Pond 177P: North Culvert

[62] Hint: Exceeded Reach 175R OUTLET depth by 0.62' @ 15.85 hrs
[62] Hint: Exceeded Reach 176R OUTLET depth by 0.77' @ 15.85 hrs

Inflow Area = 13.814 ac, 0.00% Impervious, Inflow Depth > 4.48" for 100yr-24hr Huff 3Q event
Inflow = 8.88 cfs @ 15.79 hrs, Volume= 5.158 af
Outflow = 8.87 cfs @ 15.84 hrs, Volume= 5.158 af, Atten= 0%, Lag= 3.3 min
Primary = 8.87 cfs @ 15.84 hrs, Volume= 5.158 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 449.08' @ 15.84 hrs Surf.Area= 2,444 sf Storage= 1,302 cf

Plug-Flow detention time= 1.7 min calculated for 5.148 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (960.1 - 958.4)

Volume	Invert	Avail.Storage	Storage Description
#1	448.00'	31,047 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
448.00	10	0	0
449.00	2,207	1,109	1,109
450.00	5,054	3,631	4,739
451.00	6,862	5,958	10,697
452.00	7,899	7,381	18,078
453.00	18,039	12,969	31,047

Device	Routing	Invert	Outlet Devices
#1	Primary	447.75'	**24.0" Round Culvert** L= 64.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 447.75' / 447.15' S= 0.0093 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=8.87 cfs @ 15.84 hrs HW=449.08' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 8.87 cfs @ 5.65 fps)

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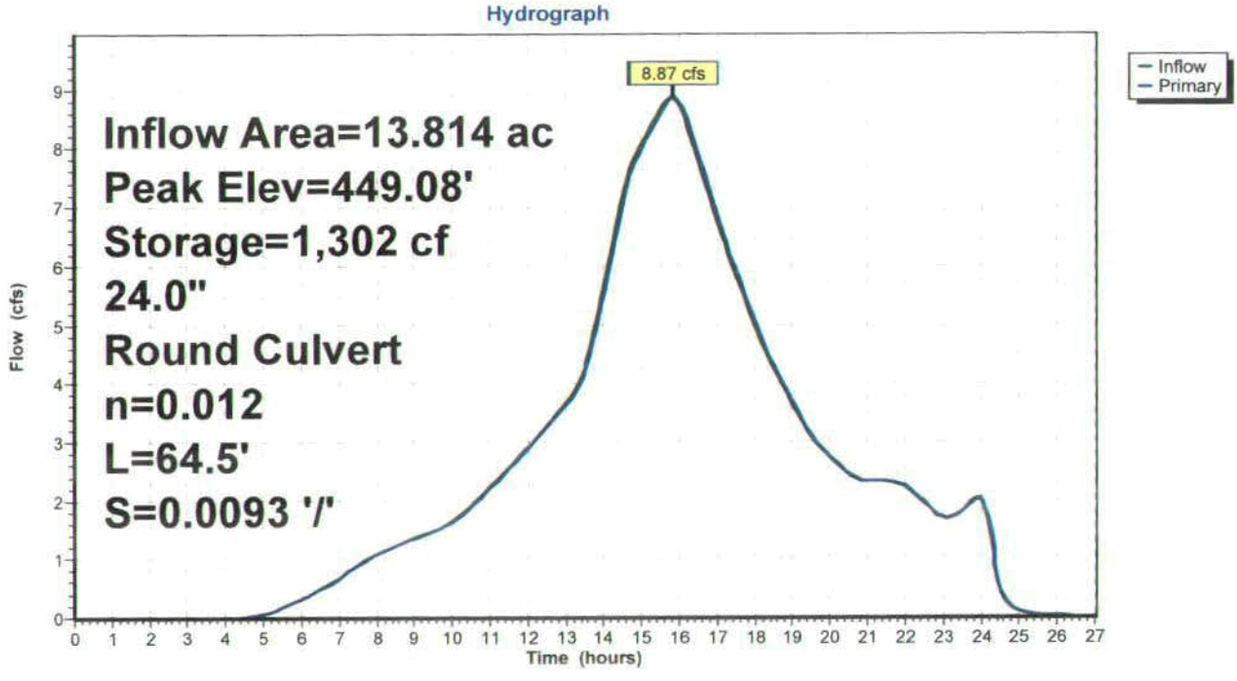
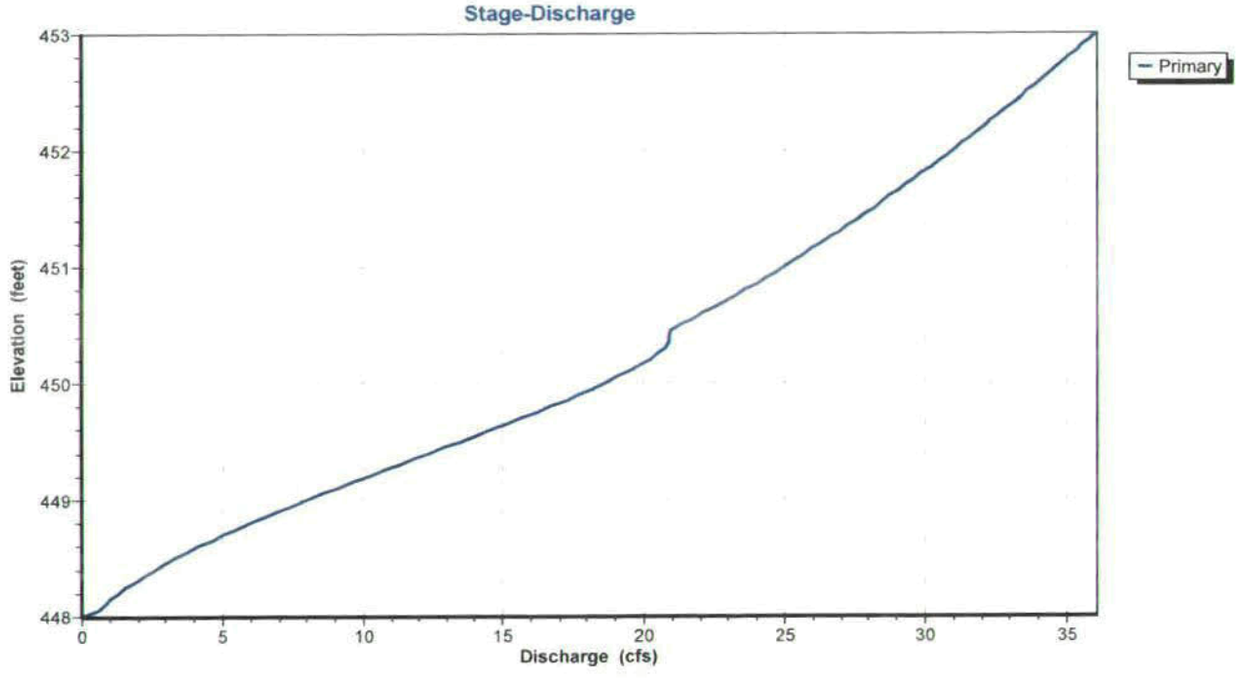
Pond 177P: North Culvert



Pond 177P: North Culvert



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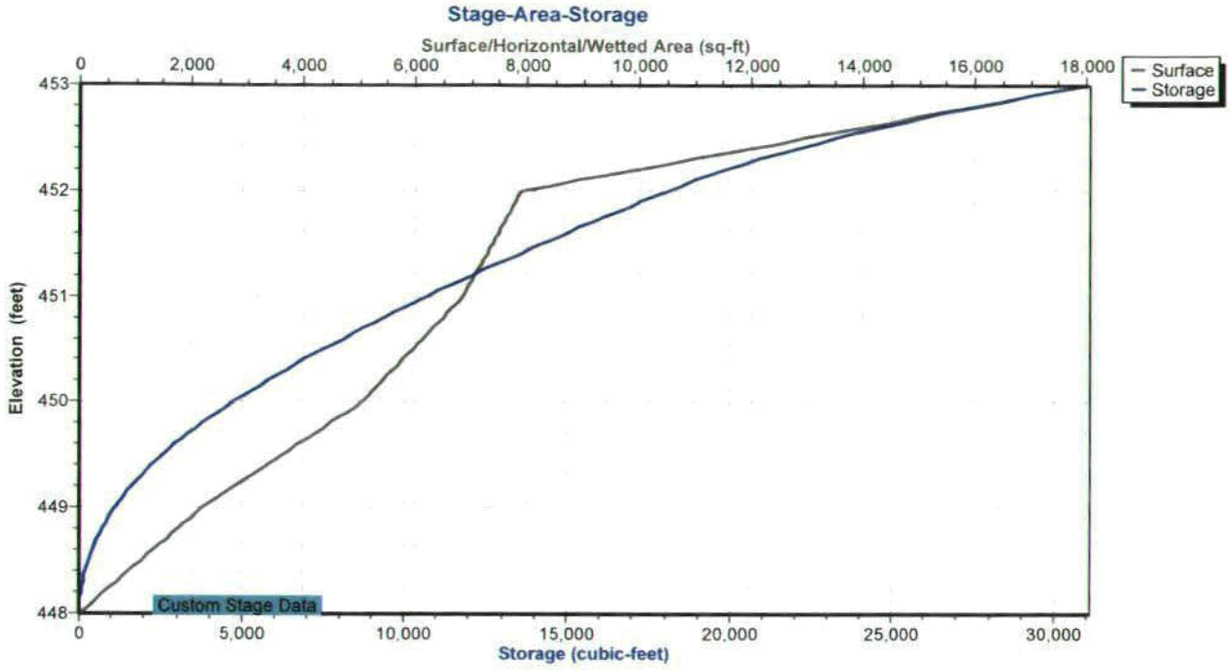
Pond 177P: North Culvert



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Hydrograph for Pond 177P: North Culvert

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	448.00	0.00
1.00	0.00	0	448.00	0.00
2.00	0.00	0	448.00	0.00
3.00	0.00	0	448.00	0.00
4.00	0.00	0	448.00	0.00
5.00	0.05	0	448.00	0.05
6.00	0.33	0	448.00	0.33
7.00	0.68	7	448.07	0.68
8.00	1.09	30	448.16	1.08
9.00	1.36	52	448.21	1.36
10.00	1.64	77	448.26	1.63
11.00	2.23	138	448.35	2.21
12.00	2.92	222	448.45	2.89
13.00	3.67	326	448.54	3.64
14.00	5.61	619	448.75	5.46
15.00	8.10	1,116	449.00	8.02
16.00	8.72	1,282	449.08	8.78
17.00	6.72	874	448.89	6.84
18.00	4.97	548	448.70	5.05
19.00	3.62	331	448.54	3.67
20.00	2.73	204	448.43	2.75
21.00	2.31	151	448.37	2.32
22.00	2.22	142	448.35	2.24
23.00	1.67	81	448.27	1.67
24.00	2.06	125	448.33	2.09
25.00	0.09	0	448.00	0.09
26.00	0.02	0	448.00	0.02
27.00	0.01	0	448.00	0.01

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Stage-Discharge for Pond 177P: North Culvert

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
448.00	0.00	450.55	21.73
448.05	0.58	450.60	22.11
448.10	0.79	450.65	22.49
448.15	1.02	450.70	22.86
448.20	1.28	450.75	23.23
448.25	1.57	450.80	23.59
448.30	1.88	450.85	23.94
448.35	2.21	450.90	24.29
448.40	2.56	450.95	24.64
448.45	2.93	451.00	24.98
448.50	3.32	451.05	25.31
448.55	3.72	451.10	25.64
448.60	4.14	451.15	25.97
448.65	4.58	451.20	26.29
448.70	5.03	451.25	26.61
448.75	5.50	451.30	26.93
448.80	5.97	451.35	27.24
448.85	6.46	451.40	27.54
448.90	6.96	451.45	27.85
448.95	7.47	451.50	28.15
449.00	7.99	451.55	28.45
449.05	8.52	451.60	28.74
449.10	9.05	451.65	29.03
449.15	9.59	451.70	29.32
449.20	10.13	451.75	29.61
449.25	10.68	451.80	29.89
449.30	11.23	451.85	30.17
449.35	11.79	451.90	30.45
449.40	12.34	451.95	30.73
449.45	12.90	452.00	31.00
449.50	13.45	452.05	31.27
449.55	14.00	452.10	31.54
449.60	14.55	452.15	31.81
449.65	15.09	452.20	32.07
449.70	15.63	452.25	32.33
449.75	16.16	452.30	32.59
449.80	16.68	452.35	32.85
449.85	17.18	452.40	33.10
449.90	17.68	452.45	33.36
449.95	18.15	452.50	33.61
450.00	18.61	452.55	33.86
450.05	19.05	452.60	34.11
450.10	19.48	452.65	34.35
450.15	19.84	452.70	34.60
450.20	20.18	452.75	34.84
450.25	20.48	452.80	35.08
450.30	20.72	452.85	35.32
450.35	20.87	452.90	35.56
450.40	20.87	452.95	35.80
450.45	20.94	453.00	36.03
450.50	21.34		

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Stage-Area-Storage for Pond 177P: North Culvert

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
448.00	10	0	450.55	6,048	7,792
448.05	120	3	450.60	6,139	8,097
448.10	230	12	450.65	6,229	8,406
448.15	340	26	450.70	6,320	8,720
448.20	449	46	450.75	6,410	9,038
448.25	559	71	450.80	6,500	9,361
448.30	669	102	450.85	6,591	9,688
448.35	779	138	450.90	6,681	10,020
448.40	889	180	450.95	6,772	10,356
448.45	999	227	451.00	6,862	10,697
448.50	1,109	280	451.05	6,914	11,041
448.55	1,218	338	451.10	6,966	11,388
448.60	1,328	401	451.15	7,018	11,738
448.65	1,438	471	451.20	7,069	12,090
448.70	1,548	545	451.25	7,121	12,445
448.75	1,658	625	451.30	7,173	12,802
448.80	1,768	711	451.35	7,225	13,162
448.85	1,877	802	451.40	7,277	13,525
448.90	1,987	899	451.45	7,329	13,890
448.95	2,097	1,001	451.50	7,381	14,258
449.00	2,207	1,109	451.55	7,432	14,628
449.05	2,349	1,222	451.60	7,484	15,001
449.10	2,492	1,343	451.65	7,536	15,376
449.15	2,634	1,472	451.70	7,588	15,754
449.20	2,776	1,607	451.75	7,640	16,135
449.25	2,919	1,749	451.80	7,692	16,518
449.30	3,061	1,899	451.85	7,743	16,904
449.35	3,203	2,055	451.90	7,795	17,293
449.40	3,346	2,219	451.95	7,847	17,684
449.45	3,488	2,390	452.00	7,899	18,078
449.50	3,631	2,568	452.05	8,406	18,485
449.55	3,773	2,753	452.10	8,913	18,918
449.60	3,915	2,945	452.15	9,420	19,376
449.65	4,058	3,144	452.20	9,927	19,860
449.70	4,200	3,351	452.25	10,434	20,369
449.75	4,342	3,564	452.30	10,941	20,904
449.80	4,485	3,785	452.35	11,448	21,463
449.85	4,627	4,013	452.40	11,955	22,048
449.90	4,769	4,248	452.45	12,462	22,659
449.95	4,912	4,490	452.50	12,969	23,295
450.00	5,054	4,739	452.55	13,476	23,956
450.05	5,144	4,994	452.60	13,983	24,642
450.10	5,235	5,253	452.65	14,490	25,354
450.15	5,325	5,517	452.70	14,997	26,091
450.20	5,416	5,786	452.75	15,504	26,854
450.25	5,506	6,059	452.80	16,011	27,642
450.30	5,596	6,337	452.85	16,518	28,455
450.35	5,687	6,619	452.90	17,025	29,293
450.40	5,777	6,905	452.95	17,532	30,157
450.45	5,868	7,196	453.00	18,039	31,047
450.50	5,958	7,492			

SEE LARGE FORMAT MAP OR PLAN SHEET

DESCRIPTION:

Site #: W0330100003
Cat #: 06L
Date: 02/26/2015
Permit #: N/A
Log #: N/A
Keyword: N/A
Comment: N/A

	Type or Description	SEE COLOR	Date of Plan	Figure/Diagram
1.	Site Demolition & Dewatering Plan	N/A	10/20/2014	None
2.	Overall Site/Location Plan	N/A	10/01/2014	None
3.	Construction Plans	N/A	10/01/2014	None
4.	Existing Conditions	N/A	10/20/2014	None
5.	Clean Closure	N/A	10/01/2014	None
6.	Ash Pond A Cover Grading Plan	N/A	10/20/2014	None
7.	Ash Pond A Perimeter Profile & Details	N/A	10/01/2014	None
8.	Ash Pond A Base Grading	N/A	10/20/2014	None
9.	Ash Pond B Grading Plan	N/A	10/20/2014	None

10.	Grading Tables Construction Plans For Closure	N/A	10/01/2014	None
11.	Ash Pond & Bottom Ash Pone	N/A	10/01/2014	None
12.	Site Fencing Plan	N/A	10/01/2014	None
13.	Ash Pond B Grading Plan	N/A	10/20/2014	None
14.	Typical Sections & Details	N/A	10/20/2014	None
15.	Temporary Erosion Control Plan	N/A	10/01/2014	None
16.	Construction Plans For the Closure of Ash Ponds A,B,C	N/A	10/01/2014	None
17.	Cross Reference	N/A	10/01/2014	None

Exhibit 2

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829

BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

April 8, 2015

W0330100003

Mr. Kevin Kersting, Manager Water Quality
Ameren Services
1901 Chouteau Avenue
P.O. Box 66149, MC 606
St. Louis, Missouri 62257

06 L

Dear Mr. Kersting;

This transmittal responds to the Ameren Energy Medina Valley Cogen, LLC (Ameren) Closure Plan: Ash Ponds A, B, C and Bottom Ash Pond Hutsonville Power Station dated October 23, 2014, the Cover-Liner Comparison dated January 14, 2015, and responses, with attachments, to Agency comments dated February 25, 2015 and March 12, 2015, received at the Illinois Environmental Protection Agency ("Agency") headquarters.

The Agency has reviewed the Closure Plan, which includes a section on post-closure care. The Agency finds that the Closure Plan, in conjunction with the supplemental submissions referenced above, represent an appropriate means by which to close Ash Ponds A, B, C and the Bottom Ash Pond at the Hutsonville Power Station.

The Agency notes that the Closure Plan contains a Groundwater Management Zone ("GMZ") application. A letter approving the establishment of a GMZ as described in the GMZ application will be issued upon the Agency's receipt and favorable review of the Acceptance Report and Certification of Final Cover Placement described in Section 4.12 of the Closure Plan.

Thank you for your attention to these matters. If you have any questions or concerns, please contact Lynn Dunaway of my staff or me at the letterhead address or 217/785-4787.

Sincerely,

William S. Buscher

William E. Buscher, P.G.
Supervisor, Hydogeology and Compliance Unit
Groundwater Section
Division of Public Water Supplies
Bureau of Water

CC: Lynn Dunaway
Darin LeCrone
Records

Exhibit 3

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Closure of Ash Pond D
Hutsonville Power Station

Closure Plan

Ameren Energy Generating Company
Crawford County, Illinois

July 26, 2011
(Revised February 15, 2012)
(Revised March 30, 2012)

HANSON
Engineering | Architecture | Planning | Allied Services

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1. Introduction

The closure plan for Ameren Energy Generating Company's Hutsonville Power Station (the Station) Ash Pond D Coal Combustion Waste Surface Impoundment, presented herein, has been prepared in accordance with the requirements of the site0specific rule enumerated at 35 Illinois Administrative Code (IAC) Part 840 (the Rule). Concurrently submitted supporting documents are listed in the Reference Section of this report.

2. Site Map

Figure 1 depicts existing buildings at the Hutsonville Power Station as well as pertinent features around Ash Pond D and the surface impoundments at the site (Ash Ponds A, B, and C and the Bottom Ash Sluice Basin). The proposed groundwater collection trench associated with the closure of Ash Pond D and all existing groundwater monitoring wells are shown as well. (No additional monitoring wells are proposed at this time.)

3. Description of Ash Pond D

Ash Pond D functioned from 1968 to 2000 as the primary disposal location for coal combustion wastes generated from the Hutsonville coal0fired power plant. Coal combustion wastes were generally sluiced to Ash Pond D where solids were permitted to settle out and supernatant liquids were decanted. The pond contains primarily fly ash and bottom ash solids.

It is estimated that Ash Pond D has accumulated between 800,000 and 850,000 cubic yards of ash.

The ash pond is contained by a 4,200 ft long perimeter embankment that varies in height between 3 ft on the west side where the pond is adjacent to other features at the site, and 14 ft along the south and east sides where the pond is situated along the Wabash River. The exterior and interior embankment slopes are approximately 2.7H:1V and the perimeter embankment has a crest width of 20ft. The depth of ash in the pond is currently about 22 feet.

The cap will be constructed on a 20H:1V (5%) slope that will intersect the existing exterior embankment slope no higher than the existing ash surface. Soil embankment materials above that point will be removed and utilized for vegetative cover on the final cap.

Analyses of the structural integrity of the Pond in the proposed closed condition, including slope stability, bearing capacity and settlement, have been completed. The critical sections selected for the slope stability analyses of the perimeter berm and the final cover are shown on Figure 2. Cross0 sections of the fully constructed critical sections and the critical analyzed potential failure surfaces are included on Figures 3 and 4. Analyses of the proposed final configuration of the pond resulted in the following factors of safety (FOS) and induced settlement with regard to the structural stability of the pond:

Table 1. Structural Stability Analyses Results

Structural Stability Criteria	Calculated FOS	Required FOS*
Short Term Slope Stability 0Exterior Embankment	2.85	1.5
Long Term Slope Stability 0Exterior Embankment	2.82	1.5
Seismic Event Slope Stability 0Exterior Embankment	2.48	1.3
Short Term Slope Stability 0Cover Materials	2.86	1.5
Long Term Slope Stability 0Cover Materials	2.37	1.5
Seismic Event Slope Stability 0Cover Materials	1.75	1.3
Bearing Capacity	39.0	2.0
Seismic Event Bearing Capacity	38.4	1.5
Maximum Induced Settlement	16.0 in.	N.A.

*The Required FOS are based on Illinois EPA Landfill Requirements, for comparison purposes.

The results of the structural stability analyses indicate adequate slope stability and bearing capacity factors of safety. The slope stability factors of safety above include those from analyses considering seismic events with a 2240year return period, based on United States Geologic Survey mapping. The maximum estimated induced settlement will occur in the middle of the pond area as the ash is graded and the cover system materials are placed, and will not be detrimental to the integrity of the cover system.

4. Closure Activities

Major closure activities proposed include the placement of the final cover system, establishment of vegetative cover and surface water control features on the surface of Ash Pond D, and installation of a groundwater collection trench and recovery system as described below. Closure activities will be conducted in accordance with the Construction Quality Assurance (CQA) Plan prepared for this project meeting the requirements of the Rule (Hanson 2011A), and will be documented by a Professional Engineer licensed in Illinois.

4.1 Backfilling and Grading

Ash will be graded to establish the final sloped surface of the cap. Ash will be graded to a maximum slope of 20H:1V to promote surface drainage and prevent ponding of runoff. The final ash grading will intersect the existing exterior embankment slope no higher than the existing ash surface, in accordance with the Rule. Soil embankment materials above that point will be removed and utilized for vegetative cover on the final cap. The final cover design will result in a maximum of about 17 ft of regarded ash near the center of the pond. The final surface of the ash cap will be rolled smooth prior to the placement of the final cover system.

4.2 Final Cover Placement

Final cover components will include approximately 992,000 ft^2 of low permeability geosynthetic membrane cover and 106,500 yd3 of final protective soil material.

The low permeability layer will consist of a textured high density polyethylene (HDPE) geomembrane which will have a 400mil minimum nominal thickness. Geomembrane seams will be continuously fusion

or extrusion welded to form one continuous membrane covering the entire area of exposed ash. The perimeter edges of the HDPE geomembrane will be finished in an anchor trench excavated in soil materials. This will serve to keep the membrane anchored in place and prevent any lateral migration of surface water into the cap.

The low permeability geomembrane will be covered with a minimum of three feet of soil materials, as required by the Rule. These soils will be compacted only to the extent required for equipment traffic and construction of overlying drainage structures.

Soils used for the final protective cover will be fertilized, seeded and mulched to facilitate and support a permanent self-sustaining vegetative cover.

Installation of the low permeability geomembrane and the overlying soils will be conducted in accordance with the CQA program. Required records will be maintained on site during construction. The acceptance report and certification of final cover placement will be submitted to the Illinois EPA and be maintained at the offices of Ameren Environmental Services in St. Louis, Missouri.

4.3 Ash Pond Dewatering

No dewatering of the ash pond is proposed during closure activities. However, after the geomembrane and soil cover components are installed, it is expected that the subsurface water level in the ash pond will drop to coincide with the surrounding groundwater table.

4.4 Surface Water Management

Surface water management features have been incorporated into the final cover design. These include intermediate berms and ditches to direct runoff to rip-rap-lined chutes running off the ash pond to surrounding areas. The location of these structures is shown on Figure 5. Additional details are included in the Project Plans and Specifications (Hanson 2011D).

Surface water control features are designed to safely pass runoff from a 1000-year, 24-hour precipitation event without excessive scouring or erosion. Surface water control structures will be installed immediately following installations of the final cover soils.

4.5 Groundwater Collection Trench

A groundwater collection trench (Trench) will be installed between the outside south toe of Ash Ponds A, B, and D and the south Ameren property line, as shown on Figure 1. The Trench will run from the southwest corner of Ash Pond A to the southeast corner of Ash Pond D. The Trench extends to bedrock (except at the extreme east end) and is designed to intercept groundwater that may migrate to the south from the Ash Pond D area. The vertical alignment of the collection pipe along the Trench bottom has been set into bedrock or below the designed bottom elevation of Ash Pond D, and below the recorded minimum groundwater elevations, as shown on Figure 6.

The Trench collection system will consist of a perforated HDPE pipe encased in coarse aggregate and wrapped in non-woven geotextile that will run the full length of the Trench. The bottom slope of the Trench will be constructed to direct collected groundwater to four separate sumps: a pair in the east portion of the Trench adjacent to Ash Pond D, and a pair in the west portion of the Trench adjacent to Ash Pond A, as indicated on Figure 6 and in the Project Plans and Specifications (Hanson 2011D).

The groundwater collection trench is designed to continuously withdraw groundwater to control the gradient and flow direction of potentially impacted groundwater associated with Ash Pond D.

Groundwater collected in the trench flows by gravity to one of the four collection sumps, each equipped with a 50 gallon per minute (gpm) pump system. The estimated average steady state groundwater flows to each of seven segments of the trench draining to the four sumps, as shown on Figure 6, were analyzed using Hooghoudt's equation for drain spacing (Hooghoudt, 1940) and Darcy's Law (flow equals conductivity times gradient times area), based on the collector pipe being placed in an 18 in. wide coarse aggregate envelope with a hydraulic conductivity of $1x10^{01}$ cm/sec. The lengths, formation hydraulic conductivities (based on previous information discussed in the Hydrogeologic Site Investigation Report completed for this project (Hanson 2011B), and on consolidation test results completed for the settlement analysis discussed in Section 3, above, for the east end silty clay materials), along with the resulting radius of influence on the groundwater table and steady state discharge flow for each segment are included on Table 2.

Table 2. Groundwater Collection Trench Flow Analysis Results

Segment	**Length** (ft)	**Formation Material / Hydraulic Conductivity** (cm/sec)	**Average Ground7 water Level Above Pipe** (ft)	**Effective Radius** (ft)	**Average Steady State Formation Discharge** (gpm)
1	300	Alluvial Sand / $1.5x10^{02}$	9	35.2	7.95
2	290	Alluvial Sand / $1.5x10^{02}$	12	45.8	7.69
3	600	Alluvial Sand / $1.5x10^{02}$	5	27.4	9.28
4	670	Alluvial Sand / $1.5x10^{02}$	9	37.9	12.49
5	240	Alluvial Sand / $1.5x10^{02}$	8	26.1	7.45
6	180	Silty Clay / $8.25x10^{06}$	10	29.8	0.004
7	310	Silty Clay / $8.25x10^{06}$	14	56.2	0.006
TOTAL					44.87

Although an estimated average total steady state flow of approximately 45 gallons per minute (gpm) into the Trench has been calculated, four 50 gpm pumps were selected to create and maintain drawdown in the collection trench, resulting in a theoretical maximum discharge from the trench of 200 gpm. The steady state rate is the estimated delivery of groundwater from the formation through the designed 180nch thick gravel pack surrounding the pipe once the anticipated drawdown level is reached. Capture of groundwater within the Trench occurs as soon as pumping begins, as the flow to the pumps induce a groundwater flow gradient toward the Trench from all sides. Therefore, the groundwater contaminants that may migrate across the south property line to adjacent private properties are intercepted. The system was designed with some over0capacity and pumps will cycle on and off as water flows into the collection pipe and accumulates in the sumps. Also, each pair of pumps (east pair and west pair) are designed to act redundantly in the event one pump fails or is out of service for maintenance or replacement. Only one pump on each side needs to be operational to handle the steady state groundwater flows into the Trench. Although the system appears to be oversized relative to the steady state flow, using the same capacity pumps provides both redundancy and uniformity (identical pumps result in ease of repair/replacement due to standardization of replacement parts, etc.).

The pumps are controlled by a pair of float switches (low0water and high0water) that activate or shut down the pump based on the water level in the sump. Water from each sump will be pumped to a

central catch basin located adjacent to the existing Ash Pond D outlet structure along the mid-east side of the pond. It will then discharge to the Wabash River in accordance with the Station's NPDES permit.

To evaluate Trench performance and pump operation, each pump will have a flow meter (for determining the discharge rate and volume) and a pressure transducer (for determining water levels) at each sump or sump discharge. Evaluation of the operation of the Trench will be based on regular readings of the flow rates, flow volumes and water elevations at each sump. For additional security, a warning light will be activated at the pump controller panel in the event that groundwater levels in the Trench exceed the pump's high-water sensor.

The collection sumps will be constructed to prevent surface water infiltration, especially in the Wabash River flood plain (elevations below approximately 450.0 ft msl) where a bentonite seal will be included in the backfill. Water-tight connections are necessary in the flood plain to prevent the collection trench or sumps from being overwhelmed with surface water.

Maintenance of the groundwater collection trench and its components is addressed in the Ash Pond D Post-Closure Care Plan (Hanson 2011E).

4.6 Schedule

Completion of the closure activities is dependent on weather and final approval of the closure plan by the Illinois Environmental Protection Agency. However, they are expected to be completed during the 2012 construction season.

5. Hydrogeologic Site Investigation

Please see the separate Hydrogeologic Site Investigation Report (Hanson 2011B) that was prepared for this project.

6. Groundwater Trend Analysis

Please see Section 5.2 in the separate Groundwater Monitoring Plan Report (Hanson 2011C) that was prepared for this project.

7. Groundwater Monitoring System

Please see Section 2 in the Groundwater Monitoring Plan Report. A monitoring system maintenance plan is included at the end of Section 2.2 of that Report.

8. Groundwater Monitoring Program

Requirements for the Groundwater Monitoring Program may be found in Section 3 and Appendix A of the Groundwater Monitoring Plan Report. Associated Quality Assurance requirements may be found in Appendix A of the that report. All monitoring data and trend analysis data will be maintained at the offices of Ameren Environmental Services in St. Louis, Missouri, for a minimum of ten years following generation of the data.

9. Groundwater Monitoring Well Locations

Locations for the Ash Pond D monitoring wells to be used for the trend analysis are identified in Table 1 in Section 2 of the Groundwater Monitoring Plan Report.

10. Groundwater Collection Trench

Please see the Ash Pond D Closure Plans and Specifications completed for this project (Hanson 2011D).

11. Final Cover System

Please see the Ash Pond D Closure Plans and Specifications, completed for this Project (Hanson 2011D).

12. Time and Cost Estimates

12.1 Time to Complete Closure

Completion of the closure activities is dependent on weather and final approval of the closure plan by the Illinois Environmental Protection Agency. However, they are expected to be completed during the 2012 construction season.

12.2 Time to Reach Hydrostatic Equilibrium of Groundwater

Please see Section 4.5 in the project Hydrogeologic Site Investigation Report.

12.3 Cost of Closure

The cost for closure activities related to the closure of Ash Pond D as described in Section 4 of this Closure Plan and as specified in the drawings and specifications is estimated to be $5,500,000.

12.4 Cost of Post-Closure Care

The cost for post0closure care activities related to the closure of Ash Pond D as specified in the Post0 Closure Care Plan completed for this project (Hanson 2011E) is estimated to be $75,000 annually.

13. Construction Quality Assurance Program

As previously indicated, please see the Construction Quality Assurance Plan completed for this project (Hanson 2011A).

14. Mitigation of Statistically Significant Increasing Trends

Please see Section 5.2.3 in the Groundwater Monitoring Plan Report.

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15. References

Hanson, 2011A. "Closure of Ash Pond D, Hutsonville Power Station, **Construction Quality Assurance Plan**, Ameren Energy Generating Company, Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson, 2011B. "Closure of Ash Pond D, Hutsonville Power Station, **Hydrogeologic Site Investigation**, Ameren Energy Generating Company, Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson, 2011C. "Closure of Ash Pond D, Hutsonville Power Station, **Groundwater Monitoring Plan**, Ameren Energy Generating Company, Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson, 2011D. "Closure of Ash Pond D, Hutsonville Power Station, **Plans and Specifications**, Ameren Energy Generating Company, Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hanson, 2011E. "Closure of Ash Pond D, Hutsonville Power Station, **Post-Closure Care Plan**, Ameren Energy Generating Company, Crawford County, Illinois". Hanson Professional Services Inc., Springfield, IL.

Hooghoudt, S.B. 1940. General consideration of the problem of field drainage by parallel drains, ditches, watercourses, and channels. Publ. No.7 in the series Contribution to the knowledge of some physical parameters of the soil (titles translated from Dutch). Bodemkundig Instituut, Groningen, The Netherlands.

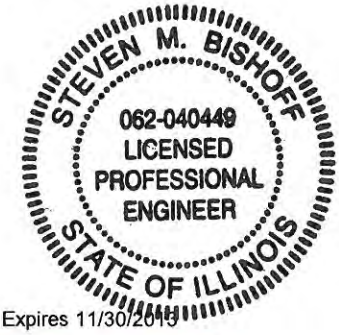
(The Hanson documents listed above are being submitted concurrently with this closure plan.)

16. Licensed Professional Signature/Seal

I herby affirm that all information and design contained in this Closure Plan is true and accurate to the best of my knowledge and belief in accordance with good engineering practice.

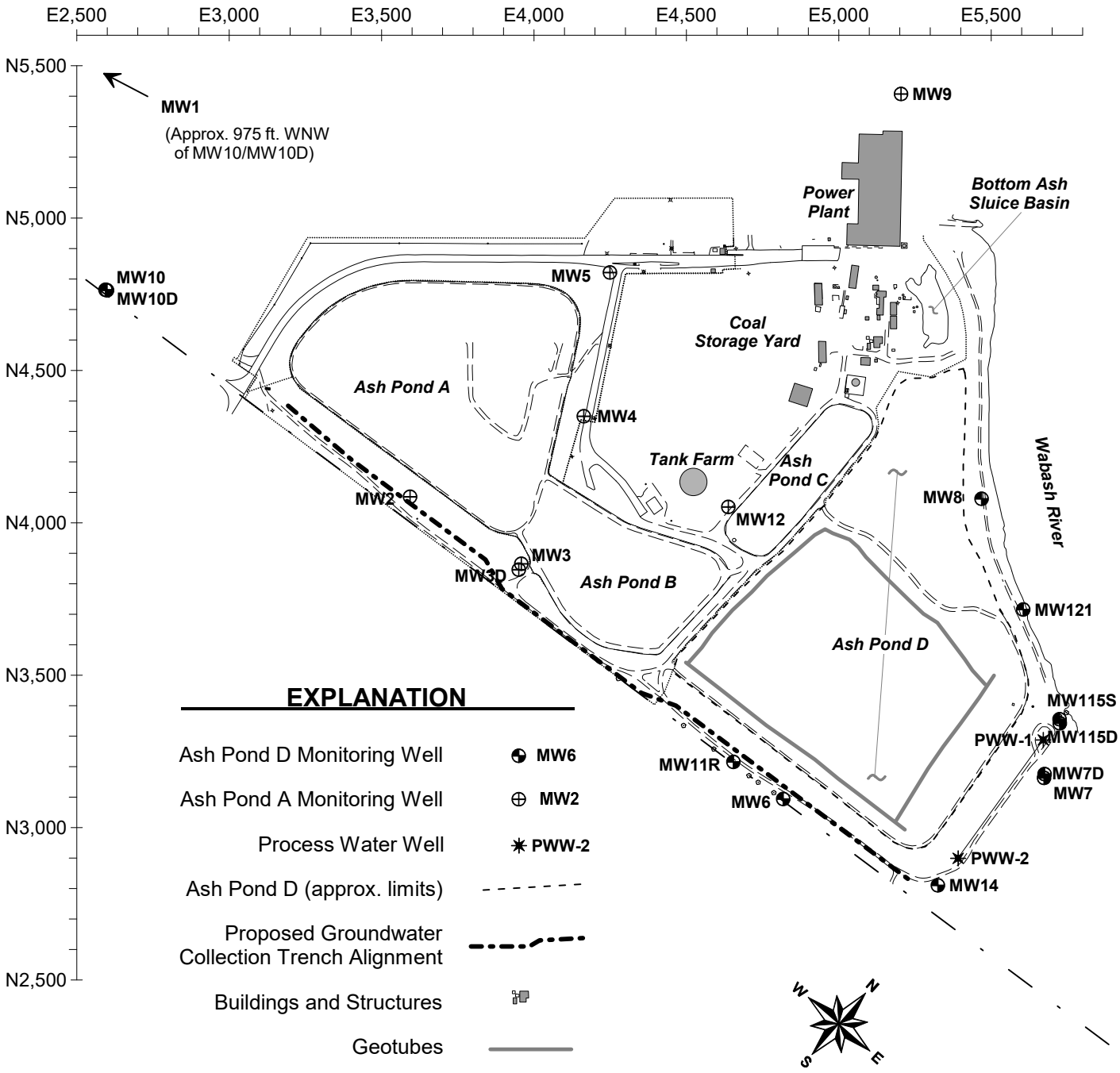
Steven M. Bishoff, P.E.
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703-2886
(217) 788-2450
Registration No. 062-040449

Seal:



Expires 11/30/2013

Signature: _____ Date: 3-30-2012



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SITE MAP

CLOSURE OF ASH POND D
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 10E0035 FIGURE NO. 1

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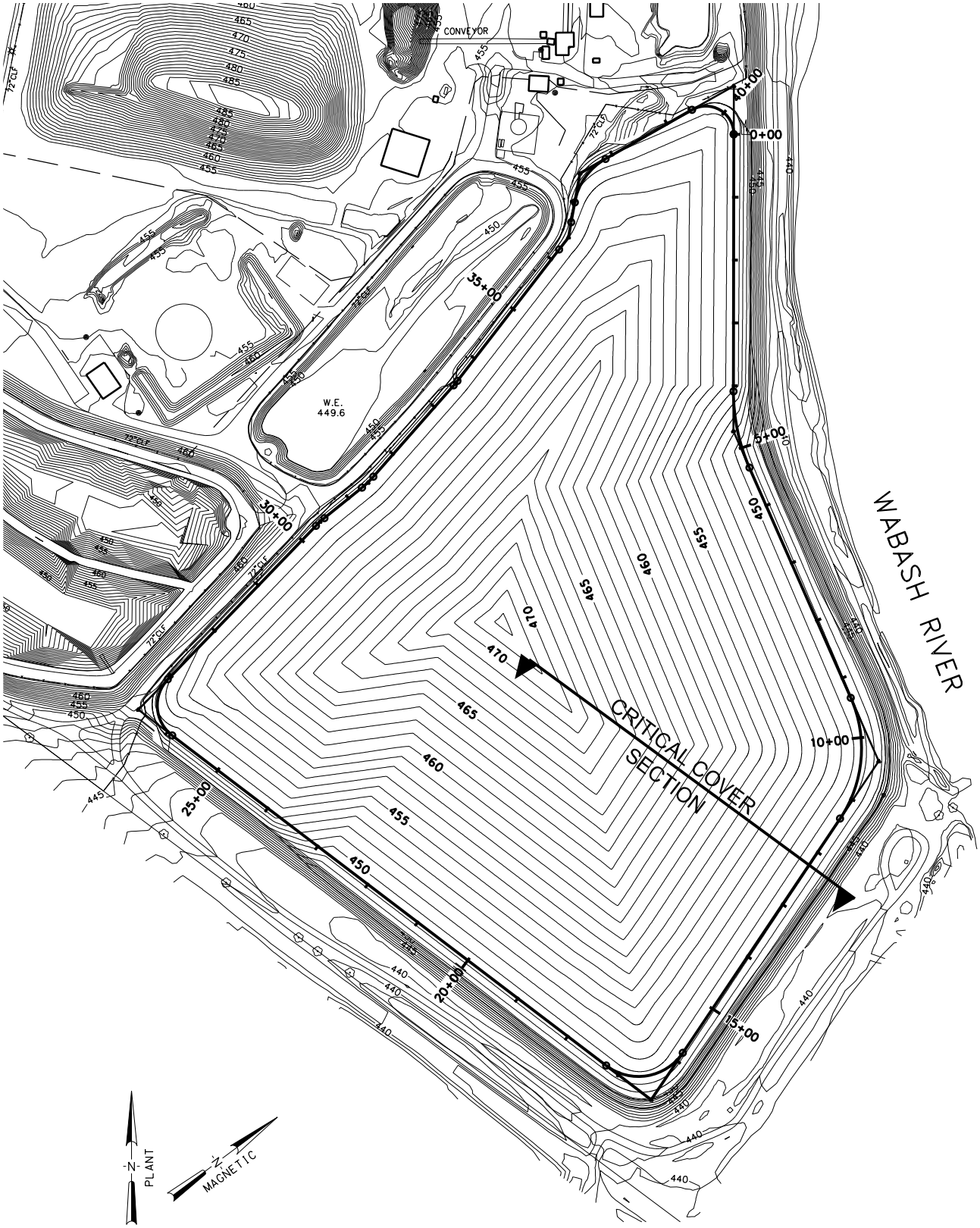

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STABILITY ANALYSIS SECTIONS

ASH POND D CLOSURE
HUTSONVILLE POWER STATION
CRAWFORD COUNTY, ILLINOIS

HANSON NO. 05S3004A FIGURE NO. 2

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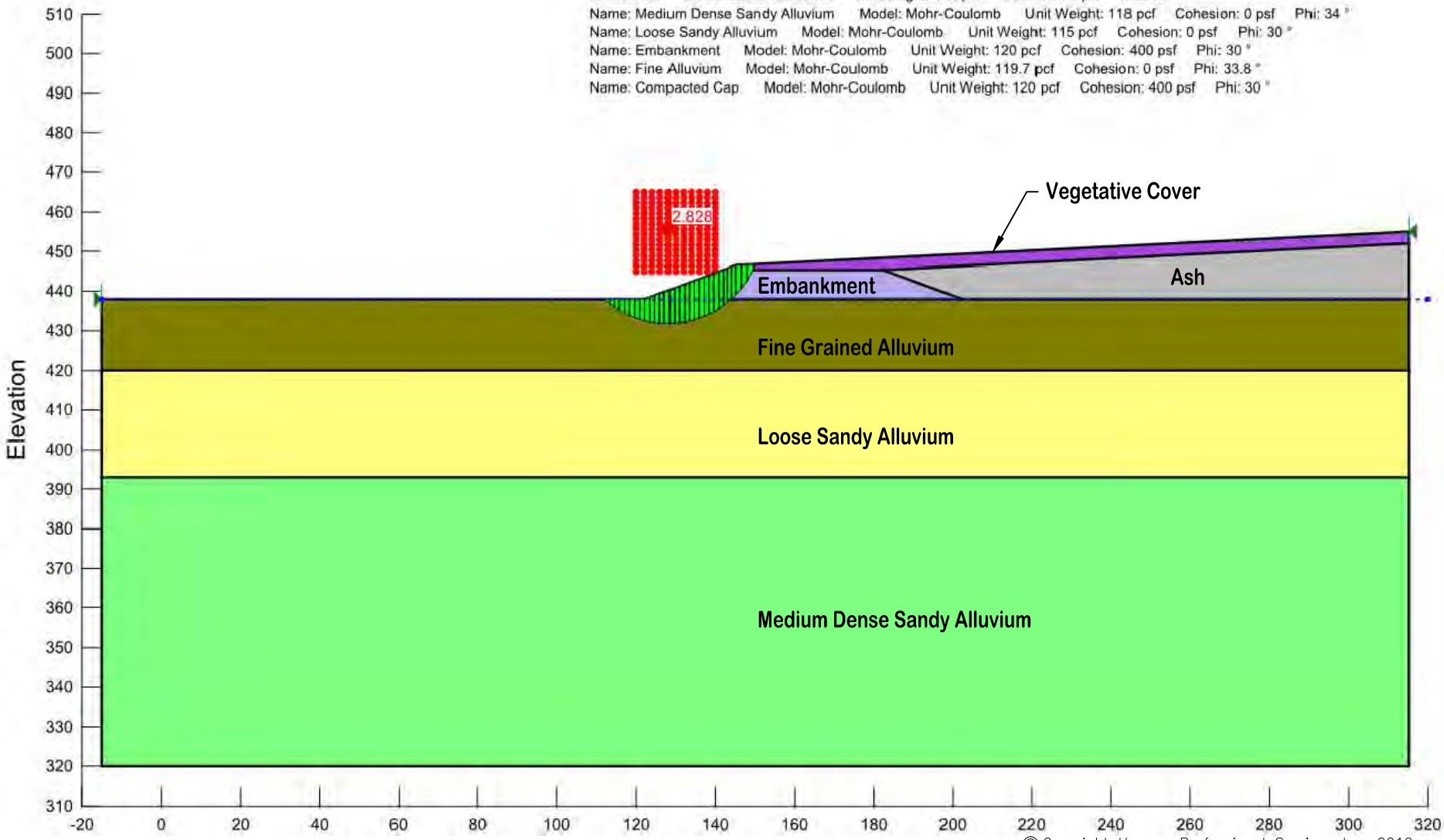
Material Properties
Name: Ash Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 32 °
Name: Medium Dense Sandy Alluvium Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 34 °
Name: Loose Sandy Alluvium Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 0 psf Phi: 30 °
Name: Embankment Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 400 psf Phi: 30 °
Name: Fine Alluvium Model: Mohr-Coulomb Unit Weight: 119.7 pcf Cohesion: 0 psf Phi: 33.8 °
Name: Compacted Cap Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 400 psf Phi: 30 °



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ANALYZED EMBANKMENT SECTION

ASH POND D CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 10E0035 FIGURE NO. 3

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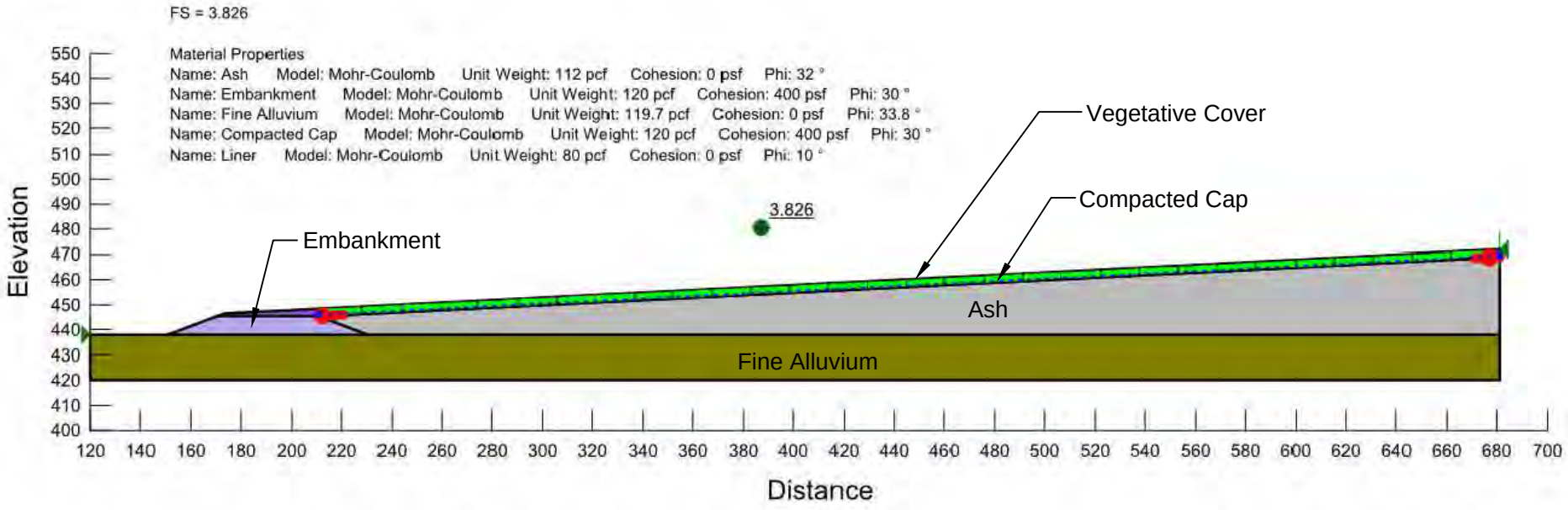

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ANALYZED COVER SECTION

ASH POND D CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE, CRAWFORD CO., ILLINOIS

HANSON NO. 10E0035 FIGURE NO. 4

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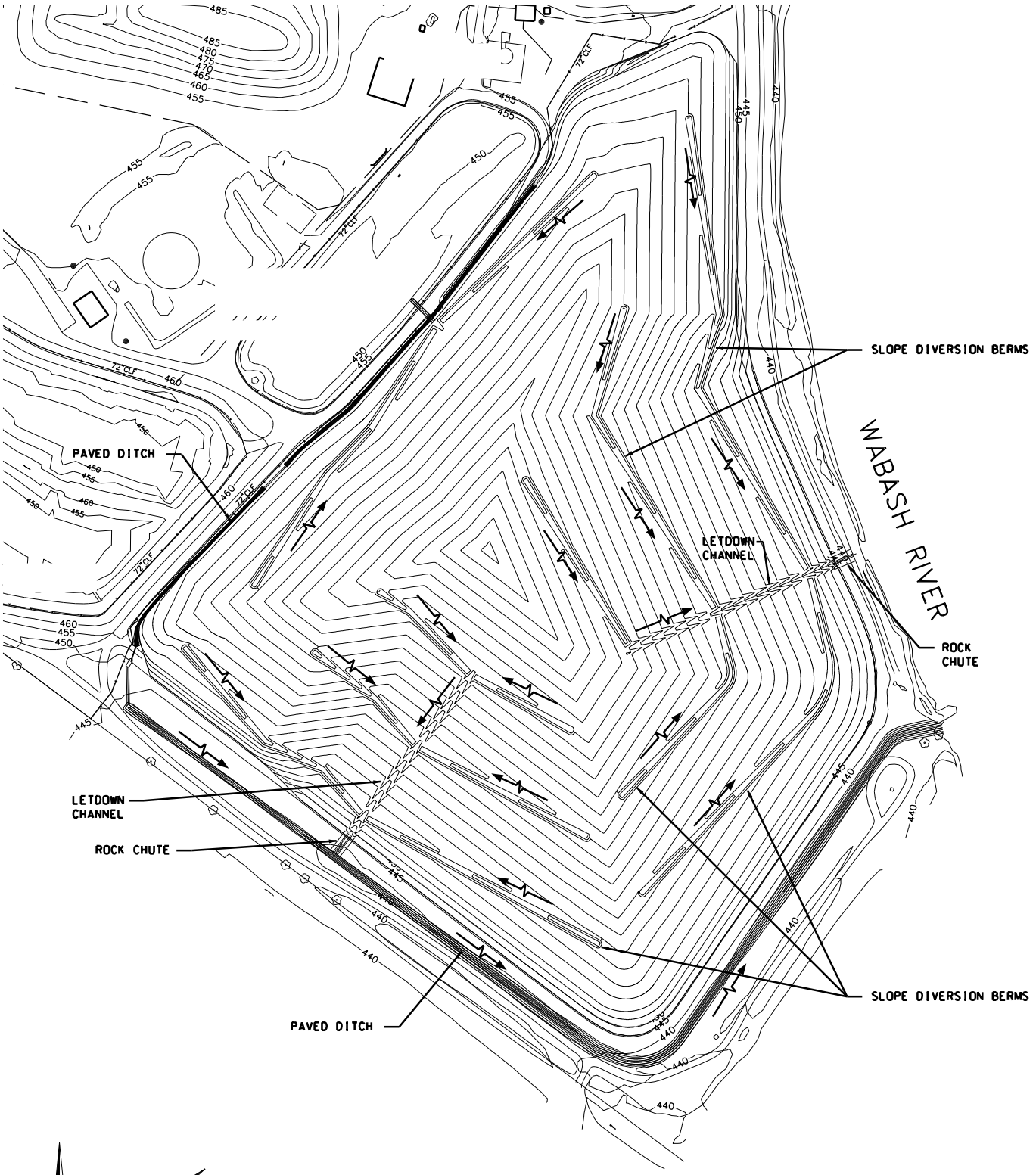

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DRAINAGE CONTROL STRUCTURES

ASH POND D CLOSURE
HUTSONVILLE POWER STATION
CRAWFORD COUNTY, ILLINOIS

HANSON NO. 05S3004A FIGURE NO. 5

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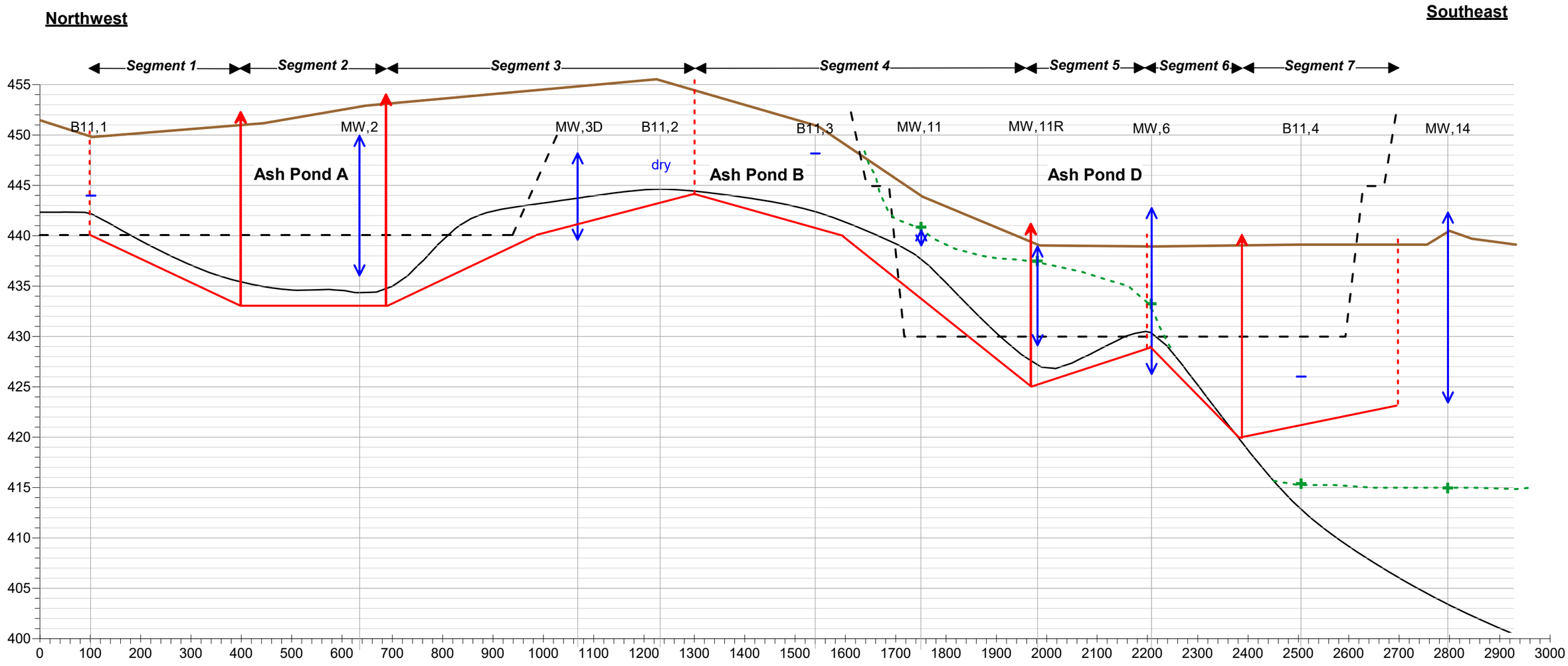

EXPLANATION

- Historic monitoring well high/low groundwater level
- Single groundwater level (April 2011 borings)
- Fine,grained (silty clay) / coarse,grained (sands) boundary
- Anticipated bedrock surface
- Base of Ash Pond (estimated from drawings and boring logs)
- Collector trench invert (proposed)
- Collector trench riser (pumping location)
- Collector trench riser (vent/clean,out location)
- Ground surface

SCALE

1 inch = 200 feet (horizontal)
1 inch = 10 feet (vertical)

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GROUNDWATER COLLECTION TRENCH

ASH POND D CLOSURE
HUTSONVILLE POWER STATION
HUTSONVILLE TWP, CRAWFORD CO, ILLINOIS

HANSON NO. 10E0035 FIGURE NO. 6

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Exhibit 4

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
PAT QUINN, GOVERNOR JOHN J. KIM, INTERIM DIRECTOR

CERTIFIED

April 18, 2012

John C. Pozzo
Managing Supervisor, Water Quality
1901 Chouteau Ave.
P.O. Box 66149. MC 602
St. Louis, Missouri 63166-6149

RE: Hutsonville, Ash Pond D Closure and Post Closure Care Plans

Dear Mr. Pozzo:

This letter provides a final determination by the Illinois Environmental Protection Agency (Illinois EPA) regarding the Ameren Energy Generating Company (Ameren), Hutsonville Power Station Ash Pond D Closure and Post Closure Care Plans (Plans), submitted pursuant to 35 AIC 840.128 and 840.138, respectively, dated July 26, 2011 and revisions thereto dated February 15, 2012 and March 30, 2012.

The Illinois EPA has reviewed the required elements of the Closure Plan and Post Closure Care Plan pursuant to the requirements of 35 IAC 840.130 and 840.140, respectively. The Illinois EPA finds that the Plans include all of the required elements and approves all elements of the Plans pursuant to 35 IAC 840.148, as submitted or as revised on the dates listed above. Pursuant to 35 IAC 840, implementation of the approved Plans is subject to acquiring all required permits.

Thank you for your attention to this matter. If you have any questions concerning this letter, please contact me or Lynn Dunaway of my staff at 217-785-4787.

Sincerely,

William E. Buscher

William E. Buscher, P.G.
Supervisor, Hydrogeology and Compliance Unit
Groundwater Section
Division of Public Water Supplies
Bureau of Water

IEPA-DIVISION OF RECORDS MANAGEMENT
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OCT 11 2013
REVIEWER JKS

CC: Rick Cobb
Al Keller
Lynn Dunaway
Records

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595 S. State, Elgin, IL 60123 (847)608-3131
2125 S. First St., Champaign, IL 61820 (217)278-5800
2009 Mall St., Collinsville, IL 62234 (618)346-5120
9511 Harrison St., Des Plaines, IL 60016 (847)294-4000
5407 N. University St., Arbor 113, Peoria, IL 61614 (309)693-5462
2309 W. Main St., Suite 116, Marion, IL 62959 (618)993-7200
100 W. Randolph, Suite 11-300, Chicago, IL 60601 (312)814-6026

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Exhibit 5

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GEOTECHNOLOGY INC
FROM THE GROUND UP

CLOSURE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 15, 2016

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J024917.01

FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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Closure Plan

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Groundwater Monitoring Plan	B
Groundwater Management Zone Application	C
Post-Closure Care Plan	D
Construction Quality Assurance Plan	E
Construction Specification	F
Construction Plans	G

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Illinois EPA

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CLOSURE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 15, 2016

J024917.01

CLOSURE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
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MEREDOSIA, ILLINOIS

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CLOSURE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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CLOSURE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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ATTACHMENTS

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Construction Specification	F
Construction Plans	G

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CLOSURE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

1.0 INTRODUCTION

This Closure Plan for the AmerenEnergy Medina Valley Cogen, LLC Meredosia Power Station (Meredosia Power Station) Fly Ash Pond and Bottom Ash Pond Coal Combustion Waste Surface Impoundments has been prepared in general accordance with the requirements of the site-specific rule in 35 Illinois Administrative Code (IAC) Part 840.101 through 840.152 and the United States Environmental Protection Agency (USEPA) regulation at 40 Code of Federal Regulations (CFR) Parts 257 and 261. Supporting documents to this Closure Plan are listed in the Reference Section of this report.

2.0 SITE LAYOUT

The Meredosia power Station is located at 800 South Washington Street, Meredosia, Illinois. The Fly Ash and Bottom Ash Ponds are located southwest of the coal pile and plant facilities. The site location and topography are shown on Plate 1. The existing structures, ash ponds, and boring/monitoring wells are shown on Plate 2.

3.0 SITE HISTORY

The Meredosia Power Station is located south of Meredosia in Morgan County, Illinois, which is located in west-central Illinois. The Meredosia Power Station ash ponds are located in the south half of Section 21 and the north half of Section 28, T.16N, R.13W. The plant generated electricity from 1948 until February 2012. The plant is located on the floodplain east of the Illinois River. A third ash pond referred to as the "Old Ash Pond" was reportedly closed, and will not be further discussed in this report. Reportedly, the Bottom Ash and Fly Ash Ponds were constructed of native materials.

The Bottom Ash Pond was constructed in 1972 with a design surface area of 11 acres, a height of 24 feet and a volume of approximately 90 acre-feet. The Bottom Ash Pond had received low-volume wastewater, bottom ash and storm water runoff. The site operates under NPDES Permit IL0000116, Outfall 003, which is for the Bottom Ash Pond. Reportedly, the Bottom Ash Pond did not have standing water within two months of the plant closure.

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The Fly Ash Pond was constructed in 1968. The Fly Ash Pond has a surface area of 34 acres, a height of 24 feet and a volume of approximately 500 acre-feet. The Fly Ash Pond reportedly received fly ash, low-volume wastewater and storm water runoff. The site operates under NPDES Permit IL0000116, Outfall 004, which is for the Fly Ash Pond. The Fly Ash Pond was reportedly dry by October 2012.

A feasibility analysis was performed regarding the closure options for the Fly Ash and Bottom Ash Ponds on the site. The options included no action, complete clean closure, soil/geosynthetic composite cap, and partial clean closure with a ClosureTurf® cap alternatives. The no closure option was not selected due to the known groundwater impacts at the site and facility decommissioning activities. Clean closure of both ponds was cost and time prohibitive due to ash disposal and subsequent backfilling and grading of the site. The soil/geosynthetic composite cap option was not selected due to the long term maintenance issues, lack of personnel on site to perform maintenance activities, cost, and the longer time frame needed to close the ponds. Partial clean closure of the bottom ash pond, moving the bottom ash to the fly ash pond, and capping the fly ash pond and bottom ash pond berm with ClosureTurf® was selected as an effective and efficient option.

4.0 SLOPE STABILITY ANALYSIS

Slope stability analysis consists of comparing the driving forces within a cross-section of slope to the resisting forces and calculating the factor of safety. Per the Illinois Department Natural Resources (IDNR)[1], embankments should have a minimum factor of safety of 1.5 for long-term static stability, and 1.0 for the pseudo-static condition (seismic condition). Major flood conditions and rapid drawdown conditions were also analyzed due to the proximity of the site to the Illinois River. Slope stability analysis discussion, section profiles, and calculated critical failure arcs at selected locations are presented in Appendix A. Global stability analysis results, at current groundwater elevations in relation to mean sea level (MSL) and design grades for the Fly Ash and Bottom Ash Ponds, are summarized in the following table.

[1] *Rules for Construction and Maintenance of Dams*, Illinois Department of Natural Resources, Office of Water Resources, Springfield, Illinois.

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SUMMARY OF STABILITY ANALYSES			
Section Location	**Case**	**Calculated Factor of Safety**	**Target Factor of Safety**
Fly Ash Pond West Embankment	Static Condition Normal River Stage	2.1	1.5
	Static Condition Major Flood Stage (447'MSL)	2.5	1.5
	Rapid Drawdown Major Flood Stage (447'MSL)	1.7	1.2
	Seismic Condition	1.3	1.0
Bottom Ash Pond West Embankment	Static Condition Normal River Stage	1.8	1.5
	Static Condition Major Flood Stage (447'MSL)	1.6	1.5
	Rapid Drawdown Major Flood Stage (447'MSL)	1.7	1.2
	Seismic Condition	1.3	1.0

The stability models for each section at the Fly Ash Pond and Bottom Ash Pond closures have calculated factors of safety greater than or equal to the recommended IDNR target factor of safety for the static and seismic conditions.

5.0 CLOSURE ACTIVITIES

Proposed closure activities include grading, installation of high performance high density polyethylene (HDPE) geomembrane, and establishment of surface water control features for the Fly Ash and Bottom Ash Ponds. Closure activities will be performed in accordance with the Closure Plans and Specifications. Quality control will be performed in accordance with the Construction Quality Assurance (CQA) Plan prepared for this project and will be documented by a professional engineer licensed in Illinois.

Refer to the Plans and Specifications completed for this project (CDG, 2016) for details on the closure system.

5.1 Grading. Ash and other material (i.e. embankment soils, bottom ash, and approved demolition debris) will be moved within and between the Fly Ash and Bottom Ash Ponds to achieve design grades. Embankment materials and bottom ash may be used to bring the subgrade to within one foot of design elevations. At least one foot of fly ash will be placed on top of the

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bottom ash to provide a good surface for ClosureTurf® installation. Ash will be placed at a maximum slope of 1V:10H (10 percent slope). Slopes are designed to promote surface runoff and reduce ponding. The final subgrade surface will be compacted and drum-rolled to provide a smooth surface prior to placement of the high performance HDPE system.

5.2 ClosureTurf®/HydroTurf® Installation. The ClosureTurf®/HydroTurf® system is a low permeability synthetic liner used to control storm water infiltration and limit exposure of the capped material to humans and vectors (i.e. animals). The design grades facilitate storm water runoff to the surface water management features outside the Fly Ash and Bottom Ash Ponds.

The ClosureTurf®/HydroTurf® is generally installed in the following manner (Refer to the CQA Plan for specific installation guidelines):

- The geomembrane component is installed per the manufacturer's requirements including the use of heat welding for seaming.
- The turf component is installed per the manufacturer's requirements including the use of a sewing machine for seaming.
- Sand or hydrobinder infill is placed and hydrated per the manufacturer's requirements.
- The perimeter of the geomembrane and turf components is secured by an anchor trench.

5.3 Surface Water Management. Surface water management features have been incorporated into the final cover design. Surface water features, such as ditches, will be formed in the subgrade to facilitate runoff. The ClosureTurf®/HydroTurf® will be placed over the berms and into ditches. Additional details are provided in the Plans and Specifications (CDG, 2016).

Surface water features are designed to handle runoff from a 20-year precipitation event without damage to the final cover and water ponding.

5.4 Construction Quality Assurance (CQA) Program. Refer to the CQA Plan (Geotechnology, 2016) for details on the project specific CQA program.

6.0 HYDROGEOLOGIC SITE INVESTIGATION

The Hydrogeologic Site Investigation includes a summary of geologic data, hydrogeologic data, and known impacts to the groundwater for the site. Boron and arsenic are typically the best indicator chemicals for coal combustion waste related impacts at the site. Please refer to the separate Hydrogeologic Site Investigation Report (Geotechnology, 2016) for detailed information.

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7.0 GROUNDWATER

7.1 Groundwater Monitoring Program. Requirements for the groundwater monitoring program and associated quality assurance are found in the Groundwater Monitoring Plan (Geotechnology, 2016). Quarterly groundwater sampling of the groundwater monitoring system will occur for the first five years after the CQA acceptance report is submitted, and sampling frequencies may be reduced after that time frame. Monitoring data and trend analysis data will be maintained at the offices of Medina Valley Cogen, LLC until a post-closure completion report is accepted by the IEPA.

7.2 Groundwater Monitoring System. Nine monitoring wells (Groundwater Monitoring Program, Plate 2) have been installed in the vicinity of the Fly Ash and Bottom Ash Ponds. These monitoring wells are used for the groundwater monitoring system. Additional monitoring wells are not planned at this time. The monitoring well network will be evaluated two years after completion of the ash pond closures for effectiveness. One monitoring well (APW-1) will be sampled for background values, and eight monitoring wells will be sampled for groundwater assessment. Please refer to the separate Groundwater Monitoring Plan (Geotechnology, 2016) for additional information.

7.3 Groundwater Trend Analysis. Intrawell analysis will be used to assess groundwater trends over time. Please refer to the separate Groundwater Monitoring Plan (Geotechnology, 2016) for additional information.

7.4 Mitigation of Statistically Significant Trends. If statistically significant increasing trends are noted in the groundwater analysis, additional investigation into the cause of the increasing trends will be needed. Refer to the Groundwater Monitoring Plan (Geotechnology, 2016) for additional information.

8.0 TIME AND COST ESTIMATES

8.1 Time to Complete Closure. Completion of closure activities is dependent on weather and final approval of the closure plan by the IEPA. However, closure activities are anticipated to begin in 2016 and be completed in 2017.

8.2 Time to Reach Class I Groundwater Standards. Boron concentrations for the current ash pond configurations were modeled for 25 years to represent a scenario where the ash ponds were not closed. After 25 years, Monitoring Well APW-3 (the well with historically highest boron concentrations) stabilized at 16.9 mg/L of boron, which exceeds the Class I Groundwater standards. Monitoring Wells APW-2, APW-6, APW-7, and APW-8 also exceeded the Class I Groundwater standards at 25 years with no action.

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After the dewatering and closure activities of the Fly Ash and Bottom Ash Ponds are complete, it will take approximately three years for boron concentrations to decrease below the Class I Groundwater standards for each well on site according to the model results.

Refer to the Hydrogeologic Site Investigation Report (Geotechnology, 2016) for more information regarding the groundwater modeling.

8.3 Remediation Time Frame. Once the ClosureTurf® caps for the Fly Ash and Bottom Ash Ponds are in place, precipitation will be diverted away from the ash ponds. Infiltration of precipitation into the ash ponds will be reduced or eliminated and further reductions of the concentrations of COCs are anticipated. Boron exhibited the highest concentration over the largest area and was used as the indicator contaminant for contaminant transport modeling. Based on the modeling results, the length of time required for the concentration of boron to decrease below the Class I Groundwater Standards is approximately three years. Additional contamination transport modeling information is in the Hydrogeologic Site Investigation Report (Geotechnology, 2016).

8.4 Cost of Closure. The cost for closure activities related to the closure of the Fly Ash and Bottom Ash Ponds as specified in the drawings and specifications is estimated to be $10,000,000.

8.5 Cost of Post-Closure Care. The cost for post-closure care activities related to the closure of the Fly Ash and Bottom Ash Ponds as specified in the Post-Closure Plan is estimated to be $20,000 annually while quarterly groundwater sampling is in progress.

9.0 REFERENCES

CDG, 2016. "Specifications and Construction Plans, Fly Ash and Bottom Ash Ponds Closure, Meredosia Power Station." CDG Engineers Architects Planners, Inc., St. Louis, Missouri, 2016

Geotechnology, Inc., Construction Quality Assurance Plan, Meredosia Power Station, Ameren, 2016.

Geotechnology, Inc., Groundwater Monitoring Plan, Meredosia Power Station, Ameren, 2016.

Geotechnology, Inc., Groundwater Management Zone Plan, Meredosia Power Station, Ameren, 2016.

Geotechnology, Inc., Post-Closure Plan, Meredosia Power Station, Ameren, 2016.

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10.0 LICENSED PROFESSIONAL SIGNATURE/SEAL

I hereby affirm that the information and design documents contained in this closure plan are true and accurate to the best of my knowledge and professional opinion.

Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.



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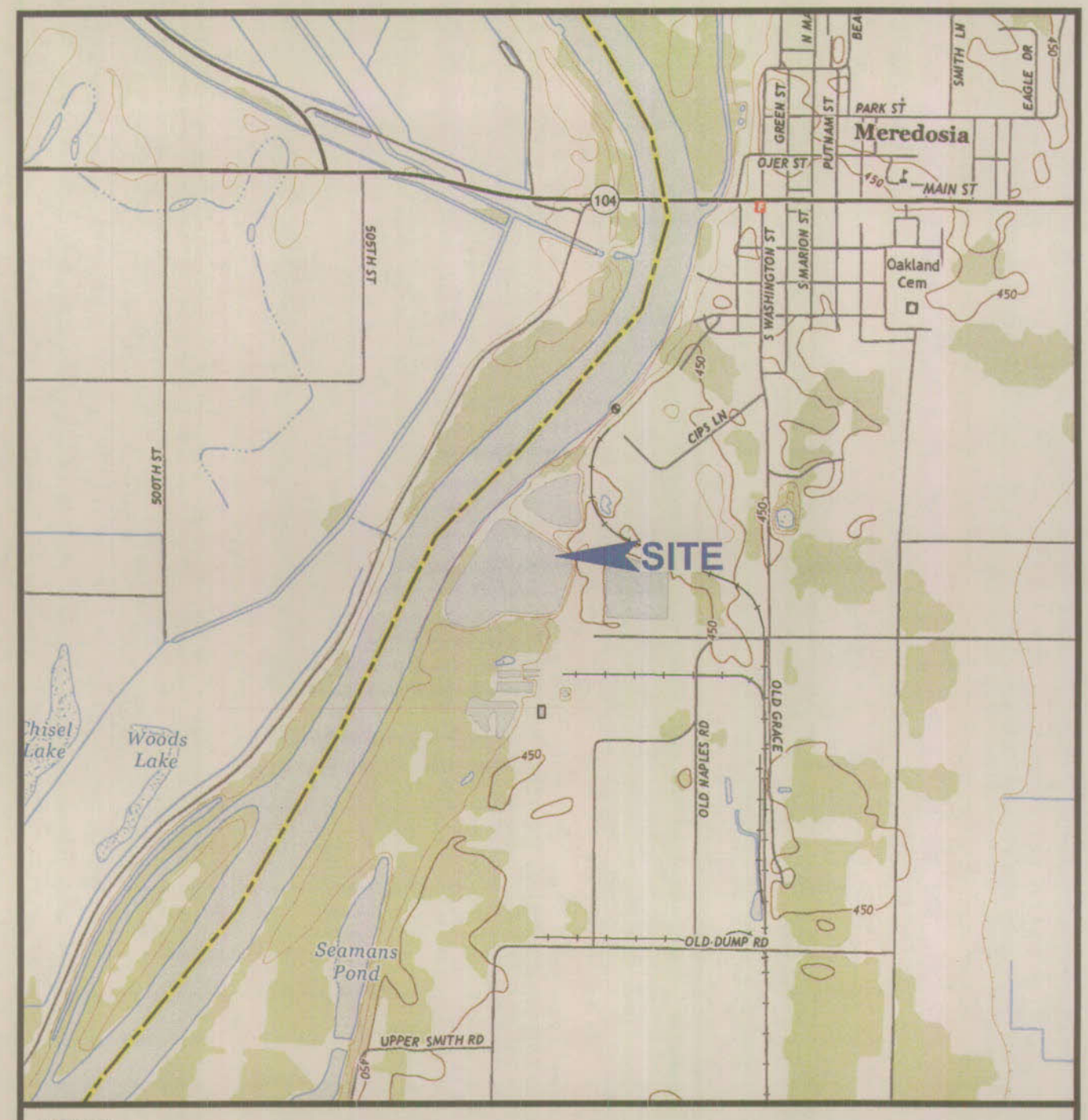

NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 7-20-16	Date: 7/20/16	Date: 7/21/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.01	PLATE 1

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.

LEGEND

- Monitoring Well Location
- Soil Boring Location
- Slope Stability Analysis Cross Section

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VHE	App'vd By: AMS
Date: 7-20-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

AERIAL PHOTOGRAPH OF SITE

Project Number	
J024917.01	PLATE 2

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APPENDIX A

STABILITY ANALYSIS

J024917.01

APPENDIX A

STABILITY ANALYSIS

1.0 PREVIOUS SLOPE STABILITY STUDY

Geotechnology performed a subsurface exploration and global stability evaluation[2] for the west embankments of the Bottom Ash and Fly Ash Ponds at the subject site in January 2011. Ten borings designated as Borings B-1 through B-10 were drilled during the subsurface exploration. Boring locations are shown on Plate 2. Laboratory testing included moisture contents for cohesive samples and Atterberg limits on selected samples. Also, consolidated-undrained triaxial, unconfined compression and direct shear tests were performed on representative samples. Relevant data from this exploration are incorporated into this report. Copies of the boring logs are presented in Attachment A. Laboratory test results are included in Attachment B.

2.0 SLOPE STABILITY ANALYSIS

Slope stability analysis consists of comparing the driving forces within a cross-section of slope to the resisting forces and determining the factor of safety. Gravity forces tend to move the slope downwards (driving force), while resisting forces, derived from the soil shear strength, tend to keep the slope in place. When the driving force acting on the slope is greater than the resisting force, sliding can occur. The factor of safety of the slope is the ratio of the restraining force divided by the driving force. Generally, when the factor of safety is 1 or less, the slope is considered to be unstable. The accepted standard in local practice and consistent with the Illinois Department of Natural Resources (IDNR) dam safety requirement is a factor of safety of 1.5 for long term static stability of a slope, and 1.0 for pseudo-static conditions (seismic loading).

Slope stability analyses were performed for representative sections of the west embankments of the Bottom Ash and Fly Ash Ponds. We understand that the embankment slopes will remain as-is or will be graded to a slope of 1V:3H (Vertical:Horizontal) or flatter. The locations of the typical cross-sections of the embankments are represented by Sections B-B' and A-A', respectively, and are shown on Plate 2. Soil profile and properties used in the stability analysis were selected based on boring and laboratory test results reported in the 2011 Global Stability Evaluation report and Geotechnology's experience with similar materials. The soil properties used in the models are summarized in the following table:

[2] *Global Stability Evaluation, Meredosia Power Station, Bottom and Fly Ash Ponds, Meredosia, Illinois,* prepared for Ameren Energy Resources by Geotechnology Inc., Report No. J017150.01, and dated January 4, 2011.

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2.1 Effective Stress Parameters

Material	Cohesion (psf)	Friction Angle (deg)	Density (pcf)
Embankment Fill	0	28	115
Silty Clay	50	29	115
Sand	0	39	120
Fly Ash	0	25	112
Bottom Ash	0	28	112

2.2 Total Stress Parameters

Material	Cohesion (psf)	Friction Angle (deg)
Embankment Fill	0	0
Silty Clay	500	14
Sand	0	0
Fly Ash	0	0
Bottom Ash	0	0

Geotechnology performed stability analysis for deep seated, global failure of the embankments. Representative cross-sections of the embankments are shown on the plates included in Appendix C. Since the embankments have been in place for 40 years or more, long-term stability of the embankments was analyzed (i.e. effective stress conditions). Both effective and total stress soil properties were used for the rapid drawdown analysis. Groundwater in the Bottom Ash Pond was varied between El 435[3] to 440 for our analyses. Groundwater in the Fly Ash Pond was assumed to be at El 450. For the rapid drawdown case it was assumed that the Illinois River will drain rapidly from its major flood stage of El 447.

A pseudo-static seismic analysis was performed on the embankment sections using a Peak Ground Acceleration (PGA) of 0.1g, which corresponds to a seismic event with a mean return time of 2,500 years. The PGA is based on data provided in Appendix 1 of the dam safety guidelines[4] published by the IDNR. The Morgenstern-Price procedure was used to compute factors of safety. The computer program SLOPE/W was used to perform the computations. The calculated factors of safety are given in the following table.

[3] All elevations herein refer to the mean sea level (msl) datum in feet.
[4] "Procedural Guidelines for Preparation of Technical Data to be included in Application for Permits for Construction and Maintenance of Dams" issued by Illinois Department of Natural Resources.

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SLOPE STABILITY ANALYSIS RESULTS				
Analysis Condition	Calculated Factor of Safety		Target Factor of Safety[a]	Reference Plate No.
	Fly Ash Pond Section AA'	Bottom Ash Pond Section BB'		
Steady State Seepage Groundwater Elevation in Ash Pond as noted	2.1 (El 450)	1.8 (El 435)	1.5	1 and 5
Steady State Seepage at Major Flood Stage El 447 Groundwater Elevation in Ash Pond as noted	2.5 (El 450)	1.6 (El 440)	1.5	2 and 6
Rapid Drawdown from Major Flood Stage at El 447 Groundwater Elevation in Ash Pond as noted	1.7 (El 450)	1.7 (El 440)	1.2	3 and 7
Slope with Seismic Forces Mean Return Time 2,500 Years Groundwater Elevation in Ash Pond as noted	1.3 (El 450)	1.3 (El 435)	1.0	4 and 8

[a] "Procedural Guidelines for Preparation of Technical Data to be included in Application for Permits for Construction and Maintenance of Dams" issued by Illinois Department of Natural Resources.

IDNR recommends a minimum factor of safety of 1.5 for long-term stability. During an extreme event, such as an earthquake, a factor of safety of 1.0 or more is recommended. Based on the results of our analyses, the Bottom Ash and Fly Ash Pond embankment slopes have adequate factors of safety for global stability.

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ATTACHMENT A

BORING LOGS AND
BORING LOG TERMS AND SYMBOLS

Surface Elevation: 449.0 Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand, trace clay lenses		6-16-10	SS1
5			3-11-13 -14	SS2
			5-7-9	SS3
10			5-9-14	SS4
			4-4-4	SS5
15	FILL: black clay with sand			
	Very soft, gray, interbedded SILT and CLAY with organics - ML/CL		0-0-1	SS6
20			2-2-3	SS7
	Medium stiff, gray CLAY - (CH)		92	ST8
25			87 89	ST9
30	Loose, gray, clayey SAND with gravel - SP		1-4-4	SS10
35	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		5-7-7	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0538301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by: DLC	App'vd. by: DAV
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-1

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 449.0 Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
45			4-5-4	SS12
			5-7-9	SS13
50			9-8-9	SS14
55			7-12-15	SS15
60	Boring terminated at 60 feet			
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by: SK	App'vd. by: DMI
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.2 Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand with black clay lenses		5-7-9	SS1
5			6-10-8	SS2
			7-8-13	SS3
10			5-5-9	SS4
			3-3-3	SS5
15				ST6
	Black, clayey SAND, trace gravel - SP			
20				
	Medium stiff, gray CLAY - CH		3-4-4	SS7
25				
			3-3-3	SS8
30				
	Soft, gray, clayey SILT with sand and clay lenses - ML		2-1-1	SS9
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		0-2-4	SS10

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by:	App'vd. by:
Date: 10/26/10	Date: 12/7/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-2

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
			3-6-6	SS11
45	Boring terminated at 46 feet.			

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638001.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SK	App'vd. by DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 449.1 Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown sand with black clay lenses		4-6-8	SS1
			5-6-9	SS2
5				ST3
			8-10-16	SS4
10			8-13-15	SS5
			6-8-8	SS6
15	FILL: black clay with sand, trace gravel			SS7
	Soft to medium stiff, gray CLAY - CH		2-2-2	SS8
20	with organics		86	ST9
				ST10
25			1-2-3	SS11
30	Soft, brown, clayey SILT with sand - ML		1-2-1	SS12
35				
	Medium dense, brown, fine to coarse SAND, trace gravel - SP		5-5-7	SS13

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SK	App'vd. by: Dwy
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-3

Project No. J017150.01

Surface Elevation: 449.1 Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
			6-7-7	SS14
45				
			6-7-9	SS15
50				
			5-8-9	SS16
55				
			8-8-13	SS17
60	Boring terminated at 60 feet.			
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002.WL J017150.01GED - MEREDOSIA.GPJ GTINC.0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SC	App'vd. by: DW
Date: 10/26/10	Date: 12/7/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-3

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 431.6 | Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft to medium stiff, brown and gray CLAY - (CH)		1-2-2	SS1
			*	ST2
5			1-2-3	SS3
			0-2-2	SS4
10				
	Soft, gray, silty CLAY, trace sand - CL		0-1-1	SS5
15				
	Very soft, gray, sandy CLAY with silt - CL		0-0-0	SS6
20				
	Very loose, brown, fine to coarse SAND, trace gravel - SP		0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * Disturbed sample Datum: IL State Plane Coordinates, West Zone. N: 1148688.82' E: 2182505.605'

Drawn by: KA	Checked by: SLC	App'vd. by: DM
Date: 10/26/10	Date: 11/9/10	Date: 11/9/10

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-4

Project No. J017150.01

Surface Elevation: 431.8 Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray, silty CLAY - CL			
			2-2-3	SS1
			2-2-2	SS2
5	Medium stiff to very soft, brown and gray CLAY - CH			
			1-1-3	SS3
			89	ST4
10				
			0-0-0	SS5
15				
	Very soft, gray, silty CLAY with sand - CL			
			0-0-0	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - TV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150 01GEO - MEREDOSIA.GPJ GTINC 063301.GPJ 12/21/10

GROUNDWATER DATA

ENCOUNTERED AT 23 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148661.88' E: 2182476.0360'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-5

Project No. J017150.01

Surface Elevation: 450.8 Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock		
	FILL: black clay with sand pockets	3-6-10	SS1
	FILL: brown, fine sand, trace clay	3-8-9	SS2
5		4-6-7	SS3
	FILL: black ash and sand		ST4
10			ST5
	FILL: brown, fine sand, trace gravel	6-7-13	SS6
15			
	Very stiff, gray, silty CLAY with sand - CL ▽	0-5-15	SS7
20	Very loose, gray silty SAND - SM	0-0-0	SS8
25	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL)	0-1-3	SS9
30			
		0-0-0	SS10
35			
		0-0-0	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SR	App'vd. by: DW
Date: 10/26/10	Date: 11/22/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-6

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 450.8 Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL) *(continued)*			
			1-1-1	SS12
45				
	Dense, brown, fine to coarse SAND - SP			
			7-13-42	SS13
50	Boring terminated at 50 feet.			
55				
60				
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 063830I.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SHL	App'vd. by: DM
Date: 10/26/10	Date: 11/4/10	Date: 11/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-6

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 450.5 Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay, ash and sand		5-8-9	SS1
	FILL: brown, fine sand		2-6-6	SS2
5			4-6-9	SS3
	FILL: black sand and ash with clay lenses		3-6-5	SS4
10				SS5
			3-7-9	SS6
15				
			6-4-3	SS7
20	Medium stiff, brown, sandy CLAY - CL			
	Medium stiff to very soft, gray, silty CLAY with sand - CL		3-4-5	SS8
25			87 86	ST9
			95	ST10
30				
			1-0-0	SS11*
35				
			*	ST12

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 450.5 Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to very soft, gray, silty CLAY with sand - CL *(continued)*			
	sandy			ST13
45				
	Medium dense to dense, brown, fine to medium coarse SAND - SP		5-8-10	SS14
50			7-9-14	SS15
55			13-17-19	SS16
60	Boring terminated at 60 feet,			
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ● LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by:	App'vd. by:
Date: 10/26/10	Date: 12/20/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-7

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 451.1 | Completion Date: 10/20/10 | Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand		5-6-10	SS1
	FILL: brown sand, trace to some clay		2-4-6	SS2
5			0-5-7	SS3
			4-8-12	SS4
10	FILL: black clay with sand		0-4-6	SS5
				ST6
15				
	FILL: gray, clayey sand with black clay lenses		2-4-6	SS7
20			4-3-3	SS8
	Medium stiff, black to gray CLAY - CH		2-3-4	SS9
25				
			0-2-3	SS10
30	Medium stiff to soft, gray clayey SILT with sand - ML		101	ST11
				SS12
35				
			0-0-2	SS13

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 553801.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 20 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SL	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-8

Project No. J017150.01

Surface Elevation: 451.1 Completion Date: 10/20/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, gray clayey SILT with sand - ML *(continued)*			
	Dense to medium dense, brown, fine to coarse SAND with gravel - SP			
45			13-16-16	SS14
50			7-9-11	SS15
55			5-7-9	SS16
60			10-13-14	SS17
	Boring terminated at 60 feet.			
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC.0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-8

Project No. J017150.01

Surface Elevation: 433.6 Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, black and gray CLAY - (CH)			
			2-3-4	SS1
			1-1-1	SS2
5				ST3
			86	ST4
10				
	Soft to very soft, gray, silty CLAY with silt seams and sand - CL			
			0-1-1	SS6
15				
			0-1-2	SS7
20				
			0-0-0	SS8
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148133.361' E: 2182009.017'

Drawn by: KA	Checked by: SAC	App'vd. by: DAV
Date: 11/3/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-9

Project No. J017150.01

Surface Elevation: 433.2 | Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray silty CLAY, trace sand and wood - CL			
			2-3-3	SS1
5			2-2-3	SS2
			0-2-3	SS3
			0-1-2	SS4
10				
			95	ST5
15				
	Very loose to medium dense, gray, silty SAND with silty clay seams - SM			
			0-1-1	SS6
20				
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002.WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148120.612' E: 2181976.582'

Drawn by: KA	Checked by: SH	App'vd. by: DM
Date: 11/3/10	Date: 12/2/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-10

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

BORING LOG: TERMS AND SYMBOLS

GENERAL NOTES

1. *Information on each boring log is a compilation of subsurface conditions based on soil or rock classifications obtained from the field as well as from laboratory testing of samples. The strata lines on the logs may be approximate or the transition between the strata may be gradual rather than distinct. Water level measurements refer only to those ob - served at the times and places indicated, and may vary with time, geologic condition or construction activity.*
2. *Relative composition and Unified Soil Classification designations are based on visual estimates and are approximate only. If laboratory tests were performed to classify the soil, the unified designation is show in parenthesis.*
3. *Value given in Unit Dry Weight/SPT Column is either a unit dry weight in pounds per cubic foot, if adjacent to a ST sample designation, or blows per 6-inch increment if adjacent to a SS sample designation.*

ABBREVIATIONS

UU/2	*Shear Strength from Unconsolidated – Undrained Triaxial Test (ASTM D2850)*
QU/2	*Shear Strength from Unconfined Compression Test (ASTM D2166)*
SV	*Shear Strength from Field Vane (ASTM D2573)*
PL	*Plastic Limit (ASTM D4318)*
LL	*Liquid Limit (ASTM D4318)*

LEGEND

CS	Continuous Sampler
GB	Grab Sample Taken From Auger Cuttings Or Wash Water Return
NX 100/42	NX Rock Core with Percent Recovery/R.Q.D. Given In Adjacent Column
PST	Three Inch Diameter Piston Tube Sample
SS	Split Spoon Sample (Standard Penetration Test)
ST	Three Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
SV	Field Vane Test

SPLIT – BARREL SAMPLER DRIVING RECORD

Blow Per Foot (N-Value)	*Description*
25	*25 blows drove sampler 12 inches after initial 6 inches of seating.*
75/10"	*75 blows drove sampler 10 inches after initial 6 inches of seating.*
50/S3"	*50 blows drove sampler 3 inches during initial 6 inch seating interval.*

NOTES: 1. *To avoid damage to sampling tools, driving is limited to 50 blows during any six inch interval.*
2. *N-Value (Blow Count) is the standard penetration resistance based on the total number of blows, using a 140-lb hammer with 30-inch free fall, required to drive a split spoon the last two of three, 6-inch drive increments. (Example: 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4/7/9 In Unit Dry Weight – SPT column.*

RELATIVE COMPOSITION

Trace.....0-10 %
With/Some.....11-35 %
Soil modifier such..... > 35 %
As silty, clayey, sandy, etc.

DENSITY OF GRANULAR SOILS

Descriptive Term:	*N—Value*
Very Loose	*0 - 4*
Loose	*5 - 10*
Medium Dense	*11 - 30*
Dense	*31 - 50*
Very Dense	*> 50*

STRENGTH OF COHESIVE SOILS

Consistency	Undrained Shear Strength Tons Per Sq. Ft.	Field Test	Approximate N-Value Range
Very Soft	*less than 0.12*	*Thumb will penetrate soil more than 1"*	*0 - 1*
Soft	*13 to 0.25*	*Thumb will penetrate soil about 1"*	*2 - 4*
Medium Stiff	*0.26 to 0.50*	*Thumb will penetrate soil about ¼"*	*5 – 8*
Stiff	*0.51 to 1.00*	*Thumb hardly indents soil*	*9 – 15*
Very Stiff	*1.01 to 2.00*	*Thumb will not indent soil, but readily indented with thumbnail*	*16 – 30*
Hard	*greater than 2.00*	*Thumbnail will not indent soil*	*> 30*

SOIL GRAIN SIZE

U.S. STANDARD SIEVE

12"	3"	¾"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
300	76.2	19.1	4.76	2.00	0.42	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

SOIL STRUCTURE

Calcareous *– Having appreciable quantities of carbonate.*
Fissured *– Containing shrinkage or relief cracks, often filled with sand or silt; usually more or less vertical.*
Slickensided *– Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along those planes.*
Layer *-- Inclusion greater than 3 inches thick.*
Seam *– Inclusion 1/8 inch to 3 inches thick extending through the sample*
Parting *– Inclusion less than 1/8 inch thick.*
Pocket *– Inclusion of material of different texture that is smaller than the diameter of the sample.*
Interlayered *– Soil samples composed of alternating layers of different soil types.*
Intermixed *– Soil samples composed of pockets of different soil types and a layered or laminated structure is not evident.*
Laminated *– Soil sample composed of alternating partings or seams of different soil type.*

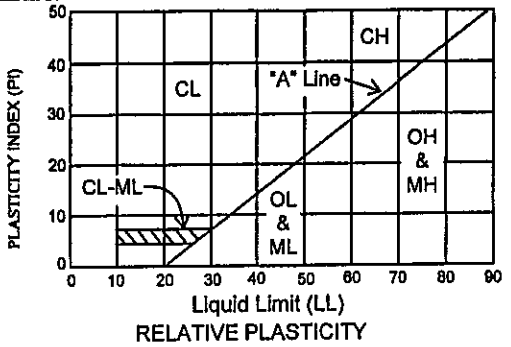
GEOTECHNOLOGY INC
FROM THE GROUND UP

Electronic Filing: Received, Clerk's Office 09/28/2020

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL	DESCRIPTION
Coarse-Grained Soils (More than 50% Larger than No 200 Sieve Size)	Gravel and Gravelly Soils	Clean Gravels Little or no Fines	GW	Well-Graded Gravel, Gravel-Sand Mixture
			GP	Poorly –Graded Gravel, Gravel-Sand Mixture
		Gravels with Appreciable Fines	GM	Silty Gravel, Gravel-Sand-Silt Mixture
			GC	Clayey-Gravel, Gravel-Sand-Clay Mixture
	Sand and Sandy Soils	Clean Sands Little or no Fines	SW	Well-Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sands with Appreciable Fines	SM	Silty Sand, Sand-Silt Mixture
			SC	Clayey Sand, Sand-Clay Mixture
Fine-Grained Soils (More than 50% Smaller than No 200 Sieve Size)	Silts and Clays	Liquid Limit Less Than 50	ML	Silt, Clayey Silt, Silty or Clayey Very Fine Sand, Slight Plasticity
			CL	Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity
			OL	Organic Silts, or Silty Clays of Low Plasticity
	Silts and Clays	Liquid Limit More Than 50	MH	Silt, Fine Sandy or Silt Soil with High Plasticity
			CH	Clay, High Plasticity
			OH	Organic Clay of Medium to High Plasticity
	Highly Organic Soils		PT	Peat, Humus, Swamp Soil

PLASTICITY CHART



RELATIVE PLASTICITY

Nonplastic	Cannot Roll Into Ball
Trace Plasticity	Barely Roll Into Ball
Medium Plastic	Can be Rolled Into Ball
Highly Plastic	No Rupture by Kneading

VISUAL DESCRIPTION CRITERIA*

TABLE 1: CRITERIA FOR DESCRIBING ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

TABLE 2: CRITERIA FOR DESCRIBING PARTICLE SHAPE

Description	Criteria
Flat	Particles with width/thickness X3
Elongated	Particles with length/width X3
Flat and Elongated	Particles meet criteria for both flat and elongated

TABLE 3: CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below the water table

TABLE 4: CRITERIA FOR DESCRIBING REACTION WITH HCL

Description	Criteria
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming rapidly

TABLE 6: CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

TABLE 8: CRITERIA FOR DESCRIBING DRY STRENGTH

Description	Criteria
None	The dry specimen crumbles into powder with mere pressure of handling
Low	The dry specimen crumbles into powder with some finger pressure
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure
High	The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface.
Very High	The dry specimen cannot be broken between the thumb and a hard surface

TABLE 9: CRITERIA FOR DESCRIBING DILATANCY

Description	Criteria
None	No visible change in the specimen
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

TABLE 10: CRITERIA FOR DESCRIBING TOUGHNESS

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness

TABLE 12: IDENTIFICATION OF INORGANIC FINE-GRAINED SOILS FROM MANUAL TESTS

Soil Symbol	Dry Strength	Dilatancy	Toughness
ML	None to low	Slow to rapid	Low or thread cannot be formed
CL	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
CH	High to very high	none	High

*NOTES: 1. Tables adapted from ASTM D2488 "Description and identification of Soils" (Visual-Manual Procedure)
2. Tables 5, 7 and 11 incorporated into other information on this plate.

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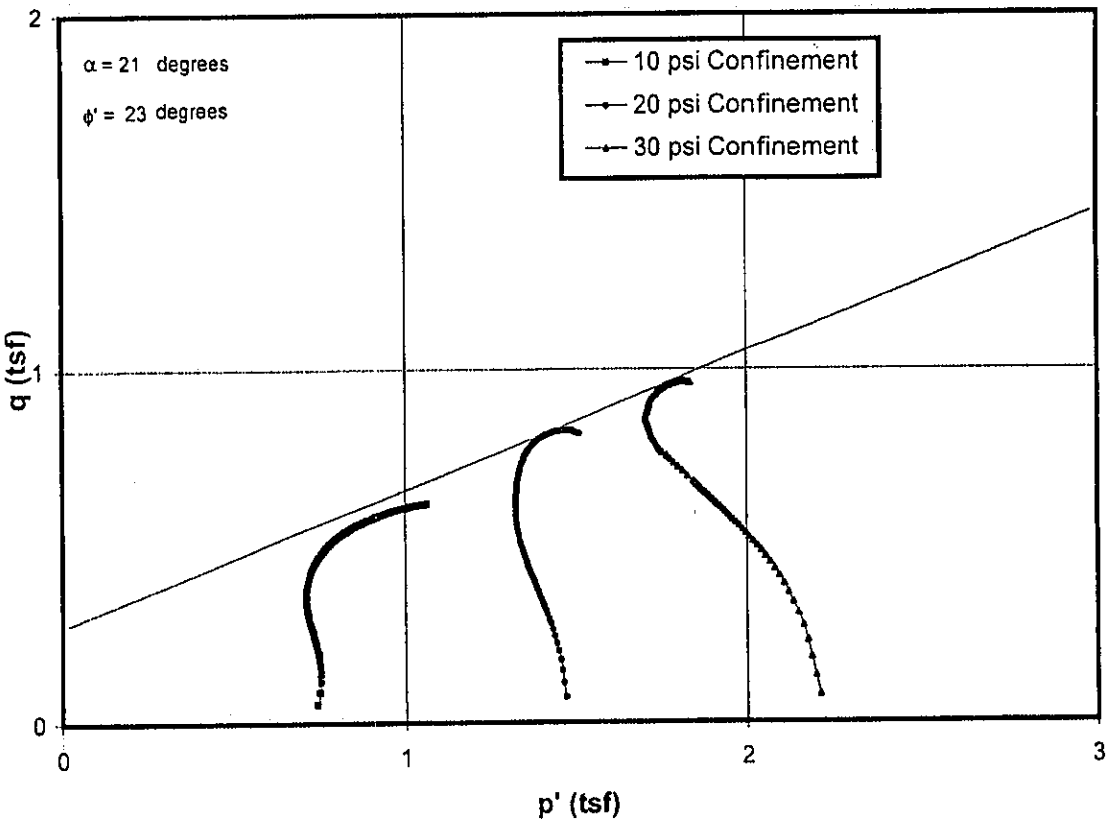
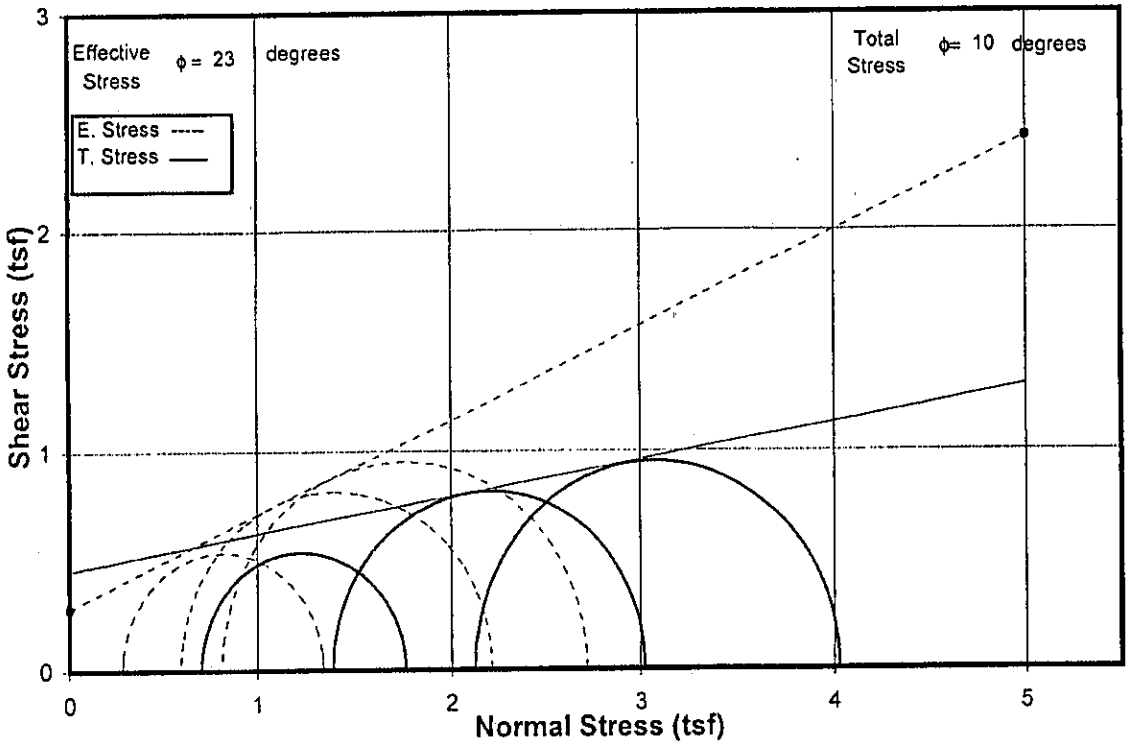
ATTACHMENT B

LABORATORY TEST RESULTS

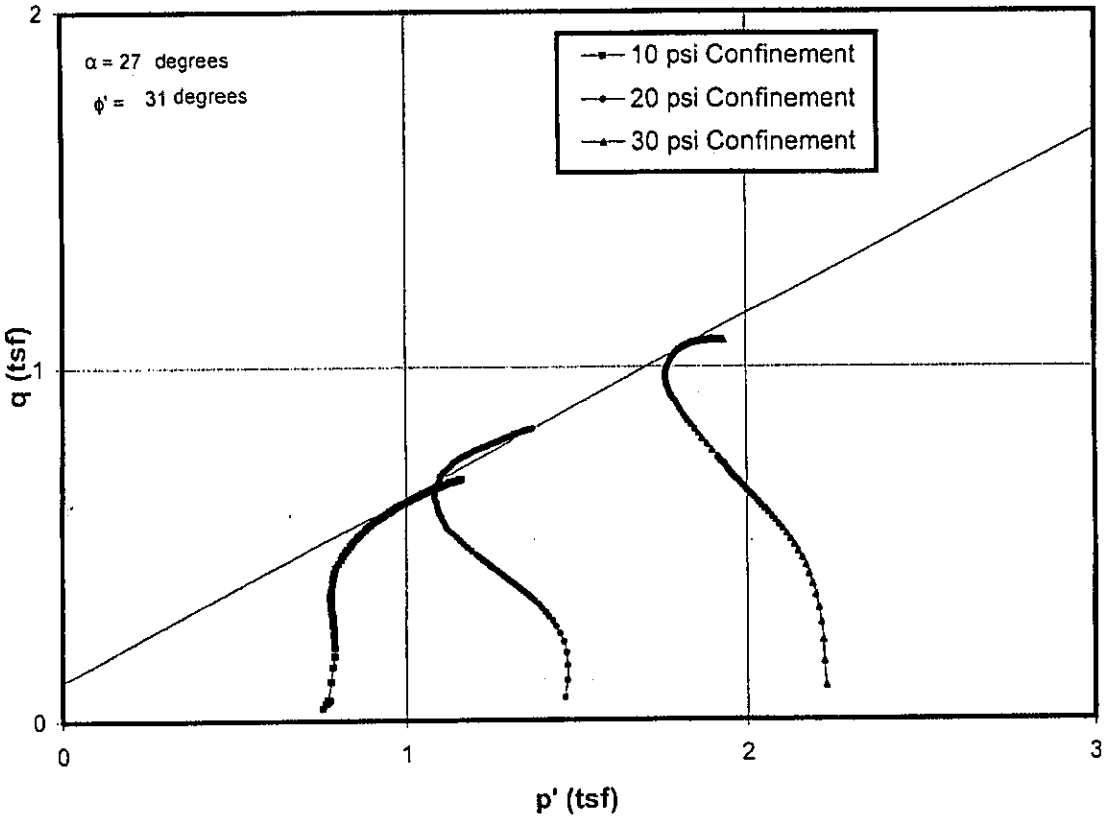
GEOTECHNOLOGY INC
FROM THE GROUND UP

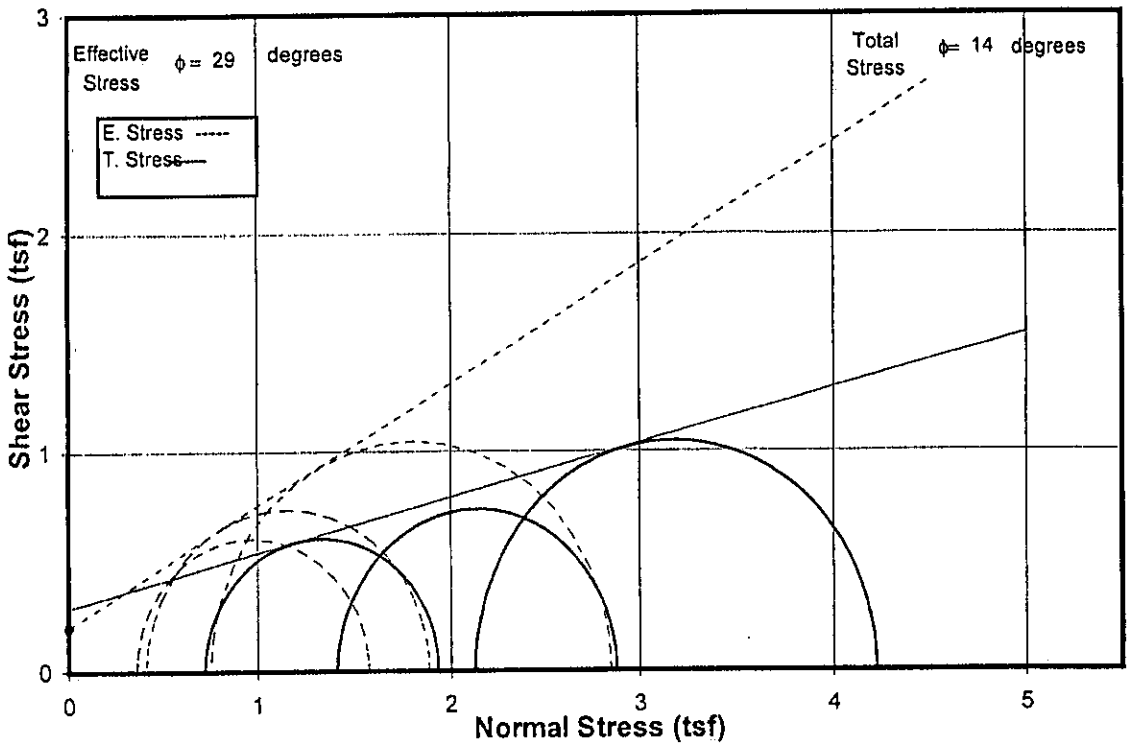




CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D 4767
Project No.: J017150.01
Boring: B-1
Sample: ST-8, ST-9, ST-9 - Depth: 26, 28, 28

GEOTECHNOLOGY INC
FROM THE GROUND UP



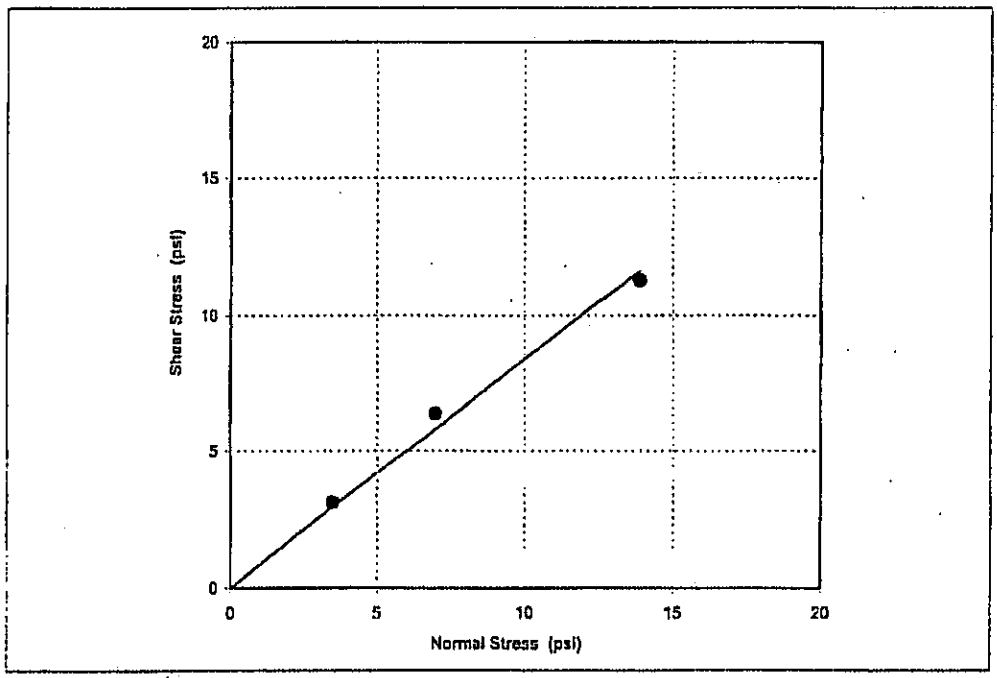


CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D 4767
Project No.: J017150.01
Boring: B-7
Sample: ST-10, ST-9, ST-9 - Depth: 28, 26, 26

DIRECT SHEAR TEST DATA

ASTM D 3080

Project Number:	J017150.01	Boring Number.:	B-1
Project Name:	Ameren-Meredosia	Sample Number:	SS-11, SS-12
Project Location:	–	Sample Depth (ft):	38.5' - 45.0'



Trial Number	Normal Stress (psi)	Shear Stress (psi)	Normal Stress (psf)	Shear Stress (psf)	ϕ (degrees)
1	3.5	3.1	500	445	39.9
2	6.9	6.4	1000	923	
3	13.9	11.3	2000	1626	

Atterberg Limits:		Standard Proctor Results:	
Liquid Limit:	–	Max. Dry Density:	N/A
Plastic Limit:	–	Opt. Moisture Content:	N/A
Plasticity Index:	NP		

Soil Classification: SAND, medium grained, brown, medium dense - (SP)

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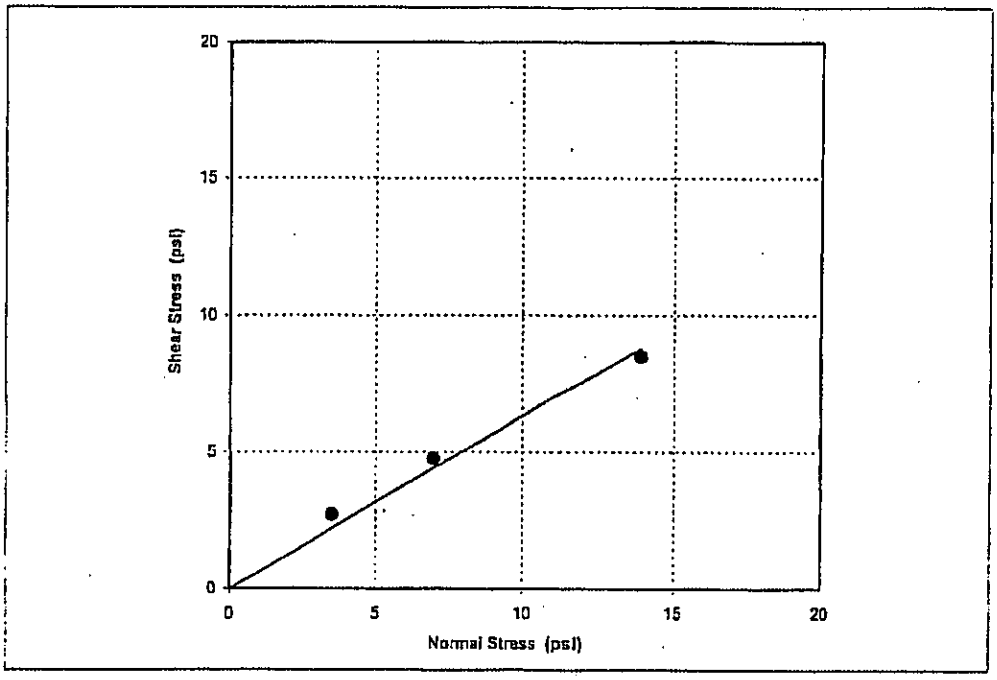
DIRECT SHEAR TEST DATA

ASTM D 3080

Project Number:	J017150.01	Boring Number.:	B-1
Project Name:	Ameren-Meredosia	Sample Number:	SS-2
Project Location:	--	Sample Depth (ft):	6.0' - 7.5'



Trial Number	Normal Stress (psi)	Shear Stress (psi)	Normal Stress (psf)	Shear Stress (psf)	ϕ (degrees)
1	3.5	2.7	500	389	32.3
2	6.9	4.7	1000	684	
3	13.9	8.5	2000	1218	

Atterberg Limits:		Standard Proctor Results:	
Liquid Limit:	--	Max. Dry Density:	N/A
Plastic Limit:	--	Opt. Moisture Content:	N/A
Plasticity Index:	NP		

Soil Classification: SAND, fine grained, brown, loose - (SP)

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ATTACHMENT C

SLOPE STABILITY ANALYSIS RESULTS

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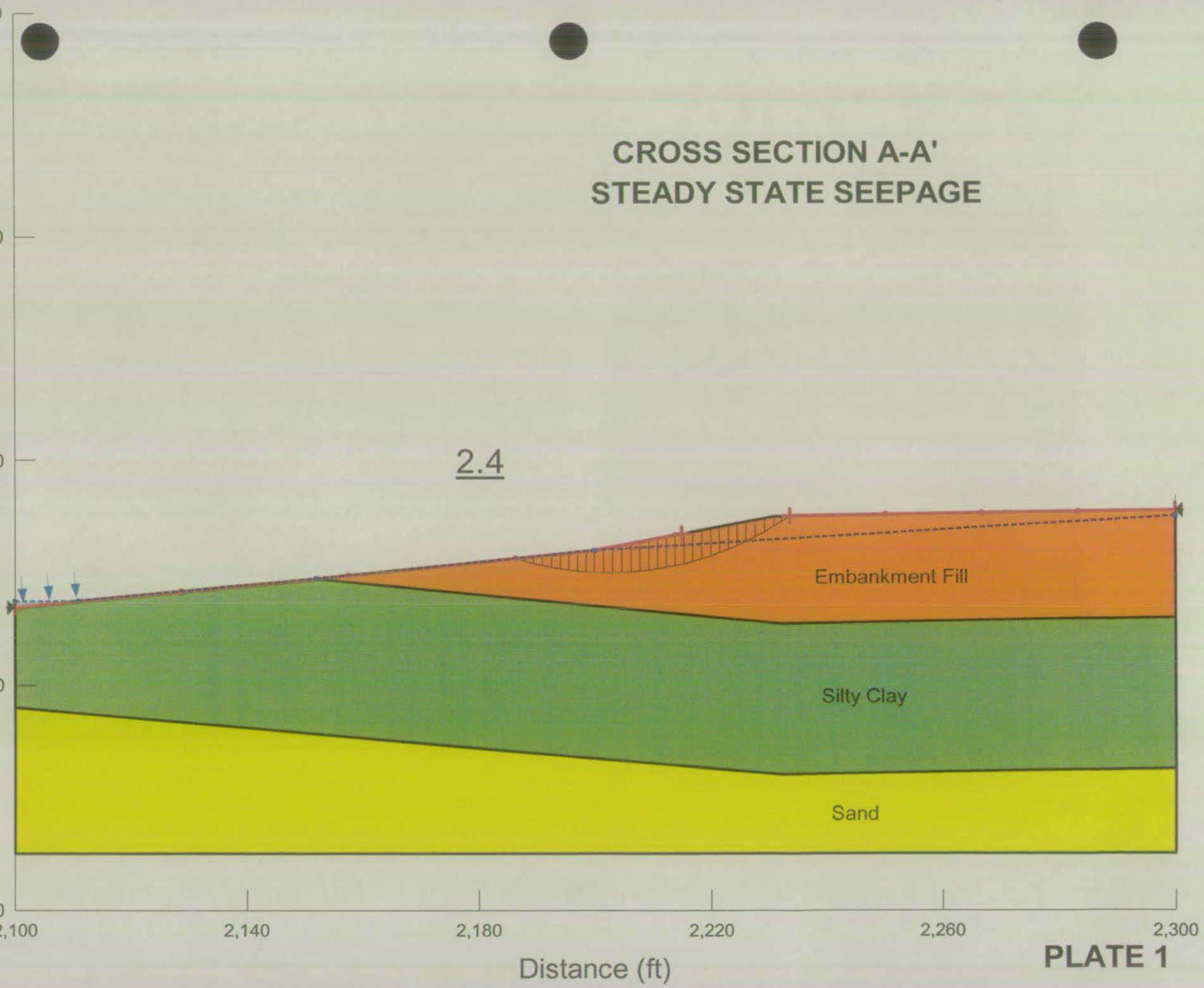

PLATE 1

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CROSS SECTION A-A'
STEADY STATE SEEPAGE AT MAJOR FLOOD STAGE

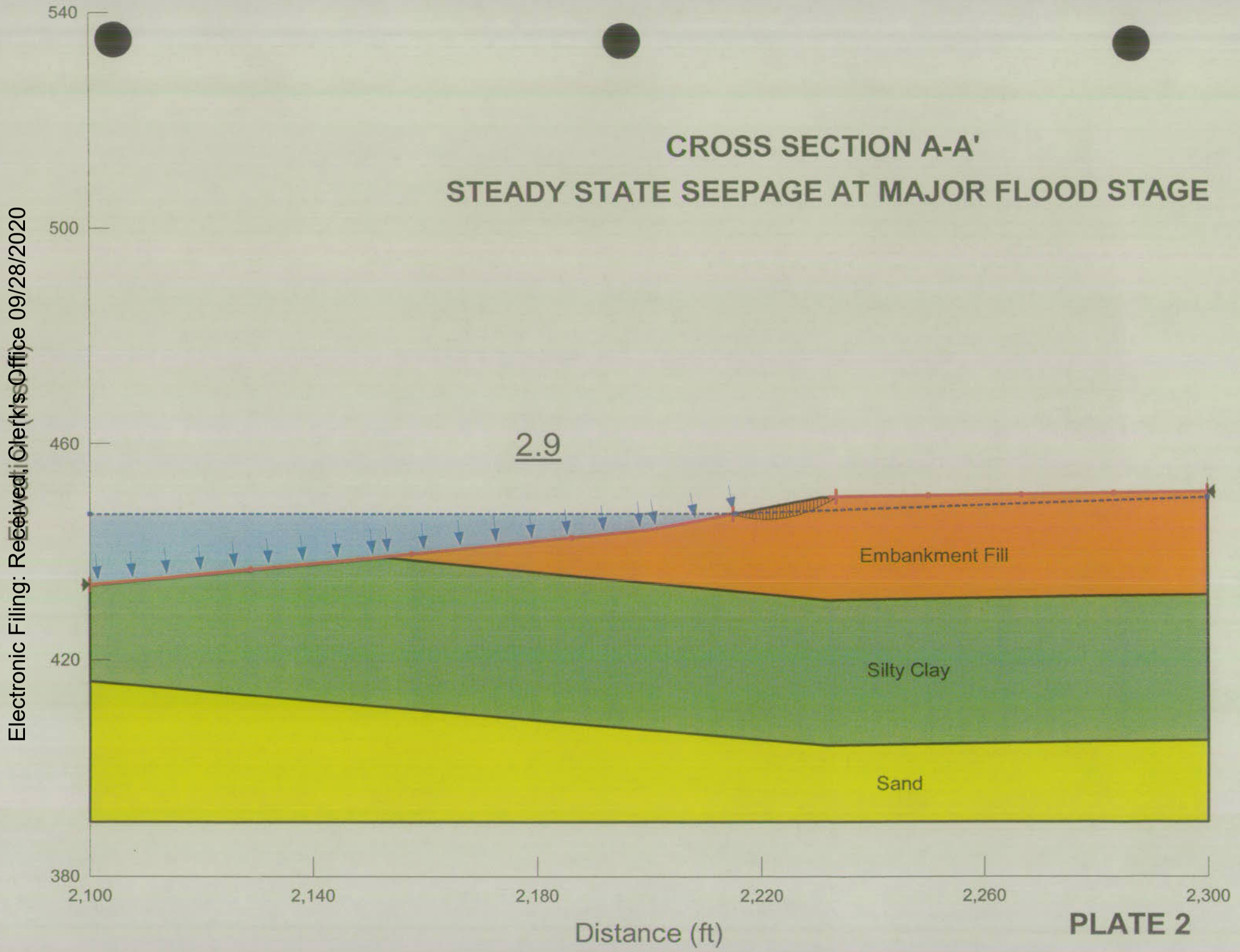

PLATE 2

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CROSS SECTION A-A'
RAPID DRAWDOWN FROM MAJOR FLOOD STAGE

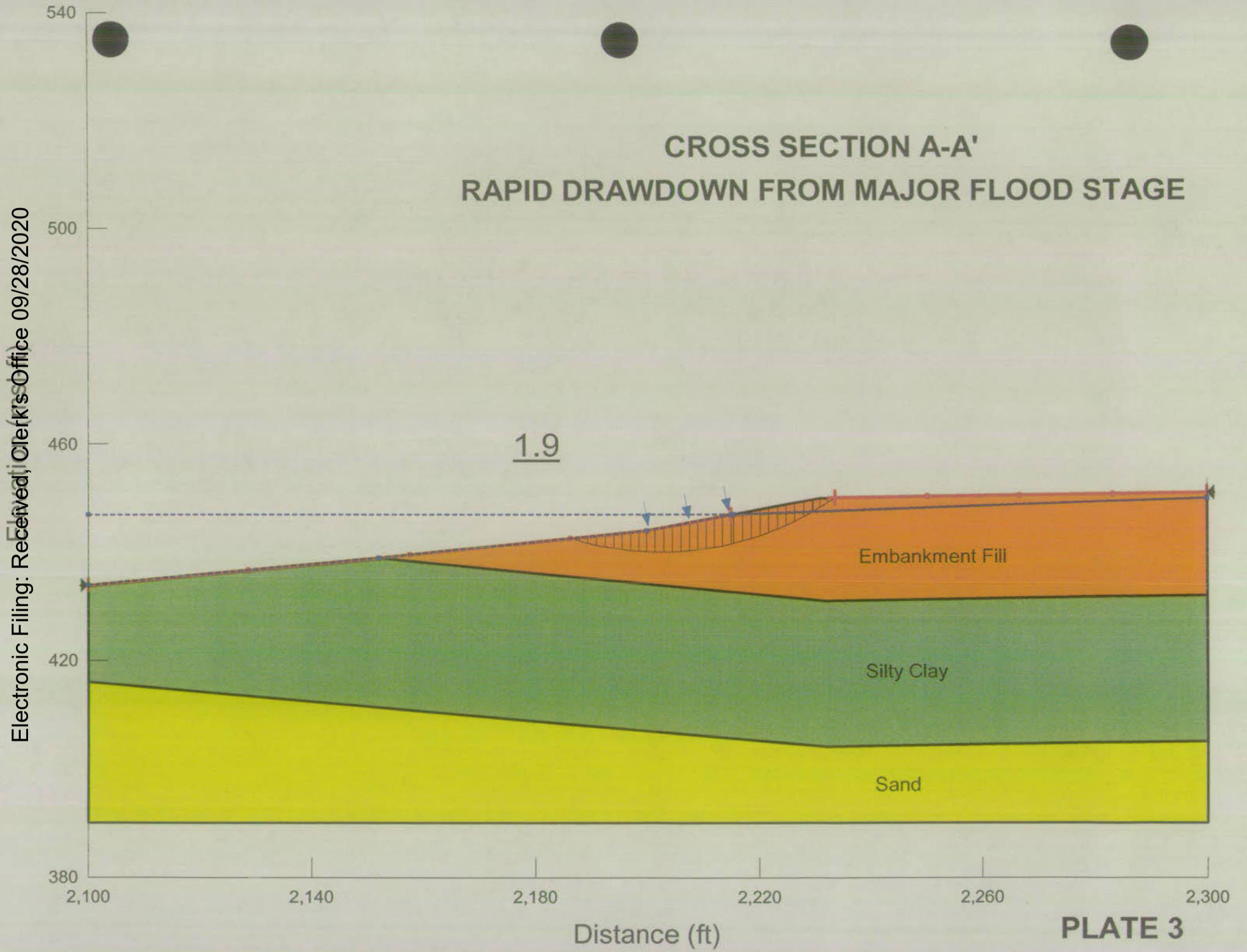

PLATE 3

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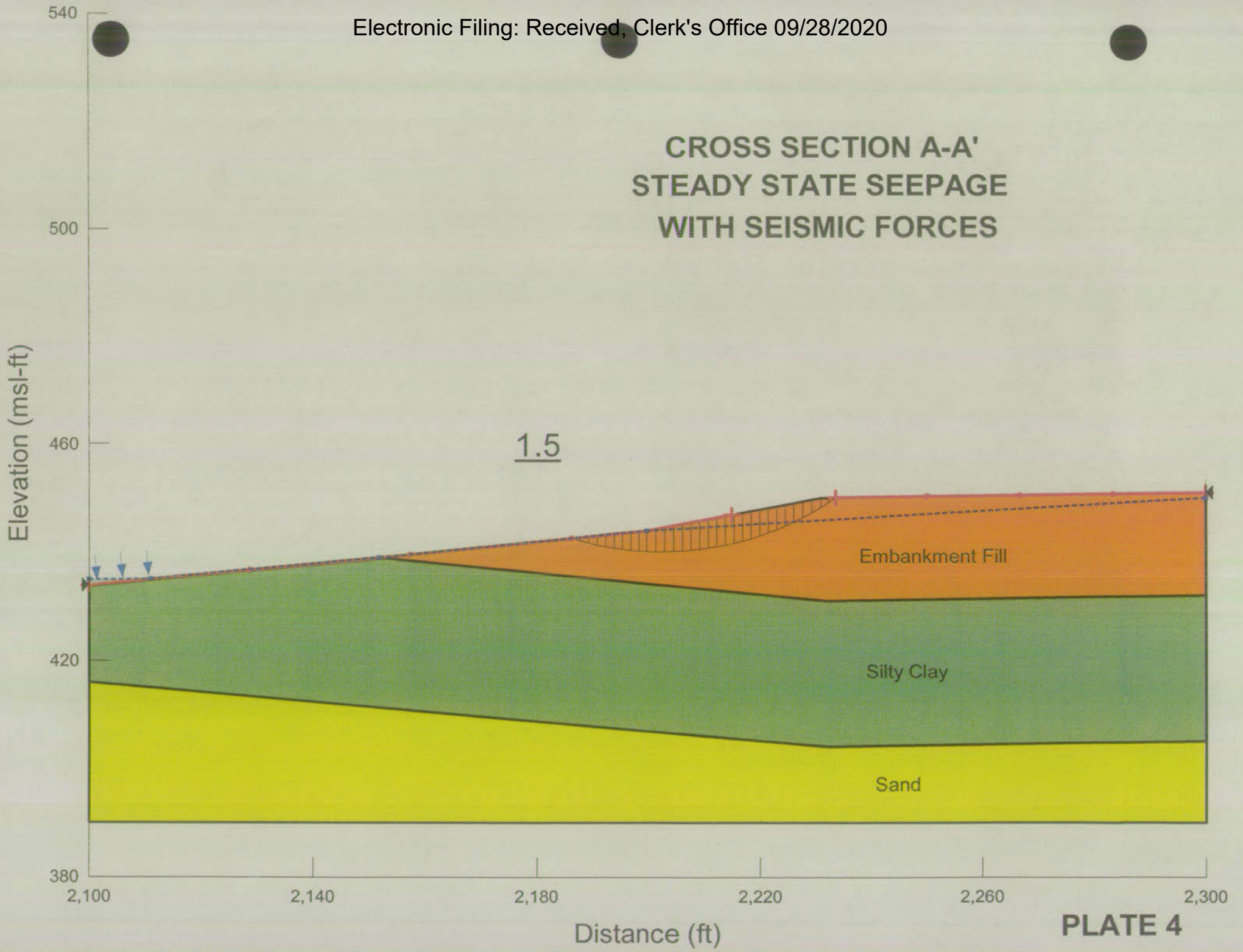

PLATE 4

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CROSS SECTION B-B'
STEADY STATE SEEPAGE

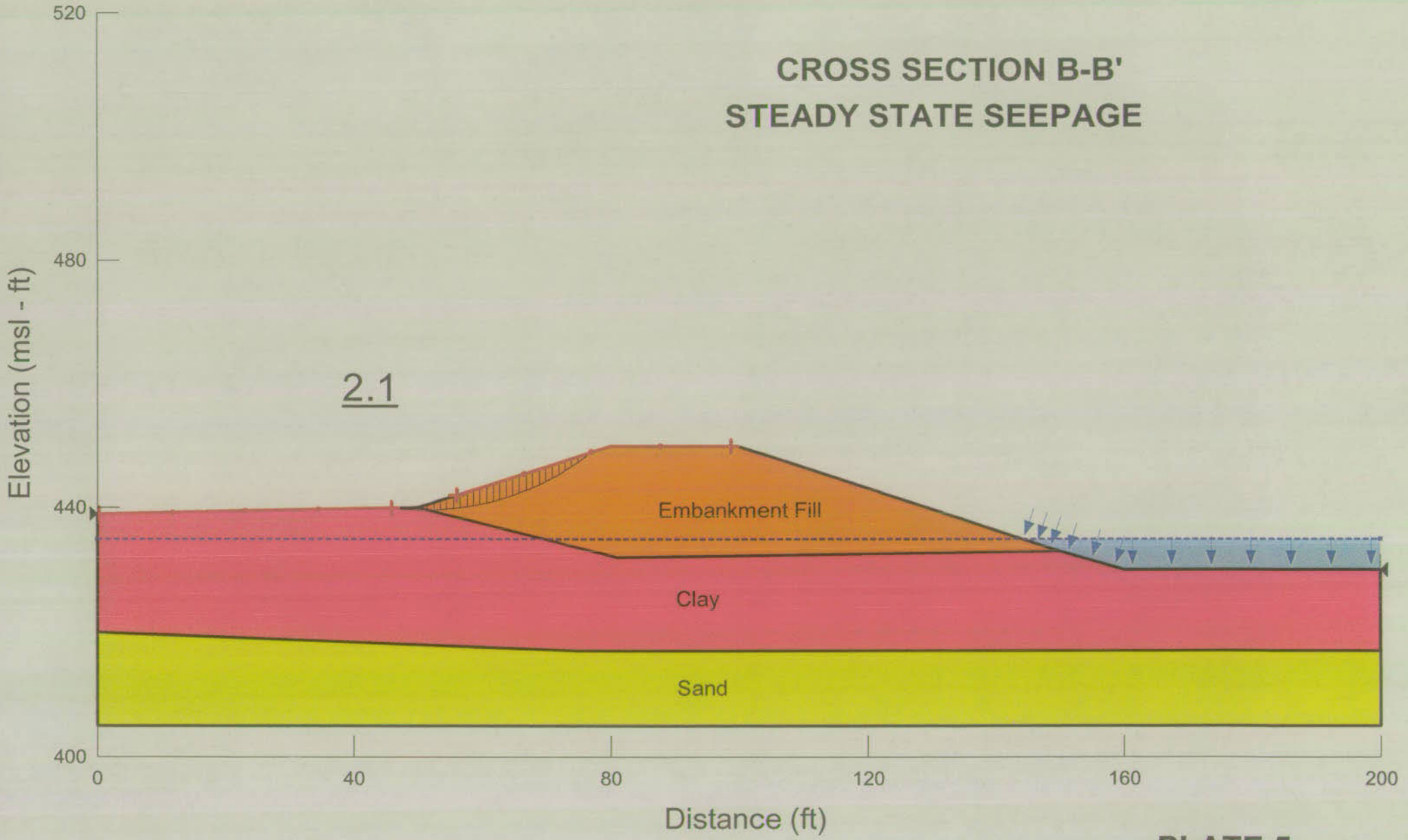

PLATE 5

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CROSS SECTION B-B'
STEADY STATE SEEPAGE AT MAJOR FLOOD STAGE

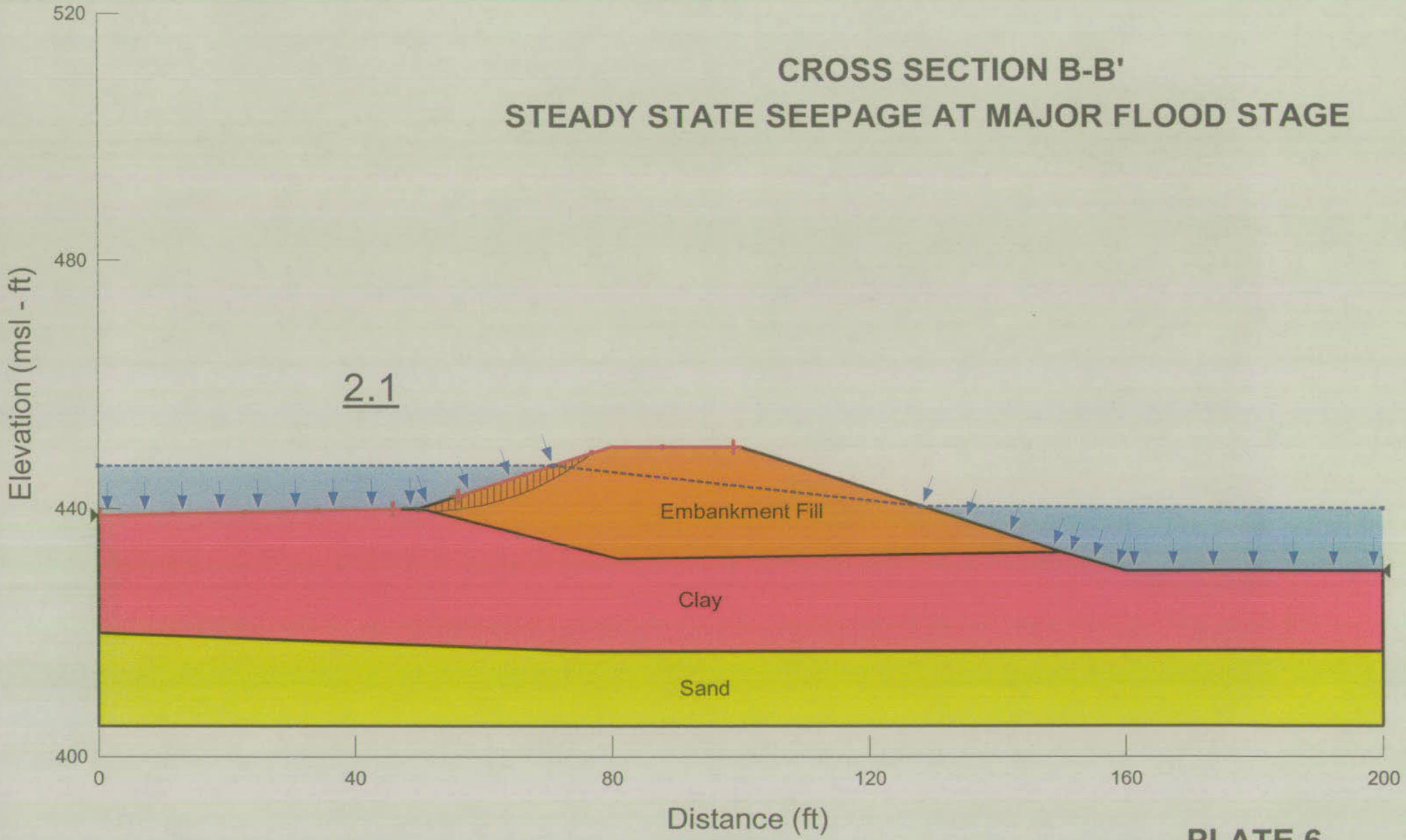

PLATE 6

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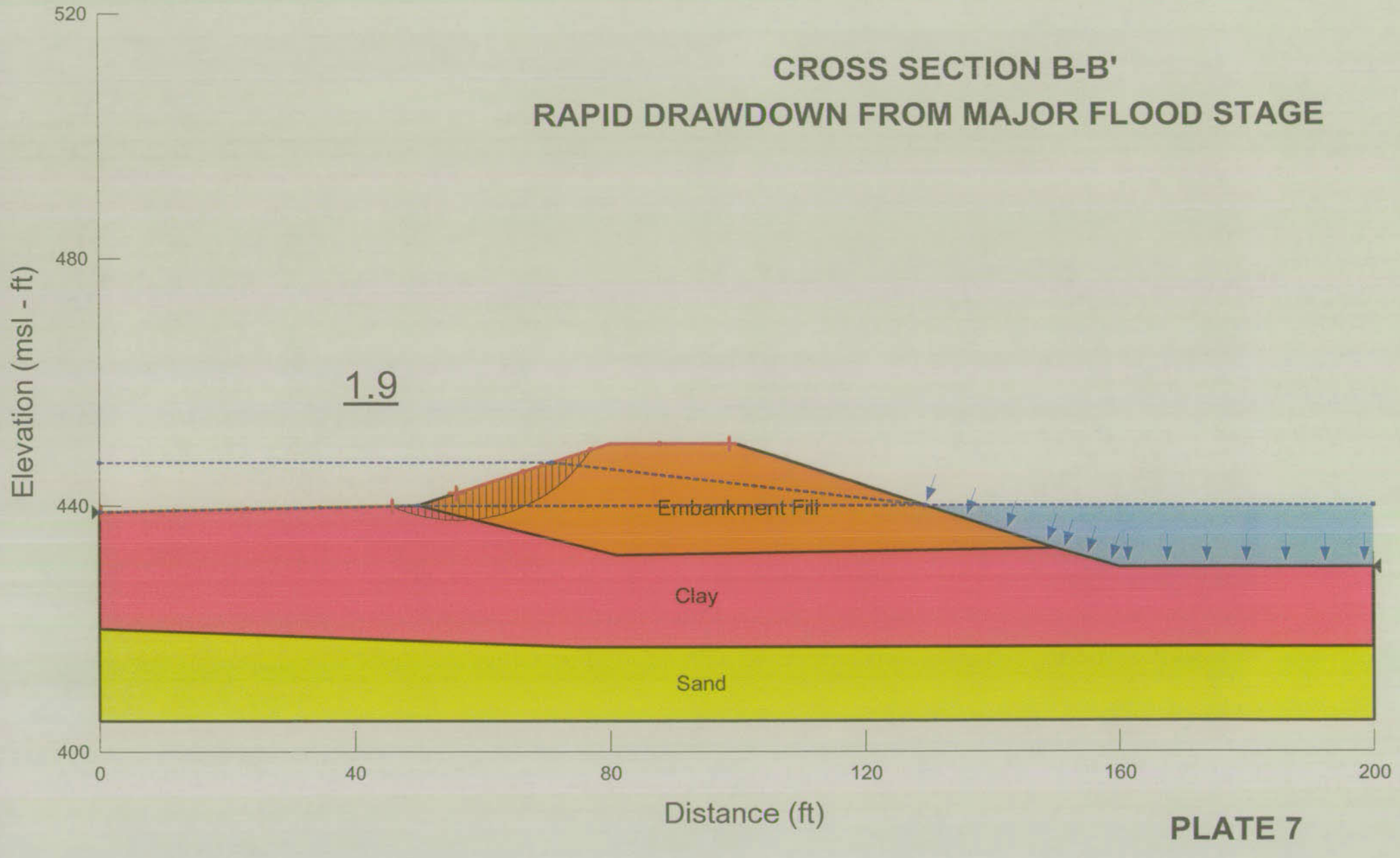

PLATE 7

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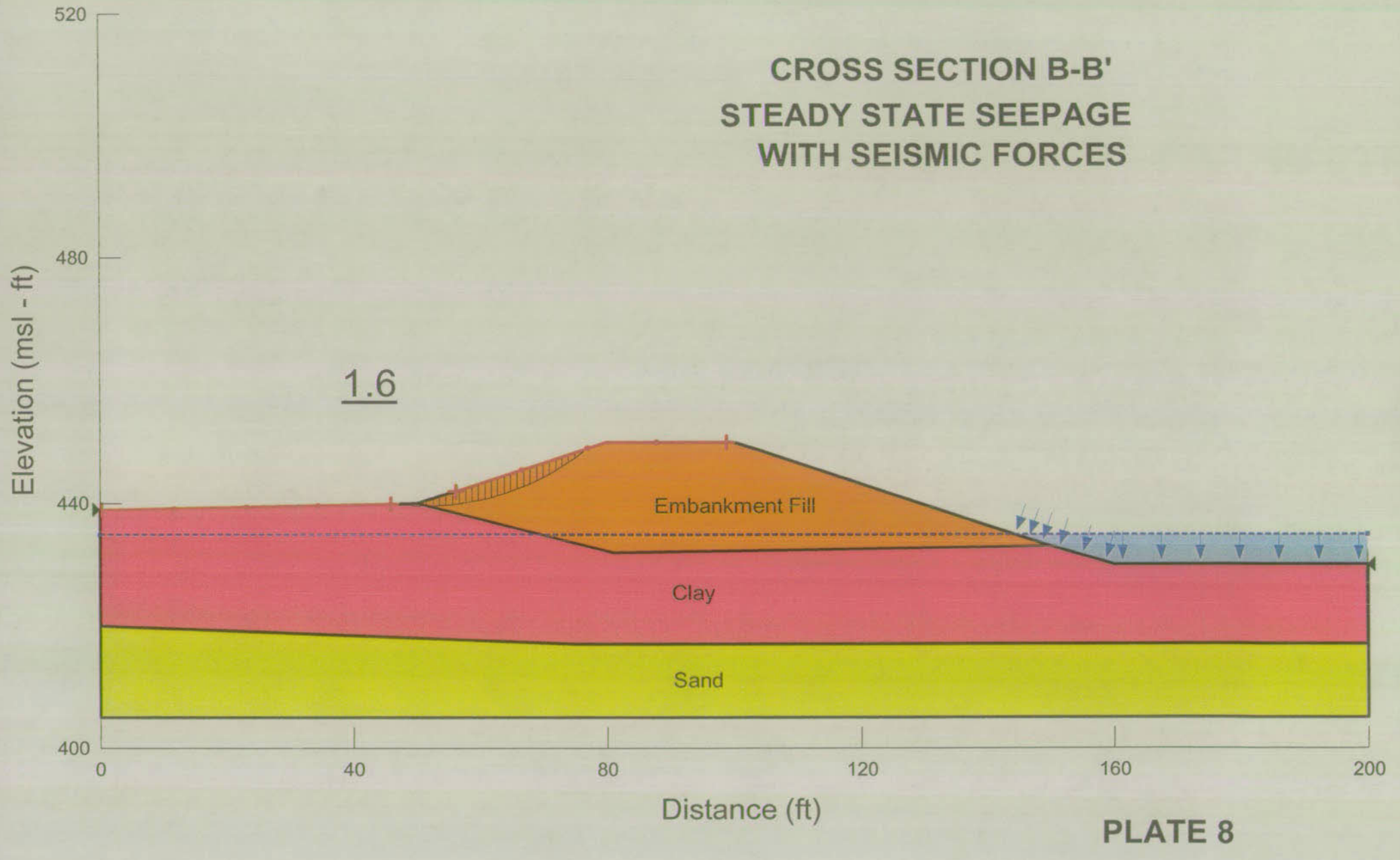

PLATE 8

ATTACHMENT A

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HYDROGEOLOGIC ASSESSMENT REPORT
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 4, 2016

J024917.01

HYDROGEOLOGIC ASSESSMENT REPORT
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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HYDROGEOLOGIC ASSESSMENT REPORT
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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HYDROGEOLOGIC ASSESSMENT REPORT
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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HYDROGEOLOGIC ASSESSMENT REPORT
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

1.0 INTRODUCTION

AmerenEnergy Median Valley Cogen, LLC (Ameren) has retained Geotechnology, Inc. (Geotechnology) to provide design services for the closures of a fly ash pond and a bottom ash pond at their Meredosia, Illinois power station. We understand that the closure rules for the Meredosia ash ponds are similar to those defined for ash pond closures at Ameren's Hutsonville Power Station - Hutsonville, Illinois in January 2011 under Illinois Administrative Code (IAC) Title 35, Part 840, Subpart A: *Closure of Ash Pond D, Hutsonville Power Station.* These rules address the hydrogeologic site investigation, groundwater monitoring, groundwater collection and discharge, final slopes and stabilization, final cover system, closure plan, and post-closure maintenance and care.

The Meredosia Power Station in Morgan County, Illinois is owned by AmerenEnergy Medina Valley Cogen, LLC and operated by the Ameren Energy Generating Company from 1948 to 2011, when the power station was closed. The Meredosia Power Station has three coal combustion product impoundments including: the Bottom Ash Pond, the Fly Ash Pond and the Old Ash Pond. The Old Ash Pond was previously closed.

This document comprises the Hydrogeologic Assessment and includes a review and update of previous hydrogeologic assessment documents prepared by others for the Meredosia Power Station. Additionally, subsurface data collected from the October 2015 subsurface investigation and monitoring well installation activities are incorporated into this assessment. Hydrogeologic assessment data was compiled from previously presented information including the March 2013 Phase I Hydrogeological Assessment Report prepared by Natural Resource Technology Environmental Consultants (NRT)[1] and the November 2009 Site Characterization and Groundwater Monitoring Plan for CCP Impoundments prepared by Rapps Engineering and Applied Science (Rapps)[2].

---

[1] *Phase I Hydrogeological Assessment Report, Coal Combustion Product Impoundments, Meredosia Power Station, Morgan County, Illinois;* prepared by Natural Resource Technology, Inc. for Ameren Energy Generating Company; Project No. 2124, dated March 19, 2013.

[2] *Site Characterization and Groundwater Monitoring Plan For CCP Impoundments, Ameren Energy Generating Company, Meredosia Power Station, Morgan County, Illinois;* prepared by Rapps Engineering and Applied Science for Ameren Services; dated November 2009.

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2.0 PHYSICAL SETTING

The Meredosia Power Station is located at 800 South Washington Street, Meredosia, Illinois. The Fly Ash and Bottom Ash Ponds are located southwest of the former coal pile and plant facilities. The site location and topography are shown on Plate 1. An aerial photograph site plan showing existing structures, ash ponds, and monitoring well/boring locations is included as Plate 2. The Meredosia Power Station is located in the floodplain of the Illinois River which borders the site to the west.

The Meredosia Power Station ash ponds are located in the south half of Section 21 and the north half of Section 28, T.16N, R.13W. The Bottom Ash Pond was constructed in 1972 with a design surface area of 11 acres, a height of 24 feet, and a volume of approximately 90 acre-feet. The Fly Ash Pond was constructed in 1968 and has a design surface area of 44.8 acres, a height of 24 feet, and a volume of approximately 500 acre-feet.

3.0 REGIONAL GEOLOGY

The Meredosia Power Station is located near the western edge of the Springfield Plain Subsection of the Till Plains Section, Central Lowland Province, Interior Plains Physiographic Region. The Interior Plains Physiographic Region extends across the Laurentian craton of central North America. It is comprised of the Great Plains and Central Lowland Provinces. The Central Lowlands Province to the east formed from eroded sediments from the topographically-higher Great Plains Province to the west (Fenneman, 1922).

The Till Plains Section of the Central Lowland Province is subdivided into seven areas in Illinois. Four of the subdivisions are in Illinoian-aged drift (Willman et al., 1975). The Springfield Plain comprises the western half of the Illinoian-aged till plain. It is level to undulatory and exhibits relatively shallow drainages. The southern boundary is observed where the drift thins and the underlying bedrock control becomes prominent. It is characterized by smoothed features and glacial landforms. The Illinois River forms the northwestern border of the Springfield Plain.

3.1 Bedrock Stratigraphy. The Meredosia Power Station and surrounding areas within the Illinois River valley are underlain by Mississippian System bedrock of the Lower Valmeyeran Series which consists of the Meppen Limestone, Fern Glen formation, and the Burlington-Keokuk Limestone (Kolata, 2005). A bedrock geology map of the site and surrounding areas is included as Plate 3.

Willman et al. (1975) describe the Meppen Limestone as a tan or buff, very fine-grained dolomitic limestone or calcareous dolomite. The formation is slightly crinoidal and contains calcite geodes up to 2-inches in diameter. The maximum thickness of this formation is

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approximately 22 feet. The Fern Glen formation consists of calcareous shale, limestone, and dolomite. Dolomitic portions of the formation are partially argillaceous. The limestone portions of the formation contain nodules of greenish-gray chert. The thickness of the formation can range from approximately 50 to 100 feet. The Burlington formation of the Burlington-Keokuk Limestone is described as a "very pure, coarsely crystalline, crinoidal, light gray limestone in medium to thick beds." The Burlington formation also contains beds of fine-grained, brownish-gray, dolomitic limestone. The formation is approximately 100 to 150 feet thick in Illinois. The Keokuk formation of the Burlington-Keokuk Limestone is composed of beds of fossiliferous, crinoidal limestone interbedded with fine-grained limestone, argillaceous dolomite, and calcareous gray shale. The Keokuk formation is approximately 60 to 80 feet thick in Illinois.

3.2 Surficial Geology. The Meredosia Power Station is situated within the Illinois River valley. The overburden soils consist of channel and floodplain deposits of the Cahokia formation underlain by glacial outwash deposits belonging to the Henry formation. Fine-grained lacustrine deposits of the Equality formation are present in the subsurface, but are discontinuous. These formations occur throughout Illinois in valley bottoms and floodplains as channel deposits in present-day rivers and streams.

The Cahokia Alluvium consists mainly of poorly-sorted silt, clay, and silty sand, but locally contains lenses of sand and gravel. The upper part consists of overbank silt and clays. The lower portion consists of coarse-textured sand and lateral accretion deposits. The Cahokia formation may be up to 20 feet thick in the area of the Meredosia Power Station (Berg and Kempton, 1987).

The Henry formation consists of glacial sand and gravel outwash. The Henry formation is subdivided into three members that differ in lithology: the Batavia Member (outwash plains), the Mackinaw Member (valley trains), and the Wasco Member (ice-contact deposits) (Willman and Frye, 1970; Willman et al., 1975). Based on information from well logs, the thickness of the Henry formation ranges from 60 to 84 feet in the area of the Meredosia Power Station.

The Equality formation consists of bedded silt and clay deposits in glacial and post-glacial lakes. Gravel, sand, and organic deposits occur in lenses that intertongue with the Henry formation. In the area of the Meredosia Power Station, the Equality formation overlies the Henry formation and generally occurs as lenses or patches not exceeding 20 feet thick.

Geotechnology has conducted subsurface explorations of the overburden soils at the Meredosia Power Station. The subsurface exploration and laboratory testing efforts are discussed further in Section 4.0.

3.3 Surface Water. The major surface water body in the vicinity of the Meredosia Power Station is the Illinois River, which flows from the north-northeast to the south-southwest, and borders the west side of the site. The normal pool elevation of the Illinois River is approximately

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421.0 feet[3]. Information from the U.S. Army Corps of Engineers indicates the Illinois River flood stage is 435.0 feet above mean sea level (MSL). The record high stage was 446.69 feet above MSL on May 26, 1943, and the record low stage was 418.40 feet above MSL on January 11, 1940.

Meredosia Lake is a backwater lake located north of the Village of Meredosia within the Illinois River valley and within the Meredosia National Wildlife Refuge. Meredosia Lake is approximately 1.5 miles north of the Meredosia Power Station. Smith Lake is located approximately 1-mile south of the Meredosia Power Station and is connected to Seaman's Pond. Westerly-flowing streams drain the uplands to the east of the Meredosia Power Station. Easterly-flowing streams and drainage channels drain the floodplain across the Illinois River to the west of the Meredosia Power Station.

3.4 Groundwater. Groundwater within and near the Illinois River valley is obtained from the sand and gravel deposits of the Henry formation and to a lesser extent from wells drilled into the Mississippian-age Burlington-Keokuk Limestone and Salem Limestone. A summary of the water supply wells identified within 1-mile of the Meredosia Power Station is presented in Table 1 below. The water supply well information is included as Appendix A. The approximate locations of the water supply wells are depicted on Plate 4.

TABLE 1 – WATER SUPPLY WELL SUMMARY

Owner	Wells	On/Off Site	Type	Status
CIPS*	42	On Site	Water Supply	Abandoned (except 4)
National Starch	15	Off Site	Water Supply	Unknown
Village of Meredosia	6	Off Site	Public Supply	In Use
IDOT	4	Off Site	Test Borings	Not Wells
W.R. Grace	2	Off Site	Water Supply	Unknown
T.A. Terminal	2	Off Site	Water Supply	Unknown
Illinois Road Contractors	1	Off Site	Water Supply	Unknown

*Central Illinois Public Service Company

The water supply wells were located using the Illinois State Geological Survey (ISGS) *Illinois Water Well* (ILWATER) *Internet Map Service,* the Illinois State Water Survey's *Domestic Wells Database*, the Illinois Environmental Protection Agency (IEPA) web-based Geographic Information System (GIS) files, Illinois Department of Health (IDPH) records, and Morgan County Health Department records.

[3] Elevations herein refer to the mean sea level datum in feet (msl-ft).

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3.4.1 Private Water Supply Wells. Approximately 62 private water supply wells and 4 non-well test borings were identified within 1-mile of the Meredosia Power Station. Twenty of the private water supply wells are off-site. The status of the wells are unknown at this time, but are assumed to be in-use. The twenty off-site private water supply wells are up-gradient or cross-gradient from the site and are not anticipated to be impacted from the site. Groundwater sampling and testing results further support that the twenty off-site water supply wells are not expected to be impacted.

The other 42 private water supply wells are located at the Meredosia Power Station. According to site records, personnel interviews, and field reconnaissance, 38 of the on-site water supply wells have been abandoned. Two wells are no longer used, but have not been abandoned. One well is shut down and one currently supplies water to the restrooms/showers on the site. Once the former power plant is demolished and the ash pond closure activities are complete, these four supply wells will be abandoned. Additional water needs at the Meredosia Power Station are provided by the Village of Meredosia public water supply.

3.4.2 Public Water Supply Wells. According to the mapping sources referenced in Section 3.4.1, public water supply wells are not located within 1-mile of the Meredosia Power Station. The closest public water supply wells to the Meredosia Power Station belong to the Village of Meredosia. The six public water supply wells are situated approximately 1.2 miles to the north-northeast. Although the wells are beyond 1-mile from the facility, the locations are depicted on Plate 4 and the water supply well information is included in Appendix A for reference.

Per the IEPA database, two of the Village of Meredosia public water supply wells have a minimum setback of 400 feet and a second setback of 1,000 feet due to the Phase I Wellhead Protection Area (WHPA). A third Village of Meredosia public water supply well has a Phase II WHPA, which has an extended area of protection that includes the recharge area or geographic area surrounding the well that supplies potable water to a community.

3.4.3 Oil and Gas Wells. Oil and gas wells within a 1-mile radius of the Meredosia Power Station were identified using the Illinois State Geological Survey *Illinois Oil and Gas Resources* (ILOIL) *Internet Map Service*. ILOIL contained records for three wells within the search radius, but the status of the three wells was listed as dry, abandoned and plugged.

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4.0 SUBSURFACE INVESTIGATION

4.1 Subsurface Investigations. From October 19 through October 26, 2010, Geotechnology advanced 15 borings at the Meredosia Power Station. Ten of the borings (B-1 through B-10) were drilled in support of a global stability evaluation, while the remaining five borings were completed as Monitoring Wells APW-1 through APW-5 in support of groundwater monitoring activities. The borings were drilled using a truck-mounted CME 550 rotary drill rig equipped with 4-1/4-inch hollow stem augers. The borings were drilled to depths ranging from 25 to 60 feet below land surface (bls). Standard Penetration Tests (SPT) were performed using an automatic hammer and split spoon sampler. The locations of the borings and monitoring wells are included on Plate 2.

From September 28 through October 1, 2015, Geotechnology advanced four additional borings at the site using a truck-mounted CME 550 rotary drill rig equipped with 4-1/4-inch hollow stem augers. The borings were drilled to depths ranging from 17 to 40 feet bls. SPTs were performed using an automatic hammer and split spoon sampler. Monitoring Wells APW-6 through APW-9 were installed in the borings in support of ongoing groundwater monitoring activities. Copies of the boring logs are included as Appendix B. The locations of the monitoring wells are included on Plate 2.

Monitoring Wells APW-6 through APW-9 were constructed using 10 feet of 2-inch-diameter 0.010-inch slotted PVC screen and riser to the surface. The monitoring wells were completed at the surface with above-ground steel covers set in a concrete pad. The monitoring wells were developed in accordance with industry practice and registered with the IDPH and the IEPA.

An engineer from Geotechnology provided technical direction during field exploration, observed drilling and sampling, assisted in obtaining samples and prepared descriptive logs of the material encountered. The boring logs represent conditions observed at the time of exploration.

Unless noted on the boring logs, the lines designating the changes between various strata represent approximate boundaries. The transition between materials may be gradual or may occur between recovered samples. The stratification given on the boring logs, or described herein, is for use by Geotechnology in its analyses and should not be used as the basis of design or construction cost estimates without realizing that there can be variation from that shown or described.

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4.2 Subsurface Conditions. Native soils consisting of brown and gray, very soft to medium stiff, silt and clay were encountered below the fill in Boring B-1 and Monitoring Well APW-9, and at the ground surface in Boring B-5. Native soils consisting of black, clayey sand with trace gravel were encountered below the fill in Boring B-2.

A stratum of very soft to medium stiff, brown, black, and gray clay with traces of sand and wood was encountered below the fill in Borings B-3 and B-8, below the native soils in Borings B-1, B-2, and B-5, and at the ground surface in Borings B-4, B-9, APW-2, APW-3, APW-4, and APW-7. This soil stratum ranged in thickness from approximately 8 to 17 feet bls.

The clay layer described above was underlain by a stratum of granular and cohesive alluvial soils (except for Boring APW-4). The granular alluvium generally consisted of loose, gray, clayey sand with gravel. The cohesive alluvium generally consisted of very soft to medium stiff, gray and brown, clayey silt, silty clay, and sandy clay. This soil stratum ranges in thickness from approximately 5 to 11 feet bls in borings where it is encountered.

Alluvium was encountered below the fill soils in Borings B-6 and B-7, and at the ground surface in Boring B-10 and Monitoring Wells APW-6 and APW-8. This stratum is interpreted as alluvium placed in a buried valley that had been cut down through the soil stratum described above. The granular portions of this alluvium infill generally consisted of very loose, gray, silty sand. The cohesive portions generally consisted of very soft to very stiff, gray, silty clay with sand and silt seams. This soil stratum was at least 28 feet thick where encountered.

The native soils described above are interpreted as belonging to the Cahokia Alluvium, and were underlain by sand deposits interpreted as belonging to the Henry formation. Generalized east-west and north-south subsurface profiles based on the soil boring data at the Meredosia Power Station are included on Plates 6 and 7, respectively. The plan-view of the subsurface profile orientations is included on Plate 5.

During the subsurface exploration activities, groundwater was observed in Borings B-3, B-4, B-5 and B-6 at depths ranging from approximately 18 to 39 feet bls. Groundwater was observed in Monitoring Wells APW-1 through APW-9 at depths ranging from 6 to 32 feet bls at the time of construction. Groundwater levels might not have stabilized before backfilling or well construction activities. Consequently, the indicated groundwater levels might not represent present or future levels. Groundwater levels could vary over time due to the effects of the Illinois River, seasonal variation in precipitation, or other factors not evident at the time of exploration.

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5.0 SITE HYDROGEOLOGY

5.1 Groundwater Classification. The Illinois Class I groundwater standards are applicable to the Meredosia Power Station. The Illinois Class I groundwater is defined as groundwater that is capable of being potable. As stated in 35 IAC 620.410(a) and (d) the following parameters are required to be monitored with the exception of Radium 226 and 228:

- antimony,
- arsenic,
- barium,
- beryllium,
- boron,
- cadmium,
- chloride,
- chromium,
- cobalt,
- copper,
- cyanide,
- fluoride,
- iron,
- lead,
- manganese,
- mercury,
- nickel,
- nitrate as nitrogen,
- selenium,
- silver,
- sulfate,
- thallium,
- total dissolved solids,
- vanadium, and
- zinc.

5.2 Groundwater Monitoring. The groundwater monitoring network at the Meredosia Power Station consists of one up-gradient monitoring well (APW-1) and eight down-gradient monitoring wells (APW-2 through APW-9). The approximate locations of the monitoring wells are included on Plate 2. The monitoring wells are screened in the uppermost aquifer which generally consists of saturated, fine to coarse sand. The monitoring well depths range from 17 to 40 feet bls. Monitoring well construction diagrams from Monitoring Wells APW-1 through APW-9 are included in Appendix B. A total of 11 groundwater monitoring events have been conducted at the Meredosia Power Station since December 2010. The groundwater monitoring events have been conducted quarterly since the third quarter of 2015. Future groundwater monitoring events are anticipated to be conducted quarterly until trend analysis indicates less frequent monitoring is acceptable. A summary of the monitoring well gauging data is included as Table 2. A summary of the groundwater laboratory analytical results collected to date is included as Table 3.

5.3 Groundwater Flow. Based on the monitoring well gauging data in Table 2, the groundwater flow direction at the Meredosia Power Station is to the west-northwest toward the Illinois River. Groundwater flow direction may be influenced by the stage of the Illinois River. Groundwater elevation contour maps for the 10 groundwater monitoring events are included as

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Plates 8 through 16. These events include a range of climate conditions including flood and dry timeframes. *Note: Only gauging events with data from at least five monitoring wells are included.*

5.4 Groundwater Geochemistry. A total of 11 groundwater sampling events have been conducted at the Meredosia Power Station since December 2010. The parameters analyzed include those listed in Section 5.1 in addition to field parameters pH, specific conductivity, and temperature. The analytical testing data are summarized in Table 3. The historical groundwater data collected prior to 2015 consists of dissolved parameter concentrations only. During the time these data were collected, laboratory analysis for dissolved concentrations was the applicable standard of care. The use of dissolved parameter concentration results in the statistical analysis for this Hydrogeologic Assessment report was the only historical data available for the site and was based on the precedent set by the Hutsonville Ash Pond D Closure which was approved by the IEPA. The recent three quarterly sampling events (3Q15, 4Q15, and 1Q16) were analyzed for both total and dissolved parameter concentrations. The purpose of the dual analysis was to allow historical data to be compared to current data and to prepare for future statistical analysis using total parameter concentrations. *Note: The historical data provided by others did not contain practical quantitation limits (PQLs) or method detection limits (MDLs). The PQLs and MDLs from the February 2016 groundwater sampling event were substituted for the missing data during statistical analysis.*

The analytical results were compared to the Illinois Class I groundwater standards. Historical concentrations of arsenic exceeded the Class I groundwater standard in Monitoring Wells APW-3 and APW-4. Currently, (as of February 2016) the arsenic concentration exceeded the Class I groundwater standard in APW-3 only. Concentrations of boron exceeded the Class I groundwater standard in Monitoring Wells APW-2, APW-3, APW-4, APW-6, APW-8, and APW-9. Currently, (as of February 2016) the boron concentration exceeded the Class I groundwater standard (2 ppm) in Monitoring Wells APW-2, APW-3, APW-8, and APW-9. Aerial photographs showing the boron concentration contours for September 2015, December 2015, and February 2016 are included as Plates 18 through 20, respectively. Concentrations of manganese exceeded the Class I groundwater standard in Monitoring Wells APW-2, APW-3, and APW-4. Historical concentrations of iron exceeded the Class I groundwater standards in Monitoring Wells APW-3 and APW-4, but the February 2016 results are below the Class I groundwater standard. A single event anomaly associated with flooding in February 2016 resulted in the concentration of sulfate in Monitoring Well APW-9 being above the Class I groundwater standard. The arsenic and manganese exceedances at each monitoring well for the February 2016 sampling event are included on Plate 21. Changes of oxidation/reduction (redox) potential in the subsurface due to fluctuations in pH make evaluation of manganese and iron concentrations unreliable at this facility. Comparison of manganese and iron to the respective Class I groundwater standard may be inappropriate for this site.

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Box and whiskers plots of the exceedances, with the exception of sulfate, iron, and manganese are included as Appendix C. Statistical trend analysis plots for arsenic and boron are also included in Appendix C. Statistical trends are decreasing or not significant at a 98% confidence level. The analysis indicates that increasing trends may have been present while the Meredosia Power Station was in operation through 2011, but appear to be decreasing based on the three most recent quarterly monitoring data.

5.5 Contaminants of Concern. Boron is the contaminant of concern for the Meredosia Power Station and is also indicator parameters. Boron is widespread across the site and is generally considered a good indicator chemical for ash pond facilities in Illinois. Due to the elevated levels of boron above background levels in the groundwater near the ash ponds on site, boron will be a primary indicator parameter for the site during remedial actions and ash pond closure activities. Boron is relatively stable in the subsurface and is not prone to attenuation.

Other chemicals and water quality parameters such as iron, manganese, pH, and TDS can be affected by redox conditions in the subsurface and are therefore not reliable as indicator parameters at this site. The concentrations of other chemicals may naturally fluctuate through attenuation.

5.6 Groundwater Modeling.

Both a two-dimensional and three-dimensional transient groundwater flow and transport model was used to describe the site. The models were calibrated to match the groundwater elevation and concentration trends observed between 2009 and 2015. Prediction simulations were then performed for no action and for proposed ash pond closure activities. The existing conditions model was used to calibrate the hydrogeologic flow and transport conditions and to evaluate the need for the ponds to be closed. The proposed closure conditions model was created to evaluate the length of time for the boron concentrations to decrease to below the IEPA Class I Groundwater standards. Boron transport was chosen because it is an indicator contaminant for coal ash leachate, is mobile in groundwater, and impacts are the most widespread across the site.

5.6.1 HELP Model

In order to assess the drainage capabilities of the proposed fly ash and bottom ash pond closures, Geotechnology utilized the USEPA Hydrologic Evaluation of Landfill Performance (HELP) model to simulate conditions at the site. The version of software used was HELP 3.07 (November 1997). A description of inputs and output data is attached in Appendix D of this report. For the purposes of this evaluation, the proposed ash pond cap, ash, and soil cross-section has been divided into six layers.

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Model parameters for the layers were the default values for each selected layer type as provided by the HELP software module, or were input by the user (for synthetic materials) with known or manufacturer provided parameters. The model was run without groundwater influx parameters.

The model indicates that steady state conditions (<0.05 inches of head on the sand layer) will be achieved within approximately six months of closure activities at the two ash ponds on site. The data obtained from the HELP model was used as input parameters for MODFLOW and MT3DMS.

5.6.2 MODFLOW and MT3DMS

MODFLOW was developed by the United States Geological Survey (USGS) to solve three-dimensional transient head distributions using finite difference approximations. The model inputs include soil properties, multiple layers, heterogeneities, variable thicknesses, variable gradients, flow boundaries, wells, and can define confined or unconfined flow systems. Assumptions of the program include that groundwater is governed by Darcy's law; the formation behaves as a continuous porous medium; flow is not affected by chemical, temperature, or density gradients; and hydraulic properties are constant within a grid cell.

MT3DMS was developed by the USGS and calculates concentration distributions for a single chemical as a function of time and location using a finite difference solution. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. MT3DMS accounts for advection, diffusion, dispersion, sorption, and first order decay. Assumptions of the module include changes in the concentration field do not affect the flow field; concentrations of solutes do not interact with each other; chemical and hydraulic properties are constant within a cell; sorption is instantaneous and fully reversible; and decay is not reversible.

Flow and transport boundaries, soil properties, and river stage fluctuations were the same for the calibration and prediction scenarios. One prediction scenario was no action and the other included the proposed ash pond closures.

Boron concentrations for the current configuration were modeled for 25 years to represent a scenario where the ash ponds were not closed. After 25 years, monitoring well APW-3 (the well with historically highest boron concentrations) stabilized at 16.9 mg/L of boron, which exceeds the Class I Groundwater standards. APW-2, APW-6, APW-7, and APW-8 also exceeded the Class I Groundwater standards at 25 years with no action.

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According to the model results, boron concentrations will be below the Class I Groundwater standards for each well on site within three years after dewatering and closure of the fly ash and bottom ash ponds.

Additional information on the MODFLOW and MT3DMS modeling and modeling results are provided in Appendix E.

5.6.3 Boron and Arsenic Loading to the Illinois River

Groundwater in the vicinity of the fly ash and bottom ash ponds discharges to the Illinois River. A mixing calculation was performed to conservatively estimate the boron and arsenic loading rates to the Illinois River. Calculations are provided in Appendix F.

The loading rate was calculated by multiplying the volume of groundwater flowing into the river by the concentration of boron and arsenic in groundwater.

Loading Rate (L) = Concentration (C) * Groundwater Discharge Volume (Q)

Where Q = Hydraulic Conductivity (K) * Hydraulic Gradient (I) * Area (A)

To be conservative, the highest single concentration in groundwater monitoring wells at the site was initially used in this calculation (Cmax). A second calculation was performed using the average of the four monitoring wells near the river (APW-2, APW-3, APW-4, and APW-9).

The monitoring wells were not tested for hydraulic conductivity; however, Gibbet al. (1979) published hydraulic conductivity values for wells along the Illinois waterway, which included a site-specific value of 1,200 gallons per day/square foot (gpd/ft2). Both a maximum and an average hydraulic gradient were used. The average hydraulic gradient was based on the ten groundwater gauging events. Two groundwater gauging events were not used because of flooding and inaccessibility of the wells. Removing flooding events provides a more conservative value. The cross sectional area was assumed to be over the entire thickness of the aquifer, and along the entire length of the Fly Ash Pond parallel to the river, plus 50 feet north and south of the pond.

The calculated loading rate was divided by: 1) the 7-day 10-year low flow (Q7,10); and 2) the mean of the average annual flow data at the Meredosia gaging station. This calculation estimates the incremental concentration increase (dB) in the river due to discharge from the Fly Ash Pond. Due to the size of the Illinois River, it is unlikely that boron and arsenic concentrations would initially be distributed across the entire width of the river. Therefore, an additional calculation was performed to determine

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the incremental concentration increase assuming that mixing occurred within 50 feet of the shoreline. This calculation was performed by multiplying dB by 750 feet/50 feet (750 feet being total river width and 50 feet being the assumed mixing width).

The result of the boron calculation is an incremental increase of 0.048 mg/L calculated using average concentration, average hydraulic gradient, and mean annual river discharge. This is near the reporting limit for boron as listed by the USEPA in method SW-846, 6010c and below the Class I Groundwater Standard. The result of the boron calculation; based on maximum concentration, maximum hydraulic gradient, and the Q7,10; is a conservative estimate of the increase in boron loading to the Illinois River. This result (1.92 mg/L) suggests that a measurable boron increase could occur near shore for worst case conditions at low flow. This value is below the IEPA Class I Groundwater standard.

Under typical conditions, arsenic will not have a measurable impact (incremental concentration increase of 0.0022 mg/L) on concentrations within the Illinois River. The calculations for arsenic suggest that it may be measurable in river water under worst case conditions (incremental increase of 0.0129 mg/L), assuming that it does not precipitate or sorb from solution prior to reaching the groundwater/surface water interface.

6.0 CONCLUSIONS

Although up to 11 groundwater monitoring events have been conducted at the Meredosia Power Station since December 2010, only three events have been conducted since the facility ceased operations in 2011. Therefore, statistical analysis of post-closure trends could not be performed. The groundwater analytical and statistical data indicates that the unlined ash ponds are a primary contributor to groundwater impacts based on the location of groundwater exceedances, the types of chemicals common to coals ash exceeding the applicable Class I groundwater standards, gradual reduction of groundwater impacts after plant closure, and contaminant transport modeling. The preliminary data suggests that a reduction in the concentrations of boron and arsenic has occurred since the facility ceased operations. The results of the groundwater modeling further supports this preliminary assessment in that once the ash ponds are capped and a Groundwater Management Zone is put into effect, the primary pathway (storm water infiltration) for contaminants to impact the groundwater at the site will not be complete. Groundwater modeling indicates that within four years of dewatering and closure, boron levels will be below the Class I Groundwater standards.

Additional groundwater monitoring events are planned to further assess the extent of the impacts of ash pond capping activities. Future monitoring events will be sampled for the parameters in accordance with the Meredosia Power Station Groundwater Monitoring Plan (GMP, 2016).

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8.0 LICENSED PROFESSIONAL SIGNATURE/SEAL

I hereby affirm that the information and design documents contained in this hydrogeologic assessment report are true and accurate to the best of my knowledge and professional opinion.



Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.

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TABLE 2

MONITORING WELL DATA SUMMARY
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

Well ID	Ground Surface Elevation	Bottom of Well Elevation	Screen Length (ft)	Top of Casing Elevation[1]	Groundwater Measurements		
					Date	Depth to Water (ft)	Groundwater Surface Elevation
APW-1	446.06	420.90	10.00	449.26	11/17/10	18.35	430.91
					12/13/10	19.15	430.11
					03/14/11	18.30	430.96
					06/24/11	10.80	438.46
					09/15/11	17.30	431.96
					10/28/11	19.60	429.66
					03/26/12	21.55	427.71
					06/18/12	21.34	427.92
					09/17/12	23.45	425.81
					08/25/15	12.10	437.16
					12/21/15	18.22	431.04
					02/18/16	13.54	435.72
APW-2	433.97	410.60	10.00	436.87	11/17/10	13.00	423.87
					12/13/10	13.14	423.73
					03/14/11	8.30	428.57
					09/15/11	12.65	424.22
					10/28/11	13.60	423.27
					03/26/12	13.27	423.60
					06/18/12	14.46	422.41
					09/17/12	15.59	421.28
					08/25/15	9.67	427.20
					12/21/15	9.05	427.82
					02/18/16	8.21	428.66
APW-3	433.35	410.30	10.00	436.28	11/17/10	13.52	422.76
					12/13/10	13.35	422.93
					03/14/11	5.70	430.58
					09/15/11	13.90	422.38
					10/28/11	14.60	421.68
					03/26/12	12.80	423.48
					06/18/12	13.95	422.33
					09/17/12	15.92	420.36
					08/25/15	11.10	425.18
					12/21/15	4.79	431.49
					02/18/16	8.74	427.54
APW-4	431.90	405.80	6.50	434.86	11/17/10	9.15	425.71
					12/13/10	9.25	425.61
					09/15/11	9.20	425.66
					10/28/11	10.00	424.86
					03/26/12	9.90	424.96
					06/18/12	10.95	423.91
					09/17/12	12.36	422.50
					08/25/15	6.13	428.73
					12/21/15	5.47	429.39
					02/18/16	4.92	429.94
APW-5	450.48	420.20	10.00	453.20	11/17/10	25.60	427.60
					12/13/10	25.40	427.80
					03/14/11	22.60	430.60
					06/24/11	14.70	438.50
					09/15/11	23.40	429.80
					10/28/11	24.50	428.70
					03/26/12	27.20	426.00
					06/18/12	27.30	425.90
					09/17/12	29.18	424.02
					08/25/15	18.55	434.65
					12/21/15	23.68	429.52
					02/18/16	19.42	433.78
APW-6	448.60	420.60	9.68	451.90	12/21/15	21.90	430.00
					02/18/16	18.35	433.55
APW-7	435.00	418.50	9.70	438.70	12/21/15	9.15	429.55
					02/18/16	6.95	431.75
APW-8	460.50	421.40	9.68	463.90	12/21/15	34.56	429.34
					02/18/16	31.60	432.30
APW-9	445.00	415.70	9.68	448.10	12/21/15	18.23	429.87
					02/18/16	17.76	430.34

[1]Elevations reported in feet above mean sea level.

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TABLE 3

GROUNDWATER ANALYTICAL DATA SUMMARY
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

WELL ID	SAMPLE DATE	PARAMETER[1]													
		Antimony (d)	Antimony (t)	Arsenic (d)	Arsenic (t)	Barium (d)	Barium (t)	Beryllium (d)	Beryllium (t)	Boron (d)	Boron (t)	Cadmium (d)	Cadmium (t)	Chloride (d)	Chromium (d)
APW-1	12/13/2010	<0.006	NA	<0.004	NA	<0.05	NA	<0.004	NA	0.117	NA	<0.004	NA	1	<0.01
	3/24/2011	<0.003	NA	<0.001	NA	0.01	NA	<0.001	NA	0.13	NA	<0.001	NA	11	<0.004
	6/24/2011	<0.003	NA	<0.001	NA	0.01	NA	<0.001	NA	0.14	NA	<0.001	NA	5.6	<0.004
	9/15/2011	<0.003	NA	<0.001	NA	0.017	NA	<0.001	NA	0.1	NA	<0.001	NA	13	<0.004
	10/28/2011	<0.003	NA	<0.001	NA	0.019	NA	<0.001	NA	0.098	NA	<0.001	NA	6.8	<0.004
	3/26/2012	<0.003	NA	<0.001	NA	0.011	NA	<0.001	NA	0.11	NA	<0.001	NA	20	<0.004
	6/18/2012	<0.003	NA	<0.001	NA	0.02	NA	<0.001	NA	0.097	NA	<0.001	NA	45	<0.004
	9/17/2012	<0.003	NA	<0.001	NA	0.013	NA	<0.001	NA	0.055	NA	<0.001	NA	39	<0.004
	8/25/2015	<0.001	<0.001	<0.001	0.004	0.014	0.032	<0.0005	<0.0005	0.066	0.071	<0.002	<0.002	54	<0.005
	12/21/2015	<0.001	<0.001	<0.001	0.003	0.014	0.03	<0.0005	<0.0005	0.074	0.079	<0.002	<0.002	62	<0.005
	2/18/2016	<0.0010	0.0004	<0.0010	0.0012	0.0207	0.0276	<0.0005	<0.0005	0.0712	0.0705	<0.0020	<0.0020	80	<0.0050
APW-2	12/13/2010	<0.006	NA	0.004	NA	<0.05	NA	<0.004	NA	2.11	NA	<0.004	NA	33	<0.01
	3/24/2011	<0.003	NA	0.004	NA	0.055	NA	<0.001	NA	3.1	NA	<0.001	NA	50	<0.004
	9/15/2011	<0.003	NA	0.003	NA	0.042	NA	<0.001	NA	2.8	NA	<0.001	NA	41	<0.004
	10/28/2011	<0.003	NA	0.004	NA	0.045	NA	<0.001	NA	3.3	NA	<0.001	NA	42	<0.004
	3/26/2012	<0.003	NA	0.004	NA	0.046	NA	<0.001	NA	3.6	NA	<0.001	NA	47	<0.004
	6/18/2012	<0.003	NA	0.004	NA	0.051	NA	<0.001	NA	3.5	NA	<0.001	NA	50	<0.004
	9/17/2012	<0.003	NA	0.004	NA	0.048	NA	<0.001	NA	3.9	NA	<0.001	NA	44	<0.004
	8/25/2015	<0.001	<0.001	0.001	0.003	0.06	0.073	<0.0005	<0.0005	2.65	2.8	<0.002	<0.002	40	<0.005
	12/21/2015	<0.001	<0.001	0.002	0.003	0.074	0.092	<0.0005	<0.0005	2.61	2.61	<0.002	<0.002	26	<0.005
	2/18/2016	<0.0010	0.0007	0.0011	0.0014	0.0597	0.0654	<0.0005	<0.0005	2.66	2.88	<0.0020	<0.0020	30	<0.0050
APW-3	12/13/2010	<0.006	NA	0.148	NA	<0.05	NA	<0.004	NA	30.2	NA	<0.004	NA	54.5	<0.01
	3/24/2011	<0.003	NA	0.17	NA	0.05	NA	<0.001	NA	28	NA	0.001	NA	54	<0.004
	9/15/2011	<0.003	NA	0.21	NA	0.042	NA	<0.001	NA	32	NA	<0.001	NA	44	<0.004
	10/28/2011	<0.003	NA	0.22	NA	0.045	NA	0.001	NA	35	NA	<0.001	NA	47	<0.004
	3/26/2012	<0.003	NA	0.19	NA	0.048	NA	<0.001	NA	31	NA	0.001	NA	54	<0.004
	6/18/2012	<0.003	NA	0.31	NA	0.081	NA	<0.001	NA	46	NA	0.002	NA	49	<0.004
	9/17/2012	<0.003	NA	0.17	NA	0.11	NA	<0.001	NA	26	NA	0.001	NA	58	<0.004
	8/25/2015	<0.001	<0.001	0.216	0.225	0.072	0.082	<0.0005	<0.0005	25.3	27	<0.002	<0.002	27	<0.005
	12/21/2015	<0.001	<0.001	0.19	0.207	0.066	0.074	<0.0005	<0.0005	24.2	24.9	<0.002	<0.002	26	<0.005
	2/18/2016	<0.0010	0.0004	0.143	0.158	0.0605	0.0690	<0.0005	<0.0005	23.1	23.7	<0.0020	<0.0020	25	<0.0050
APW-4	12/13/2010	<0.006	NA	0.053	NA	0.067	NA	<0.004	NA	2.55	NA	<0.004	NA	41	<0.01
	9/15/2011	<0.003	NA	0.15	NA	0.085	NA	0.002	NA	4.5	NA	<0.001	NA	50	0.007
	10/28/2011	<0.003	NA	0.18	NA	0.095	NA	0.002	NA	6.3	NA	<0.001	NA	63	<0.004
	3/26/2012	<0.003	NA	0.029	NA	0.048	NA	<0.001	NA	3.9	NA	<0.001	NA	58	<0.004
	6/18/2012	<0.003	NA	0.033	NA	0.063	NA	<0.001	NA	4.8	NA	<0.001	NA	53	<0.004
	9/17/2012	<0.003	NA	0.036	NA	0.064	NA	<0.001	NA	4.9	NA	<0.001	NA	49	<0.004
	8/25/2015	<0.001	<0.001	0.03	0.032	0.053	0.063	<0.0005	<0.0005	1.81	1.89	<0.002	<0.002	33	<0.005
	12/21/2015	<0.001	<0.001	0.018	0.02	0.057	0.077	<0.0005	<0.0005	1.96	2.22	<0.002	<0.002	24	<0.005
	2/18/2016	<0.0010	0.0008	0.0086	0.0151	0.0706	0.176	<0.0005	0.0007	1.33	1.62	<0.0020	<0.0020	26	<0.0050
APW-5	12/13/2010	<0.006	NA	<0.004	NA	<0.05	NA	<0.004	NA	0.118	NA	<0.004	NA	3	<0.01
	3/24/2011	<0.003	NA	<0.001	NA	0.009	NA	<0.001	NA	0.17	NA	<0.001	NA	2.8	<0.004
	6/24/2011	<0.003	NA	<0.001	NA	0.01	NA	<0.001	NA	0.2	NA	<0.001	NA	2.6	<0.004
	9/15/2011	<0.003	NA	<0.001	NA	0.006	NA	<0.001	NA	0.35	NA	<0.001	NA	<1	<0.004
	10/28/2011	<0.003	NA	<0.001	NA	0.006	NA	<0.001	NA	0.31	NA	<0.001	NA	1	<0.004
	3/26/2012	<0.003	NA	0.001	NA	0.009	NA	<0.001	NA	0.3	NA	<0.001	NA	2.5	<0.004
	6/18/2012	<0.003	NA	0.001	NA	0.01	NA	<0.001	NA	0.41	NA	<0.001	NA	4.6	<0.004
	9/17/2012	<0.003	NA	<0.001	NA	0.009	NA	<0.001	NA	0.32	NA	<0.001	NA	2.9	<0.004
	8/25/2015	<0.001	0.001	<0.001	0.008	0.011	0.042	<0.0005	<0.0005	0.109	0.119	<0.002	<0.002	9	<0.005
	12/21/2015	<0.001	<0.001	<0.001	0.001	0.012	0.018	<0.0005	<0.0005	0.092	0.116	<0.002	<0.002	6	<0.005
	2/18/2016	0.0003	0.0006	0.0003	0.0010	0.0113	0.0151	<0.0005	<0.0005	0.118	0.165	<0.0020	<0.0020	9	<0.0050
APW-6	12/21/2015	<0.001	<0.001	<0.001	<0.001	0.015	0.018	<0.0005	<0.0005	0.246	0.271	<0.002	<0.002	6	<0.005
	2/18/2016	<0.0010	0.0005	0.0006	0.0008	0.0150	0.0167	<0.0005	<0.0005	0.412	0.444	<0.0020	<0.0020	6	<0.0050
APW-7	12/21/2015	<0.001	<0.001	<0.001	0.002	0.028	0.042	<0.0005	<0.0005	0.245	0.26	<0.002	<0.002	28	<0.005
	2/18/2016	<0.0010	0.0005	0.0003	0.0010	0.0202	0.0284	<0.0005	<0.0005	0.109	0.0986	<0.0020	<0.0020	30	<0.0050
APW-8	12/21/2015	<0.001	<0.001	0.001	0.002	0.083	0.09	<0.0005	<0.0005	10.8	11	<0.002	<0.002	13	0.01
	2/18/2016	0.0003	0.0006	0.0012	0.0013	0.0729	0.0788	<0.0005	<0.0005	10.3	11.1	<0.0020	<0.0020	12	0.0070
APW-9	12/21/2015	<0.001	0.001	<0.001	0.002	0.017	0.028	<0.0005	<0.0005	0.5	0.531	<0.002	<0.002	16	<0.005
	2/18/2016	0.0008	0.0013	0.0007	0.0012	0.0363	0.0425	<0.0005	<0.0005	4.42	5.12	<0.0020	<0.0020	19	<0.0050
Class 1 GW Standards		**0.006**	**NE**	**0.010**	**NE**	**2**	**NE**	**0.004**	**NE**	**2**	**NE**	**0.005**	**NE**	**200**	**0.1**

Results are reported as mg/L or parts per million (ppm)
Contents of table obtained from data provided by Ameren.
Concentration above Illinois Class I Groundwater Standards
NA = Not Analyzed
NE = Not Established
TDS = Total Dissolved Solids
(d) = dissolved concentration
(t) = total concentration

J024917.01

TABLE 3

GROUNDWATER ANALYTICAL DATA SUMMARY
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

WELL ID	PARAMETER[1]													
	Chromium (t)	Cobalt (d)	Cobalt (t)	Copper (d)	Copper (t)	Cyanide	Fluoride (d)	Iron (t)	Iron (d)	Lead (d)	Lead (t)	Manganese (t)	Manganese (d)	Mercury (d)	Mercury (t)
APW-1	NA	<0.05	NA	<0.025	NA	<0.01	<0.1	NA	0.162	<0.005	NA	NA	<0.015	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	0.03	<0.001	NA	NA	0.008	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.26	NA	<0.01	<0.001	NA	NA	0.003	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.32	NA	<0.01	<0.001	NA	NA	0.005	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.009	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	<0.005	<0.005	0.012	<0.005	0.008	<0.007	<0.1	5.67	0.1	<0.001	0.007	0.593	<0.003	<0.0002	<0.0002
	<0.005	<0.005	0.009	<0.005	0.006	<0.007	0.11	4.18	<0.02	<0.001	0.005	0.418	<0.003	<0.0002	<0.0002
	0.0022	<0.0050	0.0028	<0.0050	0.0016	<0.007	0.10	1.53	<0.0200	<0.0010	0.0020	0.170	<0.0030	<0.00020	<0.00020
APW-2	NA	<0.05	NA	<0.025	NA	<0.01	0.3	NA	<0.1	<0.005	NA	NA	0.931	<0.0002	NA
	NA	0.004	NA	<0.003	NA	<0.005	<0.25	NA	1.1	<0.001	NA	NA	0.48	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.44	NA	0.37	<0.001	NA	NA	0.82	<0.0002	NA
	NA	0.002	NA	<0.003	NA	<0.005	0.46	NA	0.46	<0.001	NA	NA	0.79	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.32	NA	0.15	<0.001	NA	NA	0.91	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.27	NA	0.34	0.001	NA	NA	0.83	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.3	NA	0.3	<0.001	NA	NA	0.96	<0.0002	NA
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.28	2.16	0.104	<0.001	0.001	1.09	0.989	<0.0002	<0.0002
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.29	1.9	0.024	<0.001	0.001	0.686	0.63	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	0.0015	<0.007	0.31	0.297	0.018	<0.0010	0.0004	0.925	0.906	<0.00020	<0.00020
APW-3	NA	<0.05	NA	<0.025	NA	<0.01	0.25	NA	<0.1	<0.005	NA	NA	0.169	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.36	NA	0.65	<0.001	NA	NA	0.45	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.49	NA	0.41	<0.001	NA	NA	0.28	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.54	NA	0.33	<0.001	NA	NA	0.25	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.32	NA	0.48	<0.001	NA	NA	0.3	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.29	NA	0.39	0.001	NA	NA	0.46	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.29	NA	5.4	<0.001	NA	NA	1.2	<0.0002	NA
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.2	2.38	0.475	<0.001	0.001	0.492	0.432	<0.0002	<0.0002
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.23	1.93	1.38	<0.001	<0.001	0.635	0.586	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.22	2.26	1.36	<0.0010	0.0006	0.669	0.632	<0.00020	<0.00020
APW-4	NA	<0.05	NA	<0.025	NA	<0.01	0.39	NA	<0.1	<0.005	NA	NA	3.1	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.73	NA	5.9	<0.001	NA	NA	3.4	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.79	NA	6.6	<0.001	NA	NA	5.4	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.47	NA	14	<0.001	NA	NA	2.8	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.45	NA	16	<0.001	NA	NA	3.3	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.45	NA	16	<0.001	NA	NA	2.9	<0.0002	NA
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.37	13.8	11.8	<0.001	<0.001	2.14	2.05	<0.0002	<0.0002
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.41	18.4	14.1	<0.001	0.001	2.3	2.18	<0.0002	<0.0002
	0.0228	<0.0050	0.0079	<0.0050	0.0203	<0.007	0.30	27.5	2.16	<0.0010	0.0136	2.39	1.72	<0.00020	<0.00020
APW-5	NA	<0.05	NA	<0.025	NA	<0.01	0.13	NA	<0.1	<0.005	NA	NA	<0.015	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.012	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	0.012	<0.001	NA	NA	0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.31	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.36	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.04	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.002	<0.0002	NA
	0.009	<0.005	0.05	<0.005	0.023	<0.007	<0.1	11.2	<0.02	<0.001	0.018	2.13	0.004	<0.0002	<0.0002
	<0.005	<0.005	0.007	<0.005	<0.005	<0.007	<0.1	1.4	<0.02	<0.001	0.002	0.292	<0.003	<0.0002	<0.0002
	<0.0050	<0.0050	0.0035	<0.0050	0.0015	<0.007	0.08	0.886	<0.0200	<0.0010	0.0016	0.181	0.0009	<0.00020	<0.00020
APW-6	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.11	0.402	<0.02	<0.001	<0.001	0.04	0.01	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.15	0.198	<0.0200	<0.0010	0.0003	0.0129	<0.0030	<0.00020	<0.00020
APW-7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.22	2.57	<0.02	<0.001	0.002	0.177	0.018	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.21	1.32	<0.0200	<0.0010	0.0010	0.0549	0.0008	<0.00020	<0.00020
APW-8	0.013	<0.005	<0.005	<0.005	<0.005	<0.007	<0.1	0.809	<0.02	<0.001	0.001	0.116	<0.003	<0.0002	<0.0002
	0.0078	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.23	0.0531	<0.0200	<0.0010	<0.0010	0.0052	<0.0030	<0.00020	<0.00020
APW-9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.59	1.26	<0.02	<0.001	0.002	0.175	0.008	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.10	0.505	<0.0200	<0.0010	0.0007	0.0579	<0.0030	<0.00020	<0.00020
Class I GW Standards	**NE**	**1**	**NE**	**0.65**	**NE**	**0.2**	**4**	**NE**	**5**	**0.0075**	**NE**	**NE**	**0.15**	**0.002**	**NE**

Results are reported as mg/L or parts per million (ppm)
Contents of table obtained from data provided by Ameren.
Concentration above Illinois Class I Groundwater Standards
NA = Not Analyzed
NE = Not Established
TDS = Total Dissolved Solids
(d) = dissolved concentration
(t) = total concentration

Electronic Filing: Received, Clerk's Office 09/28/2020

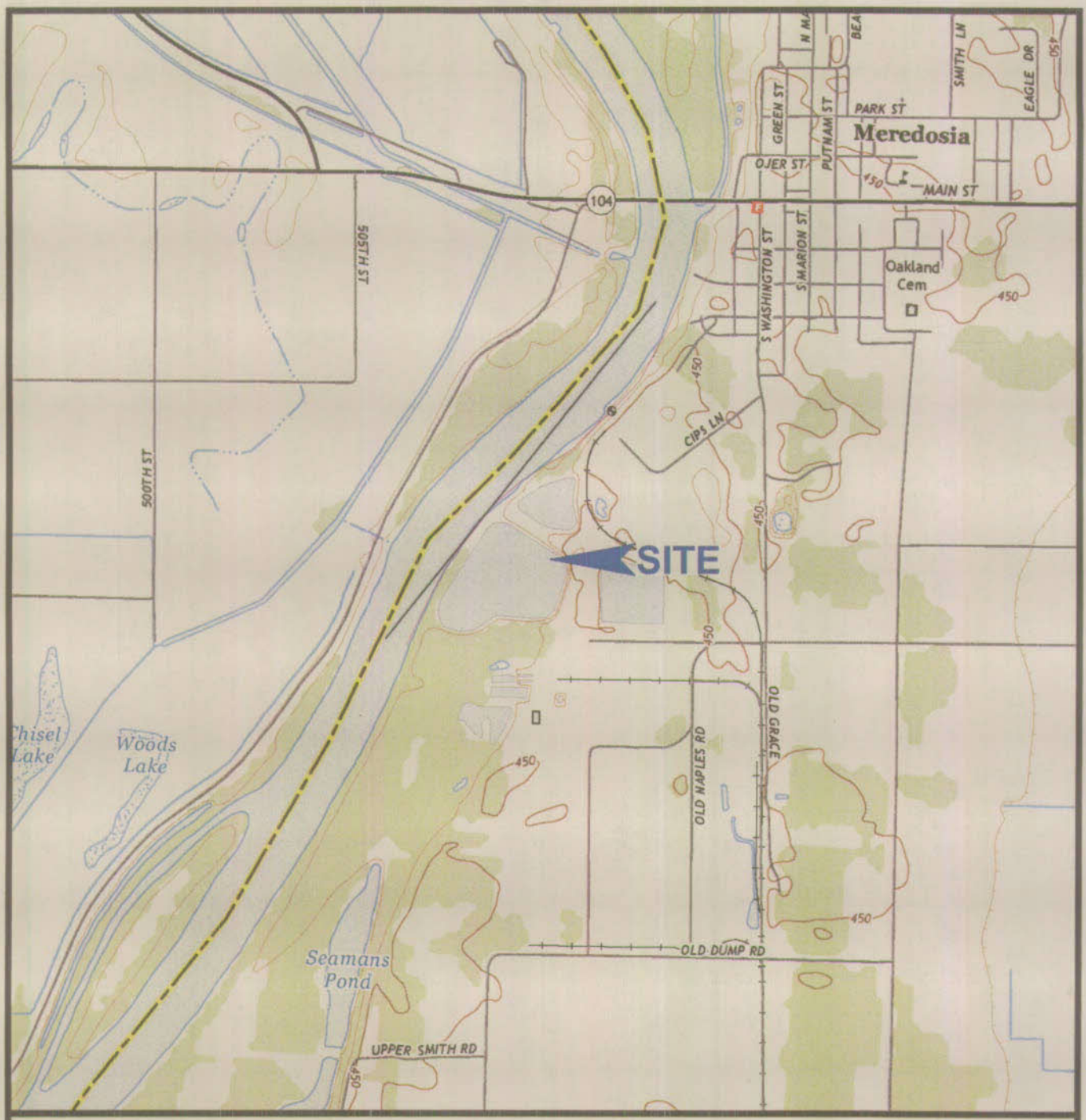
TABLE 3

GROUNDWATER ANALYTICAL DATA SUMMARY
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

WELL ID	PARAMETER														
	Nickel (d)	Nickel (t)	Nitrate	Selenium (d)	Selenium (t)	Silver (d)	Silver (t)	Sulfate	TDS	Thallium (d)	Thallium (t)	Vanadium (d)	Vanadium (t)	Zinc (d)	Zinc (t)
APW-1	<0.04	NA	3.8	<0.01	NA	<0.005	NA	26.4	132	<0.002	NA	NA	NA	<0.02	NA
	<0.005	NA	3.9	0.002	NA	<0.005	NA	23	190	<0.001	NA	NA	NA	<0.006	NA
	0.014	NA	4.7	0.002	NA	<0.005	NA	33	140	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	1.7	0.002	NA	<0.005	NA	20	190	<0.001	NA	NA	NA	<0.006	NA
	0.005	NA	2.8	0.002	NA	<0.005	NA	24	150	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	5.7	0.001	NA	<0.005	NA	15	180	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	2.1	<0.001	NA	<0.005	NA	13	270	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	1.6	0.002	NA	<0.005	NA	12	280	<0.001	NA	NA	NA	<0.006	NA
	<0.005	0.021	3.94	<0.04	<0.04	<0.005	<0.005	12	226	<0.001	<0.001	<0.01	<0.01	<0.01	0.02
	<0.005	0.015	3.43	<0.04	<0.04	<0.005	<0.005	11	280	<0.001	<0.001	<0.01	<0.01	<0.01	0.015
	0.0030	0.0090	3.59	<0.0400	<0.0400	<0.0050	<0.0050	20	298	<0.0010	<0.0010	<0.0100	0.0025	<0.0100	0.0068
APW-2	<0.04	NA	0.4	<0.01	NA	<0.005	NA	28.2	368	<0.002	NA	NA	NA	<0.02	NA
	0.012	NA	<0.02	<0.001	NA	<0.005	NA	41	630	<0.001	NA	NA	NA	<0.006	NA
	0.007	NA	<0.02	<0.001	NA	<0.005	NA	<25	430	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	0.04	0.003	NA	<0.005	NA	14	440	<0.001	NA	NA	NA	<0.006	NA
	0.009	NA	0.07	0.001	NA	<0.005	NA	13	460	<0.001	NA	NA	NA	<0.006	NA
	0.011	NA	<0.02	0.004	NA	<0.005	NA	18	510	<0.001	NA	NA	NA	0.006	NA
	0.011	NA	<0.02	0.002	NA	<0.005	NA	15	520	<0.001	NA	NA	NA	<0.006	NA
	<0.005	0.007	<0.05	<0.04	<0.04	<0.005	<0.005	<10	488	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.005	0.005	<0.05	<0.04	<0.04	<0.005	<0.005	22	572	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	0.0058	0.0062	<0.050	<0.0400	<0.0400	<0.0050	<0.0050	19	494	<0.0010	<0.0010	0.0015	0.0017	<0.0100	0.0036
APW-3	<0.04	NA	0.49	<0.01	NA	<0.005	NA	284	660	<0.002	NA	NA	NA	<0.02	NA
	0.01	NA	<0.02	0.001	NA	<0.005	NA	310	750	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	<0.02	<0.001	NA	<0.005	NA	260	680	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	<0.02	0.002	NA	<0.005	NA	290	650	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	<0.02	<0.001	NA	<0.005	NA	270	710	<0.001	NA	NA	NA	<0.006	NA
	0.011	NA	<0.02	0.002	NA	<0.005	NA	300	770	0.001	NA	NA	NA	0.012	NA
	0.012	NA	<0.02	0.003	NA	<0.005	NA	300	970	<0.001	NA	NA	NA	<0.006	NA
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	177	670	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	235	738	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	<0.0050	<0.050	<0.0400	<0.0400	<0.0050	<0.0050	192	736	<0.0010	<0.0010	<0.0100	<0.0100	<0.0100	0.0028
APW-4	<0.04	NA	0.31	<0.01	NA	<0.005	NA	49.3	418	<0.002	NA	NA	NA	<0.02	NA
	0.019	NA	0.04	0.012	NA	<0.005	NA	53	470	<0.001	NA	NA	NA	<0.006	NA
	0.01	NA	0.29	0.013	NA	<0.005	NA	17	520	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	<0.02	0.015	NA	<0.005	NA	23	300	<0.001	NA	NA	NA	<0.006	NA
	0.009	NA	<0.02	0.021	NA	<0.005	NA	14	690	<0.001	NA	NA	NA	0.007	NA
	0.01	NA	<0.02	0.03	NA	<0.005	NA	24	360	<0.001	NA	NA	NA	<0.006	NA
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	<10	504	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	28	578	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	0.0033	0.0232	<0.050	<0.0400	<0.0400	<0.0050	<0.0050	66	462	<0.0010	<0.0010	<0.0100	0.0331	0.0024	0.0677
APW-5	<0.04	NA	1.7	<0.01	NA	<0.005	NA	6.1	138	<0.002	NA	NA	NA	<0.02	NA
	0.007	NA	1.9	<0.001	NA	<0.005	NA	17	230	<0.001	NA	NA	NA	<0.006	NA
	0.01	NA	1.4	0.002	NA	<0.005	NA	15	290	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	2	0.001	NA	<0.005	NA	9.5	180	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	1.9	0.004	NA	<0.005	NA	6.7	160	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	2	0.002	NA	<0.005	NA	14	250	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	4.1	0.003	NA	<0.005	NA	15	280	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	2.6	0.002	NA	<0.005	NA	33	290	<0.001	NA	NA	NA	<0.006	NA
	<0.005	0.07	2.03	<0.04	<0.04	<0.005	<0.005	19	338	<0.001	<0.001	<0.01	0.017	<0.01	0.037
	<0.005	0.009	2.1	<0.04	<0.04	<0.005	<0.005	66	400	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.0077	1.85	<0.0400	<0.0400	<0.0050	<0.0050	36	340	<0.0010	<0.0010	<0.0100	0.0025	<0.0100	0.0048
APW-6	<0.005	<0.005	0.172	<0.04	<0.04	<0.005	<0.005	<10	354	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.002	0.730	<0.0400	<0.0400	<0.0050	<0.0050	12	296	<0.0010	<0.0010	<0.0100	<0.0100	<0.0100	0.0025
APW-7	<0.005	<0.005	1.09	<0.04	<0.04	<0.005	<0.005	17	384	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.0033	4.82	<0.0400	<0.0400	<0.0050	<0.0050	35	248	<0.0010	<0.0010	<0.0100	0.0033	<0.0100	0.0054
APW-8	<0.005	<0.005	5.73	0.126	0.135	<0.005	<0.005	473	994	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	<0.0050	5.29	0.102	0.118	<0.0050	<0.0050	338	786	<0.0010	<0.0010	<0.0100	<0.0100	<0.0100	<0.0100
APW-9	<0.005	0.005	3.25	<0.04	<0.04	<0.005	<0.005	265	716	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.0035	3.88	<0.0400	<0.0400	<0.0050	<0.0050	466	1,070	<0.0010	<0.0010	0.0028	0.0033	<0.0100	0.0030
Class I (GW Standards)	0.1	NE	10	0.05	NE	0.05	NE	400	1200	NE	NE	0.0049	NE	5	NE

Results are reported as mg/L or parts per million (ppm)
Contents of table obtained from data provided by Ameren.
Concentration above Illinois Class I Groundwater Standards
NA = Not Analyzed
NE = Not Established
TDS = Total Dissolved Solids
(d) = dissolved concentration
(t) = total concentration

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

N

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number	PLATE 1
J024917.01	

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.

LEGEND

- Monitoring Well Location
- Soil Boring Location

N

0 200 400 800

SCALE IN FEET

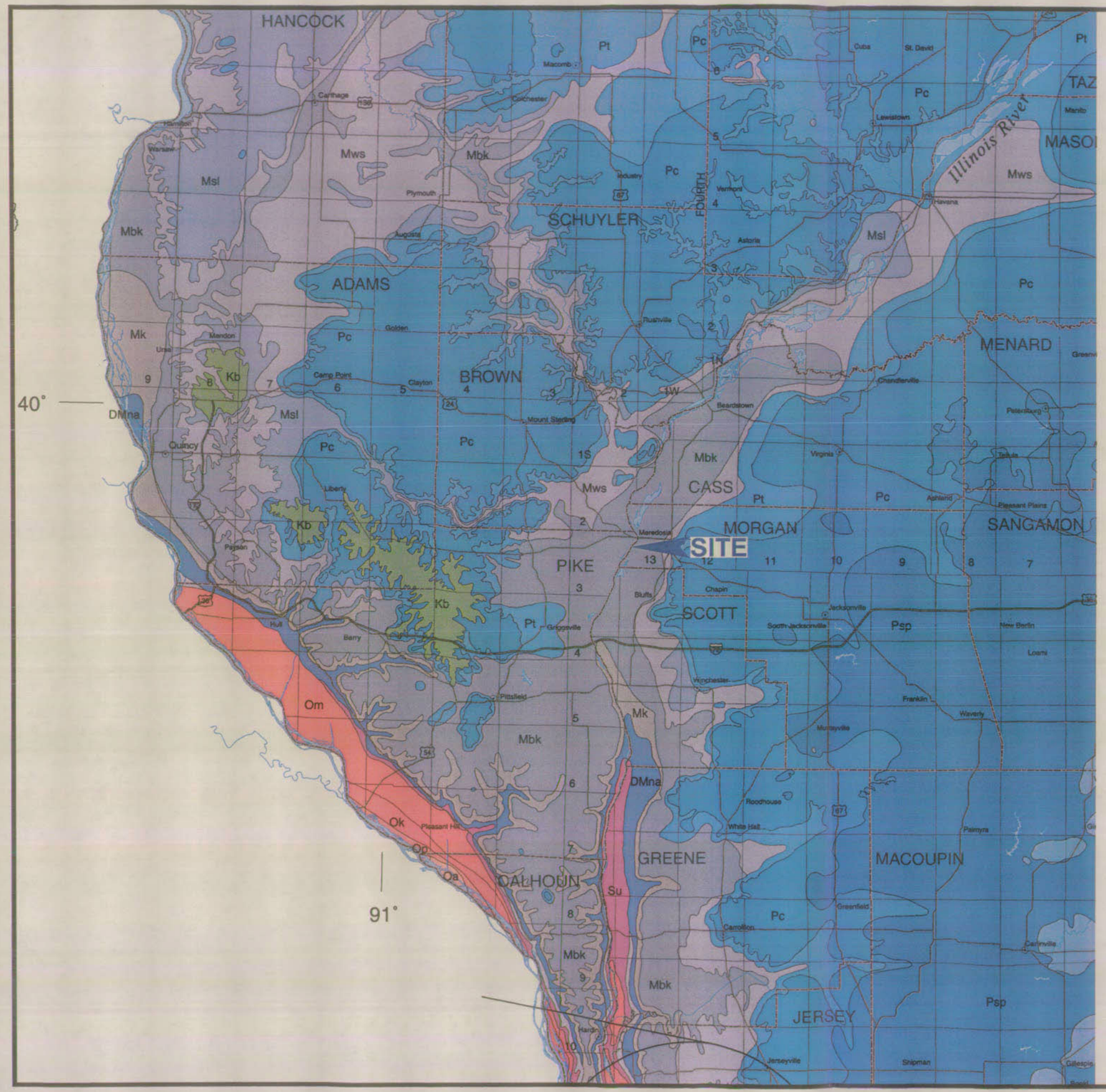
Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE PLAN AND MONITORING WELL LOCATIONS

Project Number	
J024917.01	PLATE 2



Kb	Baylis Formation (western Illinois)
Psp	Shelburn-Patoka Formations undivided
Pc	Carbondale Formation
Pt	Tradewater Formation
Msg	Ste. Genevieve Limestone
Msl	St. Louis Limestone
Mbk	Meppen Limestone, Fern Glen Formation, and Burlington-Keokuk Limestone
Mk	Glen Park Formation, Hannibal Shale, Chouteau Limestone, McCraney Limestone, Prospect Hill Siltstone, and Starrs Cave Limestone
DMna	New Albany Shale, Blocher Shale, Sylamore Sandstone, Selmier Shale, Sweetland Creek Shale, Grassy Creek Shale, Saverton Shale, and Louisiana Limestone
Su	Silurian System undivided, includes Sexton Creek Limestone, St. Clair Limestone, and Moccasin Springs Formation in southern Illinois; includes Wilhelmi Formation, Elwood Dolomite, Kankakee Dolomite, Joliet Dolomite, Sugar Run Dolomite, and Racine Dolomite in northeastern Illinois; includes Mosalem, Tete des Morts, Blanding, Sweeney, Marcus, and Racine Dolomites in northwestern Illinois
Om	Maquoketa Formation or Group, includes Cape Limestone, Cape La Croix Shale, Thebes Sandstone, Orchard Creek Shale, Girardeau Limestone, and Leemon Formation in southern Illinois; includes Scales Shale, Fort Atkinson Limestone, Brainard Shale, and Neda Formation in northern Illinois; includes Noix Oolite in western Illinois
Ok	Kimmswick (Trenton) Limestone and Decorah Formation in southern and western Illinois
Op	Platteville Group, includes Pecatonica, Mifflin, Grand Detour, Nachusa, and Quimbys Mill Formations; includes Plattin Limestone in southwestern Illinois
Oa	Ancell Group, includes St. Peter Sandstone, Dutchtown Limestone, Joachim Dolomite, and Glenwood Formation; includes Prairie du Chien Group in Jo Daviess County of northwestern Illinois

Drawn By: WAH	Ck'd By: DE	App'vd By: AMS
Date: 2-26-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BEDROCK GEOLOGY MAP

Project Number J024917.01

PLATE 3



NOTES

1. Plan adapted from a July 22, 2012 aerial photograph courtesy of Google Earth.
2. Water well locations from Illinois State Geological Survey Prairie Research Institute.
3. See Appendix A for water well records.
4. Abandoned on-site water supply wells are not shown.

LEGEND

- Water Supply Wells
- On-Site Water Supply Wells to be Abandoned

N

0 600 1200 2400

SCALE IN FEET

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 4-21-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

POTABLE WATER WELL SEARCH RADIUS

Project Number J024917.01	PLATE 4



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- Soil Boring Location
- Subsurface Profile (See Plate 6 and 7 for Cross-Section A-A' and B-B', Respectively)

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VSE	App'vd By: AMS
Date: 3-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SUBSURFACE PROFILE PLAN

Project Number	
J024917.01	PLATE 5

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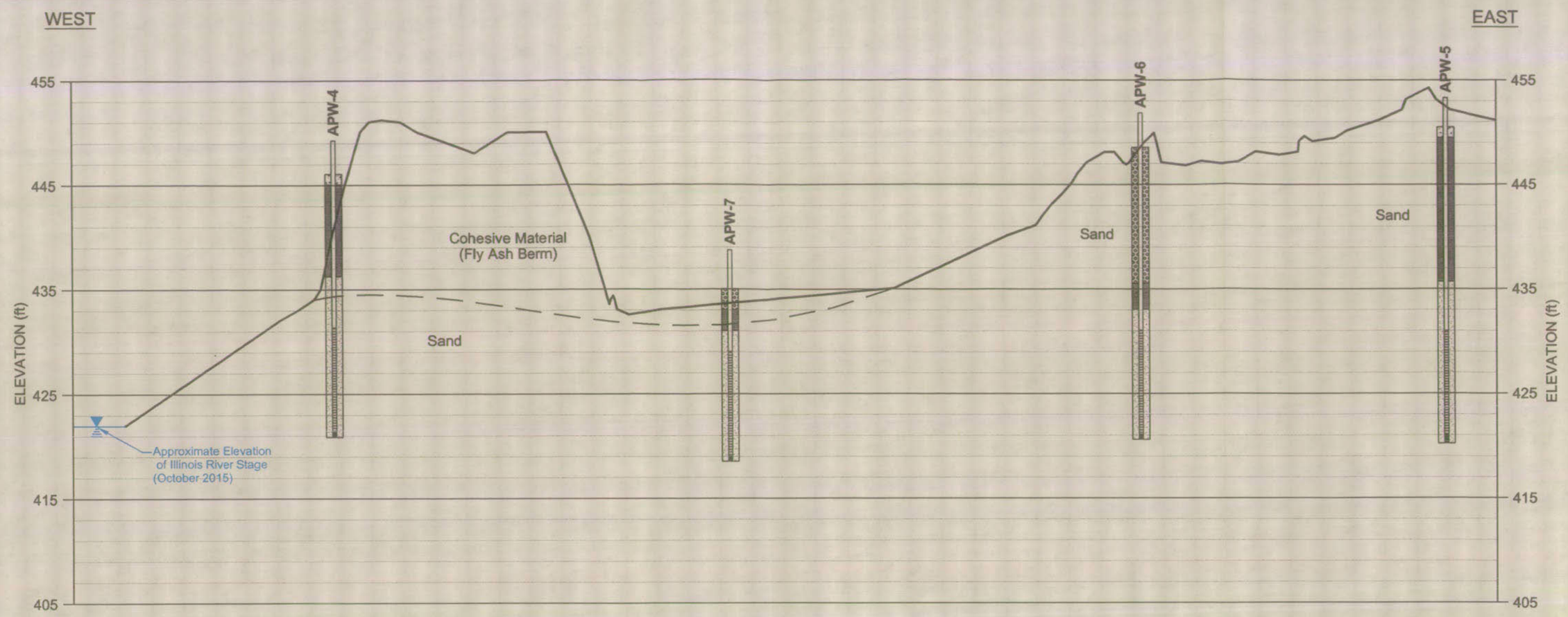


NOTES

1. See PLATE 5 for location of Subsurface Profile A-A'.
2. Data concerning subsurface conditions have been obtained at boring locations only. Actual conditions at locations between borings may differ from the generalized profile shown here.

SCALE IN FEET
Horizontal 1" = 200'
Vertical 1" = 10'

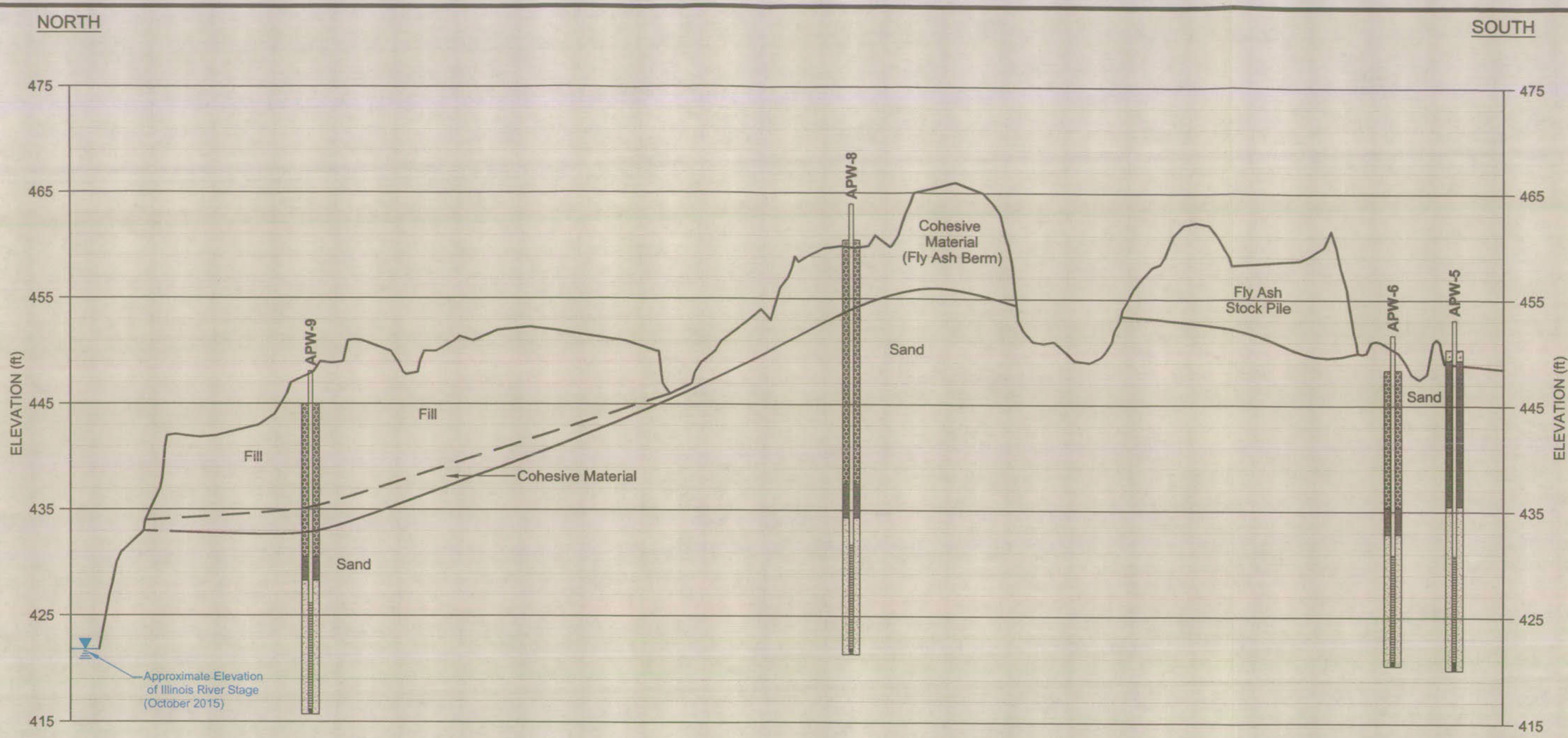
Drawn By: WAH	Ck'd By:	App'vd By:
Date: 3-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GENERALIZED SUBSURFACE PROFILE - SECTION A-A'

Project Number	
J024917.01	PLATE 6



NOTES

1. See PLATE 5 for location of Subsurface Profile B-B'.
2. Data concerning subsurface conditions have been obtained at boring locations only. Actual conditions at locations between borings may differ from the generalized profile shown here.

SCALE IN FEET
Horizontal 1" = 200'
Vertical 1" = 10'

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 3-7-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GENERALIZED SUBSURFACE PROFILE - SECTION B-B'

Project Number J024917.01	PLATE 7



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (November 17, 2010)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2010

Project Number J024917.01	PLATE 8

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (December 13, 2010)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/16/20

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - DECEMBER 2010

Project Number	
J024917.01	PLATE 9



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (September 15, 2011)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - SEPTEMBER 2011

Project Number	
J024917.01	PLATE 10



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (October 28, 2011)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - OCTOBER 2011

Project Number	
J024917.01	PLATE 11

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (March 26, 2012)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

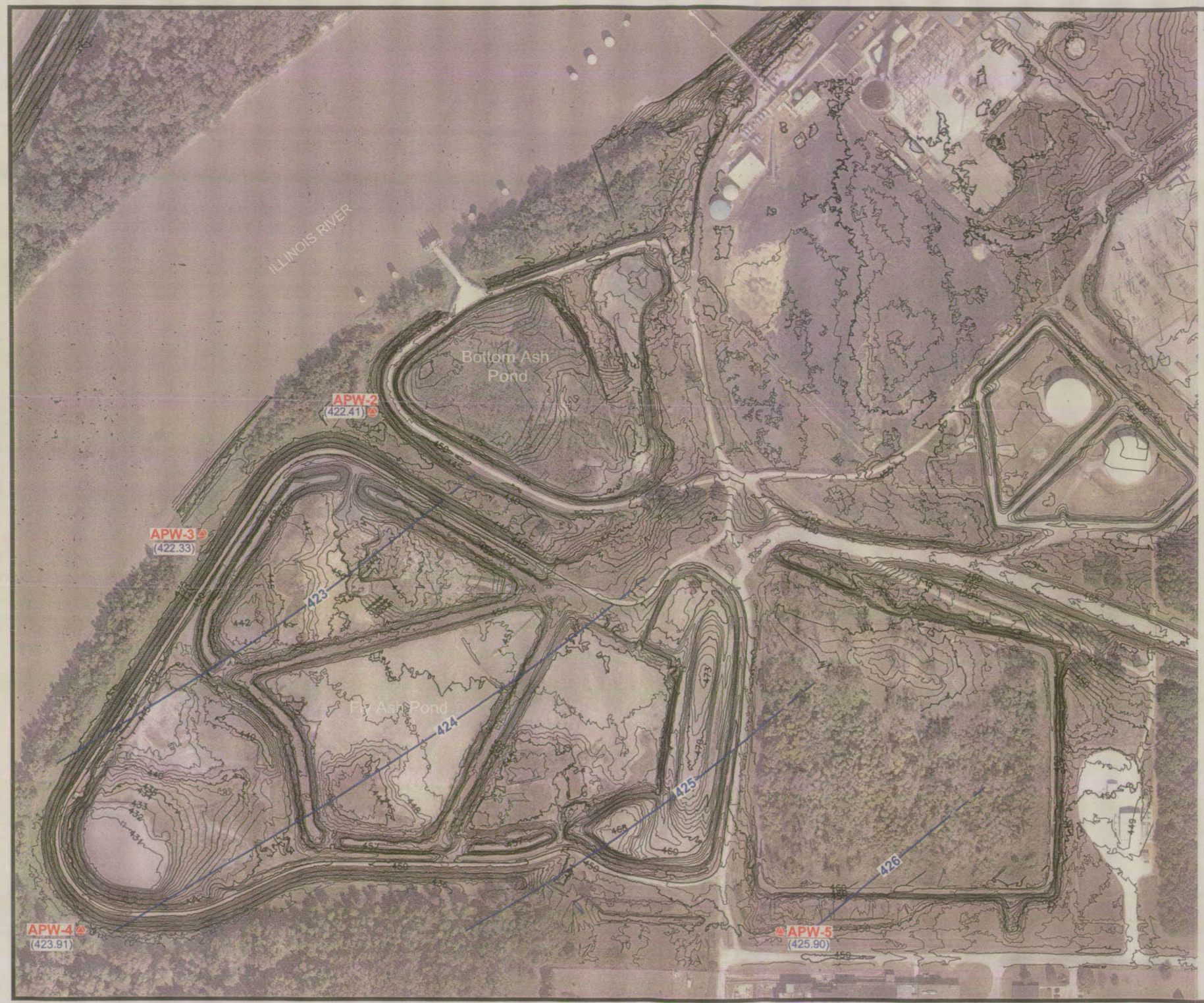
GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - MARCH 2012

Project Number	
J024917.01	PLATE 12

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (June 18, 2012)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - JUNE 2012

Project Number	
J024917.01	PLATE 13



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (September 17, 2012)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VE	App'vd By: AMS
Date: 5-18-16	Date: 7/2016	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - SEPTEMBER 2012

Project Number	
J024917.01	PLATE 14



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (August 25, 2015)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - AUGUST 2015

Project Number	
J024917.01	PLATE 15



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (December 21, 2015)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 3-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - DECEMBER 2015

Project Number
J024917.01

PLATE 16



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (February 18, 2016)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VDe	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - FEBRUARY 2016

Project Number J024917.01

PLATE 17

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NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (10.8) Boron Concentration in Groundwater, (mg/l - ppm) - August 25, 2015
- —10— Boron Concentration Isopleth, (mg/l - ppm)

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By:
Date: 4-21-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BOREON CONCENTRATION IN GROUNDWATER - AUGUST 2015

Project Number
J024917.01

PLATE 18



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (10.8) Boron Concentration in Groundwater, (mg/l - ppm) - December 21, 2015
- —10— Boron Concentration Isopleth, (mg/l - ppm)

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 4-19-16	Date: 7/22/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BORON CONCENTRATION IN GROUNDWATER - DECEMBER 2015

Project Number J024917.01	PLATE 19



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (10.3) Boron Concentration in Groundwater, (mg/l - ppm) - February 18, 2016
- —10— Boron Concentration Isopleth, (mg/l - ppm)

N

0 300 600

SCALE IN FEET

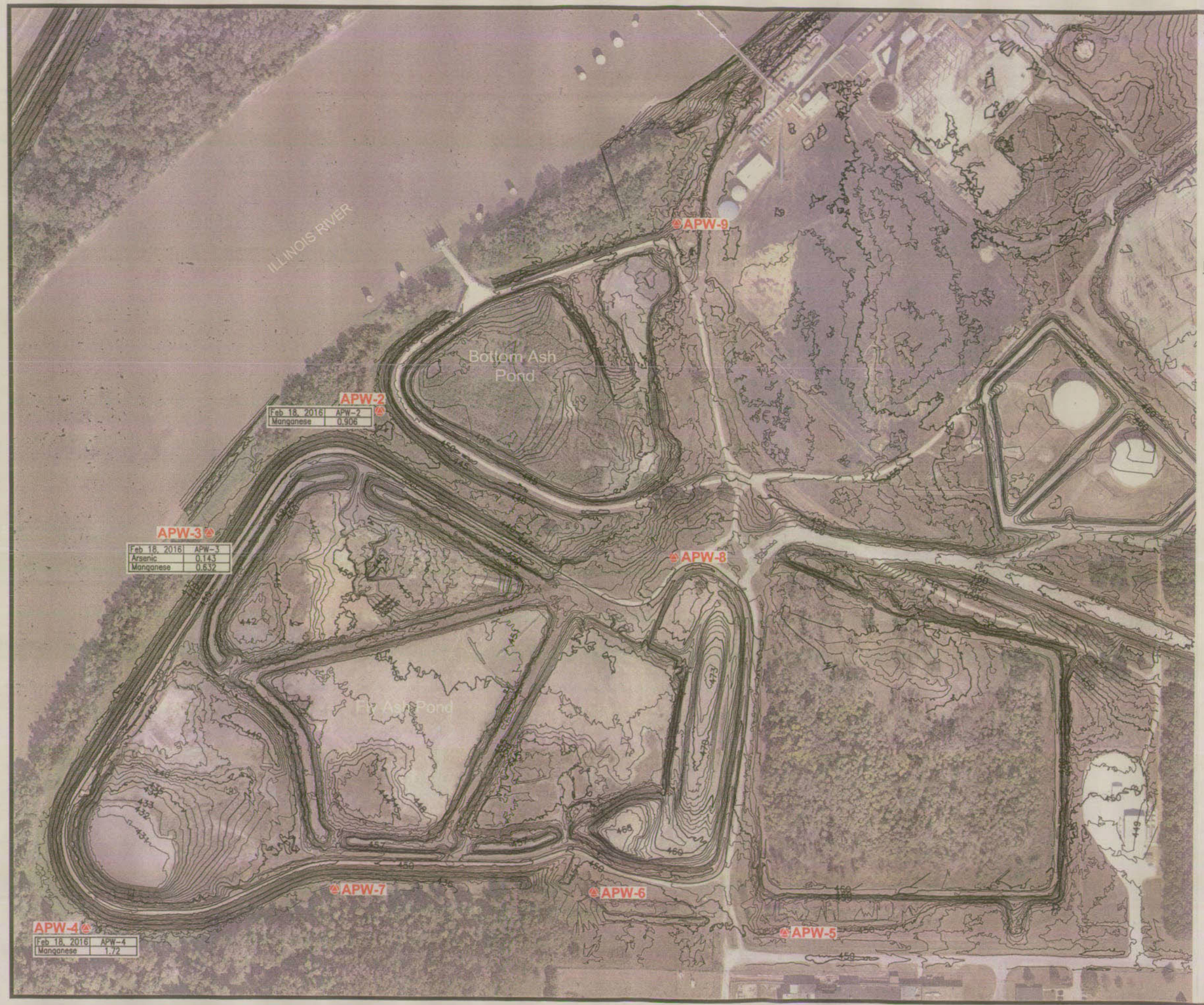
Drawn By: WAH	Ck'd By: VA2	App'vd By: AMS
Date: 4-21-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BORON CONCENTRATION IN GROUNDWATER - FEBRUARY 2016

Project Number J024917.01	PLATE 20



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

Monitoring Well Location

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

ARSENIC AND MANGANESE EXCEEDANCES - FEBRUARY 2016

Project Number
J024917.01

PLATE 21

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APPENDIX A

POTABLE WATER WELL DATA

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ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
ıd, fine; silt & pebbles	0	5
and, medium grain	5	11
sand, medium grain	11	22
sand, medium; small pebbles	22	32
sand, medium; small pebbles	32	42
sand, medium; small pebbles	42	52
sand, medium; small pebbles	52	62
sand, coarse;medium gravel & rock	62	67
limestone, chert bands; core	67	77
limestone, chert bands; core	77	88
limestone, chert bands; core	88	94
limestone, chert bands; core	94	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

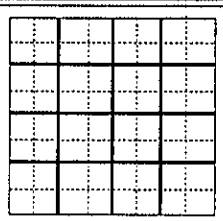
DATE DRILLED January 1, 1941 **NO.** 27

ELEVATION 418CO **COUNTY NO.** 00561

LOCATION 460'N line, 20'W line of NW SE

LATITUDE 39.82506 **LONGITUDE** -90.567886

COUNTY Morgan **API** 121370056100 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine sand	0	25
medium sand fine gravel	25	40
fine sand	40	48
fine coarse sand & gravel	48	52
fine medium sand	52	65
fine pink sand,	65	81
coarse sand, gravel & small boulders	81	105
Total Depth		105

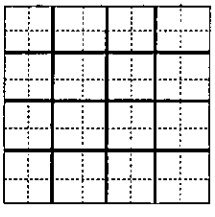
Static level 38' below casing top which is 0' above GL
Pumping level 40' when pumping at 503 gpm for 8 hours

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Central Ill.Public Service
DATE DRILLED December 1, 1960 **NO.** 4
ELEVATION 460GL **COUNTY NO.** 20656
LOCATION 2003'S line, 577'E line of section
LATITUDE 39.824389 **LONGITUDE** -90.565516
COUNTY Morgan **API** 121372065600 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

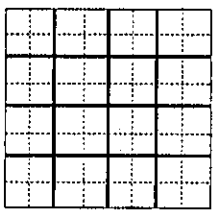
Water Well	Top	Bottom
nd, brown, medium grain	0	3
nd, brown, medium grain	3	6
sand, brown, fine grain	6	10
sand, brown, coarse grain	10	15
sand, coarse; fine gravel	15	20
sand, brown, medium grain	20	30
sand, medium, small pebbles	30	40
sand, brown, medium grain	40	50
sand, brown, fine grain	50	60
sand, coarse; medium gravel	60	70
sand, brown, fine grain	70	80
sand, coarse; coarse gravel	80	83
limestone, 2 1/8" core	83	86
limestone, 2 1/8" core	86	91
limestone, crystallized bands, very hard	91	96
limestone, 2 1/8" core	96	100
Total Depth		100

Driller's Log filed

Owner Address:

cation source: Location from the driller

Permit Date: **Permit #:**



COMPANY owner

FARM Cen. Ill. Pub. Service Co

DATE DRILLED January 1, 1941 **NO.** 21

ELEVATION 433CO **COUNTY NO.** 00555

LOCATION 530'N 315'E SW/c NE SE

LATITUDE 39.824039 **LONGITUDE** -90.564817

COUNTY Morgan **API** 121370055500 **21 - 16N - 13W**

Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

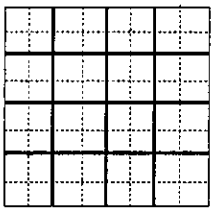
Water Well	Top	Bottom
sand, medium, light brown	0	3
sand, medium, clay content	3	6
sand, brown, medium grain	6	10
sand, medium, slight clay content	10	15
sand, brown, fine grain	15	20
sand, brown, fine grain	20	30
sand, coarse; fine gravel	30	40
sand, brown, fine grain	40	50
sand, coarse; fine gravel	50	60
sand, coarse; small gravel	60	70
sand, coarse; coarse gravel	70	80
sand, fine	80	90
sand, fine	90	98
boulders, small	98	99
sand, coarse; small gravel	99	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 20
ELEVATION 450CO **COUNTY NO.** 00554
LOCATION 485'N 350'E SW/c NE SE
LATITUDE 39.823913 **LONGITUDE** -90.564729
COUNTY Morgan **API** 121370055400 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, silty, brown	0	3
and, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, brown, medium grain	30	40
sand, brown, coarse grain, medium gravel	40	50
sand, coarse, small gravel	50	60
gravel, medium	60	70
gravel, medium	70	80
gravel, medium;sand, medium brown	80	90
medium gravel & sand, traces of lignite	90	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service

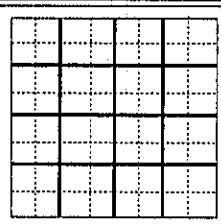
DATE DRILLED January 1, 1941 **NO.** 11

ELEVATION 456CO **COUNTY NO.** 00545

LOCATION 420'N 405'E SW/c NE SE

LATITUDE 39.823732 **LONGITUDE** -90.564583

COUNTY Morgan **API** 121370054500 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

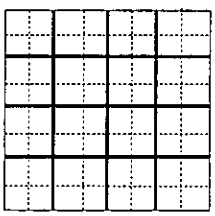
Water Well	Top	Bottom
sand, brown, medium grain	0	5
sand, brown, medium grain	5	7
sand, coarse; fine gravel	7	11
sand, coarse; fine gravel	11	16
sand, medium grain	16	26
sand, medium; medium gravel	26	36
sand, medium; medium gravel	36	46
sand, fine grain	46	56
sand, fine grain	56	66
sand, medium grain	66	76
sand, coarse; medium gravel	76	82
limestone	82	88
limestone	88	91
limestone, interbedded with flint	91	98
limestone	98	100
Total Depth		100

Driller's Log filed

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**



COMPANY owner

FARM Cen. Ill. Pub. Service Co

DATE DRILLED January 1, 1941 **NO.** 22

ELEVATION 434CO **COUNTY NO.** 00556

LOCATION 445'N 230'E SW/c NE SE

LATITUDE 39.823809 **LONGITUDE** -90.565185

COUNTY Morgan **API** 121370055600 21 - 16N - 13W

Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, fine grain	0	3
sand, fine grain	3	6
sand, fine grain	6	10
sand, fine grain	10	15
sand, fine grain	15	25
sand, medium, clay content	25	35
sand, coarse, small pebbles	35	45
sand, coarse, small pebbles	45	55
sand, fine grain	55	65
sand, fine grain	65	75
sand, medium grain	75	85
sand, coarse; fine gravel	85	92
sand, coarse; medium gravel (rock)	92	94
limestone (core)	94	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

DATE DRILLED January 1, 1941 **NO.** 19

ELEVATION 444CO **COUNTY NO.** 00553

LOCATION 400'N 270'E SW/c NE SE

LATITUDE 39.823683 **LONGITUDE** -90.56508

COUNTY Morgan **API** 121370055300 **21 - 16N - 13W**

Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

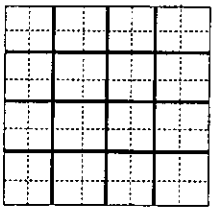
Water Well	Top	Bottom
sand, brown, medium grain	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, brown, medium grain	30	40
sand, coarse grain, small gravel	40	50
sand, coarse, grain, medium gravel	50	60
sand, coarse grain, small gravel	60	70
sand, coarse grain, small gravel	70	80
sand, coarse, grain, med gvl, tr lignite	80	90
sand, coarse grain, medium gravel	90	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 12
ELEVATION 457CO **COUNTY NO.** 00546
LOCATION 370'N 360'E SW/c NE SE
LATITUDE 39.823598 **LONGITUDE** -90.564781
COUNTY Morgan **API** 121370054600 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

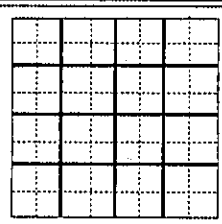
Water Well	Top	Bottom
lty sand	0	15
arse sand & gravel	15	30
medium sand & gravel	30	50
gravel, coarse sand	50	60
fine sand	60	67
sand & gravel	67	80
fine sand	80	85
gravel	85	106
rock at	106	106
Total Depth		106

Casing: 12" from -2' to 81'
20" from 0' to 30'
Water from sand & gravel at 0' to 0'.
Static level 27' below casing top which is 2' above GL
Pumping level 33' when pumping at 503 gpm for 24 hours

Driller's Log filed

Owner Address:
Location source: Location from permit

Permit Date: **Permit #:**



COMPANY owner
FARM CIPS Meredosia Unit 4
DATE DRILLED May 1, 1974 **NO.** 5
ELEVATION 455TM **COUNTY NO.** 20658
LOCATION 1700'S line, 300'E line of SE
LATITUDE 39.823541 **LONGITUDE** -90.564662
COUNTY Morgan **API** 121372065800 **21 - 16N - 13W**

Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, fine grain	0	3
sand, fine grain	3	6
sand, medium grain	6	10
sand, medium grain	10	15
sand, medium; fine gravel	15	25
sand, coarse; medium gravel	25	35
sand, fine grain	35	45
sand, fine grain	45	55
sand, medium; small gravel	55	65
sand, coarse; small gravel	65	75
sand, coarse; medium gravel	75	82
limestone	82	85
limestone	85	95
limestone	95	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

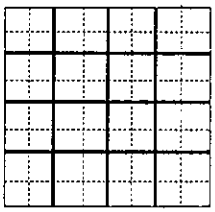
DATE DRILLED January 1, 1941 **NO.** 23

ELEVATION 432CO **COUNTY NO.** 00557

LOCATION 380'N 160'E SW/c NE SE

LATITUDE 39.823633 **LONGITUDE** -90.565487

COUNTY Morgan **API** 121370055700 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, fine; little clay	0	3
and, fine grain	3	6
sand, medium grain	6	10
sand, medium grain	10	15
sand, coarse; fine gravel	15	25
sand, coarse; fine gravel	25	35
sand, medium, small pebbles	35	45
sand, coarse; fine gravel	45	55
sand, fine grain	55	65
sand, fine grain	65	75
sand, medium, small pebbles	75	85
sand, coarse; coarse gravel	85	93
limestone core	93	97
limestone, chert bands, core	97	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

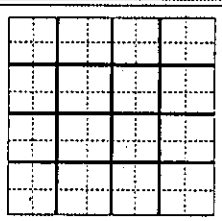
DATE DRILLED January 1, 1941 **NO.** 18

ELEVATION 443CO **COUNTY NO.** 00552

LOCATION 335'N 200'E SW/c NE SE

LATITUDE 39.823507 **LONGITUDE** -90.565381

COUNTY Morgan **API** 121370055200 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine to medium sand	0	24
medium sand & fine gravel	24	55
fine sand	55	68
sand & gravel	68	73
medium sand, gravel & boulders	73	78
total depth	78	109
Total Depth		109

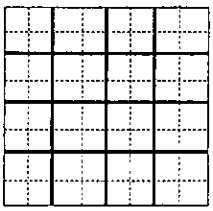
Casing: 30" from 0' to 30'
10" from 4' to 84'
Pumping level 3' when pumping at 165 gpm for 1 hour

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Central Ill.Public Ser.
DATE DRILLED November 21, 1957 **NO.** 3
ELEVATION 460GL **COUNTY NO.** 20657
LOCATION 1643'S line, 473'E line of section
LATITUDE 39.823391 **LONGITUDE** -90.565304
COUNTY Morgan **API** 121372065700 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, medium grain	0	3
nd, brown, medium grain	3	10
sand, brown, medium grain	10	15
sand, medium grain, clay content	15	17
sand, brown, medium grain	17	20
sand, brown, medium grain	20	30
sand, coarse; small gravel	30	40
sand, coarse; small gravel	40	50
sand, coarse; medium gravel	50	60
sand, coarse; medium gravel	60	70
sand, medium grain	70	80
sand, medium grain	80	90
sand, medium grain; medium gravel	90	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

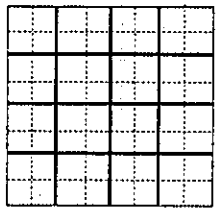
DATE DRILLED January 1, 1941 **NO.** 13

ELEVATION 456CO **COUNTY NO.** 00547

LOCATION 305'N 295'E SW/c NE SE

LATITUDE 39.823421 **LONGITUDE** -90.565065

COUNTY Morgan **API** 121370054700 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

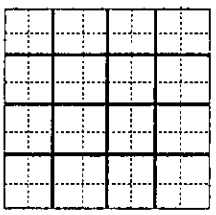
 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	25
Total Depth		25

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**



COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 10
ELEVATION 456CO **COUNTY NO.** 00544
LOCATION 255'N 350'E SW/c NE SE
LATITUDE 39.823282 **LONGITUDE** -90.564909
COUNTY Morgan **API** 121370054400 21 - 16N - 13W

Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, silty, medium grain	0	1
and, brown, medium grain	1	7
sand, brown, medium grain	7	10
sand, brown, slight clay content	10	13
sand, brown, slight clay content	13	19
sand, dark brown, medium grain	19	25
Total Depth		25

Driller's Log filed

Permit Date: **Permit #:**

COMPANY C.I.P.S.

FARM Cen. Ill. Pub. Service

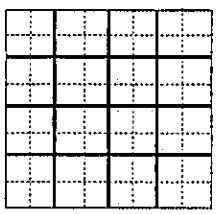
DATE DRILLED January 1, 1941 **NO.** 1

ELEVATION 454CO **COUNTY NO.** 00535

LOCATION 190'N 410'E SW/c NE SE

LATITUDE 39.823098 **LONGITUDE** -90.564749

COUNTY Morgan **API** 121370053500 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, medium grain	0	3
sand, medium grain	3	6
sand, medium grain	6	10
sand, medium grain	10	15
sand, fine grain	15	25
sand, medium; fine gravel	25	35
sand, fine grain	35	45
sand, fine grain	45	50
Total Depth		50

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: Permit #:

COMPANY owner

FARM Cen. Ill. Pub. Service Co

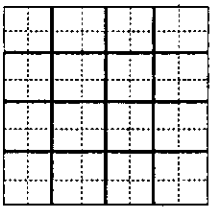
DATE DRILLED January 1, 1941 NO. 26

ELEVATION 423CO COUNTY NO. 00560

LOCATION 395'N 45'E SW/c NE SE

LATITUDE 39.823679 LONGITUDE -90.565885

COUNTY Morgan API 121370056000 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, brown, medium grain	0	3
and, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, medium grain; small gravel	30	40
sand, medium grain; small gravel	40	50
sand, medium grain; small gravel	50	60
sand, medium grain; medium gravel	60	70
sand, medium grain; small gravel	70	80
sand, medium grain; small gravel	80	90
sand, medium grain; small gravel	90	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

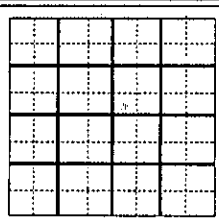
DATE DRILLED January 1, 1941 **NO.** 14

ELEVATION 456CO **COUNTY NO.** 00548

LOCATION 240'N 230'E SW/c NE SE

LATITUDE 39.823245 **LONGITUDE** -90.565349

COUNTY Morgan **API** 121370054800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY Electronic Filing: Received, Clerk's Office 09/28/2020

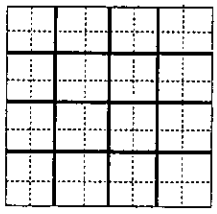
Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain, small gravel	20	25
Total Depth		25

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 9
ELEVATION 456CO **COUNTY NO.** 00543
LOCATION 215'N 310'E SW/c NE SE
LATITUDE 39.823173 **LONGITUDE** -90.565083
COUNTY Morgan **API** 121370054300 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, silty	0	2
and, brown, medium grain	2	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	14
sand,brown,medium grain,slight clay	14	15
sand, brown, medium grain	15	20
sand, brown, medium grain	20	25
Total Depth		25

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: Permit #:

COMPANY owner

FARM Cen. Ill. Pub. Service

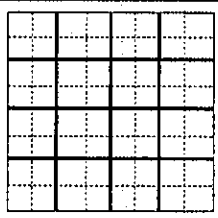
DATE DRILLED January 1, 1941 NO. 2

ELEVATION 454CO COUNTY NO. 00536

LOCATION 150'N 370'E SW/c NE SE

LATITUDE 39.822992 LONGITUDE -90.564922

COUNTY Morgan API 121370053600 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, fine grain	0	3
sand, medium grain	3	6
sand, fine grain	6	10
sand, fine grain	10	15
sand, medium, small pebbles	15	25
sand, fine grain	25	35
sand, medium grain	35	45
sand, fine grain	45	55
sand, fine grain	55	65
sand, coarse; fine gravel	65	75
sand, coarse; medium gravel	75	81
limestone core	81	86
limestone with chert bands	86	89
limestone	89	91
limestone	91	100
Total Depth		100

Driller's Log filed

Owner Address: .

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

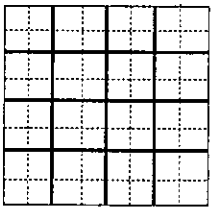
DATE DRILLED January 1, 1941 **NO.** 24

ELEVATION 431CO **COUNTY NO.** 00558

LOCATION 310'N 95'E SW/c NE SE

LATITUDE 39.823442 **LONGITUDE** -90.565774

COUNTY Morgan **API** 121370055800 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

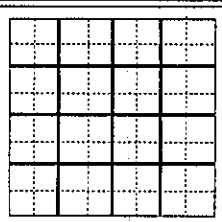
Water Well	Top	Bottom
nd, medium grain	0	3
and, medium grain	3	10
sand, medium grain	10	20
sand, medium grain; small gravel	20	30
sand, medium grain	30	40
sand, coarse; large gravel	40	50
sand, coarse; large gravel	50	56
sand, fine	56	60
sand, fine; small gravel	60	70
sand, fine; small gravel	70	80
sand, coarse; coarse gravel	80	90
gravel, medium, clay content	90	95
limestone	95	96
limestone	96	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**



COMPANY owner

FARM Cen. Ill. Pub. Service Co.

DATE DRILLED January 1, 1941 **NO.** 17

ELEVATION 446CO **COUNTY NO.** 00551

LOCATION 270'N 135'E SW/c NE SE

LATITUDE 39.82333 **LONGITUDE** -90.565661

COUNTY Morgan **API** 121370055100 **21 - 16N - 13W**

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ILLINOIS STATE GEOLOGICAL SURVEY

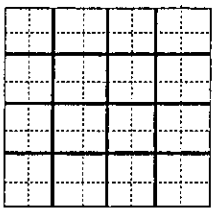
Water Well	Top	Bottom
sand, brown, medium grain	0	2
sand, brown, medium grain	2	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	25
Total Depth		25

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 8
ELEVATION 457CO **COUNTY NO.** 00542
LOCATION 175'N 270'E SW/c NE SE
LATITUDE 39.823063 **LONGITUDE** -90.565256
COUNTY Morgan **API** 121370054200 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

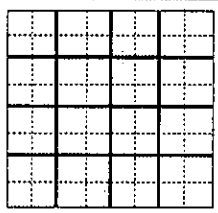
Water Well	Top	Bottom
nd, brown, silty	0	3
nd, brown, medium grain	3	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	20
sand, brown, traces of fine gravel	20	25
Total Depth		25

Driller's Log filed

Owner Address:
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 3
ELEVATION 454CO **COUNTY NO.** 00537
LOCATION 105'N 330'E SW/c NE SE
LATITUDE 39.822869 **LONGITUDE** -90.5651
COUNTY Morgan **API** 121370053700 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

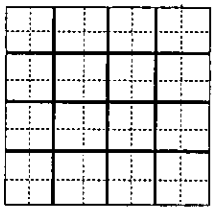
Water Well	Top	Bottom
sand, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, medium grain; small gravel	30	40
sand, medium grain; small gravel	40	50
sand; small gravel	50	60
sand; coarse gravel	60	70
sand, fine grain; traces small gravel	70	80
sand, fine grain	80	90
sand, coarse	90	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co.
DATE DRILLED January 1, 1941 **NO.** 15
ELEVATION 454CO **COUNTY NO.** 00549
LOCATION 175'N 160'E SW/c NE SE
LATITUDE 39.823068 **LONGITUDE** -90.565647
COUNTY Morgan **API** 121370054900 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

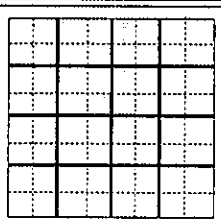
Water Well	Top	Bottom
nd, brown, medium grain	0	3
and, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, medium coarse grain, small gravel	30	40
sand, medium coarse grain, small gravel	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 7
ELEVATION 456CO **COUNTY NO.** 00541
LOCATION 130'N 230'E SW/c NE SE
LATITUDE 39.822943 **LONGITUDE** -90.565434
COUNTY Morgan **API** 121370054100 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

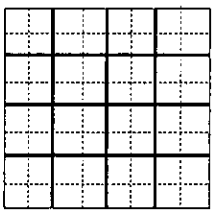
Water Well	Top	Bottom
sand, silty,brown	0	1
sand, brown, medium grain	1	5
sand, brown, medium grain	5	10
sand,brown,medium grain,slight clay	10	10
sand, brown, medium grain	10	28
sand, medium gravel	28	30
sand, medium gravel, water showing	30	40
sand, medium gravel, water showing	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 4
ELEVATION 454CO **COUNTY NO.** 00538
LOCATION 65'N 290'E SW/c NE SE
LATITUDE 39.82276 **LONGITUDE** -90.565273
COUNTY Morgan **API** 121370053800 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, brown, medium grain	0	5
and, brown, medium grain	5	10
sand, brown, medium grain	10	20
sand, light brown, medium grain	20	30
no record	30	31
sand, coarse; medium gravel	31	35
sand, coarse; medium gravel	35	40
sand, fine grain	40	50
sand, fine grain	50	60
gravel, small, pea size	60	70
sand, coarse; small gravel	70	80
sand, coarse; small gravel	80	86
limestone	86	92
limestone	92	95
limestone	95	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

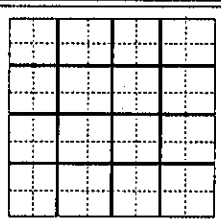
DATE DRILLED January 1, 1941 **NO.** 25

ELEVATION 436CO **COUNTY NO.** 00559

LOCATION 245'N 25'E SW/c NE SE

LATITUDE 39.823266 **LONGITUDE** -90.566072

COUNTY Morgan **API** 121370055900 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, brown, medium grain	0	4
clay, sandy	4	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	20
sand, medium; medium gravel	20	30
sand, medium; medium gravel	30	40
sand, coarse; medium gravel	40	50
sand, fine; coarse gravel	50	60
sand, fine	60	70
sand; medium gravel	70	80
sand, coarse; small gravel	80	90
sand, coarse; small gravel	90	93
sand, coarse; small gravel	93	95
limestone	95	96
limestone	96	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

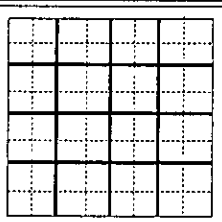
DATE DRILLED January 1, 1941 **NO.** 16

ELEVATION 446CO **COUNTY NO.** 00550

LOCATION 190'N 80'E SW/c NE SE

LATITUDE 39.823113 **LONGITUDE** -90.565919

COUNTY Morgan **API** 121370055000 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, silty, brown	0	2
nd, brown, medium grain	2	10
sand, brown, medium grain	10	20
sand, brown, medium coarse grain	20	30
sand, brown, small gravel	30	40
sand, medium coarse, medium gravel	40	50
Total Depth		50

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service

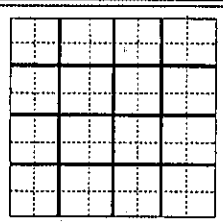
DATE DRILLED January 1, 1941 **NO.** 6

ELEVATION 454CO **COUNTY NO.** 00540

LOCATION 85'N 190'E SW/c NE SE

LATITUDE 39.82282 **LONGITUDE** -90.565614

COUNTY Morgan **API** 121370054000 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	5
sand, brown, medium grain	5	10
sand, brown, slight clay content	10	15
sand, brown, medium grain	15	20
sand, brown, medium grain	20	29
sand, medium gravel, water showing	29	30
sand, medium grain, medium gravel	30	40
sand, medium grain, medium gravel	40	50
Total Depth		50

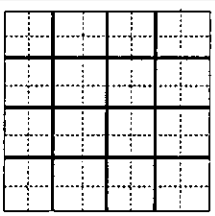
Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 5
ELEVATION 454CO **COUNTY NO.** 00539
LOCATION 25'N 250'E SW/c NE SE
LATITUDE 39.822653 **LONGITUDE** -90.565447
COUNTY Morgan **API** 121370053900 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
d, medium; silt & pebbles	0	5
and, medium; fine gravel	5	14
sand, medium; fine gravel	14	24
sand, fine grain	24	34
sand, fine grain	34	44
sand, fine grain	44	54
sand, coarse; small pebbles	54	64
sand, coarse; medium gravel	64	67
limestone (broken), core	67	77
limestone (broken), core	77	87
limestone (broken), core	87	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

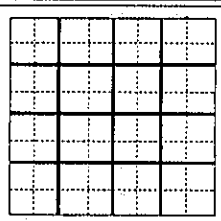
DATE DRILLED January 1, 1941 **NO.** 28

ELEVATION 417CO **COUNTY NO.** 00562

LOCATION 290'N 180'W SE/c NW SE

LATITUDE 39.823398 **LONGITUDE** -90.566769

COUNTY Morgan **API** 121370056200 21 - 16N - 13W



ILLINOIS STATE GEOLOGICAL SURVEY
Electronic Filing: Received, Clerk's Office 09/28/2020

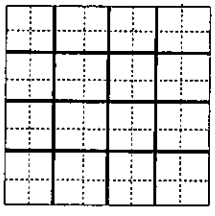
Water Well	Top	Bottom
silt, sandy, dark brown	0	3
silt, sandy, dark brown	3	6
sand, medium & silt	6	10
sand, fine, light brown	10	15
sand, medium; fine gravel	15	20
sand, coarse; coarse gravel	20	30
sand, fine; small stones	30	40
sand, fine	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 29
ELEVATION 429CO **COUNTY NO.** 00563
LOCATION 200'N 95'W SE/c NW SE
LATITUDE 39.823148 **LONGITUDE** -90.566536
COUNTY Morgan **API** 121370056300 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
nd, brown, slight clay content	0	3
nd, brown, medium grain	3	10
sand, brown, medium grain	10	19
sand, course; medium gravel	19	20
sand, course; medium gravel	20	30
sand, coarse; small gravel	30	40
sand, coarse; medium gravel	40	50
sand, fine	50	60
sand, coarse	60	70
sand, coarse	70	80
sand, coarse	80	89
sand, coarse;small gvl w/tr of lignite	89	90
limestone	90	96
limestone	96	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

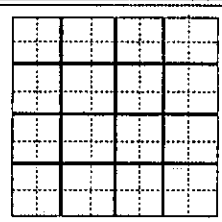
DATE DRILLED January 1, 1941 **NO.** 30

ELEVATION 442CO **COUNTY NO.** 00564

LOCATION 115'N 5'W SE/c NW SE

LATITUDE 39.822911 **LONGITUDE** -90.566281

COUNTY Morgan **API** 121370056400 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Electronic Filing: Received, Clerk's Office 09/28/2020

Water Well	Top	Bottom
sand fill	0	20
clay	20	30
coarse sand & gravel	30	104
rock at	104	104
Total Depth		**104**

Casing: 30" STEEL .312 from 0' to 30'
12" STEEL .375 from 0' to 79'

Screen: 25' of 12" diameter 6 slot

Size hole below casing: 38"

Water from alluvial at 30' to 102'.

Static level 25' below casing top which is 2' above GL

Driller's Log filed

Owner Address: Meredosia, IL

Location source: Platbook verified

Permit Date: September 8, 1977 **Permit #:** 66466

COMPANY Ruester, John T.

FARM Central Ill. Public Ser.Co.

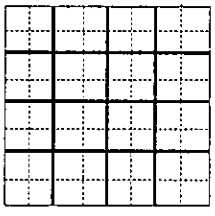
DATE DRILLED April 25, 1978 **NO.** 6

ELEVATION 448GL **COUNTY NO.** 20758

LOCATION 100'S line, 50'W line of SW NE SE

LATITUDE 39.822865 **LONGITUDE** -90.566098

COUNTY Morgan **API** 121372075800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY Electronic Filing: Received, Clerk's Office 09/28/2020

Water Well	Top	Bottom
sand, brown, medium grain	0	8
nd, medium, clay content	8	10
sand, brown, medium grain	10	15
sand, brown, medium grain	15	20
sand, brown, medium grain	20	30
sand & medium gravel	30	35
sand, coarse; medium gravel	35	40
sand, coarse; medium gravel	40	45
sand, coarse; fine gravel	45	50
Total Depth		50

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

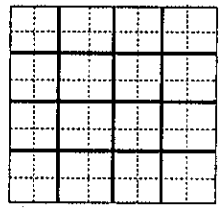
DATE DRILLED January 1, 1941 **NO.** 31

ELEVATION 454CO **COUNTY NO.** 00565

LOCATION 40'N 70'E SW/c NE SE

LATITUDE 39.8227 **LONGITUDE** -90.566074

COUNTY Morgan **API** 121370056500 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine brown sand	0	30
coarse sand	30	50
medium sand	50	70
fine to medium sand	70	90
sand & gravel	90	105
rock at	105	105
Total Depth		105

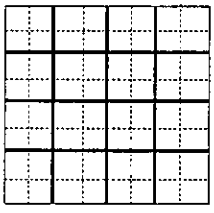
Casing: 12" from -1' to 79'
30" from 0' to 31'
Water from sand & gravel at 0' to 0'.
Static level 32' below casing top which is 0' above GL
Pumping level 39' when pumping at 517 gpm for 22 hours

Driller's Log filed
Sample set # 58921 (0' - 103') Received: December 8, 1973

Owner Address: ,
Location source: Location from permit

Permit Date: **Permit #:**

COMPANY owner
FARM CIPS Meredosia Power Sta unit 4,#
DATE DRILLED August 30, 1973 **NO.** 5
ELEVATION 445TM **COUNTY NO.** 00639
LOCATION 1300'S line, 500'E line of SE
LATITUDE 39.822448 **LONGITUDE** -90.565551
COUNTY Morgan **API** 121370063900 **21 - 16N - 13W**



 ILLINOIS STATE GEOLOGICAL SURVEY Electronic Filing: Received, Clerk's Office 09/28/2020

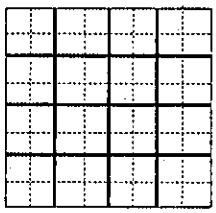
Test Hole	Top	Bottom
crushed stone	0	1
silty sand	1	5
fine sand	5	20
fine to medium sand	20	25
fine to coarse sand	25	35
coarse sand	35	40
med. to coarse sand w/gravel	40	45
fine to medium sand	45	50
fine to coarse sand	50	70
fine to coarse sand w/gravel	70	75
silty, fine to medium sand	75	85
fine to coarse sand	85	95
medium to coarse sand	95	101
fine to coarse sand w/boulders	101	104
Total Depth		104

Sample set # 67974 (5' - 103') Received: July 1, 1994

Owner Address: Meredosia, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Brotcke, Paul
FARM CIPS Power Station
DATE DRILLED June 21, 1994 **NO.** 7
ELEVATION 0 **COUNTY NO.** 21579
LOCATION SE NE SE
LATITUDE 39.823501 **LONGITUDE** -90.564221
COUNTY Morgan **API** 121372157900 21 - 16N - 13W



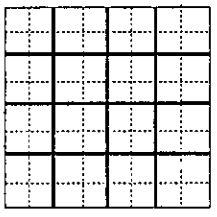
Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fine-medium sand	0	24
medium sand & fine gravel	24	55
fine sand	55	68
sand & gravel	68	73
medium sand, gravel & boulders	73	78
Total Depth		78

Pumping level 0' when pumping at 165 gpm for 1 hour

Permit Date: **Permit #:**



COMPANY

FARM CIPS

DATE DRILLED November 21, 1957 **NO.** 3

ELEVATION 460 **COUNTY NO.** 21982

LOCATION NW NE SE

LATITUDE 39.825368 **LONGITUDE** -90.564994

COUNTY Morgan **API** 121372198200 **21 - 16N - 13W**

Electronic Filing: Received, Clerk's Office 09/28/2020

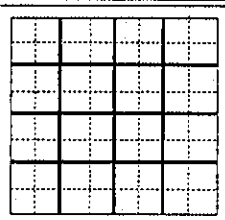
ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
[illegible]e sand	0	25
[illegible]dium sand-fine gravel	25	40
fine sand	40	48
fine-coarse sand & gravel	48	52
fine-medium sand	52	65
fine pink sand	65	81
coarse sand, gravel & small boulders	81	105
Total Depth		105

Static level 38' below casing top which is 0' above GL
Pumping level 40' when pumping at 503 gpm for 8 hours

Permit Date: **Permit #:**

COMPANY
FARM CIPS
DATE DRILLED December 1, 1960 **NO.** 4
ELEVATION 460 **COUNTY NO.** 21981
LOCATION NE NE SE
LATITUDE 39.825356 **LONGITUDE** -90.563863
COUNTY Morgan **API** 121372198100 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fill sand	0	20
fine sand	20	40
medium sand	40	85
medium sand with gravel	85	104
rock at	104	104
Total Depth		104

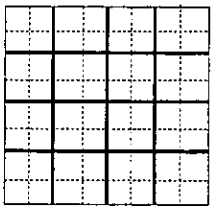
Casing: 36" STEEL 166.35#/FT from -2' to 30'
16" STEEL 62.58#/FT from -2' to 79'
Screen: 25' of 16" diameter .05 slot
Grout: NEAT from 0 to 30.

Water from sand & gravel at 32' to 104'.
Static level 32' below casing top which is 2' above GL
Permanent pump installed at 75'
on July 11, 1994, with a capacity of 600 gpm

Owner Address: 800 S. Washington St. Meredosia, IL
Location source: Location from permit

Permit Date: June 9, 1994 **Permit #:**

COMPANY Brotcke Engineering
FARM Central IL Public Service C
DATE DRILLED June 21, 1994 **NO.** 7
ELEVATION 0 **COUNTY NO.** 21613
LOCATION SE NE SE
LATITUDE 39.823501 **LONGITUDE** -90.564221
COUNTY Morgan **API** 121372161300 21 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fill sand	0	20
fine sand	20	40
medium sand	40	85
medium sand w/ gravel	85	104
rock @	104	104
Total Depth		104

Casing: 36" STEEL from -2' to 30'
16" STEEL from -2' to 79'

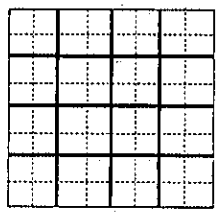
Grout: NEAT from 0 to 30.

Water from sand & gravel at 32' to 104'.
Static level 32' below casing top which is 2' above GL
Permanent pump installed at 75'
on July 11, 1994, with a capacity of 600 gpm
Remarks: IEPA well #13700182

Owner Address:
Address of well: 800 Washington
Meredosia, IL
Location source: Location from the driller

Permit Date: June 9, 1994 **Permit #:**

COMPANY Brotcke Engineering
FARM CIPS
DATE DRILLED June 21, 1994 **NO.** 7
ELEVATION 0 **COUNTY NO.** 21980
LOCATION SE NE SE
LATITUDE 39.823501 **LONGITUDE** -90.564221
COUNTY Morgan **API** 121372198000 **21 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand	0	40
medium to fine sand	40	70
sand & gravel	70	94
gravel & boulders	94	98
Total Depth		98

Casing: 12" STEEL CASING from 0' to 78'

Static level 25' below casing top which is 0' above GL

Pumping level 34' when pumping at 600 gpm for 15 hours

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM National Starch & Chem. Co

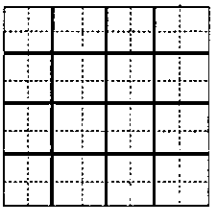
DATE DRILLED July 7, 1964 **NO.** 4

ELEVATION 435GL **COUNTY NO.** 20802

LOCATION 1669'N line, 1850'E line of NE

LATITUDE 39.814322 **LONGITUDE** -90.570968

COUNTY Morgan **API** 121372080200 28 - 16N - 13W



 ILLINOIS STATE GEOLOGICAL SURVEY Electronic Filing: Received, Clerk's Office 09/28/2020

Water Well	Top	Bottom
gs #31677	0	0
nd	0	20
sand & gravel	20	60
coarse sand & gravel	60	92
Total Depth		92

Casing: 12" ID from -2' to 72'

Water from at 70' to 90'.

Static level 25' below casing top which is 0' above GL

Pumping level 0' when pumping at 500 gpm for 0 hours

Remarks: see file for detail sample study

Driller's Log filed

Sample set # 31677 (0' - 92') Received: October 21, 1958

Owner Address:

Location source: Location from permit

Permit Date: September 9, 1958 **Permit #:**

COMPANY owner

FARM National Starch Prod.

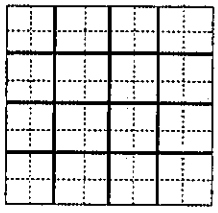
DATE DRILLED October 1, 1958 **NO.** 2

ELEVATION 442GL **COUNTY NO.** 00147

LOCATION 310'N line, 1200'E line of NE

LATITUDE 39.818045 **LONGITUDE** -90.568641

COUNTY Morgan **API** 121370014700 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand	0	45
sand & gravel	45	90
Total Depth		90

Casing: 16" STEEL 3/8 WALL from -2' to 65'

Screen: 25' of 16" diameter .8 slot

Water from drift at 65' to 90'.

Owner Address: P.O. Box 197 Meredosia, IL

Location source: Location from permit

Permit Date: October 13, 1978 **Permit #:** 80737

COMPANY owner

FARM National Starch

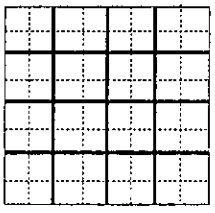
DATE DRILLED October 24, 1978 **NO.** 11

ELEVATION 0 **COUNTY NO.** 20760

LOCATION 1408'N line, 855'E line of NE

LATITUDE 39.815 **LONGITUDE** -90.567407

COUNTY Morgan **API** 121372076000 28 - 16N - 13W



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ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand	0	40
dium to fine sand	40	70
sand & gravel	70	94
gravel & boulders	94	98
Total Depth		98

Casing: 12" STEEL CASING from 0' to 78'

Static level 25' below casing top which is 0' above GL

Pumping level 34' when pumping at 600 gpm for 15 hours

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM National Starch & Chem. Co

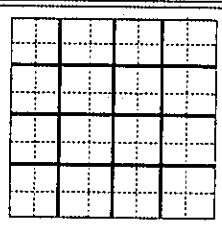
DATE DRILLED July 7, 1964 **NO.** 4

ELEVATION 435GL **COUNTY NO.** 20802

LOCATION 1669'N line, 1850'E line of NE

LATITUDE 39.814322 **LONGITUDE** -90.570968

COUNTY Morgan **API** 121372080200 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Semi-Private Water Well	Top	Bottom
top soil	0	2
fine sand	2	17
medium-coarse sand	17	40
medium-coarse gravel	40	62
coarse sand at	62	62
Total Depth		62

Casing: 5" SS SCREEN from 0' to 4'
5" PLAIN CASING from 4' to 62'

Screen: 4' of 5" diameter .012 slot

Grout: BENTONITE from 4 to 25.

Permanent pump installed at 45'
on , with a capacity of 10 gpm

Owner Address: P.O. Box #500 Meredosia, IL

Address of well: Co. Rd. #1975N

Location source: Location from permit

Permit Date: July 16, 1993 **Permit #:**

COMPANY Dirks, Michael J.

FARM National Starch & Chemical Co.

DATE DRILLED July 26, 1993 **NO.**

ELEVATION 0 **COUNTY NO.** 21524

LOCATION NW SE NE

LATITUDE 39.814361 **LONGITUDE** -90.567035

COUNTY Morgan **API** 121372152400 28 - 16N - 13W

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ILLINOIS STATE GEOLOGICAL SURVEY

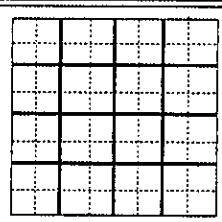
Water Well	Top	Bottom
Sand & gravel	0	89
Total Depth		89

Casing: 16" OD STEEL 3/8"WALL from 0' to 63'
Screen: 25' of 16" diameter .08 slot
Water from sand & gravel at 63' to 88'.
Static level 26' below casing top which is 2' above GL
Pumping level 33' when pumping at 600 gpm for 8 hours

Owner Address: Merdosia, IL
Location source: Location from permit

Permit Date: October 16, 1977 **Permit #:** 61809

COMPANY Miller, J.P. Artesian Well Co.
FARM Natl. Starch & Chem.
DATE DRILLED June 21, 1977 **NO.** 6A
ELEVATION 0 **COUNTY NO.** 20759
LOCATION 1889'N line, 871'E line of NE
LATITUDE 39.813672 **LONGITUDE** -90.567465
COUNTY Morgan **API** 121372075900 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY
Electronic Filing: Received, Clerk's Office 09/28/2020

Water Well	Top	Bottom
sand	0	40
medium to fine sand	40	70
sand & gravel	70	94
gravel & boulders	94	98
Total Depth		98

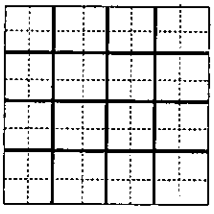
Casing: 12" STEEL CASING from 0' to 78'

Static level 25' below casing top which is 0' above GL
Pumping level 34' when pumping at 600 gpm for 15 hours

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM National Starch & Chem. Co
DATE DRILLED July 7, 1964 **NO.** 4
ELEVATION 435GL **COUNTY NO.** 20802
LOCATION 1669'N line, 1850'E line of NE
LATITUDE 39.814322 **LONGITUDE** -90.570968
COUNTY Morgan **API** 121372080200 28 - 16N - 13W



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ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
ne sand, not clean	0	18
Fine sand, clean	18	60
Total Depth		60

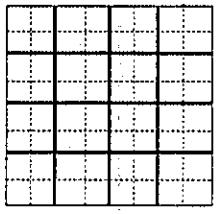
Casing: 16" STEEL 3/8" WALL from 0' to 49'
8" STEEL 25# from 0' to 52'
Screen: 10' of 8" diameter 40 slot
Water from aluvium at 0' to 62'.
Static level 20' below casing top which is 2' above GL
Pumping level 25' when pumping at 120 gpm for 2 hours

Driller's Log filed

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: January 1, 1971 **Permit #:** 10077

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED January 1, 1971 **NO.** 2A
ELEVATION 0 **COUNTY NO.** 00629
LOCATION 2154'N line, 1108'E line of NE
LATITUDE 39.812952 **LONGITUDE** -90.568313
COUNTY Morgan **API** 121370062900 **28 - 16N - 13W**



 Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
drift- sand & gravel	0	96
Total Depth		96

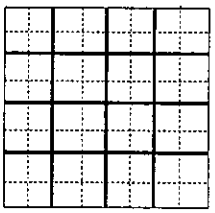
Casing: 16" STEEL 62.58 LB. from 0' to 70'
Screen: 25' of 16" diameter .08 slot
Water from drift at 50' to 96'.
Static level 17' below casing top which is 0' above GL
Pumping level 24' when pumping at 800 gpm for 8 hours

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 58824 (0' - 95') Received: September 19, 1973

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: May 1, 1973 **Permit #:** 18880

COMPANY Miller, J.P. Artesian Well Co.
FARM National Starch & Chemical
DATE DRILLED May 1, 1973 **NO.** 9
ELEVATION 0 **COUNTY NO.** 00638
LOCATION 2600'N line, 1400'E line of NE
LATITUDE 39.811734 **LONGITUDE** -90.569358
COUNTY Morgan **API** 121370063800 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
#55587	0	0
sandy brown clay	0	20
sandy gravel	20	92
Total Depth		92

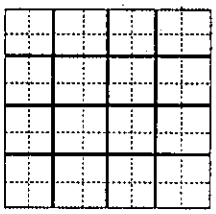
Casing: 24" STEEL 3/8" WALL from 0' to 50'
12" STEEL 3/8" WALL from 0' to 62'
Screen: 30' of 12" diameter 50 slot
Water from drift at 0' to 92'.
Static level 26' below casing top which is 0' above GL

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 55587 (0' - 93') Received: October 1, 1968

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: January 1, 1968 Permit #: NF 4615

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED August 31, 1968 NO. 8
ELEVATION 0 COUNTY NO. 00422
LOCATION 2150'N line, 1400'E line of NE
LATITUDE 39.812976 LONGITUDE -90.569359
COUNTY Morgan API 121370042200 28 - 16N - 13W



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ILLINOIS STATE GEOLOGICAL SURVEY

Non Potable Water Well	Top	Bottom
brown silty sand	0	5
fine sand	5	18
medium to large sand w/1" gravel	18	83
sand w/medium to large gravel	83	85
gravel	85	86
Total Depth		86

Casing: 24" STEEL 94.62#/FT from -2' to 51'

Screen: 15' of 24" diameter 100 slot

Grout: CEMENT from 0 to 20.

Size hole below casing: 42"

Water from sand & gravel at 0' to 0'.
Static level 18' below casing top which is 2' above GL
Pumping level 33' when pumping at 1500 gpm for 8 hours

Permanent pump installed at 65'
on September 17, 1996, with a capacity of 1500 gpm

Owner Address: PO Box 500 Meredosia, IL

Address of well: S. Washington St.
Meredosia, IL

Add'l loc. info: FALSE
Process water only

Location source: Location from permit

Permit Date: August 28, 1996 **Permit #:** 137-046

COMPANY Stollhans, Jeff

FARM National Starch & Chem. Co

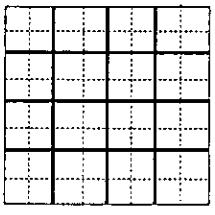
DATE DRILLED September 13, 1996 **NO.** 16

ELEVATION 0 **COUNTY NO.** 21769

LOCATION SW SW NE

LATITUDE 39.812578 **LONGITUDE** -90.570974

COUNTY Morgan **API** 121372176900 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
#55586	0	0
Sandy brown clay	0	24
fine sand & gravel	24	69
medium sand & small gravel	69	96
Total Depth		96

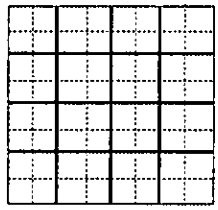
Casing: 8" STEEL 3/8" WALL from 0' to 96'
Screen: 16' of 8" diameter 25 slot
Water from drift at 0' to 96'.
Static level 26' below casing top which is 0' above GL

Driller's Log filed
Sample set # 55586 (0' - 97') Received: October 1, 1968

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: January 1, 1968 **Permit #:** NF 4614

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED August 31, 1968 **NO.** 7
ELEVATION 0 **COUNTY NO.** 00421
LOCATION 0'N 0'E SW/c NW SE NE
LATITUDE 39.813492 **LONGITUDE** -90.569044
COUNTY Morgan **API** 121370042100 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #57364	0	0
sandy top soil	0	18
fine sand	18	45
fine sand, small gravel	45	55
fine sand	55	65
fine sand, small gravel	65	93
very large boulders	93	95
rock at	95	95
Total Depth		95

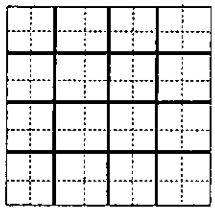
Casing: 26" 3/8 WALL from 0' to 63'
12" 48 POUND from 0' to 68'
Screen: 25' of 12" diameter 40 slot
Water from glacial drift at 0' to 95'.
Static level 25' below casing top which is 2' above GL
Pumping level 34' when pumping at 1000 gpm for 6 hours

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 57364 (2' - 93') Received: February 4, 1971

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: June 24, 1970 **Permit #:** 10077

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED December 18, 1970 **NO.** 8
ELEVATION 0 **COUNTY NO.** 00628
LOCATION 1800'N line, 625'E line of NE
LATITUDE 39.813907 **LONGITUDE** -90.566585
COUNTY Morgan **API** 121370062800 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
#54997	0	0
Sandy clay	0	21
fine sand, very little gravel	21	60
sand & gravel	60	90
Total Depth		90

Casing: 18" CASING STEEL 3/8" from 0' to 60'
12" STEEL WALL from 0' to 67'

Screen: 25' of 10" diameter 35 slot

Size hole below casing: 18"

Water from glacial drift at 0' to 0'.
Static level 27' below casing top which is 0' above GL
Pumping level 47' when pumping at 780 gpm for 3 hours

Driller's Log filed

Sample set # 54997 (50' - 91.5') Received: December 14, 1967

Owner Address: Meredosia, IL

Location source: Location from permit

Permit Date: January 1, 1967 **Permit #:** 3350

COMPANY Diehl Pump and Supply Co.

FARM National Starch

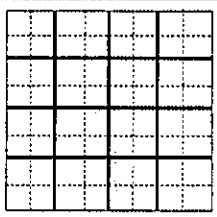
DATE DRILLED February 1, 1968 **NO.** 6

ELEVATION 0 **COUNTY NO.** 00396

LOCATION 1800'N line, 900'E line of NE

LATITUDE 39.81392 **LONGITUDE** -90.567569

COUNTY Morgan **API** 121370039600 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #60435	0	0
sand	0	40
sand & fine gravel	40	90
rock at	90	90
Total Depth		90

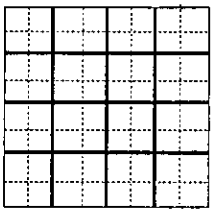
Casing: 16" from -2' to 65'
Screen: 25' of 16" diameter slot
Static level 25' below casing top which is 0' above GL
Pumping level 38' when pumping at 1075 gpm for 2 hours

Sample set # 60435 (0' - 90') Received: August 30, 1976

Owner Address: ,
Location source: Location from permit

Permit Date: January 20, 1976 **Permit #:** 44276

COMPANY owner
FARM National Starch & Chem.Co
DATE DRILLED February 17, 1976 **NO.** 10
ELEVATION 0 **COUNTY NO.** 20682
LOCATION 1403'N line, 332'E line of NE
LATITUDE 39.81499 **LONGITUDE** -90.565535
COUNTY Morgan **API** 121372068200 28 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
[illegible]e brown sand	0	40
fine light brown sand	40	55
medium to coarse brown sand & gravel	55	90
Total Depth		91

Casing: 16" BLACK 375 from -2' to 64'

Screen: 25' of 16" diameter .08 slot

Grout: CEMENT from 0 to 20.

Water from sand & gravel at 64' to 91'.
Static level 28' below casing top which is 2' above GL
Pumping level 36' when pumping at 800 gpm for 6 hours

Permanent pump installed at 50'
on November 10, 1988, with a capacity of 800 gpm

Owner Address: South Washington St. Meredosia, IL

Location source: Location from permit

Permit Date: September 23, 1988 **Permit #:** 006133

COMPANY Peterson, Steven R.

FARM National Starch-Chemical Co.

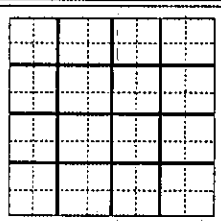
DATE DRILLED October 11, 1988 **NO.**

ELEVATION 0 **COUNTY NO.** 21398

LOCATION NE NE NE

LATITUDE 39.817955 **LONGITUDE** -90.565139

COUNTY Morgan **API** 121372139800 **28 - 16N - 13W**



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ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
SS #67434 (0'-80.5')	0	0
fine reddish brown sand	0	15
fine-med lt brown to reddish brown sand	15	25
fine-medium light brown sand	25	30
med lt brn sand, some cobbles in samples	30	45
medium light brown sand	45	50
med lt brown sand, lignite in sample	50	55
medium to fine light brown sand	55	60
medium light brown sand	60	80
medium to fine light brown sand	80	81
Total Depth		81

Casing: 8" CARBON STEEL 24.7# from -2' to 58'

Screen: 20' of 8" diameter 60 slot

Grout: CONCRETE from 0 to 20.

Size hole below casing: 34"

Water from at 24' to 81'.
Static level 24' below casing top which is 2' above GL
Pumping level 26' when pumping at 0 gpm for 1 hour

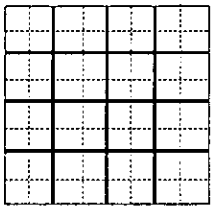
Permanent pump installed at 50'
on March 8, 1991, with a capacity of 80 gpm

Sample set # 67434 (0' - 80.5') Received: April 17, 1981

Owner Address: S. Washington Meredosia, IL
Location source: Location from the driller

Permit Date: January 15, 1991 **Permit #:** 13736

COMPANY Skouby, Marion
FARM National Starch
DATE DRILLED February 13, 1991 **NO.**
ELEVATION 0 **COUNTY NO.** 21647
LOCATION SW NE NE
LATITUDE 39.816167 **LONGITUDE** -90.56688
COUNTY Morgan **API** 121372164700 28 - 16N - 13W



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ILLINOIS STATE GEOLOGICAL SURVEY

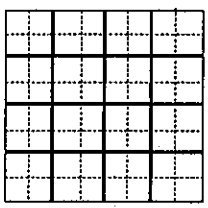
Water Well	Top	Bottom
ss #20134	0	0
sand	0	30
sand, coarse	30	40
Total Depth		40

Casing: 8" from 0' to 0'
Screen: 10' of " diameter 16 slot

Driller's Log filed
Sample set # 20134 (0' - 40') Received: January 1, 1950

Owner Address:
Location source: Location from the driller

Permit Date: **Permit #:**



COMPANY owner
FARM Meredosia, Village of
DATE DRILLED April 1, 1950 **NO.** 1
ELEVATION 455GL **COUNTY NO.** 00514
LOCATION 900'N line, 3000'E line of section
LATITUDE 39.831189 **LONGITUDE** -90.5543
COUNTY Morgan **API** 121370051400 **22 - 16N - 13W**

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ILLINOIS STATE GEOLOGICAL SURVEY

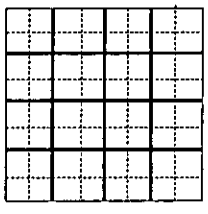
Municipal Water Supply	Top	Bottom
no record	0	84
Total Depth		84

Casing: 8" CASING from 0' to 70'
8" SCREEN from 70' to 84'
Screen: 14' of 8" diameter 25 slot
Water from coarse sand at 69' to 84'.

Owner Address: ,
Address of well: 120' NNE of WTP

Permit Date: **Permit #:**

COMPANY Elmer W. Franke/Calhoun Drlg.
FARM Meredosia, Village
DATE DRILLED September 1, 1973 **NO.** 3
ELEVATION 0 **COUNTY NO.** 21944
LOCATION SE NE NW
LATITUDE 39.830881 **LONGITUDE** -90.554188
COUNTY Montgomery **API** 121352194400 **22 - 16N - 13W**



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ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
Total Depth		88

Permit Date: Permit #: 37760

COMPANY

FARM Meredosia Village

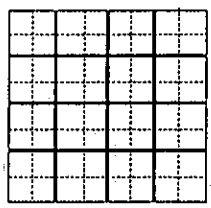
DATE DRILLED NO. 4

ELEVATION 0 COUNTY NO. 20971

LOCATION 805'N line, 2950'E line of NE

LATITUDE 39.83145 LONGITUDE -90.554082

COUNTY Morgan API 121372097100 22 - 16N - 13W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
ss #20135	0	0
s,lgt brn,f,rndd,well srtd,drty,noncalc	0	5
s,lgt brn,f,rndd,well srtd,few calc grns	5	10
s,f,rndd,well srtd,few calc grns,clean	10	25
sand,light brown,fine/med,clean,noncalc	25	30
s,lgt brn,f/med,clean,few calc grns	30	35
sand,lgt brn,f/vy crd,clean,mly calc	35	40
Pleistocene	5	40
Total Depth		40

Casing: 8" from 0' to 0'

Screen: 10' of " diameter 16 slot

Remarks: see logbook for detail sample study

Driller's Log filed

Survey Sample Study filed

Sample set # 20135 (0' - 40') Received: January 1, 1950

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Meredosia, Village of

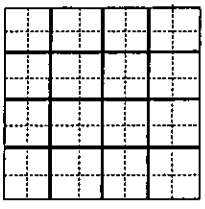
DATE DRILLED April 1, 1950 **NO.** 2

ELEVATION 0 **COUNTY NO.** 00515

LOCATION 725'S 10'W NE/c NW

LATITUDE 39.831665 **LONGITUDE** -90.552929

COUNTY Morgan **API** 121370051500 **22 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

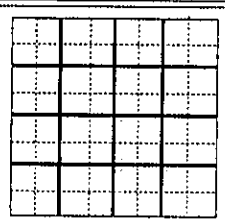
Municipal Water Supply	Top	Bottom
no record	0	25
sand & gravel	25	92
Total Depth		92

Casing: 10" CASING from -1' to 72'
10" SCREEN from 72' to 92'
Screen: 20' of 10" diameter slot
Water from sand & gravel at 25' to 92'.
Static level 27' below casing top which is 1' above GL
Pumping level 32' when pumping at 300 gpm for 3 hours

Owner Address:
Address of well: 200' NNW of WTP

Permit Date: **Permit #:**

COMPANY Albrecht Well Drilling Inc
FARM Meredosia, Village
DATE DRILLED September 2, 1980 **NO.** 5
ELEVATION 0 **COUNTY NO.** 21945
LOCATION 612'S line, 2425'E line of section
LATITUDE 39.820473 **LONGITUDE** -90.553748
COUNTY Montgomery **API** 121352194500 **22 - 16N - 13W**



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 ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
railroad embankment ballast stone, cinders, & silty clay loam fill drilled 5' to seat augers	0	5
brown silty clay loam moist (v. stiff)	5	8
brown silty clay loam moist (hard)	8	10
dark brown & grey silty clay loam moist (v. stiff)	10	13
dark brown & grey silty clay moist (v. stiff)	13	18
grey clay v. moist (stiff)	18	20
grey & brown clay v. moist (medium)	20	23
grey & brown clay v. moist (stiff)	23	25
grey & brown clay v. moist (medium)	25	28
grey & brown silty clay loam v. moist (stiff)	28	30
grey silty clay v. moist (stiff)	30	33
grey silty clay v. moist (medium)	33	35
grey clay loam wet (soft)	35	38
grey silty clay loam v. moist (soft)	38	40
grey sand (coarse) w/medium pebble gravel wet (v. loose)	40	43
grey sand (coarse) w/some small gravel wet medium	43	45
brown sand (medium) w/some small gravel wet (medium)	45	50
brown sand (medium) wet (medium)	50	53
brown sand (medium-coarse) w/some small gravel wet (medium)	53	55
brown sand (medium-coarse) w/some small gravel wet (dense)	55	58

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAS 2585 P-96-056-85

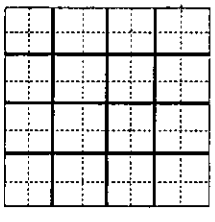
DATE DRILLED June 9, 1986 **NO.** 1(NW.Abut)

ELEVATION 438GL **COUNTY NO.** 21245

LOCATION 0'S 0'W NE/c SW SE NW

LATITUDE 39.833731 **LONGITUDE** -90.582965

COUNTY Pike **API** 121492124500 1 - 3S - 2W



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wn sand (coarse) w/some small gravel (medium)	58	60
brown sand (coarse) w/some medium pebble gravel wet (dense)	60	65
brown sand (medium-coarse) w/some fine pebble gravel wet (dense	65	70
brown sand (medium-coarse) w/some gravel wet (dense)	70	71.5
Total Depth		**71**

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ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
brown-brown & grey silty clay loam moist (stiff)	0	7
grey & brown silty clay loam v. moist (medium)	7	9
grey silty clay wet (medium)	9	12
grey silty clay wet (soft)	12	14
grey silty clay wet (medium)	14	17
grey silty clay wet (soft)	17	22
grey clay loam wet (soft)	22	27
grey sand (fine-medium) w/some clay bonding wet (v. loose)	27	29
grey sand (medium-coarse) w/some medium pebble gravel wet (medium)	29	39
grey sand (fine-medium) wet (medium)	39	44
grey sand (medium-coarse) w/some fine pebble gravel wet (medium)	44	49
grey sand (medium-coarse) w/some medium pebble gravel wet (medium)	49	57
grey sand (medium-coarse) w/some medium pebble gravel wet (dense)	57	60.5
Total Depth		60

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAS 2585 Illinois Route 99

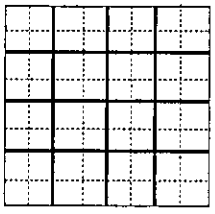
DATE DRILLED June 19, 1986 **NO.** 2(SE.Abut)

ELEVATION 427GL **COUNTY NO.** 21246

LOCATION SW SE NW

LATITUDE 39.832804 **LONGITUDE** -90.584075

COUNTY Pike **API** 121492124600 1 - 3S - 2W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
concrete pavement & subbase material	0	3
dark grey silty clay loam moist (soft)	3	7
dark grey silty clay loam moist (stiff)	7	12
grey & brown silty clay moist (stiff)	12	14
grey sand (fine) wet (v. loose)	14	19
grey sand (fine) wet (loose)	19	22
grey sand (fine) wet (medium)	22	27
grey sand (medium) wet (medium)	27	37
grey sand (medium-coarse) w/some gravel wet (dense)	37	42
grey sand (medium) wet (medium)	42	54
grey sand (medium-coarse) w/some fine pebble gravel wet (dense)	54	59
grey sand (medium-coarse) w/some fine pebble gravel wet (medium)	59	64
grey sand (medium-coarse) w/some fine pebble gravel wet (dense)	64	67
standard 50 tsf bearing achieved. augered and additional 10' to check for possible limestone bedrock	67	70
grey sand w/some gravel throughout wet (medium-dense) from elev.365.7 to 354.7	70	78
Total Depth		78

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAP 745 Il. Rte. 104

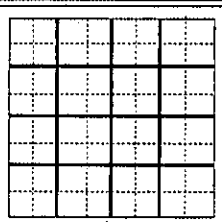
DATE DRILLED June 3, 1986 **NO.** 2(W.Abut)

ELEVATION 433GL **COUNTY NO.** 21248

LOCATION 2640'N line, 2640'W line of section

LATITUDE 39.831966 **LONGITUDE** -90.579769

COUNTY Pike **API** 121492124800 1 - 3S - 2W



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
concrete pavement & subbase material	0	2
brown sand (medium) moist (loose) w/some shells @ 9.5 - 10.5'	2	10.5
grey clay moist (medium)	10.5	14
grey clay moist (stiff)	14	17
grey silty clay v. moist (medium)	17	19
grey sand (fine) wet (loose)	19	22
grey sand (fine) wet (v. loose)	22	24
grey sand (fine) wet (loose)	24	27
grey sand (fine) wet (medium)	27	29
grey sand (fine) wet (loose)	29	31
grey sand (medium) wet (medium)	31	37
grey sand (fine-medium) wet (medium)	37	44
grey fine pebble gravel wet (medium)	44	49
grey gravel (fine-medium pebble) wet (medium)	49	54
brown sand (coarse) w/some gravel wet (dense)	54	59
grey sand (fine) wet (dense)	59	63.5
grey sand (fine) wet (medium)	63.5	65.5
Total Depth		65

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAP 745 Ill. RTE. 104

DATE DRILLED June 2, 1986 **NO.** 1 (E.Abut)

ELEVATION 436GL **COUNTY NO.** 21247

LOCATION

LATITUDE 39.831875 **LONGITUDE** -90.579775

COUNTY Pike **API** 121492124700 1 - 3S - 2W

Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
#56380	0	0
ne sand	0	20
fine sand, small gravel	20	45
fine sand, coarse gravel	45	55
fine sand, small gravel	55	71
medium sand, small gravel	71	85
medium sand, large gravel	85	90
Total Depth		90

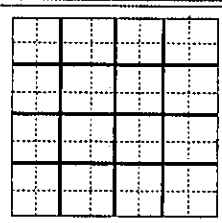
Casing: 24" 3/8 WALL from 0' to 60'
12" 52 LB. from 0' to 64'
Screen: 26' of 12" diameter 60 slot
Water from sand & gravel at 0' to 90'.
Static level 14' below casing top which is 2' above GL
Pumping level 32' when pumping at 1000 gpm for 8 hours

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 56380 (0' - 90') Received: August 26, 1969

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: June 29, 1969 **Permit #:** 06700

COMPANY Lorenz D A
FARM W.R. Grace Co.
DATE DRILLED September 11, 1969 **NO.** DL-3
ELEVATION 0 **COUNTY NO.** 00607
LOCATION NE NE NE
LATITUDE 39.817955 **LONGITUDE** -90.565139
COUNTY Morgan **API** 121370060700 28 - 16N - 13W



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ILLINOIS STATE GEOLOGICAL SURVEY

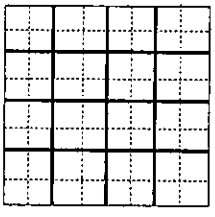
Water Well	Top	Bottom
sand	0	36
sand & gravel	36	67
fine to medium gravel	67	91
Total Depth		91

Casing: 16" STEEL .375 from 3' to 66'
Screen: 25' of 16" diameter .08 slot
Water from drift at 66' to 91'.
Static level 12' below casing top which is 0' above GL
Pumping level 22' when pumping at 1000 gpm for 8 hours

Owner Address: P.O. Box 153 Meredosia, IL
Location source: Location from permit

Permit Date: May 11, 1979 **Permit #:** 85480

COMPANY Hakala, Richard L.
FARM Grace, W.R. & Co.
DATE DRILLED May 15, 1979 **NO.** 4
ELEVATION 0 **COUNTY NO.** 20770
LOCATION 1980'N line, 450'W line of NW
LATITUDE 39.813373 **LONGITUDE** -90.562736
COUNTY Morgan **API** 121372077000 27 - 16N - 13W



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 ILLINOIS STATE GEOLOGICAL SURVEY

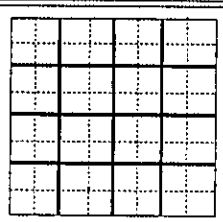
Industrial Water Well	Top	Bottom
fine to medium sand	0	40
dium to coarse sand	40	50
medium sand	50	62
coarse sand to fine gravel	62	73
medium to coarse sand	73	78
fine to medium sand with gravel	78	85
coarse sand & fine to medium gravel	85	90
medium sand to fine gravel	90	91
coarse sand, gravel & boulders	91	95
Total Depth		95

Casing: 24" STEEL from -2' to 65'
24" STAINLESS STL SCREEN from 65' to 94'
Screen: 29' of 24" diameter .05 slot
Grout: NEAT CEMENT from 0 to 20.
Grout: BENTONITE CHIPS from 20 to 27.
Grout: SILICA #2 NORTHERN from 27 to 94.

Water from sand & gravel at 16' to 94'.
Static level 16' below casing top which is 2' above GL
Pumping level 40' when pumping at 2503 gpm for 20 hours
Permanent pump installed at 60'
on January 25, 2011, with a capacity of 1850 gpm
Remarks: driller's est. well yield 3000 gpm
Sample set # 69973 (0' - 95') Received: January 9, 2012
ner Address: ,
ddress of well: 1994 Old Grace Road
Location source: Location from permit

Permit Date: **Permit #:**

COMPANY Water Well Solutions
FARM T.A. Terminal
DATE DRILLED November 23, 2011 **NO.** 6
ELEVATION **COUNTY NO.** 22134
LOCATION NW NW SW
LATITUDE 39.81073 **LONGITUDE** -90.563186
COUNTY Morgan **API** 121372213400 27 - 16N - 13W



 Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

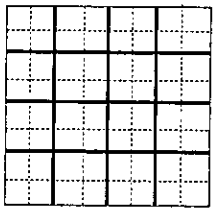
Industrial Water Well	Top	Bottom
fine to medium sand	0	40
medium to coarse sand	40	50
medium sand	50	62
coarse sand to fine gravel	62	73
medium to coarse sand	73	78
fine to medium sand with gravel	78	85
coarse sand & fine to medium gravel	85	90
medium sand to fine gravel	90	91
coarse sand, gravel & flat boulders	91	95
Total Depth		100

Casing: 24" STEEL from -2' to 65'
24" STAINLESS STL SCREEN from 65' to 94'
Screen: 29' of 24" diameter .05 slot
Grout: NEAT CEMENT from 0 to 20.
Grout: BENTONITE CHIPS from 20 to 27.
Grout: SILICA #3 NORTHERN from 27 to 94.

Water from sand & gravel at 20' to 94'.
Static level 20' below casing top which is 2' above GL
Pumping level 43' when pumping at 2485 gpm for 24 hours
Permanent pump installed at 60'
on January 19, 2011, with a capacity of 1850 gpm
Remarks: driller's est. well yield 3000 gpm
Sample set # 69972 (0' - 100') Received: January 9, 2012
Owner Address: ,
Address of well: 1994 Old Grace Road
Location source: Location from permit

Permit Date: **Permit #:**

COMPANY Water Well Solutions
FARM T.A. Terminal
DATE DRILLED November 23, 2011 **NO.** 5
ELEVATION **COUNTY NO.** 22133
LOCATION NW NW SW
LATITUDE 39.81073 **LONGITUDE** -90.563186
COUNTY Morgan **API** 121372213300 **27 - 16N - 13W**



Electronic Filing: Received, Clerk's Office 09/28/2020

ILLINOIS STATE GEOLOGICAL SURVEY

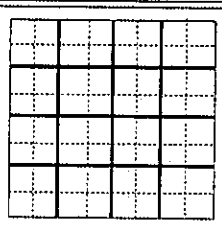
Water Well	Top	Bottom
nd fine	0	30
nd coarse	30	50
coarse sand and gravel	50	60
gravel small to large	60	73
Total Depth		73

Casing: 10" STEEL from 0' to 61'
" 12' SCREEN from 0' to 73'
Screen: 12' of 9.5" diameter 50 slot
Water from sand gravel at 61' to 73'.
Static level 4' below casing top which is 3' above GL
Pumping level 15' when pumping at 300 gpm for 2 hours

Owner Address: Box 328 Jacksonville, IL
Location source: Platbook verified

Permit Date: December 11, 1975 **Permit #:** 43710

COMPANY Chadwick, G. W.
FARM Ill. Road Contractors Inc.
DATE DRILLED December 20, 1975 **NO.**
ELEVATION 0 **COUNTY NO.** 20621
LOCATION SE SE NE
LATITUDE 39.832804 **LONGITUDE** -90.571759
COUNTY Pike **API** 121492062100 1 - 3S - 2W



Electronic Filing: Received, Clerk's Office 09/28/2020

APPDENDIX B

BORING LOGS

Surface Elevation: 449.0 Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand, trace clay lenses		6-16-10	SS1
5			3-11-13 -14	SS2
			5-7-9	SS3
10			5-9-14	SS4
			4-4-4	SS5
15	FILL: black clay with sand			
	Very soft, gray, interbedded SILT and CLAY with organics - ML/CL		0-0-1	SS6
20				
	Medium stiff, gray CLAY - (CH)		2-2-3	SS7
25			92	ST8
			87 89	ST9
30				
	Loose, gray, clayey SAND with gravel - SP		1-4-4	SS10
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		5-7-7	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0535301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by: JLC	App'vd. by: DAV
Date: 10/26/10	Date: 12/22/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.0 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
45			4-5-4	SS12
50			5-7-9	SS13
55			9-8-9	SS14
60			7-12-15	SS15
	Boring terminated at 60 feet			
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/29/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand with black clay lenses		5-7-9	SS1
5			6-10-8	SS2
			7-8-13	SS3
10			5-5-9	SS4
			3-3-3	SS5
15				
	Black, clayey SAND, trace gravel - SP			ST6
20				
	Medium stiff, gray CLAY - CH		3-4-4	SS7
25				
			3-3-3	SS8
30				
	Soft, gray, clayey SILT with sand and clay lenses - ML		2-1-1	SS9
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		0-2-4	SS10

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SKL	App'vd. by: JW
Date: 10/26/10	Date: 12/2/10	Date: 11/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
45			3-6-6	SS11
	Boring terminated at 46 feet.			
50				
55				
60				
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC.0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/28/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 449.1 | Completion Date: 10/21/10

Datum msl

SHEAR STRENGTH, tsf: Δ - UU/2, O - QU/2, □ - SV (0.5, 1.0, 1.5, 2.0, 2.5)

STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, % PL ⊢—●—⊣ LL (10, 20, 30, 40, 50)

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown sand with black clay lenses		4-6-8	SS1
			5-6-9	SS2
5				ST3
			8-10-16	SS4
10			8-13-15	SS5
			6-8-8	SS6
15	FILL: black clay with sand, trace gravel			SS7
	Soft to medium stiff, gray CLAY - CH		2-2-2	SS8
20	with organics		86	ST9
				ST10
25				
			1-2-3	SS11
30				
	Soft, brown, clayey SILT with sand - ML		1-2-1	SS12
35				
	Medium dense, brown, fine to coarse SAND, trace gravel - SP		5-5-7	SS13

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SK	App'vd. by: Dwy
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-3

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 449.1 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; 0.5, 1.0, 1.5, 2.0, 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) Δ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % (PL, LL; 10, 20, 30, 40, 50)
	Medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*				
45			6-7-7	SS14	Δ
			6-7-9	SS15	Δ
50			5-8-9	SS16	Δ
55			8-8-13	SS17	Δ
60	Boring terminated at 60 feet.				
65					
70					
75					

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SC	App'vd. by: JW
Date: 10/26/10	Date: 12/17/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-3

Project No. J017150.01

Surface Elevation: 431.6 Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY - (CH)		1-2-2	SS1
			*	ST2
5			1-2-3	SS3
			0-2-2	SS4
10				
	Soft, gray, silty CLAY, trace sand - CL		0-1-1	SS5
15				
	Very soft, gray, sandy CLAY with silt - CL		0-0-0	SS6
20				
	Very loose, brown, fine to coarse SAND, trace gravel - SP		0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * Disturbed sample Datum: IL State Plane Coordinates, West Zone. N: 1148688.82' E: 2182505.605'

Drawn by: KA	Checked by: SJC	App'vd. by: DM
Date: 10/26/10	Date: 12/13/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-4

Project No. J017150.01

Surface Elevation: 431.8 | Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray, silty CLAY - CL			
			2-2-3	SS1
			2-2-2	SS2
5	Medium stiff to very soft, brown and gray CLAY - CH			
			1-1-3	SS3
			89	ST4
10				
			0-0-0	SS5
15				
	Very soft, gray, silty CLAY with sand - CL			
			0-0-0	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 ▯ - TV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

GROUNDWATER DATA

ENCOUNTERED AT 23 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148661.88' E: 2182476.0360'

Drawn by: KA	Checked by: SJC	App'vd. by: DMR
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-5

Project No. J017150.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 450.8 Datum msl | Completion Date: 10/19/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand pockets		3-6-10	SS1
	FILL: brown, fine sand, trace clay		3-8-9	SS2
5			4-6-7	SS3
	FILL: black ash and sand			ST4
10				ST5
	FILL: brown, fine sand, trace gravel		6-7-13	SS6
15				
	Very stiff, gray, silty CLAY with sand - CL		0-5-15	SS7
20	Very loose, gray silty SAND - SM			
			0-0-0	SS8
25	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL)			
			0-1-3	SS9
30				
			0-0-0	SS10
35				
			0-0-0	SS11

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SA	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-6

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 450.8 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL) *(continued)*			
45			1-1-1	SS12
	Dense, brown, fine to coarse SAND - SP			
50			7-13-42	SS13
	Boring terminated at 50 feet.			
55				
60				
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▼

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/21/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-6

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 450.5 Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay, ash and sand		5-8-9	SS1
	FILL: brown, fine sand		2-6-6	SS2
5			4-6-9	SS3
	FILL: black sand and ash with clay lenses		3-6-5	SS4
10				SS5
			3-7-9	SS6
15				
	Medium stiff, brown, sandy CLAY - CL		6-4-3	SS7
20				
	Medium stiff to very soft, gray, silty CLAY with sand - CL		3-4-5	SS8
25			87 86	ST9
			95	ST10
30				
			1-0-0	SS11
35				
			*	ST12

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by: SK	App'vd. by: DAI
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 450.5 Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to very soft, gray, silty CLAY with sand - CL *(continued)*			
	sandy			ST13
45				
	Medium dense to dense, brown, fine to medium coarse SAND - SP			
			5-8-10	SS14
50				
			7-9-14	SS15
55				
			13-17-19	SS16
60	Boring terminated at 60 feet,			
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 20 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by:	App'vd. by:
Date: 10/26/10	Date: 12/20/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 451.1 Completion Date: 10/20/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand		5-6-10	SS1
	FILL: brown sand, trace to some clay		2-4-6	SS2
5			0-5-7	SS3
			4-8-12	SS4
10	FILL: black clay with sand		0-4-6	SS5
				ST6
15				
	FILL: gray, clayey sand with black clay lenses		2-4-6	SS7
20			4-3-3	SS8
	Medium stiff, black to gray CLAY - CH		2-3-4	SS9
25				
			0-2-3	SS10
30	Medium stiff to soft, gray clayey SILT with sand - ML		101	ST11
				SS12
35				
			0-0-2	SS13

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 ▯ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1588)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-8

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 451.1 | Completion Date: 10/20/10 | Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, gray clayey SILT with sand - ML *(continued)*			
	Dense to medium dense, brown, fine to coarse SAND with gravel - SP			
45			13-16-16	SS14
50			7-9-11	SS15
55			5-7-9	SS16
60	Boring terminated at 60 feet.		10-13-14	SS17
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 20 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/28/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-8

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

Surface Elevation: 433.6 Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, black and gray CLAY - (CH)			
			2-3-4	SS1
			1-1-1	SS2
5				ST3
			86	ST4
10				
	Soft to very soft, gray, silty CLAY with silt seams and sand - CL			
15			0-1-1	SS6
20			0-1-2	SS7
25			0-0-0	SS8
	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148133.361' E: 2182009.017'

Drawn by: KA | Checked by: SJC | App'vd. by: DJM

Date: 11/3/10 | Date: 12/22/10 | Date: 12/27/10

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-9

Project No. J017150.01

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 433.2 Datum msl

Completion Date: 10/25/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray silty CLAY, trace sand and wood - CL			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10				
			95	ST5
15				
	Very loose to medium dense, gray, silty SAND with silty clay seams - SM			
20			0-1-1	SS6
25	Wood		8-11-7	SS7
	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2302 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148120.612' E: 2181976.582'

Drawn by: KA	Checked by: SH	App'vd. by: DM
Date: 11/3/10	Date: 12/2/10	Date: 1/4/11

GEOTECHNOLOGY INC FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

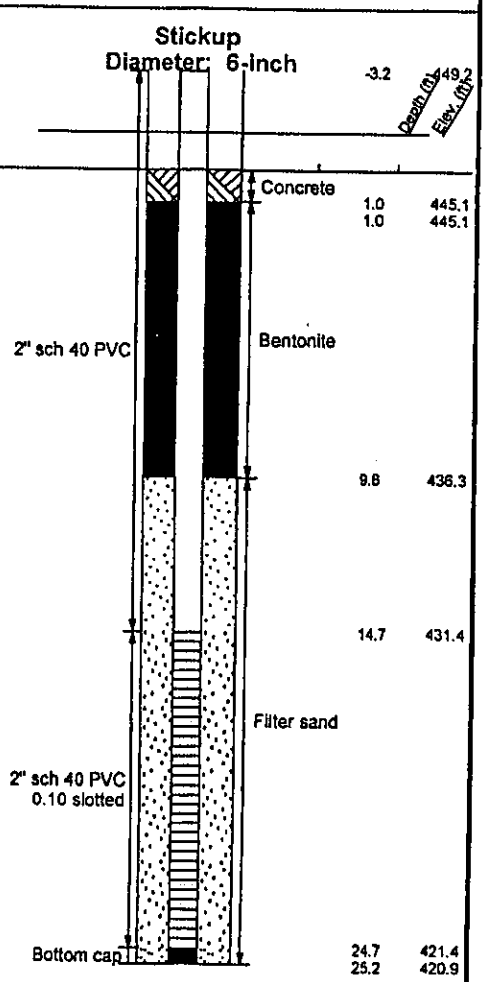
LOG OF BORING: B-10

Project No. J017150.01

Surface Elevation: 446.06
Datum msl
Completion Date: 10/26/10
Northing: 1147018.68
Easting: 2185605.2

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			1-1-1	SS1
			2-2-1	SS2
5			2-4-4	SS3
			3-3-3	SS4
10				
	Loose, brown fine to coarse SAND, trace gravel - SP ▽			
			1-1-2	SS5
15				
			1-1-2	SS6
20				
	Loose, brown, fine SAND - SP			
			0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 1/11/11

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating
Facility
Meredosia, Illinois

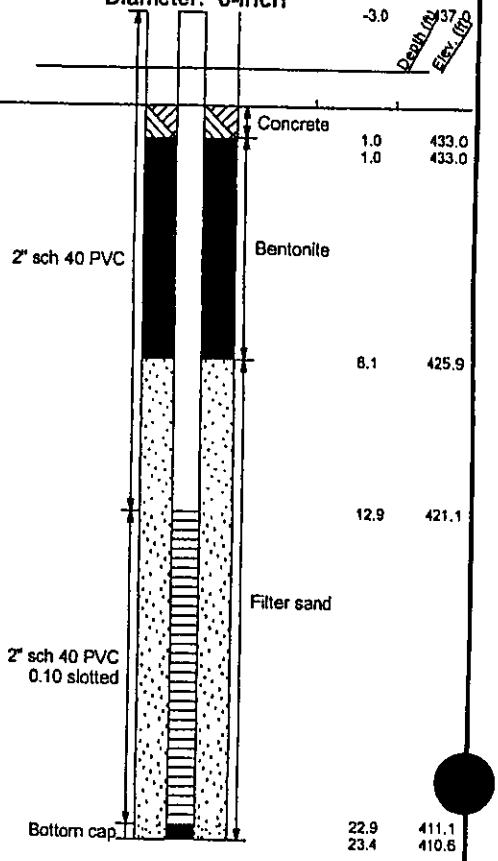
LOG OF BORING: APW-1

Project No. J017150.01

Surface Elevation: 433.97
Datum msl
Completion Date: 10/25/10
Northing: 1148489.69
Easting: 2182485.19

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY, trace sand - CH			
			2-2-2	SS1
5			2-2-2	SS2
			2-2-4	SS3
10			0-2-3	SS4
15			2-2-3	SS5
	Soft, gray, silty CLAY with shells, trace to some sand - CL			
20			0-1-1	SS6
	Very loose, brown, fine to medium SAND - SP			
25	Boring terminated at 25 feet.		0-0-1	SS7
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KSP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-2/MW-2

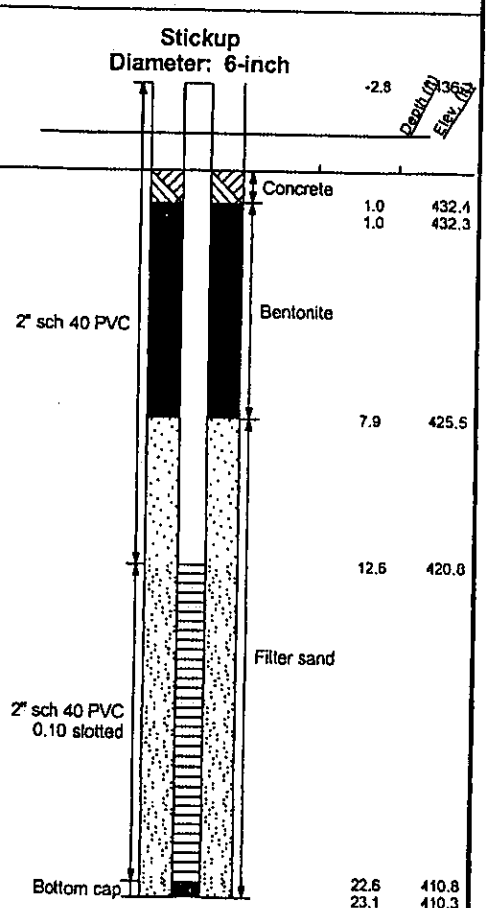
Project No. J017150.01

Surface Elevation: 433.35 Datum msl

Completion Date: 10/25/10
Northing: 1148118.6
Easting: 2181973.76

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff, brown and gray CLAY, trace sand and wood - CH			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10				
	Gray, silty CLAY, trace sand - CL		95	ST5
15				
	Soft, gray, silty SAND with shells and silty clay seams - SM			
			0-1-1	SS6
20				
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DAK	App'vd. by: MSP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

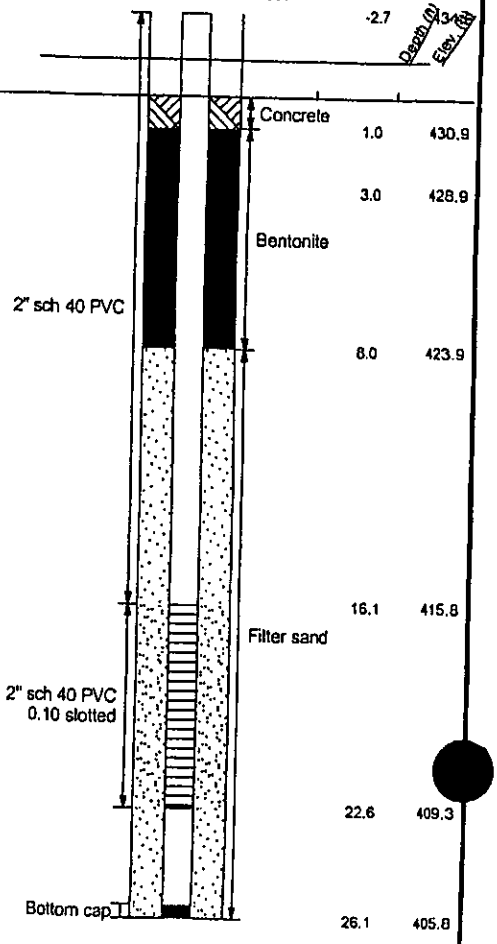
LOG OF BORING: APW-3/B-10

Project No. J017150.01

Surface Elevation: 431.90 | Completion Date: 10/26/10
Datum msl | Northing: 1146935.94 | Easting: 2181602.97

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray CLAY, trace sand and wood - CH			
			0-0-4	SS1
			2-4-4	SS2
5			1-1-1	SS3
			1-1-2	SS4
10				
	Loose, brown, fine SAND - SP			
			3-6-7	SS5
15				
			0-2-2	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 11.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DT	App'vd. by: HPC
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-4

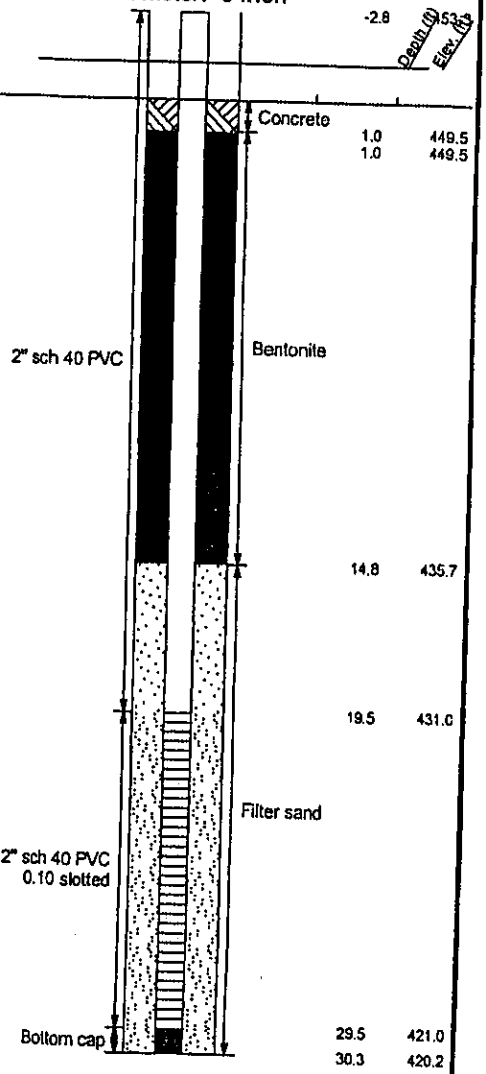
Project No. J017150.01

Surface Elevation: 450.48 | Completion Date: 10/26/10
Datum msl | Northing: 1146922.64 | Easting: 2183711.11

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			3-3-3	SS1
5			2-2-2	SS2
			1-3-4	SS3
10			2-3-3	SS4
15			2-3-4	SS5
20	Loose, brown, fine to coarse SAND, trace to some gravel - SP		2-1-2	SS6
25			3-3-3	SS7
30	Boring terminated at 30 feet.		1-1-1	SS8
35				

WELL DIAGRAM

Stickup
Diameter: 6-Inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 TYL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: TBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating
Facility
Meredosia, Illinois

LOG OF BORING: APW-5

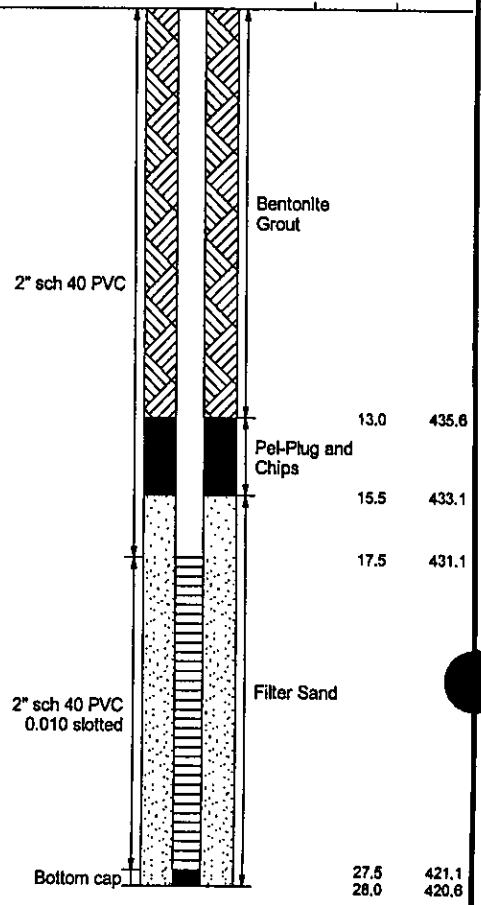
Project No. J017150.01

Surface Elevation: 448.55
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.570556

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained SAND - SP		0-3-4	SS1
			3-4-6	SS2
5			2-3-1	SS3
			2-2-2	SS4
			3-3-5	SS5
10			4-5-6	SS6
			1-3-3	SS7
			1-2-3	SS8
15			4-6-7	SS9
	Brown, medium grained SAND - SP ▽		4-3-4	SS10
			1-2-2	SS11
20				
	Blind drilled - heaving sands			
25				
	Boring terminated at 28 feet.			
30				
35				

WELL DIAGRAM

Stickup = 3.3 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/

GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-6

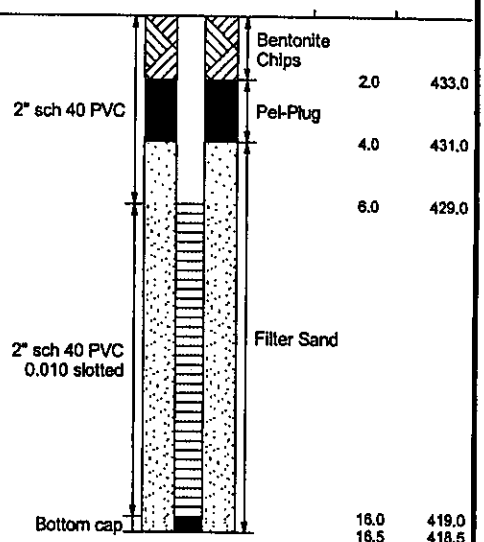
Project No. J024917.01

Surface Elevation: 435.03
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.573333

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Black, silty CLAY - CL		2-4-3	SS1
	Brown, silty CLAY - CL		2-3-4	SS2
5			1-2-1	SS3
	Brown, fine grained SAND - SP		1-1-1	SS4
			0-0-1	SS5
10	Blind drilled - heaving sands			
15				
	Boring terminated at 17 feet.			
20				
25				
30				
35				

WELL DIAGRAM

Stickup = 3.7 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 6 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-7

Project No. J024917.01

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

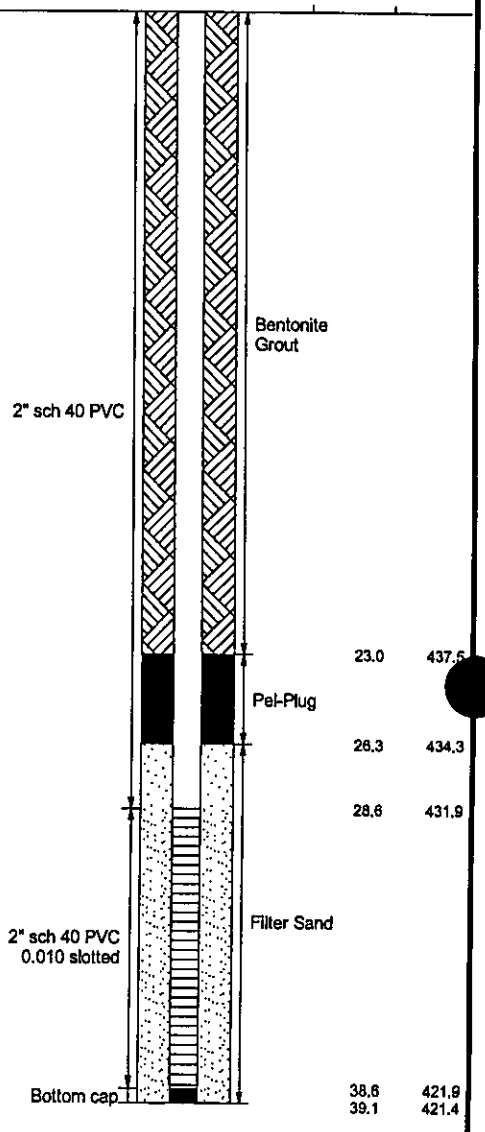
Surface Elevation: 460.54
Datum: _____

Completion Date: 10/1/2015
Latitude: 39.818611
Longitude: -90.5697222

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained, poorly graded SAND - SP		3-9-9	SS1
			7-11-12	SS2
5			3-4-5	SS3
			2-3-3	SS4
			2-3-4	SS5
10			2-3-5	SS6
			3-5-9	SS7
15			5-7-7	SS8
			5-7-8	SS9
			5-7-8	SS10
20			9-15-16	SS11
			7-12-13	SS12
25			8-13-14	SS13
			9-10-11	SS14
	Brown, medium grained, poorly graded SAND - SP		6-6-9	SS15
30		▽	5-8-9	SS16
			4-5-6	SS17
	Blind drilled - heaving sands			
35				
40	Boring terminated at 40 feet.			

WELL DIAGRAM

Stickup = 3.4 ft
Diameter: 8 1/2 Inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 32 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-8

Project No. J024917.01

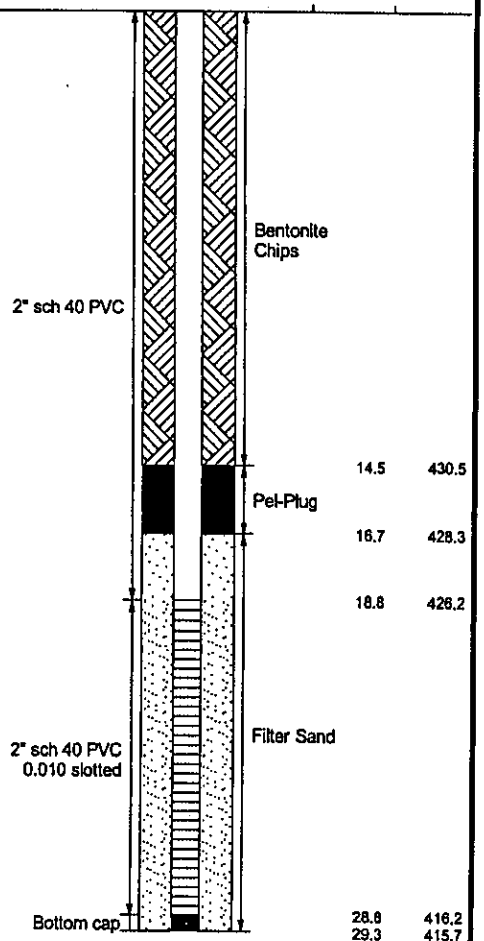
LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/20

Surface Elevation: 444.97
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.821388
Longitude: -90.569722

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: black, silty sand with coal CCR		4-3-2	SS1
			2-3-3	SS2
5			3-8-8	SS3
			2-4-1	SS4
			2-3-10	SS5
10	Gray SILT - ML		4-3-2	SS6
	Brown, fine grained SAND - SP		5-6-5	SS7
15			3-4-3	SS8
			3-3-4	SS9
	Brown, medium grained SAND - SP		3-3-4	SS10
20	▽		1-2-1	SS11
			2-2-4	SS12
25	Blind drilled - heaving sands			
30	Boring terminated at 30 feet.			
35				

WELL DIAGRAM

Stickup = 3.1 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/

GROUNDWATER DATA

ENCOUNTERED AT 20 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:
CCR = Coal Combustion Residuals

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-9

Project No. J024917.01

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APPENDIX C

STATISTICAL ANALYSIS PLOTS

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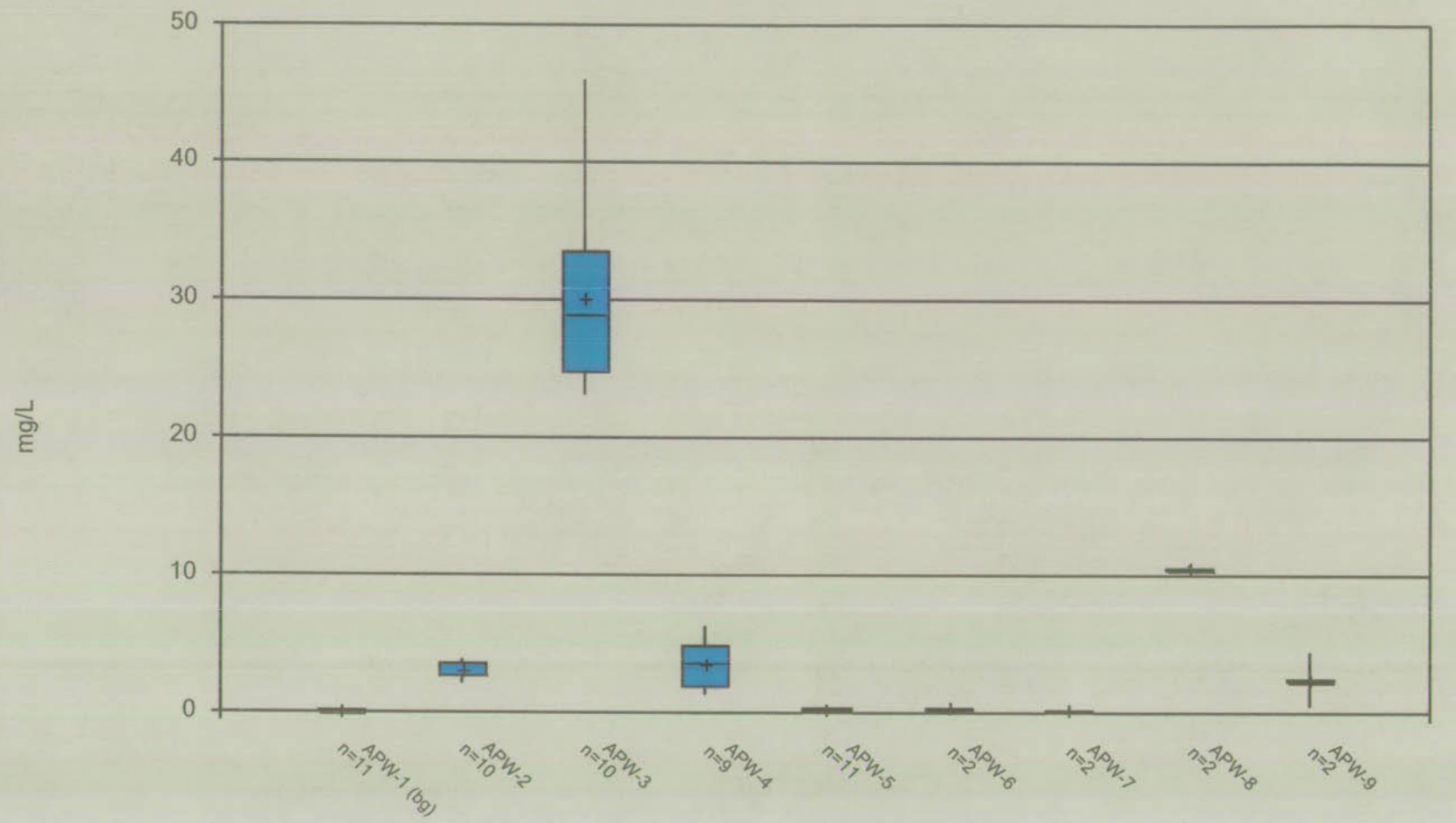
Box & Whiskers Plot



Constituent: Boron Dissolved Analysis Run 4/18/2016 3:06 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

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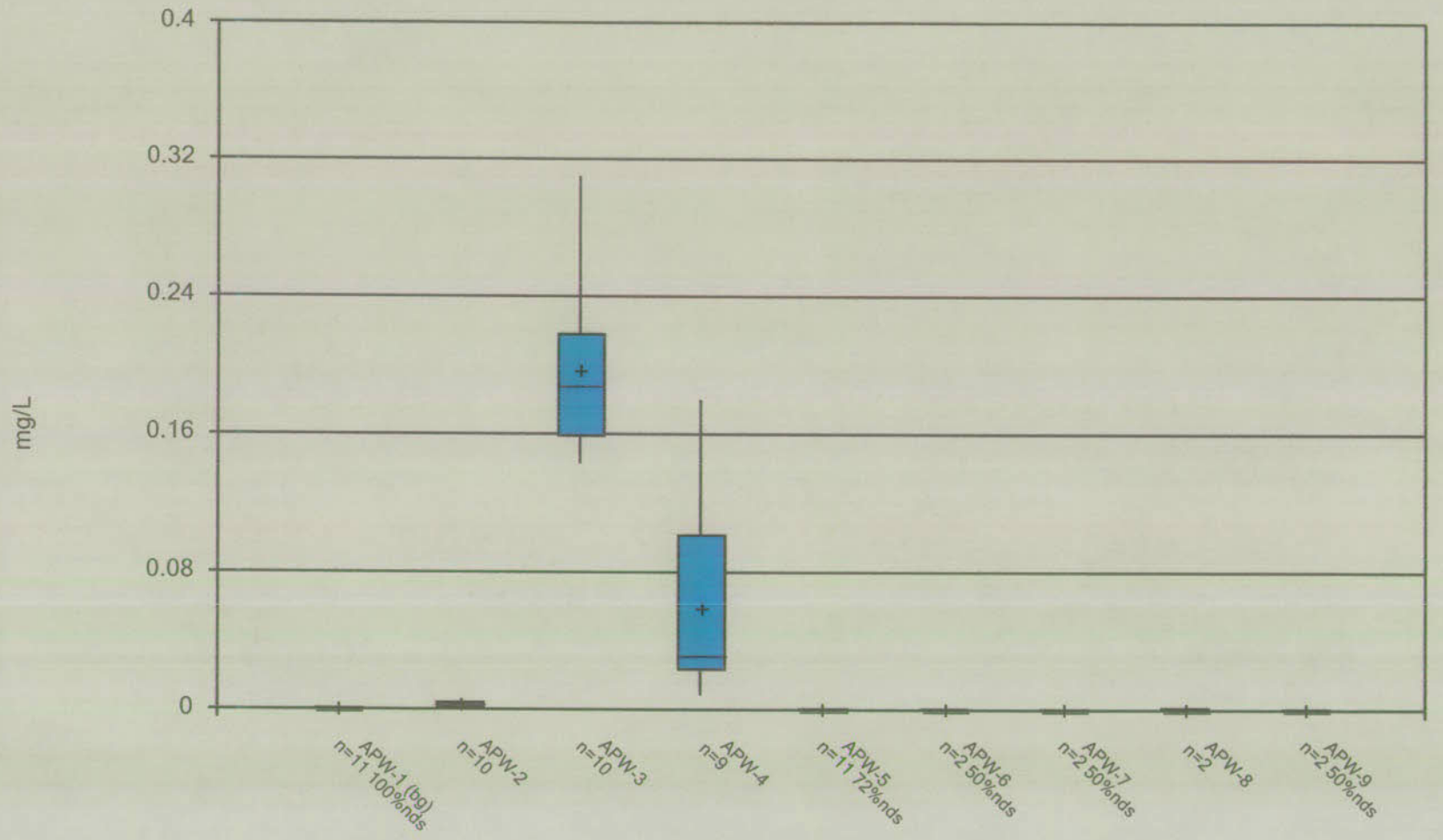
Box & Whiskers Plot



Constituent: Arsenic Dissolved Analysis Run 4/18/2016 3:07 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Electronic Filing: Received, Clerk's Office 09/28/2020

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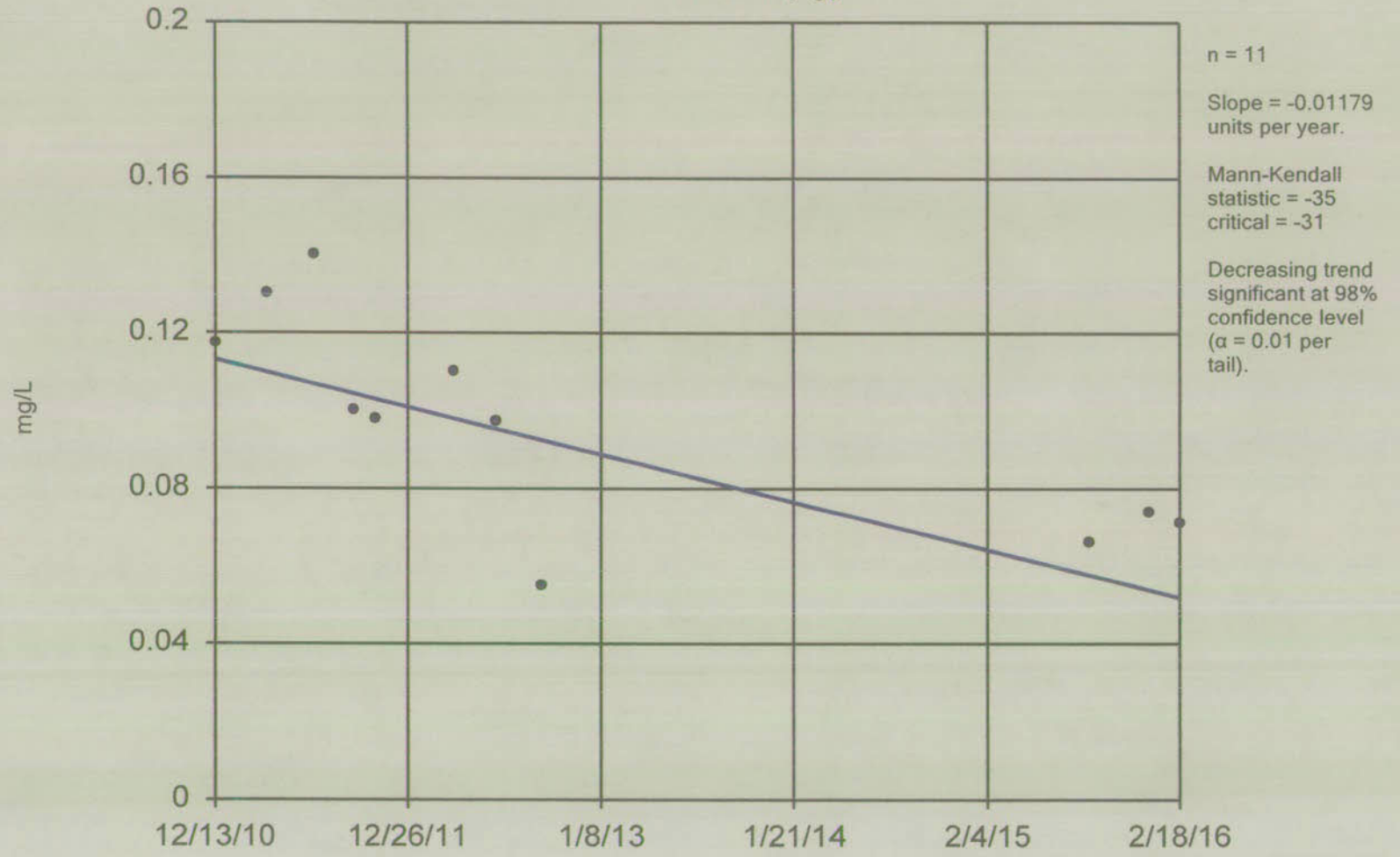
Sen's Slope Estimator

APW-1 (bg)



Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

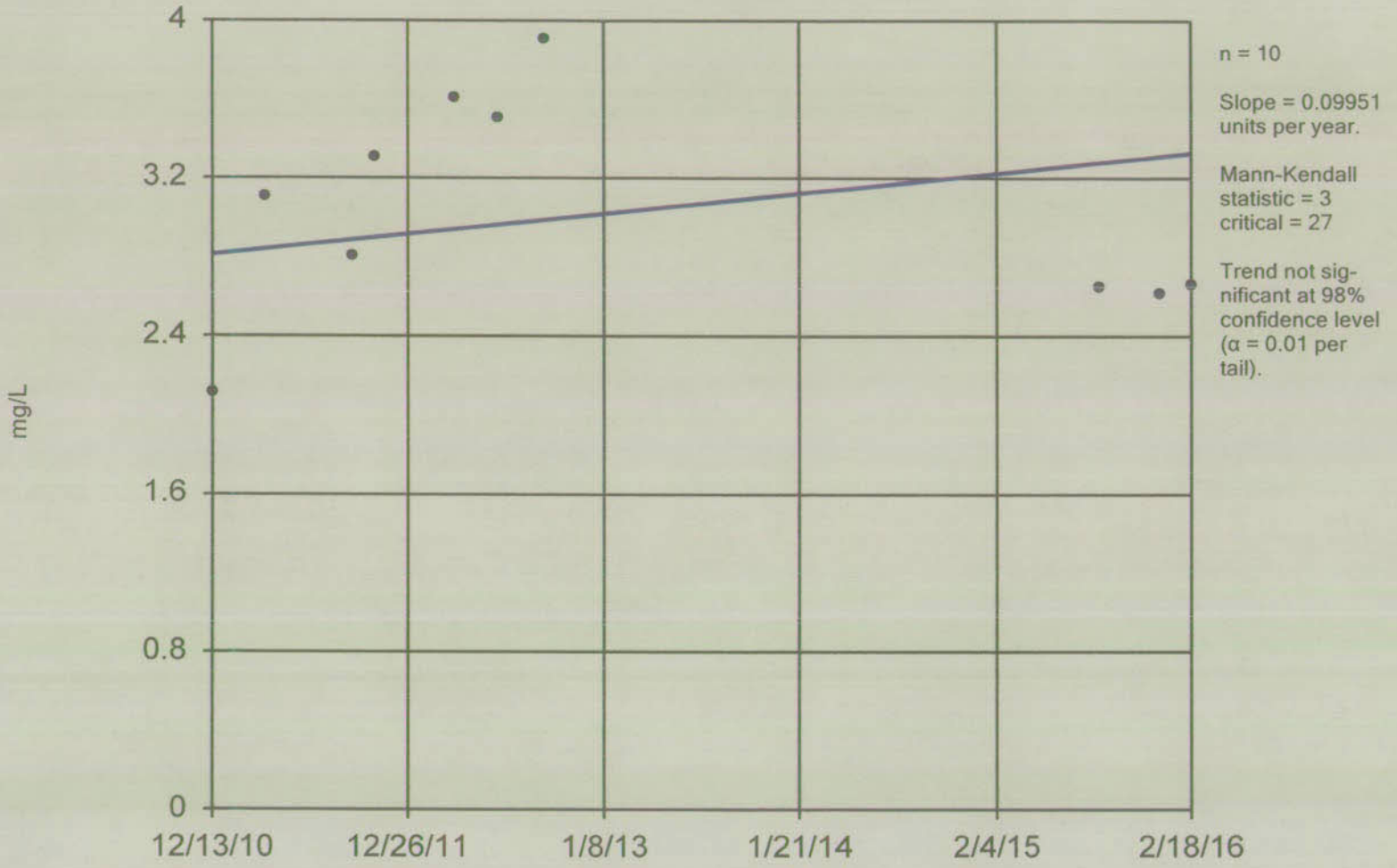
Facility: Meredosia Client: Geotechnology Data File: Final EDD

Electronic Filing: Received, Clerk's Office 09/28/2020

Sanitas™ v.9.4.41 Sanitas software licensed to Geotechnology. EPA

Sen's Slope Estimator

APW-2



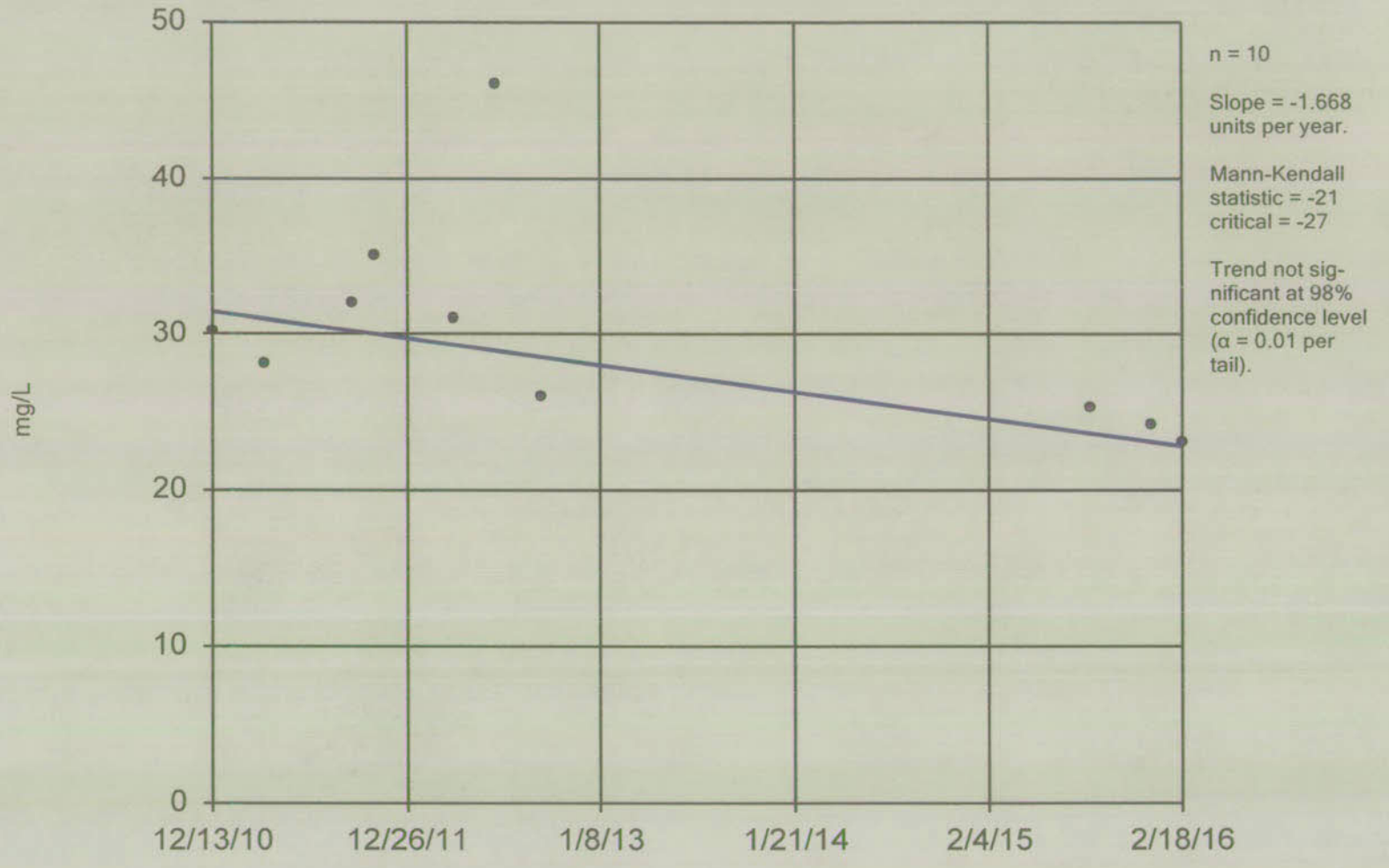
Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sanitas™ v.9.4.41 Sanitas software licensed to Geotechnology. EPA

Sen's Slope Estimator

APW-3



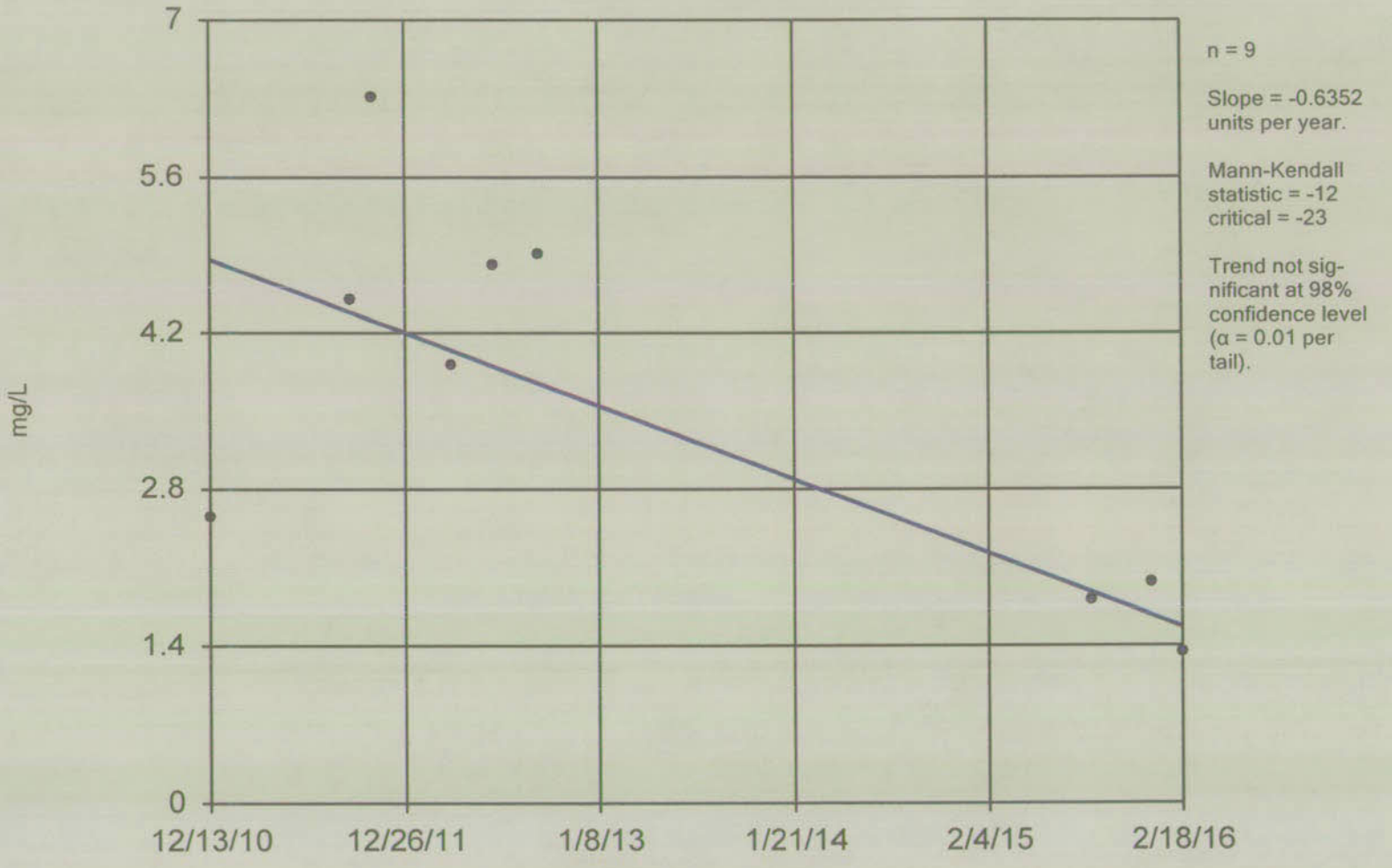
Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sanitas™ v.9.4.41 Sanitas software licensed to Geotechnology. EPA

Sen's Slope Estimator

APW-4



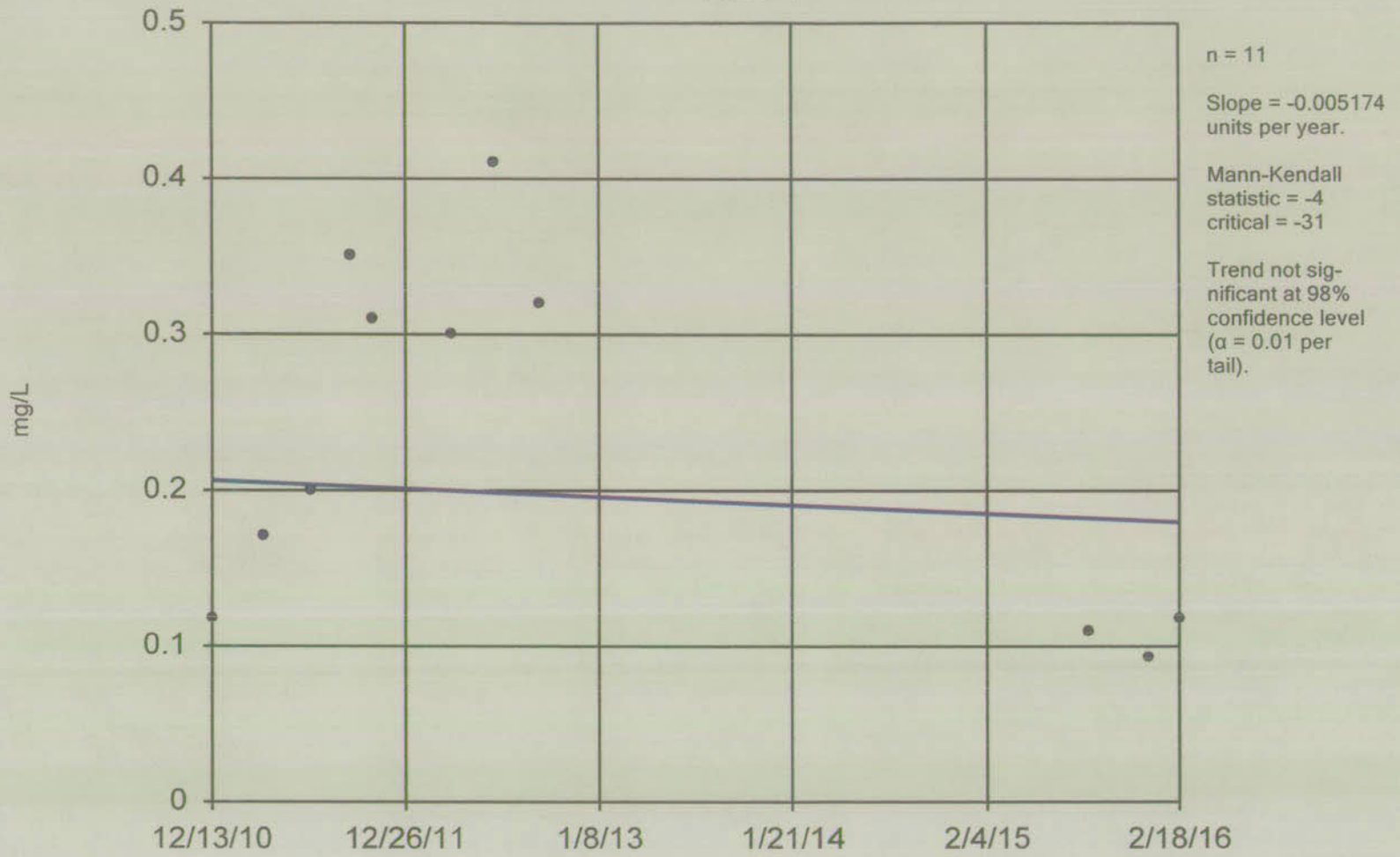
Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sanitas™ v.9.4.41 Sanitas software licensed to Geotechnology. EPA

Sen's Slope Estimator

APW-5



Constituent: Boron Dissolved Analysis Run 4/18/2016 3:05 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

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APPENDIX D

HELP GROUNDWATER MODEL DATA

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In order to assess the drainage capabilities of the proposed Meredosia Ash Pond, Geotechnology utilized the USEPA Hydrologic Evaluation of Landfill Performance (HELP) model to simulate conditions at the site. The version of software used was HELP 3.07 (1 November 1997). For the purposes of this evaluation, the ash pond designed cap has been divided into 6 layers as follows:

Layer 1 – Closure Turf (Geotextile/Turf Layer)
Layer 2 – Closure Turf Drainage Layer
Layer 3 – Membrane (50 mil HDPE)
Layer 4 – Fly Ash (at elevations above the piezometric surface of the pond, but 100% saturated to reflect conservative conditions at initial placement)
Layer 5 – Fly Ash (at elevations below the piezometric surface of the pond, at 100% saturation)
Layer 6 – Fine Silty Sand (conservative for the range of sands encountered)

Model parameters for the layers were the default values for each selected layer type as provided by the HELP software module, or were input by the user (for synthetic materials) with manufacturer provided parameters. Geotechnology utilized user-selected variables of 5 pinholes and 1 installation defect per each acre of membrane material as the modeled values, with a "good" initial installation quality. We assumed the Illinois River was at nominal stage and does not affect the drainage. During future flooding events, groundwater elevation may increase to the point where the lower levels of the ash are rewetted. In the case of a 100-year flood, it is not expected that the conditions in the ash will be as saturated as provided in this model due to the limited time of flooding and relatively low permeability of the ash compared to the underlying native sands.

Geotechnology utilized a user-generated Soil Conservations Service (SCS) Curve Number of 95% and an evaporative zone depth of 0.8 inches for the model based on the site location. Evapotranspiration data were calculated using site latitude, an artificial vegetative surface, and a growing season from April 19 to October 10. Average wind speed at the site was chosen from the Springfield, Illinois National Oceanic and Atmospheric Administration (NOAA) Station, and humidity input was calculated from NOAA data provided for Meredosia, Illinois. Precipitation and temperature coefficients were selected from the HELP database-provided site (Columbia, Missouri) and adjusted for site latitude. The model was run without groundwater influx parameters. The model indicates that steady state conditions (<0.05 inches of head on the sand layer) will be achieved within approximately six months of closure activities at the two ash ponds on site.

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RBCA1

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** **
** HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE **
** HELP MODEL VERSION 3.07 (1 NOVEMBER 1997) **
** DEVELOPED BY ENVIRONMENTAL LABORATORY **
** USAE WATERWAYS EXPERIMENT STATION **
** FOR USEPA RISK REDUCTION ENGINEERING LABORATORY **
** **
** **
****
****

PRECIPITATION DATA FILE: C:\HELP3\DATA4.D4
TEMPERATURE DATA FILE: C:\HELP3\DATA7.D7
SOLAR RADIATION DATA FILE: C:\HELP3\DATA13.D13
EVAPOTRANSPIRATION DATA: C:\HELP3\DATA11.D11
SOIL AND DESIGN DATA FILE: C:\HELP3\DATAMER2.D10
OUTPUT DATA FILE: C:\HELP3\RBCA1.OUT

TIME: 11:49 DATE: 4/15/2016

****

TITLE: Meredosia

****

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
WERE SPECIFIED BY THE USER.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.60	INCHES
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0180	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.720000011000E-03	CM/SEC

LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER

RBCA1

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0050	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04	CM/SEC
SLOPE	=	4.00	PERCENT
DRAINAGE LENGTH	=	750.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.05	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	5.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 30

THICKNESS	=	240.00	INCHES
POROSITY	=	0.5410	VOL/VOL
FIELD CAPACITY	=	0.1870	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5410	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 30

THICKNESS	=	264.00	INCHES
POROSITY	=	0.5410	VOL/VOL
FIELD CAPACITY	=	0.1870	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5410	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04	CM/SEC

LAYER 6

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TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 7

THICKNESS	=	480.00	INCHES
POROSITY	=	0.4730	VOL/VOL
FIELD CAPACITY	=	0.2220	VOL/VOL
WILTING POINT	=	0.1040	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4730	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.520000001000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	95.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	41.900	ACRES
EVAPORATIVE ZONE DEPTH	=	0.8	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.012	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.420	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.012	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	499.716	INCHES
TOTAL INITIAL WATER	=	499.716	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
MEREDOSIA IL

STATION LATITUDE	=	39.83	DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	109	
END OF GROWING SEASON (JULIAN DATE)	=	283	
EVAPORATIVE ZONE DEPTH	=	0.8	INCHES
AVERAGE ANNUAL WIND SPEED	=	9.40	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.70	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	67.70	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	72.80	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR COLUMBIA MISSOURI

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.57	1.86	3.19	3.83	4.47	3.76
3.51	2.93	3.64	3.34	2.02	1.95

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NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR COLUMBIA MISSOURI

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
27.50	32.50	41.70	54.80	64.10	72.90
77.60	76.00	68.40	57.10	43.50	32.90

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR COLUMBIA MISSOURI
AND STATION LATITUDE = 39.83 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.65	0.98	4.35	2.34	2.09	5.12
	1.99	2.71	2.91	5.84	0.59	3.18
RUNOFF	0.268	0.076	3.142	0.562	0.817	1.215
	0.076	0.413	1.655	4.155	0.135	2.372
EVAPOTRANSPIRATION	0.237	0.691	1.145	1.773	1.675	3.834
	1.966	2.312	1.253	1.680	0.453	0.559
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0004	0.0023	0.0009	0.0006	0.0007
	0.0001	0.0003	0.0004	0.0011	0.0003	0.0018
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0004	0.0021	0.0071	0.0039	0.0029	0.0032
	0.0007	0.0014	0.0017	0.0041	0.0013	0.0053
PERCOLATION/LEAKAGE THROUGH LAYER 6	54.4649	19.1717	12.2311	8.0304	6.2079	4.7599
	4.0537	3.4231	2.8656	2.5884	2.2323	2.0824

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.026	0.122	0.487	0.254	0.179	0.209
	0.031	0.079	0.104	0.259	0.081	0.364
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.080	0.211	0.299	0.225	0.208	0.197
	0.107	0.164	0.187	0.285	0.183	0.370
AVERAGE DAILY HEAD ON TOP OF LAYER 6	4.633	0.242	0.140	0.095	0.071	0.056
	0.046	0.039	0.034	0.029	0.026	0.024

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STD. DEVIATION OF DAILY	22.615	0.047	0.019	0.009	0.005	0.003
HEAD ON TOP OF LAYER 6	0.002	0.002	0.001	0.001	0.001	0.001

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.75	4981177.000	100.00
RUNOFF	14.887	2264236.500	45.46
EVAPOTRANSPIRATION	17.579	2673680.250	53.68
DRAINAGE COLLECTED FROM LAYER 2	0.0089	1348.050	0.03
PERC./LEAKAGE THROUGH LAYER 3	0.033986	5169.242	0.10
AVG. HEAD ON TOP OF LAYER 3	0.1828		
PERC./LEAKAGE THROUGH LAYER 6	122.111244	18572754.000	372.86
AVG. HEAD ON TOP OF LAYER 6	0.4529		
CHANGE IN WATER STORAGE	-121.836	-18530826.000	-372.02
SOIL WATER AT START OF YEAR	499.716	76005376.000	
SOIL WATER AT END OF YEAR	377.881	57474548.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-17.406	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.86	1.75	3.39	5.43	9.02	6.65
	3.39	1.19	0.84	5.12	1.57	0.67
RUNOFF	0.146	2.270	3.338	2.979	6.238	3.405
	1.386	0.404	0.179	4.267	0.565	0.319

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EVAPOTRANSPIRATION	0.611	0.427	1.316	2.334	3.009	3.243
	1.703	1.084	0.350	1.151	0.628	0.490
LATERAL DRAINAGE COLLECTED	0.0007	0.0001	0.0005	0.0009	0.0012	0.0010
FROM LAYER 2	0.0005	0.0001	0.0016	0.0013	0.0007	0.0027
PERCOLATION/LEAKAGE THROUGH	0.0040	0.0024	0.0032	0.0042	0.0043	0.0035
LAYER 3	0.0020	0.0008	0.0047	0.0043	0.0028	0.0084
PERCOLATION/LEAKAGE THROUGH	1.8995	1.5731	1.6060	1.4391	1.3817	1.2485
LAYER 6	1.2092	1.1317	1.0323	1.0082	0.9299	0.9066

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.237	0.131	0.178	0.276	0.288	0.243
TOP OF LAYER 3	0.132	0.041	0.343	0.294	0.176	0.581
STD. DEVIATION OF DAILY	0.214	0.000	0.191	0.232	0.272	0.281
HEAD ON TOP OF LAYER 3	0.223	0.115	0.327	0.304	0.267	0.230
AVERAGE DAILY HEAD ON	0.022	0.020	0.018	0.017	0.016	0.015
TOP OF LAYER 6	0.014	0.013	0.012	0.011	0.011	0.010
STD. DEVIATION OF DAILY	0.001	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.88	6369823.000	100.00
RUNOFF	25.496	3877910.000	60.88
EVAPOTRANSPIRATION	16.345	2486056.250	39.03
DRAINAGE COLLECTED FROM LAYER 2	0.0114	1726.946	0.03
PERC./LEAKAGE THROUGH LAYER 3	0.044646	6790.513	0.11
AVG. HEAD ON TOP OF LAYER 3	0.2433		
PERC./LEAKAGE THROUGH LAYER 6	15.365823	2337095.750	36.69
AVG. HEAD ON TOP OF LAYER 6	0.0149		
CHANGE IN WATER STORAGE	-15.339	-2332968.000	-36.63
SOIL WATER AT START OF YEAR	377.881	57474548.000	
SOIL WATER AT END OF YEAR	362.542	55141580.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

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SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.886	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.74	2.95	1.91	2.30	1.25	3.82
	8.48	0.95	5.48	2.08	2.67	1.16
RUNOFF	2.459	2.121	0.531	1.093	0.696	1.824
	4.299	0.054	3.751	0.637	1.542	0.260
EVAPOTRANSPIRATION	0.096	0.889	1.304	1.204	0.768	2.022
	4.004	1.227	1.642	1.371	1.250	0.372
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0021	0.0009	0.0008	0.0010	0.0007
	0.0011	0.0001	0.0006	0.0008	0.0017	0.0003
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0027	0.0070	0.0036	0.0029	0.0031	0.0036
	0.0041	0.0006	0.0025	0.0036	0.0055	0.0023
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.8677	0.7468	0.7898	0.7322	0.7255	0.6688
	0.6678	0.6424	0.5990	0.5954	0.5543	0.5595

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.138	0.530	0.235	0.204	0.212	0.223
	0.259	0.030	0.162	0.227	0.377	0.134
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.030	0.237	0.258	0.253	0.320	0.194
	0.247	0.078	0.231	0.238	0.310	0.152
AVERAGE DAILY HEAD ON TOP OF LAYER 6	0.010	0.009	0.009	0.009	0.008	0.008
	0.008	0.007	0.007	0.007	0.007	0.006
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 3

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	35.79	5443552.000	100.00
RUNOFF	19.266	2930366.500	53.83
EVAPOTRANSPIRATION	16.149	2456188.000	45.12
DRAINAGE COLLECTED FROM LAYER 2	0.0102	1553.305	0.03
PERC./LEAKAGE THROUGH LAYER 3	0.041437	6302.389	0.12
AVG. HEAD ON TOP OF LAYER 3	0.2274		
PERC./LEAKAGE THROUGH LAYER 6	8.149208	1239470.120	22.77
AVG. HEAD ON TOP OF LAYER 6	0.0079		
CHANGE IN WATER STORAGE	-7.785	-1184027.870	-21.75
SOIL WATER AT START OF YEAR	362.542	55141580.000	
SOIL WATER AT END OF YEAR	354.618	53936332.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.140	21218.414	0.39
ANNUAL WATER BUDGET BALANCE	0.0000	2.176	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.80	2.25	2.37	2.92	4.89	4.29
	2.02	4.10	3.72	1.07	2.94	2.40
RUNOFF	0.586	1.541	1.387	1.382	1.789	1.468
	0.137	1.452	1.793	0.022	1.683	1.930
EVAPOTRANSPIRATION	0.353	0.761	1.322	1.149	3.297	3.003
	1.881	2.388	1.942	0.917	1.206	0.461
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0015	0.0019	0.0006	0.0013	0.0006
	0.0002	0.0007	0.0010	0.0004	0.0020	0.0023
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0027	0.0056	0.0062	0.0024	0.0051	0.0027
	0.0012	0.0025	0.0038	0.0022	0.0068	0.0074
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.5398	0.4892	0.5039	0.4772	0.4789	0.4493
	0.4517	0.4385	0.4116	0.4133	0.3914	0.3909

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MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.131 0.064	0.392 0.163	0.424 0.257	0.153 0.141	0.329 0.477	0.160 0.498
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.001 0.145	0.254 0.231	0.274 0.237	0.241 0.168	0.239 0.217	0.205 0.303
AVERAGE DAILY HEAD ON TOP OF LAYER 6	0.006 0.005	0.006 0.005	0.006 0.005	0.006 0.005	0.005 0.005	0.005 0.004
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 6	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	33.77	5136316.500	100.00
RUNOFF	15.170	2307287.750	44.92
EVAPOTRANSPIRATION	18.679	2840977.500	55.31
DRAINAGE COLLECTED FROM LAYER 2	0.0124	1883.304	0.04
PERC./LEAKAGE THROUGH LAYER 3	0.048741	7413.380	0.14
AVG. HEAD ON TOP OF LAYER 3	0.2659		
PERC./LEAKAGE THROUGH LAYER 6	5.435782	826766.250	16.10
AVG. HEAD ON TOP OF LAYER 6	0.0052		
CHANGE IN WATER STORAGE	-5.527	-840596.500	-16.37
SOIL WATER AT START OF YEAR	354.618	53936332.000	
SOIL WATER AT END OF YEAR	349.231	53116956.000	
SNOW WATER AT START OF YEAR	0.140	21218.414	0.41
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.668	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.31	0.76	4.61	6.11	2.96	7.06
	0.87	1.98	3.38	2.79	3.89	2.30
RUNOFF	0.116	0.531	2.830	3.019	0.715	4.162
	0.103	0.369	1.915	1.795	2.559	0.983
EVAPOTRANSPIRATION	0.194	0.281	1.802	3.116	2.530	2.893
	0.767	1.562	1.247	1.254	1.317	0.911
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0001	0.0016	0.0015	0.0009	0.0011
	0.0001	0.0003	0.0006	0.0008	0.0017	0.0007
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0027	0.0025	0.0054	0.0056	0.0036	0.0040
	0.0006	0.0014	0.0023	0.0029	0.0056	0.0030
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.3862	0.3427	0.3694	0.3482	0.3489	0.3338
	0.3365	0.3309	0.3111	0.3122	0.2973	0.2996

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.131	0.143	0.364	0.385	0.230	0.267
	0.037	0.081	0.160	0.189	0.390	0.187
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.001	0.082	0.272	0.240	0.259	0.266
	0.108	0.155	0.236	0.259	0.290	0.240
AVERAGE DAILY HEAD ON TOP OF LAYER 6	0.004	0.004	0.004	0.004	0.004	0.004
	0.004	0.004	0.004	0.004	0.003	0.003
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.02	5630630.500	100.00
RUNOFF	19.098	2904761.000	51.59
EVAPOTRANSPIRATION	17.872	2718264.500	48.28
DRAINAGE COLLECTED FROM LAYER 2	0.0095	1444.178	0.03

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PERC./LEAKAGE THROUGH LAYER 3	0.039613	6025.084	0.11
AVG. HEAD ON TOP OF LAYER 3	0.2135		
PERC./LEAKAGE THROUGH LAYER 6	4.016714	610930.187	10.85
AVG. HEAD ON TOP OF LAYER 6	0.0039		
CHANGE IN WATER STORAGE	-3.976	-604767.562	-10.74
SOIL WATER AT START OF YEAR	349.231	53116956.000	
SOIL WATER AT END OF YEAR	345.255	52512188.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.523	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.47	1.74	3.33	3.82	4.04	5.39
	3.35	2.19	3.27	3.38	2.33	1.94
STD. DEVIATIONS	1.23	0.90	1.19	1.81	3.09	1.43
	3.00	1.27	1.67	2.03	1.28	1.01
RUNOFF						
TOTALS	0.715	1.308	2.246	1.807	2.051	2.415
	1.200	0.538	1.859	2.175	1.297	1.173
STD. DEVIATIONS	0.993	0.970	1.227	1.127	2.384	1.296
	1.819	0.532	1.270	1.965	0.960	0.950
EVAPOTRANSPIRATION						
TOTALS	0.298	0.610	1.378	1.915	2.256	2.999
	2.064	1.714	1.287	1.275	0.971	0.559
STD. DEVIATIONS	0.198	0.250	0.248	0.826	1.034	0.656
	1.185	0.606	0.599	0.282	0.399	0.208
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.0002	0.0008	0.0014	0.0010	0.0010	0.0008
	0.0004	0.0003	0.0008	0.0009	0.0013	0.0016

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STD. DEVIATIONS	0.0003	0.0009	0.0007	0.0004	0.0003	0.0002
	0.0004	0.0002	0.0005	0.0003	0.0007	0.0010

PERCOLATION/LEAKAGE THROUGH LAYER 3

TOTALS	0.0025	0.0039	0.0051	0.0038	0.0038	0.0034
	0.0017	0.0013	0.0030	0.0034	0.0044	0.0053
STD. DEVIATIONS	0.0013	0.0022	0.0017	0.0012	0.0009	0.0005
	0.0014	0.0008	0.0012	0.0009	0.0023	0.0027

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	11.6316	4.4647	3.1000	2.2054	1.8286	1.4921
	1.3438	1.1933	1.0439	0.9835	0.8810	0.8478
STD. DEVIATIONS	23.9518	8.2352	5.1269	3.2834	2.4802	1.8604
	1.5515	1.2838	1.0552	0.9358	0.7930	0.7280

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	0.1323	0.2634	0.3375	0.2543	0.2476	0.2203
	0.1045	0.0789	0.2051	0.2219	0.3002	0.3528
STD. DEVIATIONS	0.0747	0.1867	0.1292	0.0871	0.0603	0.0400
	0.0953	0.0524	0.0948	0.0599	0.1649	0.1927

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.9350	0.0564	0.0354	0.0260	0.0208	0.0176
	0.0153	0.0136	0.0123	0.0112	0.0104	0.0097
STD. DEVIATIONS	2.0672	0.1042	0.0585	0.0387	0.0283	0.0219
	0.0177	0.0146	0.0124	0.0107	0.0093	0.0083

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.24 (3.567)	5512299.0	100.00
RUNOFF	18.783 (4.2906)	2856912.50	51.828
EVAPOTRANSPIRATION	17.325 (1.0653)	2635033.25	47.803
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.01046 (0.00142)	1591.157	0.02887
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.04168 (0.00553)	6340.122	0.11502

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AVERAGE HEAD ON TOP OF LAYER 3	0.227 (0.031)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	31.01575 (51.11133)	4717403.000	85.57959
AVERAGE HEAD ON TOP OF LAYER 6	0.097 (0.199)		
CHANGE IN WATER STORAGE	-30.892 (51.0256)	-4698637.00	-85.239

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.59	393931.219
RUNOFF	2.144	326045.4060
DRAINAGE COLLECTED FROM LAYER 2	0.00013	20.29407
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000370	56.22432
AVERAGE HEAD ON TOP OF LAYER 3	0.800	
MAXIMUM HEAD ON TOP OF LAYER 3	1.569	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	13.3 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	7.397256	1125100.62000
AVERAGE HEAD ON TOP OF LAYER 6	126.484	
SNOW WATER	2.25	342081.3750

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5253
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0148

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	0.2646	0.4411
2	0.1556	0.7778
3	0.0000	0.0000
4	51.6723	0.2153
5	66.1214	0.2505
6	227.0400	0.4730
SNOW WATER	0.000	

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APPENDIX E

MODFLOW AND MT3DMS MODEL DATA

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MODFLOW was developed by the United States Geological Survey (USGS) to solve three-dimensional transient head distributions using finite difference approximations. The user can input soil properties, multiple layers, heterogeneities, variable thicknesses, variable gradients, flow boundaries, wells, and can define confined or unconfined flow systems. Major assumptions of the program include that groundwater is governed by Darcy's law; the formation behaves as a continuous porous medium; flow is not affected by chemical, temperature, or density gradients; and hydraulic properties are constant within a grid cell.

MT3DMS calculates concentration distributions for a single chemical as a function of time and location using a finite difference solution. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. MT3DMS accounts for advection, diffusion, dispersion, sorption, and first order decay. Major assumptions of the module include changes in the concentration field do not affect the flow field; concentrations of solutes do not interact with each other; chemical and hydraulic properties are constant within a cell; sorption is instantaneous and fully reversible; and decay is not reversible.

The current configuration was calibrated to groundwater elevation data collected between 2009 and 2015 in the MODFLOW program and the boron concentration data was used to calibrate the MT3DMS module. The prediction scenario includes the clean closure and capping of the two ash ponds.

Model Setup

A two layer grid with twelve objects was established with 100-foot grid spacing parallel and perpendicular to the primary flow direction. The grid size was decreased to a 50-foot grid in the vicinity of the ash ponds. Areas adjacent to the flow and transport boundaries, soil properties, and river stage fluctuations were the same for the calibration and prediction scenarios. The upgradient (east) edge of the model was a general head boundary to allow for flow reversals due to the Illinois River fluctuations. The bottom of the aquifer (estimated), north boundary, and south boundary was modeled as no-flow boundaries. The downgradient boundary was a river object to model the Illinois River. The top boundary (land surface) was a specified flux boundary condition to model rainfall infiltration and seepage through the ash ponds.

Simplifying assumptions were made for this model.

- boron instantaneously dissolves into water;
- leachate instantaneously migrates to the groundwater;
- leachate concentrations remain constant over time and the source is not depleted;
- the Illinois River has a consistent annual pattern; and
- the cap has an instantaneous effect on the percolation rate.

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MODFLOW and MT3DMS Input Values

Layers

The top layer included the two ash pond objects and the topographic surface. This layer was between 2 and 42 feet thick depending on the location of the layer. The bottom layer represented the unconfined sand aquifer and was 50 feet thick.

Soil Parameters

Soil parameters were estimated using published values for the units as observed during drilling activities, from laboratory testing results, or defaults provided within the MODFLOW and MT3DMS program. Soil parameters were refined during model calibration using observed data.

Recharge

Water recharge rates were modeled using results from the HELP model for the proposed closure configuration. Rainfall and infiltration rates were applied across the site using average annual rainfall data from the City of Meredosia.

River Parameters

The Illinois River was represented by a head-dependent flux that required inputs for river stage, width, bed thickness, and bed hydraulic conductivity. River stage data was obtained from the river gauge located adjacent to the site (National Weather Service http://water.weather.gov/) from years 2009 to 2015. River stages were split into high stage (March to July) and low stage (August to February) for each year.

Source Concentration

The source concentration of boron in the Fly Ash and Bottom Ash Ponds was based on calibration results at the end of 25 years. The Fly Ash Pond boron concentration was modeled as a constant source of 25 mg/L. The Bottom Ash Pond boron concentration was modeled as a constant source of 3 mg/L. Boron and other contaminants dissolve slower into water from bottom ash instead of fly ash due to the higher temperatures that form bottom ash stabilizing the chemicals as solids (Cox 1978; Leaching of Boron from Coal Ash). Retardation and decay were not used to be conservative.

Model Results

Boron concentrations for the current configuration were modeled for 25 years to represent a scenario where the ash ponds were not closed. After 25 years, monitoring well APW-3 (the well with historically highest concentrations) stabilized at 16.9 mg/L of boron, which exceeds the Class I Groundwater standards. As shown in the table below, APW-2,

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APW-6, APW-7, and APW-8 also exceeded the Class I Groundwater standards at 25 years with no action.

Boron Concentration in Groundwater for the No Action Scenario at 25 Years

Well	Boron (mg/l)
APW-1	0.010
APW-2	10.2
APW-3	16.9
APW-4	0.330
APW-5	0.002
APW-6	7.60
APW-7	8.89
APW-8	12.9
APW-9	0.261

Yellow highlighting indicates a prediction exceeding the Class I Groundwater standard of 2 mg/l.

Within three years after dewatering and complete closure of the two ash ponds on site, boron modeling results indicate that boron will be below the Class I Groundwater standards for each well on the site. Boron concentrations at each of the monitoring wells after three years are shown in the table below.

Boron Concentration in Groundwater for the Ash Pond Closure Scenario at at 3 years after Closure and Dewatering

Well	Boron (mg/l)
APW-1	0.056
APW-2	0.124
APW-3	0.955
APW-4	0.011
APW-5	0.033
APW-6	0.067
APW-7	0.030
APW-8	1.17
APW-9	0.014

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APPENDIX F

ILLINOIS RIVER LOADING DATA

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Boron and Arsenic Loading in the Illinois River

L=C(Q)
Q=KIA

Cmax=highest single concentration
Cavg=mean concentration of APWs-2, 3, 4, and 9 (closest to river)
Q=groundwater discharge volume into river
K=hydraulic conductivity, from NRT value in report
Imax=maximum observed hydraulic gradient from all events
Iavg=mean hydraulic gradient from all events
A=cross section of aquifer, 52 feet thick x 2000 feet long
Q7,10=7-day, 10 year low flow, from IL Water Survey 1988 (most recent calculated value)
converted from cfs to gpd with factor of 1cfs = 646190.4 gpd
Qavg=average annual flow from 1936 to 1988, from USGS NWIS
converted from cfs to gpd with factor of 1cfs = 646190.4 gpd
Mixing Zone = 50 feet from shore, river is 750 feet wide

Boron Cmax=46	46
Arsenic Cmax=0.31	0.31
Boron Cavg=11.87	11.87
Arsenic Cavg=0.08	0.08
K=1,200 gpd/ft2	1200
Imax=11.98 feet	11.98
Iavg=6.72 feet	6.72
A=104,000 ft2	104,000

Qmax	1,495,104,000	gpd
Qavg	838,656,000	gpd

Boron Loading

Lmax	68,774,784,000	
Lavg	9,954,846,720	
(1) Q7,10	2,390,904,625	gpd
(2) Qavg	13,818,782,542	gpd

dB max (1)	28.76517251	div by 15 (750/50)	**1.917678 mg/L**
dB max (2)	4.976906163	div by 15 (750/50)	**0.331794 mg/L**
dB avg (1)	4.163631881	div by 15 (750/50)	**0.277575 mg/L**
dB avg (2)	0.720385221	div by 15 (750/50)	**0.048026 mg/L**

Arsenic Loading

Lmax	463,482,240	
Lavg	67,092,480	
(1) Q7,10	2,390,904,625	gpd
(2) Qavg	13,818,782,542	gpd

dB max (1)	0.19385225	div by 15 (750/50)	**0.012923 mg/L**
dB max (2)	0.03354002	div by 15 (750/50)	**0.002236 mg/L**
dB avg (1)	0.028061546	div by 15 (750/50)	**0.001871 mg/L**
dB avg (2)	0.004855166	div by 15 (750/50)	**0.000324 mg/L**

ATTACHMENT B

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GROUNDWATER MONITORING PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 5, 2016

J024917.01

GROUNDWATER MONITORING PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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GROUNDWATER MONITORING PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

1.0 INTRODUCTION

The following groundwater monitoring plan is provided for the AmerenEnergy Medina Valley Cogen, LLC Meredosia Power Station Fly Ash Pond and Bottom Ash Pond closure project for the purpose of evaluating the performance of the ash pond closure activities. This is done in general accordance with Title 35, Illinois Administrative Code (IAC), Part 840 even though the regulation does not directly apply to this facility. Groundwater will be monitored to evaluate closure and post-closure groundwater quality by conducting statistical trend analysis and assessing compliance with the applicable standards. The site location and topography are shown on Plate 1.

A Groundwater Management Zone (GMZ) is proposed for the site. The purpose of the GMZ will be to remediate groundwater to the level of the Class I groundwater standard. The method of remediation is the closure and capping of the ash ponds which will reduce or eliminate the current primary contaminate infiltration source (precipitation).

2.0 GROUNDWATER MONITORING PROGRAM

The groundwater monitoring program is based on the geology and hydrogeology information presented in the April 2016 Hydrogeologic Assessment Report. This Groundwater Monitoring Plan (GMP) provides groundwater monitoring and sampling procedures; parameter list and analytical methods; and assessment of groundwater quality data.

2.1 Monitoring Locations. Groundwater samples will be obtained from existing groundwater monitoring wells (APW-1 through APW-9). If additional wells are constructed in the future (see Section 2.2), the construction, sampling, and analysis methods described herein will apply to those monitoring wells. Monitoring wells have a well identification number with an "APW" identifier, followed by a 1-, 2-, or 3-place alpha-numeric designation. The approximate locations of the monitoring wells are included on Plate 2. The monitoring program generally follows 35 IAC 620 by satisfying the following standards for the monitoring system:

- The monitoring wells are sufficiently located to represent the quality of groundwater at the compliance point(s);
- The monitoring wells are located within the stratigraphic unit(s) that may serve as potential contaminant migration pathways;

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- The groundwater monitoring wells are secure; and,
- Monitoring wells are installed to evaluate on-site and off-site groundwater quality.

2.2 Monitoring Well Installation. The current monitoring well network is comprised of five groundwater monitoring wells installed in October 2010 and four groundwater monitoring wells installed in October 2015. The nine groundwater monitoring wells are screened in the uppermost aquifer on the site.

The October 2015 groundwater monitoring wells were installed to better delineate groundwater impacts previously identified at the site. These wells were also installed to provide information on the effects of the ash pond closure activities on the groundwater. The monitoring well network data is included as Table 1 and includes the monitoring well identification numbers, screened intervals, and gradient designation. The groundwater monitoring wells were constructed in accordance with the Illinois Department of Public Health (IDPH) standards as cited in 77 IAC 920.170 and regulatory standards as cited in 35 IAC 620.505(a). As-built diagrams for the groundwater monitoring wells are included in Appendix A.

The current monitoring well network is adequate to design remedial activities, but is not adequate to fully delineate boron groundwater impacts and the future effects of the remedial activities (clean closure and capping) at the site. Installation of three additional monitoring wells is proposed: one to the southwest of the Fly Ash Pond; one to the east of the closed old ash pond, and one to the northeast of the Fly Ash Pond. The three proposed monitoring well locations are illustrated on Plate 3. These three locations will assist boron plume delineation to the southwest, east, and northeast of the ash ponds as well as provide information needed to evaluate the effect of remedial activities at the facility. It is anticipated that monitoring well installation will occur during the clean closure and capping activities on the site.

Monitoring wells will be maintained so representative groundwater samples may be collected. Items to observe during routine monitoring include: checking the concrete pad/seal for cracks, assessing the integrity of the protective casing, casing lock, seal of well cap, and integrity of the well riser. In the event a monitoring well is damaged, the well shall be repaired or replaced in accordance with regulatory requirements.

3.0 GROUNDWATER SAMPLING

3.1 Sampling Schedule. The initial sampling schedule for groundwater monitoring is provided in Table 2. Groundwater monitoring events are anticipated to be conducted quarterly until trend analysis indicates less frequent monitoring is acceptable.

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Table 2 - Quarterly Groundwater Monitoring Schedule

Sampling Quarter	Report Due	Parameter List
1 – January-March	May 31	Per Section 3.2
2 – April-June	August 31	Per Section 3.2
3 – July-September	November 30	Per Section 3.2
4 – October-December	February 28	Per Section 3.2

Five years after approval of the CQA Acceptance Report, a request may be made to modify the post-closure care plan to reduce the frequency of groundwater monitoring to semi-annual sampling by demonstrating the following:

- Monitoring effectiveness will not be compromised by the reduced frequency of monitoring;
- Adequate data has been collected to characterize groundwater; and
- Concentrations of constituents monitored at the downgradient boundaries do not demonstrate statistically significant increasing trends that can be attributed to the former ash ponds.

Five years after reducing the monitoring frequency to semi-annual, a request may be made to modify the post-closure care plan to reduce monitoring frequency to annual sampling by demonstrating the same items above as for the reduction to semi-annual monitoring.

Groundwater monitoring may be discontinued when the IEPA approves the post-closure care completion report. This occurs after statistically significant increasing trends are not detected for five (5) consecutive years after changing to an annual monitoring frequency.

3.2 Parameter List. Routine sample collection will be conducted quarterly on the schedule outlined above, for the constituents listed below. Ameren may seek future reductions in the monitoring frequency and/or monitored parameters, consistent with criteria in the regulations, if approved, and found applicable to the closure of these ponds. Groundwater monitoring will continue until completion of the GMZ.

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As stated in 35 IAC 620.410(a) and (d), the following laboratory analysis parameters are required to be monitored:

- Antimony,
- Arsenic,
- Barium,
- Beryllium,
- Boron,
- Cadmium,
- Chloride,
- Chromium,
- Cobalt,
- Copper,
- Cyanide,
- Fluoride,
- Iron,
- Lead,
- Manganese,
- Mercury,
- Nickel,
- Nitrate as nitrogen,
- Selenium,
- Silver,
- Sulfate,
- Thallium,
- Total dissolved solids,
- Vanadium, and
- Zinc.

Prior to 2015, groundwater samples were obtained and tested for dissolved constituents. Current regulatory preferences are to obtain and analyze groundwater samples for total constituents. Both dissolved and total parameters will be obtained for analytical testing for eight quarters after closure activities are completed or until there is enough statistical strength in the total analysis to warrant switching to total constituent analysis only. This provides information that is comparable to data obtained prior to the power station closing operations through the closure process.

Field monitoring parameters will include pH, specific conductance, groundwater surface elevation, well depth, temperature, depth to water, and elevation of measuring point.

3.3 Sampling Procedure. Groundwater samples shall be collected following the procedures presented in Appendix B, or equivalent methods developed by Ameren or its contractors.

4.0 SAMPLE ANALYSIS

Laboratory analysis and testing methods shall be in general accordance with those listed in the U.S. EPA publication Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA/530/SW-846, 3rd Edition – Update V, amended October 2013 (U.S. EPA, 2013) or as superseded by future editions. The specific testing method used for analysis shall have Practical Quantitation Limit (PQL) values that are capable of assessing if regulatory and/or site groundwater standards are exceeded. Specific testing methods shall be referenced in the Laboratory Analysis Report.

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The Quality Assurance/Quality Control (QA/QC) program at the laboratory should generally follow the requirements outlined in the U.S. EPA publication Test Methods for Evaluation Solid Waste, Physical/Chemical Methods, EPA/530/SW-846, 3rd Edition –Update V, amended January 2013 (U.S. EPA, 2013) and which may be periodically revised in the future. However, other published QA/QC methods may be utilized as part of laboratory policy provided the QA/QC methodologies generally follow those numerated above. A copy of the laboratory Quality Assurance Manual is included as Appendix C.

5.0 DATA EVALUATION

5.1 Groundwater Quality Standards. Pursuant to 35 IAC 620.450, the on-site groundwater quality requirements shall be the Class I Potable Resource Groundwater standard (35 IAC 620.410) with the exception of the areas under the GMZ. If upon completion of the post-closure care period the observed concentrations in the site groundwater still exceed a Class I standard, the on-site standard may be adjusted provided criteria are addressed to the satisfaction of the IEPA. If off-site groundwater impacts are detected, the groundwater quality requirements shall be the Class I Potable Resource Groundwater standard or a GMZ will be obtained for those areas during the timeframe of remedial activities.

5.2 Compliance Demonstration. Compliance will be evaluated against the appropriate groundwater standard. On-site groundwater shall be considered to be in compliance when no statistically significant increasing trend can be attributable to the Fly Ash Pond or the Bottom Ash Pond at the compliance boundary for five (5) consecutive years following the change to an annual monitoring frequency and with IEPA concurrence.

Compliance will be demonstrated by performing an annual trend analysis for each downgradient monitoring well for all of the monitored constituents listed in Section 3.2 that exceed the Class I groundwater standards. The analysis shall be performed on a minimum of eight (8) consecutive samples and use Sen's Estimate of Slope for compliance assessment. Generally, if analyses for a parameter show an increasing trend at a down-gradient well, a Mann-Kendall analysis must be performed at a 95% tolerance interval to assess whether the increasing trend is statistically significant. If a statistically significant increase is observed, three (3) alternative statistical methods may be applied:

1. Notification of statistically significant increasing trends and revision to the sampling frequency must be reported to the IEPA within 30 days of making the determinations.

2. If an investigation determines that the statistically significant increasing trend is due to a superseding cause then the IEPA will be notified in writing, stating the cause of the increasing trend and the rationale used in its determination.

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3. If there is no superseding cause, and the monitoring frequency has been decreased to semi-annual or annual, then sampling must return to a quarterly frequency. If after four (4) consecutive quarters and no statistically significant increasing trend is observed, then sampling frequency can return to the previous frequency.

If a statistically significant increasing trend continues to be observed over two or more consecutive years and there is no superseding cause, a hydrogeologic investigation (and additional site investigation(s), if necessary) will be performed.

Based on the outcome of the additional activities, action must be taken to mitigate the statistically significant increasing trends that are causing, threatening or allowing exceedances of off-site groundwater quality standards. Any actions must be proposed as a modification to the post-closure care plan within 180 days after completion of the additional hydrogeologic and/or additional site investigations.

6.0 REFERENCES

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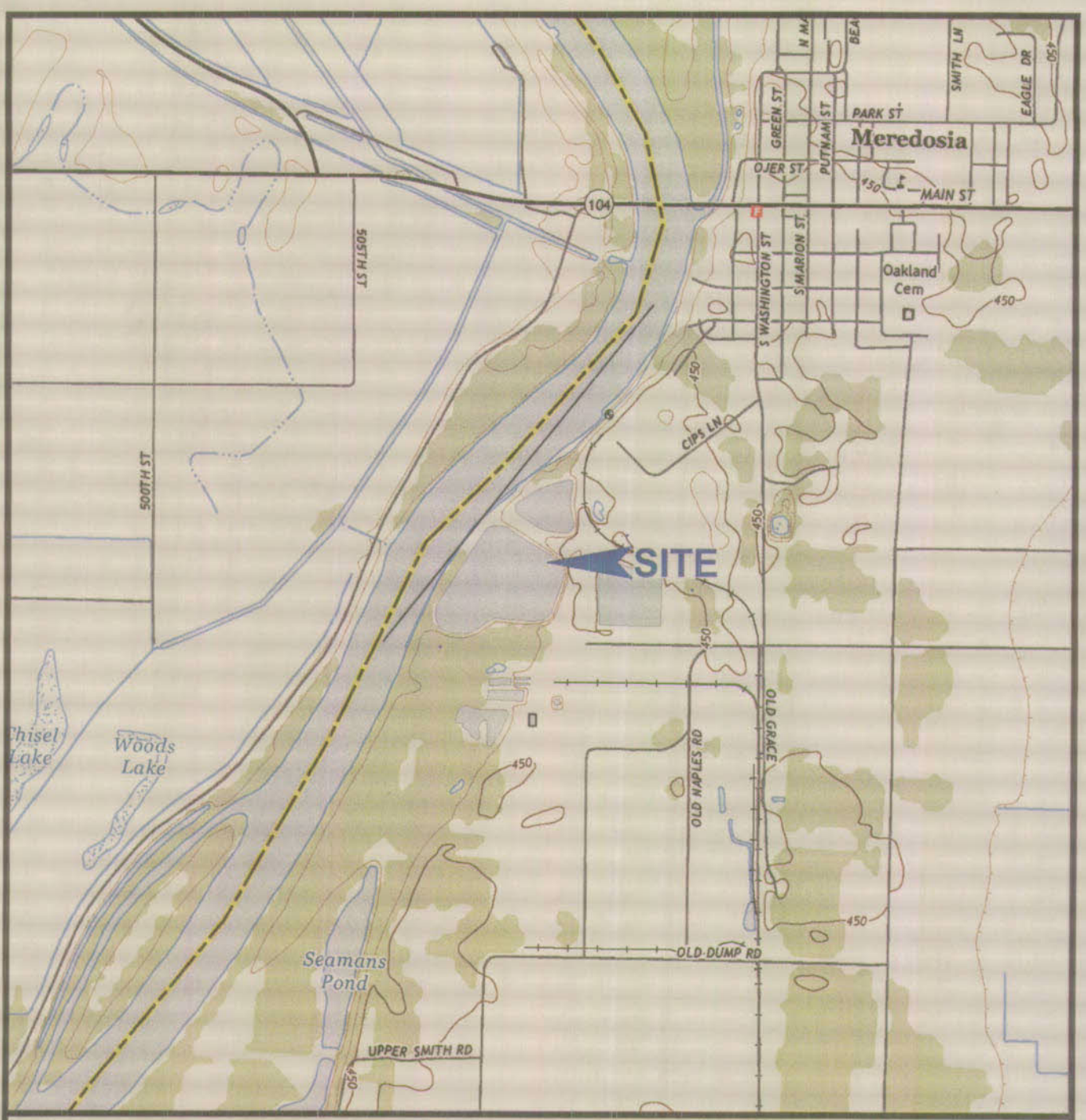
J024917.01

TABLE 1

GROUNDWATER MONITORING NETWORK SUMMARY
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

Well ID	Gradient	Ground Surface Elevation	Bottom of Well Elevation	Screen Length (ft)	Top of Casing Elevation[1]	Installation Completion Date
APW-1	Upgradient	446.06	420.90	10.00	449.26	10/26/2010
APW-2	Downgradient	433.97	410.60	10.00	436.87	10/25/2010
APW-3	Downgradient	433.35	410.30	10.00	436.28	10/25/2010
APW-4	Downgradient	431.90	405.80	6.50	434.86	10/26/2010
APW-5	Downgradient	450.48	420.20	10.00	453.20	10/26/2010
APW-6	Downgradient	448.60	420.60	10.00	451.90	10/1/2015
APW-7	Downgradient	435.00	418.50	10.00	438.70	10/1/2015
APW-8	Downgradient	460.50	421.40	10.00	463.90	10/1/2015
APW-9	Downgradient	445.00	415.70	10.00	448.10	10/1/2015

[1] Elevations reported in feet above mean sea level.



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

N

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 5-9-16	Date: 5/9/16	Date: 5/9/2016

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.01	PLATE 1

Electronic Filing: Received, Clerk's Office 09/28/2020



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.

LEGEND

- Monitoring Well Location
- Property Boundary

N

0 200 400 800

SCALE IN FEET

Drawn By: WAH	Ck'd By: JYH	App'vd By: AMS
Date: 5-13-16	Date: 7-15-16	Date: 7/15/2016

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE PLAN AND MONITORING WELL LOCATIONS

Project Number J024917.01	PLATE 2



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- Proposed Monitoring Well Location
- Property Boundary

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-9-16	Date: 5/9/16	Date: 5/9/2016

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

PROPOSED MONITORING WELL LOCATIONS

Project Number J024917.01	PLATE 3

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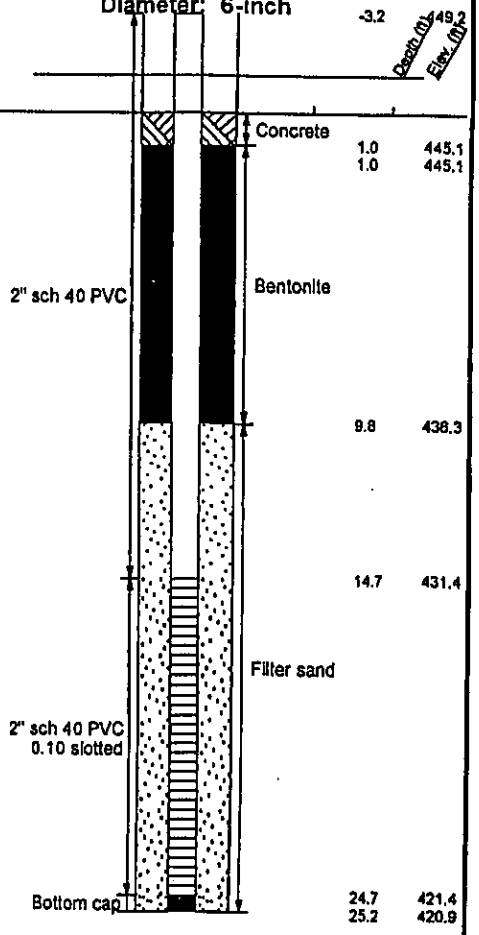
APPENDIX A

BORING LOGS AND MONITORING WELL DIAGRAMS

Surface Elevation: 446.06 | Completion Date: 10/26/10
Datum msl | Northing: 1147018.68 | Easting: 2185605.2

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			1-1-1	SS1
			2-2-1	SS2
5				
			2-4-4	SS3
			3-3-3	SS4
10				
	Loose, brown fine to coarse SAND, trace gravel - SP ▽			
			1-1-2	SS5
15				
			1-1-2	SS6
20				
	Loose, brown, fine SAND - SP			
			0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0838301.GPJ 1/11/11

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

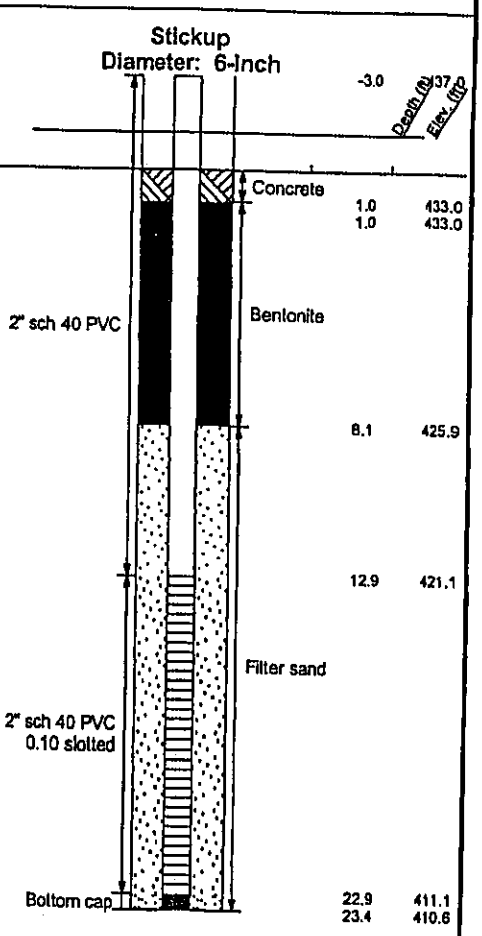
LOG OF BORING: APW-1

Project No. J017150.01

Surface Elevation: 433.97
Datum msl
Completion Date: 10/25/10
Northing: 1148489.69
Easting: 2182485.19

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY, trace sand - CH			
			2-2-2	SS1
			2-2-2	SS2
5			2-2-4	SS3
			0-2-3	SS4
10				
			2-2-3	SS5
15				
	Soft, gray, silty CLAY with shells, trace to some sand - CL			
			0-1-1	SS6
20				
	Very loose, brown, fine to medium SAND - SP			
			0-0-1	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KGr
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-2/MW-2

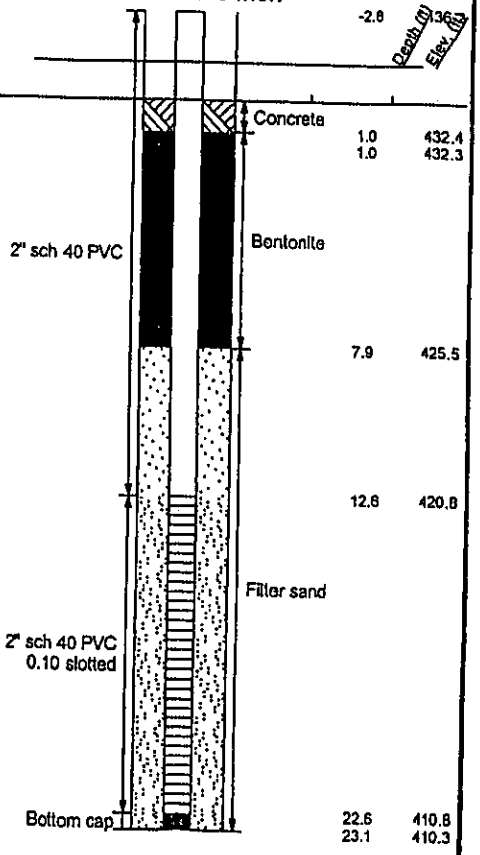
Project No. J017150.01

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 433.35
Datum msl
Completion Date: 10/25/10
Northing: 1148118.6
Easting: 2181973.76

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff, brown and gray CLAY, trace sand and wood - CH			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10				
	Gray, silty CLAY, trace sand - CL		95	ST5
15				
	Soft, gray, silty SAND with shells and silty clay seams - SM			
			0-1-1	SS6
20				
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: RAP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

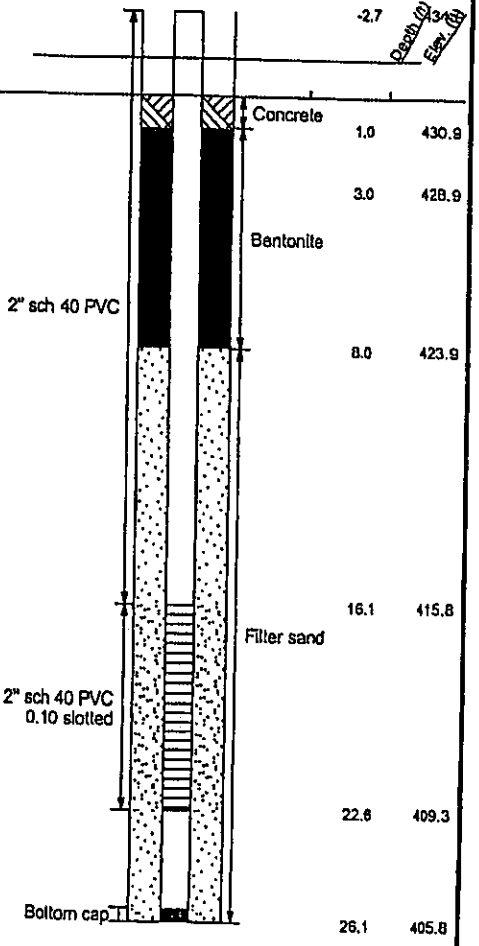
LOG OF BORING: APW-3/B-10

Project No. J017150.01

Surface Elevation: 431.90
Datum msl
Completion Date: 10/26/10
Northing: 1146935.94
Easting: 2181602.97

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray CLAY, trace sand and wood - CH			
			0-0-4	SS1
			2-4-4	SS2
5			1-1-1	SS3
			1-1-2	SS4
10				
	Loose, brown, fine SAND - SP			
			3-6-7	SS5
15				
			0-2-2	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 11.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DT	App'vd. by: MBS
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-4

Project No. J017150.01

Surface Elevation: 450.48

Datum msl

Completion Date: 10/26/10

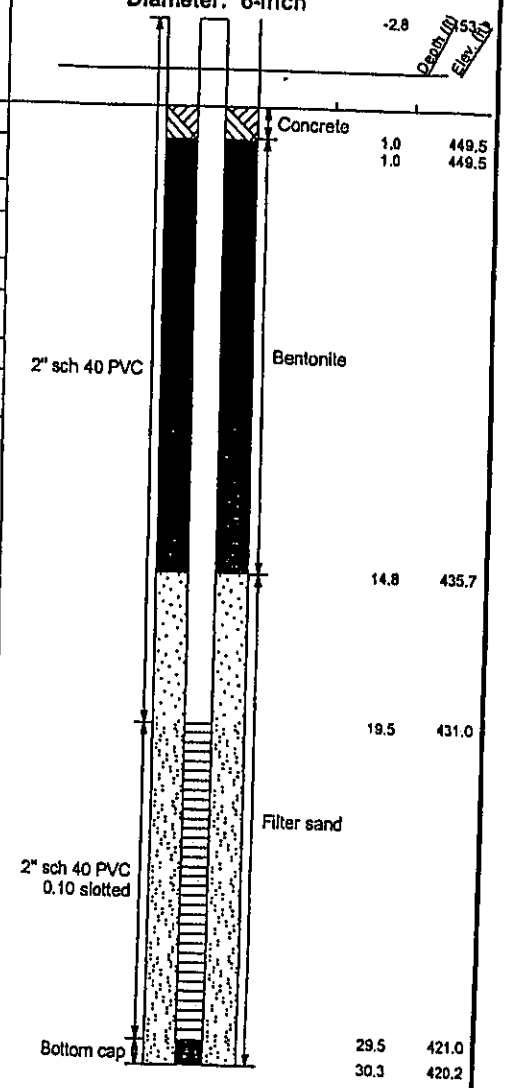
Northing: 1146922.64

Easting: 2183711.11

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			3-3-3	SS1
5			2-2-2	SS2
			1-3-4	SS3
10			2-3-3	SS4
15			2-3-4	SS5
20	Loose, brown, fine to coarse SAND, trace to some gravel - SP		2-1-2	SS6
25			3-3-3	SS7
30	Boring terminated at 30 feet.		1-1-1	SS8
35				

WELL DIAGRAM

Stickup
Diameter: 6-Inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL 017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ∇

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: RBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-5

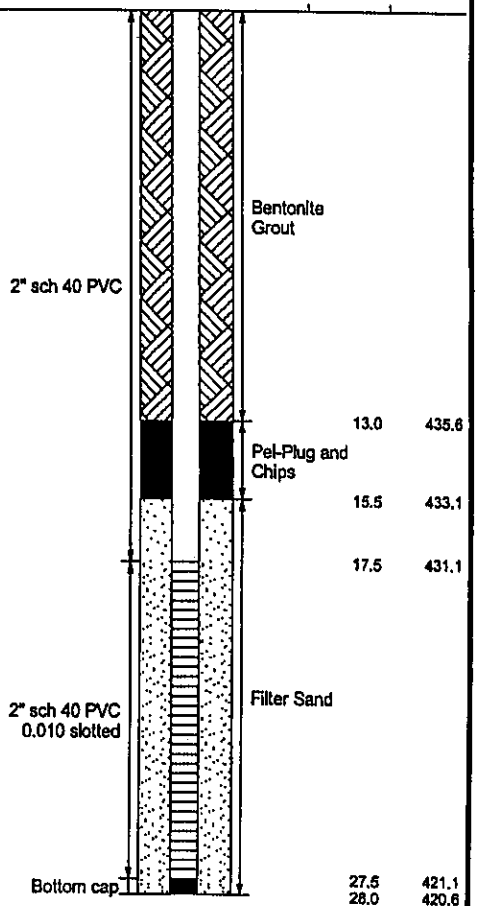
Project No. J017150.01

Surface Elevation: 448.55
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.570556

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained SAND - SP		0-3-4	SS1
			3-4-6	SS2
5			2-3-1	SS3
			2-2-2	SS4
			3-3-5	SS5
10			4-5-6	SS6
			1-3-3	SS7
			1-2-3	SS8
15			4-6-7	SS9
	Brown, medium grained SAND - SP ▽		4-3-4	SS10
			1-2-2	SS11
20				
	Blind drilled - heaving sands			
25				
	Boring terminated at 28 feet.			
30				
35				

WELL DIAGRAM

Stickup = 3.3 ft
Diameter: 8 1/2 inch



GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-6

Project No. J024917.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

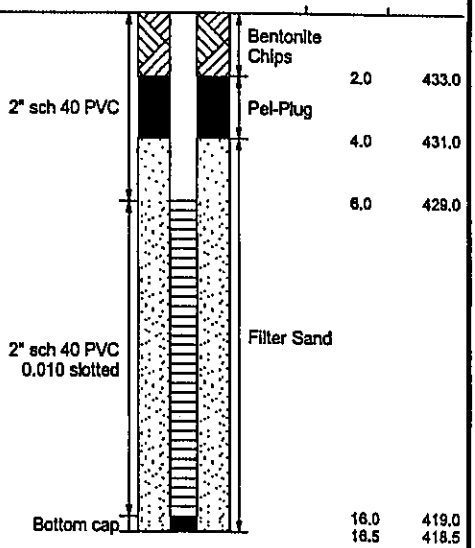
LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/10

Surface Elevation: 435.03
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.573333

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Black, silty CLAY - CL		2-4-3	SS1
	Brown, silty CLAY - CL		2-3-4	SS2
5			1-2-1	SS3
	Brown, fine grained SAND - SP		1-1-1	SS4
			0-0-1	SS5
10	Blind drilled - heaving sands			
15				
	Boring terminated at 17 feet.			
20				
25				
30				
35				

WELL DIAGRAM

Stickup = 3.7 ft
Diameter: 8 1/2 Inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 6 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by: AWS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5-/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-7

Project No. J024917.01

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ GO CLONE ME.GPJ 12/29/10

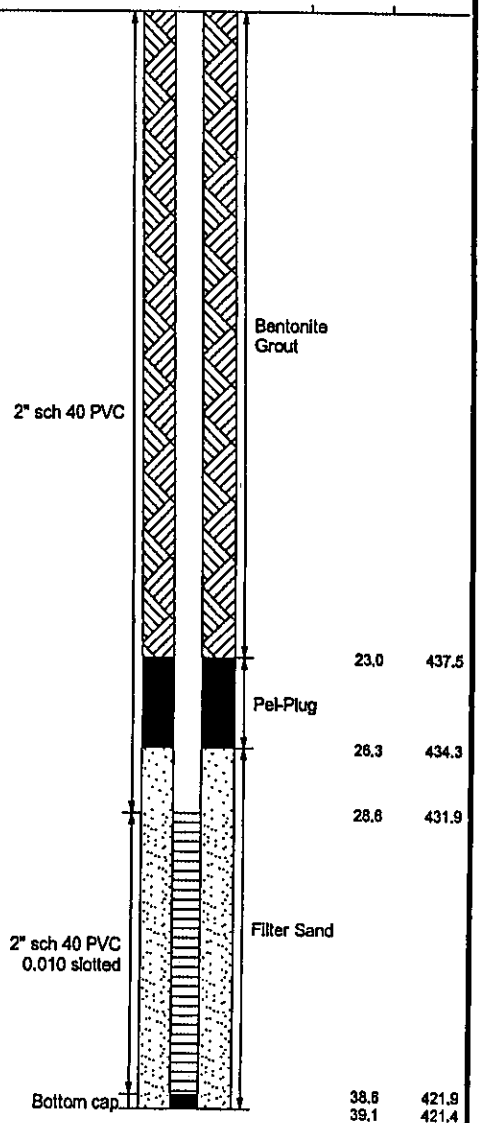
Surface Elevation: 460.54
Datum: _____

Completion Date: 10/1/2015
Latitude: 39.818611
Longitude: -90.5697222

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained, poorly graded SAND - SP		3-9-9	SS1
			7-11-12	SS2
5			3-4-5	SS3
			2-3-3	SS4
			2-3-4	SS5
10			2-3-5	SS6
			3-5-9	SS7
			5-7-7	SS8
15			5-7-8	SS9
			5-7-8	SS10
			9-15-16	SS11
20			7-12-13	SS12
			8-13-14	SS13
			9-10-11	SS14
25	Brown, medium grained, poorly graded SAND - SP		6-6-9	SS15
			5-8-9	SS16
30			4-5-6	SS17
	Blind drilled - heaving sands			
35				
40	Boring terminated at 40 feet.			

WELL DIAGRAM

Stickup = 3.4 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

GROUNDWATER DATA

ENCOUNTERED AT 32 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: MC	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-8

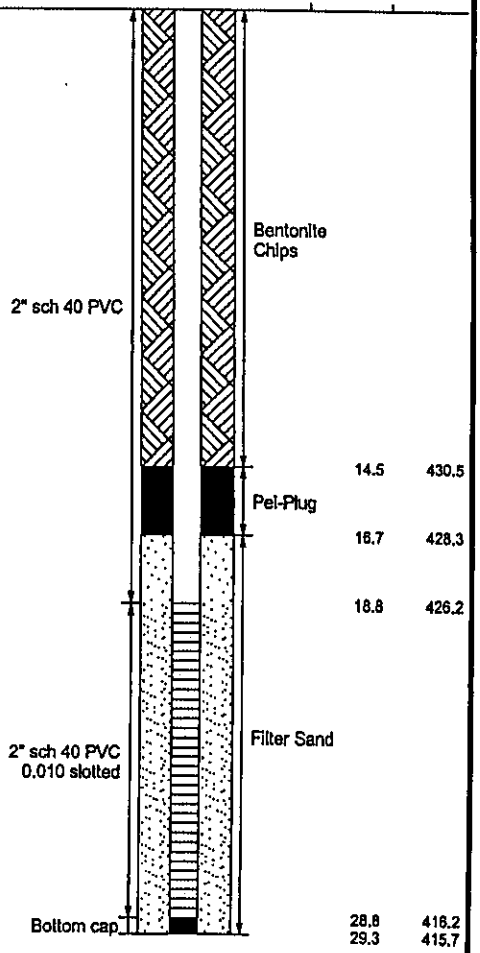
Project No. J024917.01

Surface Elevation: 444.97
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.821388
Longitude: -90.569722

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: black, silty sand with coal CCR		4-3-2	SS1
			2-3-3	SS2
5			3-8-8	SS3
			2-4-1	SS4
			2-3-10	SS5
10	Gray SILT - ML		4-3-2	SS6
	Brown, fine grained SAND - SP		5-6-5	SS7
15			3-4-3	SS8
			3-3-4	SS9
	Brown, medium grained SAND - SP		3-3-4	SS10
20	▽		1-2-1	SS11
			2-2-4	SS12
	Blind drilled - heaving sands			
25				
30	Boring terminated at 30 feet.			
35				

WELL DIAGRAM

Stickup = 3.1 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/00

GROUNDWATER DATA

ENCOUNTERED AT 20 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:
CCR = Coal Combustion Residuals

Drawn by: AGB	Checked by: [illegible]	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-9

Project No. J024917.01

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APPENDIX B

GROUNDWATER SAMPLING PROTOCOL

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Appendix B – Groundwater Sampling Procedure

The following procedure shall be used in sampling groundwater at the site. This sampling procedure applies to the routine quarterly and/or modified semi-annual or annual sampling events. A groundwater sampling field data sheet, comparable to the example located in Exhibit B-1, may be used to document the sampling activities at each well. If site conditions at the time of sampling could influence the results, sampling should be postponed until a later date. However, under no circumstances shall the sampling deviate from the schedule in Section 3.1.

To ensure samples are identified and collected at the correct location, monitoring wells should be marked with the monitoring identification designated in the groundwater monitoring program. Brass monument tags with the well identification stamped into the metal shall be installed on each well.

Wells must have permanently marked reference points from which groundwater levels and well depths will be measured. Elevations of reference points must be established relative to the *North American Vertical Datum of 1929 or 1983*, whichever is available. All sampling points should use the same datum.

Upgradient wells should be sampled first to avoid cross contamination. In general, this procedure is intended to sample the least potentially contaminated monitoring point first, and subsequently sample all other monitoring points with increasing contamination potentials.

The three principal steps in collecting groundwater samples from monitoring wells are measuring static groundwater levels; evacuating or purging well bores and casings; and collecting and preserving samples. Each step must be performed consistently from well to well, and from one sampling event to the next if accurate data and representative samples are to be obtained.

General Procedures

The date, time, ambient air temperature, general weather conditions, and individuals present, including sample team members and any observers shall be recorded on the groundwater sampling sheet for each well. The sampling equipment and containers should be stored so that contact with the ground surface is minimized.

All parts of sampling equipment coming in contact with groundwater must be thoroughly washed with a non-phosphate detergent and triple rinsed with deionized or distilled water before use. Decontamination shall be conducted initially upon arrival at the site and after each monitoring well has been sampled. Sampling equipment shall be calibrated in accordance to the manufacturer's specifications at the start of each day or as required by the manufacturer.

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Water Level Gauging

Static elevations of groundwater should be measured prior to purging each well. Initially, depths to static groundwater levels should be measured from the specified reference point of each well during each sampling event in order to calculate the initial groundwater volume. Groundwater elevations in wells are obtained by subtracting measured depths to groundwater from the specified reference point elevation. Water levels at all monitoring wells should be collected on the same day to prevent time distortion of the water surface data.

Monitoring well depths should be measured as the distance from the reference point to the well bottom. Record these depths at each sampling event after low-flow purging. A decrease in well depth, from the known installed total depth, may indicate that sediments have been deposited in the well. If accumulated sediment obstructs approximately 10 percent of the screened interval length, then the well should be redeveloped.

The most common device used to measure well depth and groundwater level is an electronic water level meter. Electronic water level meters are battery-powered devices with a probe that is lowered into the well until an audible signal and/or light indicates contact with the water surface has been made.

The difference between installed total well depth and depth to static groundwater level is the stabilized height of the groundwater column in the well. Accumulated sediment is not subtracted when calculating the volume of groundwater in the well, resulting in a greater and more conservative estimate of purge volume. These measurements are used to determine the static well volume (in gallons) of groundwater for each well as follows:

1. In order to obtain the height (H) of the groundwater column, measure the well total depth (TD) and subtract the measured depth to static water level (MSD)

$$H = TD - MSD$$

2. Use the following formula to calculate the static well volume (in gallons) of groundwater:

$$V = 5.875 \times D^2 \times H$$

Where:
V = Well volume (gallons)
D = Inside well diameter (feet)
H = Height of groundwater column (feet)

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Monitoring Well Purging – Pump Method

Low flow sampling methods will be used to obtain representative samples from the groundwater bearing zone being monitored in wells that demonstrate consistent and sufficient yields. A dedicated pumping device installed permanently in the well or a portable pumping device will be used to conduct low flow sampling. The pump intake must be near the middle of the well screen. Pumping flow rates must be less than natural recovery rate of the well generally less than 0.5 liters per minute. The goal is to minimize drawdown in the well. Drawdown is limited to less than 0.3 feet or 10% of the total water column. Continuous monitoring of water level and water quality indicator parameters for stabilization will be obtained during purging.

Indicator parameters for stabilization will begin to be obtained after one equivalent volume of tubing has been removed from the well. For this facility, the following parameters and stabilization requirements are:

- pH ± 0.05 S.U.
- temperature ± 0.5°F
- specific conductivity ± 5%
- dissolved oxygen ± 10% (optional)
- redox potential ± 10% (optional)
- turbidity ± 10% (optional)

Samples should be directly placed into the appropriate laboratory containers and handled according to the Sample Handling section and laboratory protocols. If a well is dry or exhibits slow recharge, the well will be allowed to recharge for a minimum of 12 hours. Samples shall be collected until all sample containers have been filled or the well becomes dry. The sampling conditions including dry well conditions shall be documented on the groundwater sampling field data sheet.

Monitoring Well Purging – Bailer Method

Bailers shall only be used for sample collection in the event of a non-functioning pump. Only new, disposable bailers with new string attached shall be used for sampling. Stabilization indicator parameter readings will be collected at each 0.5 gallon interval until stabilization is achieved in accordance with the Low Flow sampling method described above. Well volumes will be calculated in accordance with well gauging formulas described above.

Sample Collection Procedures

Sample handling and preservation techniques depend on the parameters to be analyzed. Groundwater samples should be collected, preserved and containerized in their order of sensitivity to volatilization (most sensitive to least sensitive). The purpose of sample preservation is to stabilize parameters of interest by retarding chemical or biological changes. Methods of preservation are generally limited to pH adjustment, chemical addition and cooling.

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Samples requiring preservation should be preserved immediately upon collection or be placed in sealed containers with preservative added by the laboratory. Proper preservation will help ensure that samples are representative of groundwater.

Every sample must be cooled to 4° C (approximately 39° F) immediately after being containerized and preserved. Every sample must also be maintained at 4° C until analyzed. Laboratory protocol regarding appropriate containers, preservatives, and holding times should be followed.

Groundwater samples that are to be analyzed for total recoverable metals must not be field filtered. However, if dissolved metals analyses are required, then the samples must either be field filtered through a 0.45-micron filter immediately upon collection and prior to preservation and transport to a laboratory or filtered by the laboratory upon receipt.

Field measurements for the indicator parameters of pH, temperature and specific conductivity should be taken on a portion of the sample that has been placed in a separate clean container that will not be analyzed for any other parameters. This procedure avoids cross contamination from field instrument probes.

Sample Documentation and Transportation

Before samples are transported to the laboratory, a chain-of-custody record shall be provided. Chain-of-custody records document in a legally defensible manner the history of collection, transfer and transport of each sample. Every individual, who is responsible for the samples from the time of collection to the time they are received by a laboratory, must be documented in the Chain-of-Custody record. The Chain-of-Custody document records allow tracing the possession and handling of individual samples from the time of field collection through the time of laboratory analyses. The sample labels shall be completed in indelible ink and sample seals (if required) should be applied to each container prior to packing and shipment. Samples shall be transported to the laboratory in sealed, insulated shipping containers, ice chests, or coolers. The samples should be shipped/delivered to the laboratory as soon as practical, preferably within 24 hours of sample collection.

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GEOTECHNOLOGY, INC. ENGINEERING AND ENVIRONMENTAL SERVICES ST LOUIS • COLLINSVILLE	GROUNDWATER SAMPLING FIELD DATA SHEET Project No:

WELL NUMBER		PROJECT:

Personnel _____ Date _____ Weather _____

WELL DATA

Depth to water (pre-purge):		Condition of Well	Yes	No
Depth to water (post-sample):		Is well easily accessible?		
Total drawdown (ft).		Is well clearly labeled?		
Total well depth (ft):		Is protective casing in good		
Water column (ft):		Is PVC casing in good condition?		
Casing diameter inches:		Is padlock present? Locked?		
Depth to top of screen (ft):		Any obstruction or kinks in well?		
Casing volume (liters):		Is concrete pad intact?		
Tubing volume (liters)		Weep hole adequately drain well		
Method of purging:		Does well have protective posts?		
Purge rate (liters/min):		Purge Equipment?		
Purging time:		Was flow through cell used?		
Vol. purged (liters):		Instruments calibrated?		

FIELD PARAMETERS

Purge vol (L)	Sample Time	pH (SU)	Temp (°C)	Dissolved Oxygen (mg/L)	Spec. Cond. (S/m)	Turbidity NTU	ORP mV

SAMPLE DATA

Sample Date	
Time:	
Pumping rate (liters/min):	
Sample appearance:	

Observations:	1 gallon = 3.8 liters Tubing volume 1/4 ID inch = 0.0094 liters/foot 2" well volume = 0.6 liters/foot

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APPENDIX C

LABORATORY QUALITY ASSURANCE MANUAL

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BOW REFERENCE SHEET --- SAME FACILITY

Facility Number:	**W1370300005**
Facility Name:	**Ameren Energy - Meredosia**
USEPA Number:	
File Category:	**06L – Groundwater Closure**

FOR ADDITIONAL INFORMATION ON THIS, SEE CATEGORY UNDER THIS SAME FILE HEADING:	**06L – Groundwater Closure** **(CD)**

DATE OF OTHER DOCUMENT	DESCRIPTION OF OTHER DOCUMENT:
08/22/2016	**Closure Plan – Fly Ash Pond and Bottom Ash Pond**
	CD: Teklab QA Manual

IEPA-DIVISION OF RECORDS MANAGEMENT
RELEASABLE

AUG 18 2017

REVIEWER: JKS

ATTACHMENT C

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GROUNDWATER MANAGEMENT ZONE PLAN
FLY ASH AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 15, 2016

J024917.01

GROUNDWATER MANAGEMENT ZONE PLAN
FLY ASH AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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ATTACHMENTS

	Attachment
Confirmation of Corrective Action Form	1
Groundwater Sampling Procedures	2
Laboratory Quality Assurance Program	3

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GROUNDWATER MANAGEMENT ZONE PLAN
FLY ASH AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

1.0 INTRODUCTION

The Meredosia Power Station in Morgan County, Illinois is owned by AmerenEnergy Medina Valley Cogen, LLC and operated by the Ameren Energy Generating Company from 1948 to 2011, when the power station was closed. The Meredosia Power Station has three coal combustion residual impoundments including: the Bottom Ash Pond, the Fly Ash Pond and the Old Ash Pond. The Old Ash Pond was previously closed. The ash ponds were reportedly constructed of native materials and do not have bottom liners.

The Bottom Ash Pond was constructed in 1972 with a current surface area of approximately 14.8 acres. The Bottom Ash Pond received low-volume wastewater, bottom ash and storm water runoff. The Fly Ash Pond was constructed in 1968 with a current surface area of approximately 44.8 acres. The Fly Ash Pond reportedly received fly ash, low-volume wastewater and storm water runoff.

This document comprises the plan to establish a Groundwater Management Zone (GMZ) for the Meredosia Power Station in accordance with 35 Illinois Administrative Code (IAC) Part 620.250. This GMZ plan includes Parts I, II, and III of the 35 IAC Part 620.250(a)(2) Illinois Bureau of Land Management Confirmation of Adequate Corrective Action forms which are included in Attachment 1. Some of the information contained in this plan was obtained from the April 2016 Hydrogeologic Assessment Report[1] and the Groundwater Monitoring Plan[2] (GMP). The four on-site water supply wells identified in the Hydrogeologic Assessment report will be abandoned during planned demolition activities that are scheduled to occur in 2016-2018. The four on-site water supply wells should not be considered when assessing the adequacy of this GMZ request.

---

[1] *Hydrogeologic Assessment Report, Fly Ash and Bottom Ash Ponds Meredosia Power Station, Meredosia, Illinois;* prepared for Ameren Energy Medina Valley Cogen, LLC; prepared by Geotechnology, Inc.; Report No. J024917.01, dated April 2016.

[2] *Groundwater Management Plan, Fly Ash and Bottom Ash Ponds Meredosia Power Station, Meredosia, Illinois;* prepared for Ameren Energy Medina Valley Cogen, LLC; prepared by Geotechnology, Inc.; Report No. J024917.01, dated April 2016.

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Sections 2.0 through 6.0 below contain the text of the requirements specified in the Confirmation of Corrective Action forms in italics followed by the required information and/or response.

2.0 GENERAL FACILITY INFORMATION

a. Facility Name

The facility name is the Meredosia Power Station.

b. Facility Address

The facility address is 800 South Washington Street, Meredosia, Illinois 62665.

c. County in which facility is located

The facility is located in Morgan County, Illinois.

d. Illinois EPA, Bureau of Land, and USEPA Identification Numbers

The Illinois Bureau of Land identification number is 1370305002. The United States Environmental Protection Agency (USEPA) identification number is ILD065236226.

e. A general description of the type of industry, products manufactured, raw materials used, location and size of the facility, including SIC codes

The Meredosia Power Station was a coal-fired electricity-generating power plant. Coal was shipped by rail and barge to the facility, burned, and the CCR deposited on-site in storage ponds. The Bottom Ash Pond was constructed in 1972 with a current surface area of approximately 14.8 acres. The Bottom Ash Pond received low-volume wastewater, bottom ash and storm water runoff. The Fly Ash Pond was constructed in 1968 with a current surface area of approximately 44.8 acres. The Fly Ash Pond reportedly received fly ash, low-volume wastewater and storm water runoff. The SIC code for the facility is 4911.

f. An identification of special units (operating or closed) present at the facility for which the GMZ is proposed

The Bottom Ash Pond and the Fly Ash Pond are the units for which the GMZ is proposed. Due to their proximity and relative positioning on the site, the two ash ponds will be treated as a single unit for purposes of groundwater monitoring and this GMZ.

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g. A USGS topographic or county map showing the location of the site and a more detailed scaled map of the facility with each waste management unit identified in Item 2.0 (f) above. Map scale must be specific and the location of the facility must be provided with respect to Township, Section, and Range.

A United States Geologic Survey (USGS) topographic map with the site location is attached in Plate 1. A scaled site plan of the facility including the surveyed area of the proposed aerial extent of the GMZ is included in Plate 2. The ash ponds are located in the south half of Section 21 and the north half of Section 28, Township 16 North, Range 13 West.

h. A description of the geology and hydrogeology within the proposed GMZ and the surrounding area

The following is a summary of the information provided in the Hydrogeologic Assessment Report.

The Meredosia Power Station is located near the western edge of the Springfield Plain Subsection of the Till Plains Section, Central Lowland Province, Interior Plains Physiographic Region. The Interior Plains Physiographic Region extends across the Laurentian craton of central North America. It is comprised of the Great Plains and Central Lowland Provinces. The Central Lowlands Province to the east formed from eroded sediments from the topographically-higher Great Plains Province to the west.

Bedrock Stratigraphy. The Meredosia Power Station and surrounding areas within the Illinois River valley are underlain by Mississippian System bedrock of the Lower Valmeyeran Series which consists of the Meppen Limestone, Fern Glen formation, and the Burlington-Keokuk Limestone (Kolata, 2005).

Willman et al. (1975) describe the Meppen Limestone as a tan or buff, very fine-grained dolomitic limestone or calcareous dolomite. The formation is slightly crinoidal and contains calcite geodes up to 2-inches in diameter. The maximum thickness of this formation is approximately 22 feet. The Fern Glen formation consists of calcareous shale, limestone, and dolomite. Dolomitic portions of the formation are partially argillaceous. The limestone portions of the formation contain nodules of greenish-gray chert. The thickness of the formation can range from approximately 50 to 100 feet. The Burlington formation of the Burlington-Keokuk Limestone is described as a "very pure, coarsely crystalline, crinoidal, light gray limestone in medium to thick beds." The Burlington formation also contains beds of fine-grained, brownish-gray, dolomitic limestone. The formation is approximately 100 to 150 feet thick in Illinois. The Keokuk formation of the Burlington-Keokuk Limestone is composed of beds of fossiliferous, crinoidal limestone interbedded with fine-grained limestone, argillaceous dolomite, and calcareous gray shale. The Keokuk formation is approximately 60 to 80 feet thick in Illinois.

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Surficial Geology. The Meredosia Power Station is situated within the Illinois River valley. The overburden soils consist of channel and floodplain deposits of the Cahokia formation underlain by glacial outwash deposits belonging to the Henry formation. Fine-grained lacustrine deposits of the Equality formation are present in the subsurface, but are discontinuous. These formations occur throughout Illinois in valley bottoms and floodplains as channel deposits in present-day rivers and streams.

The Cahokia Alluvium consists mainly of poorly-sorted silt, clay, and silty sand, but locally contains lenses of sand and gravel. The upper part consists of overbank silt and clays. The lower portion consists of coarse-textured sand and lateral accretion deposits. The Cahokia formation may be up to 20 feet thick in the area of the Meredosia Power Station (Berg and Kempton, 1987).

The Henry formation consists of glacial sand and gravel outwash. The Henry formation is subdivided into three members that differ in lithology: the Batavia Member (outwash plains), the Mackinaw Member (valley trains), and the Wasco Member (ice-contact deposits) (Willman and Frye, 1970; Willman et al., 1975). Based on information from well logs, the thickness of the Henry formation ranges from 60 to 84 feet in the area of the Meredosia Power Station.

The Equality formation consists of bedded silt and clay deposits in glacial and post-glacial lakes. Gravel, sand, and organic deposits occur in lenses that intertongue with the Henry formation. In the area of the Meredosia Power Station, the Equality formation overlies the Henry formation and generally occurs as lenses or patches not exceeding 20 feet thick.

Subsurface Conditions. Geotechnology has conducted subsurface explorations of the overburden soils at the Meredosia Power Station. The subsurface exploration and laboratory testing efforts are discussed further in the Hydrogeologic Assessment Report and the following is a summary of the site conditions.

Native soils consisting of brown and gray, very soft to medium stiff, silt and clay were encountered below the fill in Boring B-1 and Monitoring Well APW-9, and at the ground surface in Boring B-5. Native soils consisting of black, clayey sand with trace gravel were encountered below the fill in Boring B-2.

A stratum of very soft to medium stiff, brown, black, and gray clay with traces of sand and wood was encountered below the fill in Borings B-3 and B-8, below the native soils in Borings B-1, B-2, and B-5, and at the ground surface in Borings B-4, B-9, APW-2, APW-3, APW-4, and APW-7. This soil stratum ranged in thickness from approximately 8 to 17 feet bls.

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The clay layer described above was underlain by a stratum of granular and cohesive alluvial soils (except for Boring APW-4). The granular alluvium generally consisted of loose, gray, clayey sand with gravel. The cohesive alluvium generally consisted of very soft to medium stiff, gray and brown, clayey silt, silty clay, and sandy clay. This soil stratum ranges in thickness from approximately 5 to 11 feet bls in borings where it is encountered.

Alluvium was encountered below the fill soils in Borings B-6 and B-7, and at the ground surface in Boring B-10 and Monitoring Wells APW-6 and APW-8. This stratum is interpreted as alluvium placed in a buried valley that had been cut down through the soil stratum described above. The granular portions of this alluvium infill generally consisted of very loose, gray, silty sand. The cohesive portions generally consisted of very soft to very stiff, gray, silty clay with sand and silt seams. This soil stratum was at least 28 feet thick where encountered.

The native soils described above are interpreted as belonging to the Cahokia Alluvium, and were underlain by sand deposits interpreted as belonging to the Henry formation. Generalized east-west and north-south subsurface profiles based on the soil boring data at the Meredosia Power Station.

Surface Water. The major surface water body in the vicinity of the Meredosia Power Station is the Illinois River, which flows from the north-northeast to the south-southwest, and borders the west side of the site. The normal pool elevation of the Illinois River is approximately 421.0 feet[3]. Information from the U.S. Army Corps of Engineers indicates the Illinois River flood stage is 435.0 feet above mean sea level (MSL). The record high stage was 446.69 feet above MSL on May 26, 1943, and the record low stage was 418.40 feet above MSL on January 11, 1940.

Meredosia Lake is approximately 1.5 miles north of the Meredosia Power Station. Smith Lake is located approximately 1-mile south of the site. Westerly-flowing streams drain the uplands east of the site to the Illinois River located west of the site.

Groundwater Flow. Based on the monitoring well gauging data, the groundwater flow direction at the Meredosia Power Station is to the west-northwest toward the Illinois River. Groundwater flow direction may be influenced by the stage of the Illinois River.

i. Groundwater classification at the site

Groundwater at the site is classified as Class I Groundwater per 35 Illinois Administrative Code (IAC) Part 620.

[3] Elevations herein refer to the mean sea level datum in feet (msl-ft).

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j. A description of the circumstances under which the release from each waste management unit identified in Item 2.0 (f) above, to groundwater was identified

Five groundwater wells were installed near the facility Fly Ash and Bottom Ash Ponds at the request of the IEPA in 2010. A release was detected during routine groundwater monitoring at the site.

3.0 RELEASE INFORMATION

a. The chemical constituents released to groundwater

The analytical results from 11 groundwater sampling and testing events were compared to the Illinois Class I groundwater standards. Boron, arsenic, iron, manganese, and sulfate were identified in at least one sampling event as exceeding the Class I groundwater standards. Changes of oxidation/reduction (redox) potential in the subsurface due to fluctuations in pH make evaluation of manganese and iron concentrations unreliable at this facility. Comparison of manganese and iron to the respective Class I groundwater standard may be inappropriate for this site.

The chemical constituents released to groundwater are described in detail in the Hydrogeologic Assessment Report. In summary, boron is the chemical constituents of concern due to the extent of impacts. These are consistent with typical CCR residual releases.

b. Identification of the chemical constituents detected in groundwater that are above the applicable standard in 35 Ill. Adm. Code Part 620

The analytical results from 11 groundwater sampling and testing events were compared to the Illinois Class I groundwater standards. As of the February 2016 sampling event, the boron concentration exceeded the Class I groundwater standard (2 ppm) in Monitoring Wells APW-2, APW-3, APW-8, and APW-9. As of the February 2016 sampling event, the arsenic concentration exceeded the Class I groundwater standard in Monitoring Well APW-3. Concentrations of manganese exceeded the Class I groundwater standard in Monitoring Wells APW-2, APW-3, and APW-4. Historical concentrations of iron exceeded the Class I groundwater standards in Monitoring Wells APW-3 and APW-4, but the February 2016 results are below the Class I groundwater standard. A single event anomaly associated with flooding in February 2016 resulted in the concentration of sulfate in Monitoring Well APW-9 being above the Class I groundwater standard. Changes of oxidation/reduction (redox) potential in the subsurface due to fluctuations in pH make evaluation of manganese and iron concentrations unreliable at this facility. Comparison of manganese and iron to the respective Class I groundwater standard may be inappropriate for this site.

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c. *A description of how the site has been investigated to determine the source or sources of the release*

A detailed description of site investigation activities to date is included in the Hydrogeologic Assessment Report. A summary of the site investigation activities follows.

From October 19 through October 26, 2010, Geotechnology advanced 15 borings at the Meredosia Power Station. Ten of the borings (B-1 through B-10) were drilled in support of a global stability evaluation, while the remaining five borings were completed as Monitoring Wells APW-1 through APW-5 in support of groundwater monitoring activities. The borings were drilled to depths ranging from 25 to 60 feet below land surface (bls). Standard Penetration Tests (SPT) were performed using an automatic hammer and split spoon sampler.

From September 28 through October 1, 2015, Geotechnology advanced four additional borings at the site. The borings were drilled to depths ranging from 17 to 40 feet bls. SPTs were performed using an automatic hammer and split spoon sampler. Monitoring Wells APW-6 through APW-9 were installed in the borings in support of ongoing groundwater monitoring activities.

d. *A description of the groundwater monitoring network and groundwater sampling protocols in place at the facility*

Groundwater samples will be obtained from existing groundwater monitoring wells (APW-1 through APW-9). If additional wells are constructed in the future, the construction, sampling, and analysis methods described in the Groundwater Monitoring Plan will apply to those monitoring wells. Monitoring wells have a well identification number with an "APW" identifier, followed by a 1-, 2-, or 3-place alpha-numeric designation. The approximate locations of the monitoring wells are included on Plate 2. The monitoring program generally follows 35 IAC 620 by satisfying the following standards for the monitoring system:

- The monitoring wells are sufficiently located to represent the quality of groundwater at the compliance point(s);
- The monitoring wells are located within the stratigraphic unit(s) that may serve as potential contaminant migration pathways;
- The groundwater monitoring wells are secure; and,
- Monitoring wells are installed to evaluate on-site and off-site groundwater quality.

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The groundwater sampling protocols are provided in Appendix B of the Groundwater Monitoring Plan and a copy has been provided in Appendix B of this plan.

e. The schedule for monitoring of the groundwater

Groundwater monitoring events are anticipated to be conducted quarterly until trend analysis indicates less frequent monitoring is acceptable.

Five years after approval of the CQA Acceptance Report, a request may be made to modify the post-closure care plan to reduce the frequency of groundwater monitoring to semi-annual sampling by demonstrating the following:

- Monitoring effectiveness will not be compromised by the reduced frequency of monitoring;
- Adequate data has been collected to characterize groundwater; and
- Concentrations of constituents monitored at the downgradient boundaries do not demonstrate statistically significant increasing trends that can be attributed to the former ash ponds.

Five years after reducing the monitoring frequency to semi-annual, a request may be made to modify the post-closure care plan to reduce monitoring frequency to annual sampling by demonstrating the same items above as for the reduction to semi-annual monitoring.

Groundwater monitoring may be discontinued when the IEPA approves the post-closure care completion report. This occurs after statistically significant increasing trends are not detected for five (5) consecutive years after changing to an annual monitoring frequency.

4.0 PROPOSED GMZ BOUNDARIES

The horizontal boundaries of the proposed GMZ are illustrated on Plate 2. The vertical component of the proposed GMZ will extend to 60 feet below the ground surface within the horizontal boundaries of the GMZ, concurrent with the bottom of the Henry Formation at the site.

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5.0 APPROVED REMEDIAL ACTION INFORMATION

a. A description of the approved remedial action

The remedial action for the facility is the relocation and clean closing of the east ash storage pile, capping of the Fly Ash Pond, and the partial clean closure and capping of the Bottom Ash Pond. The Bottom Ash Pond will be closed by the removal of most coal combustion residuals (CCR) to the Fly Ash Pond. The remaining CCR under the roadway and pipeline will be capped in-place. Because the groundwater contamination is a result of leaching inorganics from the CCR, this will effectively remove the majority of the contamination source material from the Bottom Ash Pond, and protect the remaining material from storm water infiltration.

The Fly Ash Pond will be closed by the installation of a cap. A capped closure will redirect precipitation that may otherwise pass through the CCR. The capped closure will reduce further leaching of inorganics into the groundwater.

b. A description of how the approved remedial action has impacted the release

It is anticipated that the closure of the ash ponds will reduce the concentrations of contaminants below the Illinois Class I groundwater standards in approximately 3 years after dewatering and closure. This is based on the general reduction of chemicals in groundwater since the plant was closed and modeling of the cap system using the HELP model, MODFLOW and MT3DMS models, and river concentration calculations. The remedial action will occur concurrently with the implementation of this proposed GMZ.

c. A description of how the approved remedial action is operated and maintained

Subject to IEPA approval, the remedial action is the closure of the Bottom Ash Pond and the Fly Ash Pond. Proposed ash pond closure activities include reducing the aerial extent of the Fly Ash Pond to 41.9 acres, moving approximately 12.3 acres of the Bottom Ash Pond to the Fly Ash Pond, grading the ash for storm water runoff, installing ClosureTurf (meets the performance requirements of Subtitle D) cover over the 41.9 acres of the Fly Ash Pond and the 2.5 acres of Bottom Ash Pond that is being closed-in-place. These activities will address the source of the impacts by directing storm water away from the CCR and reduce future infiltration of impacted water into the groundwater.

d. A projected schedule for completion of remediation

The completion of remediation activities are anticipated to be performed during the 2016 and 2017 construction seasons. Groundwater monitoring will continue in accordance with the schedule described in Section 3.0(e).

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e. An identification of any and all permits obtained from the Illinois EPA for the remedial action

An NPDES permit is pending renewal.

f. A description of how groundwater at the facility will be monitored following the future completion of the remedy to ensure that the groundwater quality standards have been attained

Groundwater will be monitored using the groundwater monitoring network of nine wells described in Section 3.0(d) in the GMP.

Compliance will be demonstrated by performing an annual trend analysis for each downgradient monitoring well for the monitored constituents listed in the Groundwater Monitoring Plan that exceed the Class I groundwater standards. The analysis shall be performed on a minimum of eight (8) consecutive samples and use Sen's Estimate of Slope for compliance assessment. Generally, if analyses for a parameter show an increasing trend at a down-gradient well, a Mann-Kendall analysis must be performed at a 95% tolerance interval to assess whether the increasing trend is statistically significant. If a statistically significant increase is observed, three (3) alternative statistical methods may be applied:

1. Notification of statistically significant increasing trends and revision to the sampling frequency must be reported to the IEPA within 30 days of making the determinations.

2. If an investigation determines that the statistically significant increasing trend is due to a superseding cause then the IEPA will be notified in writing, stating the cause of the increasing trend and the rationale used in its determination.

3. If there is no superseding cause, and the monitoring frequency has been decreased to semi-annual or annual, then sampling must return to a quarterly frequency. If after four (4) consecutive quarters and no statistically significant increasing trend is observed, then sampling frequency can return to the previous frequency.

If a statistically significant increasing trend continues to be observed over two or more consecutive years and there is no superseding cause, a hydrogeologic investigation (and additional site investigation(s), if necessary) will be performed.

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g. A discussion addressing the adequacy of the controls and management of the proposed GMZ at the site

The controls and management of the GMZ are common practice in the industry and adequate to reduce the concentrations of contaminants below the Class I groundwater standards over time.

h. Course of action for future activities and/or request for modification in regards to the proposed GMZ at the site

Requests for future action or changes to the GMZ will be submitted in writing to the IEPA.

6.0 POINT OF COMPLIANCE

In any GMZ, the goal is remediation of the groundwater to the level of the standards applicable to that class of groundwater. This goal does not mean all groundwater within the GMZ must be returned to the groundwater standard. On the other hand, groundwater within the GMZ that is beyond the point of compliance as established under 35 Ill. Adm. Code part 620.505(a) is to be remediated to the level applicable to that groundwater class. However, groundwater contamination within the three-dimensional zone between the compliance point wells and the waste management unit could still exceed the applicable standards at completion of the corrective action. If this is the case, post-remediation monitoring may be necessary.

The point of compliance wells for the subject property will be APW-2 and APW-3. These wells are located adjacent to the Illinois River, and are located downgradient relative to the site. If remedial activities do not reduce the contaminant concentrations to levels below the Class I groundwater standards, a plan for post-remediation monitoring will be submitted to the IEPA.

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7.0 LICENSED PROFESSIONAL SIGNATURE/SEAL

I hereby affirm that the information and design documents contained in this groundwater management zone plan are true and accurate to the best of my knowledge and professional opinion.



Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.

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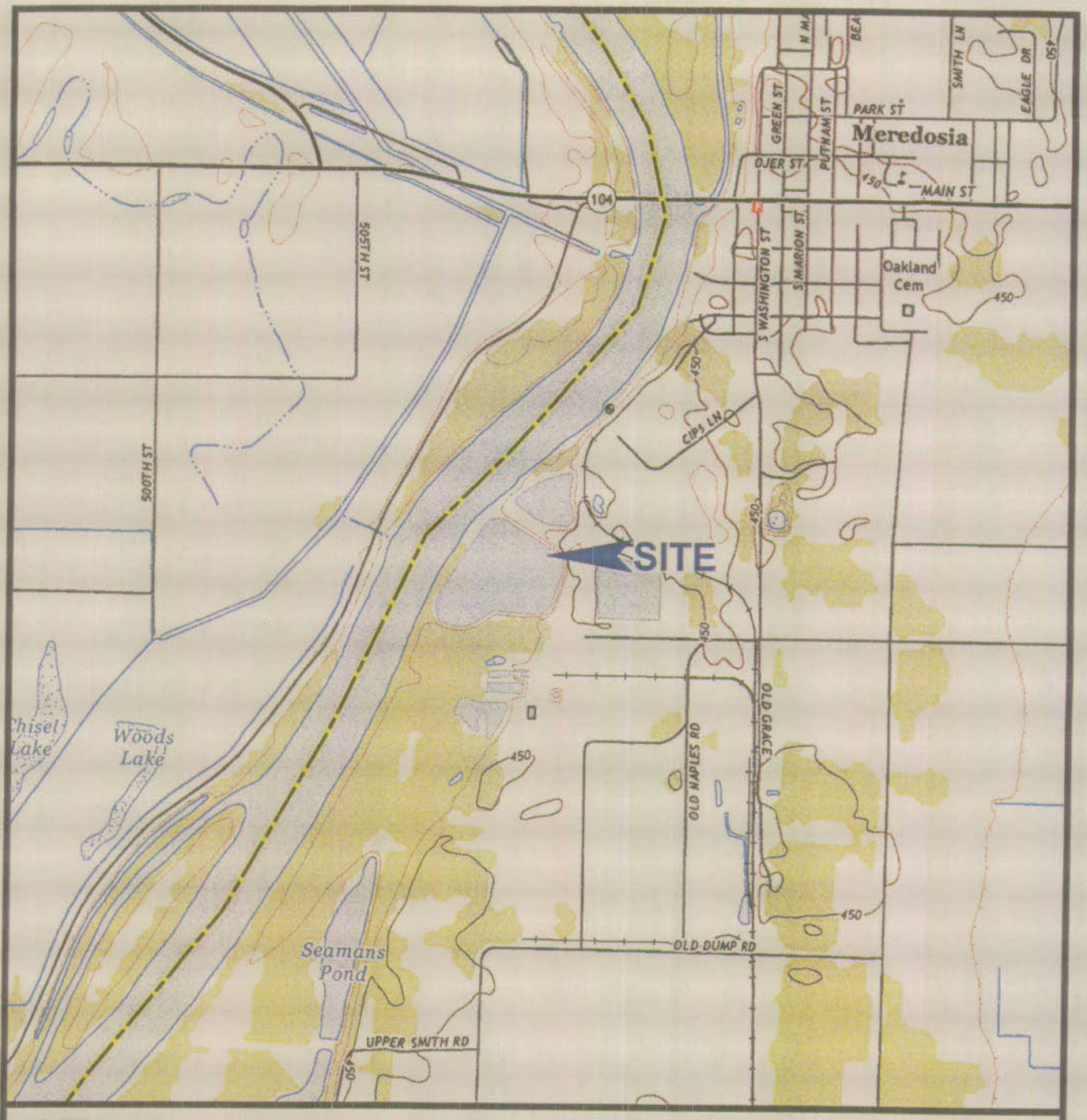

NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: MSR
Date: 2-26-16	Date: 4/21/16	Date: 4/21/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.01	PLATE 1

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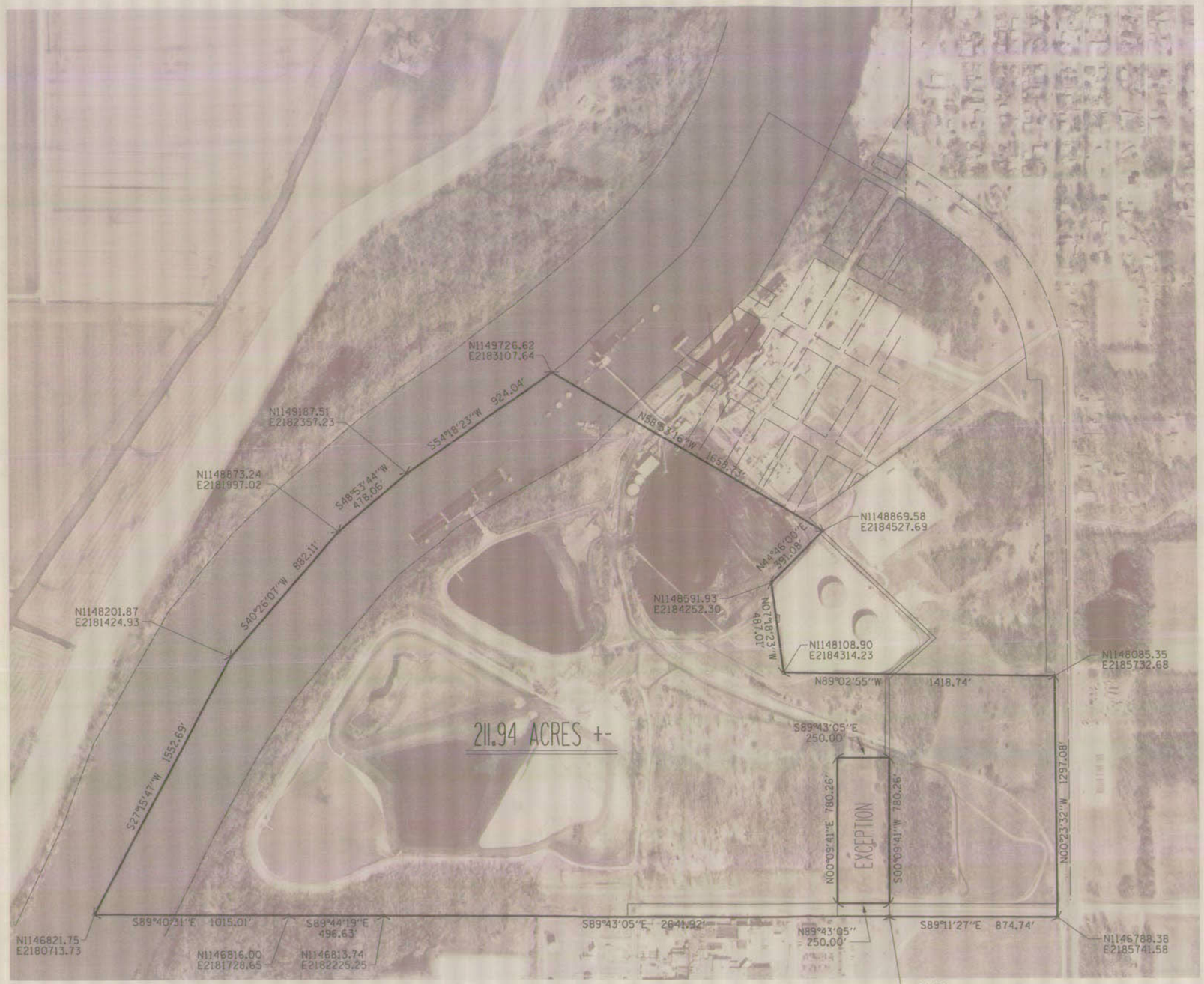

NOTE:
ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE ILLINOIS STATE PLANE COORDINATE SYSTEM, NAD83, ILLINOIS WEST ZONE.
ALL DISTANCES ARE GROUND

N

0 300 600
GRAPHIC SCALE

LEGAL DESCRIPTION

Part of the Northwest Quarter (NW 1/4) of Section Twenty-seven (27), part of the Northeast Quarter (NE 1/4) of Section Twenty-eight (28), and part of the Southeast Quarter (SE 1/4) of Section Twenty-One (21), all in Township Sixteen (16) North, Range Thirteen (13) of the Third Principal Meridian, Morgan County, Illinois, being more particularly described as follows; Beginning at the Southeast corner of the North Half (N 1/2) of the Northeast Quarter (NE 1/4) of said Section Twenty-eight (28); thence South 89°11'27" East (all bearings referenced to the Illinois State Plane Coordinate System, NAD 83, Illinois West Zone), 874.74 feet; thence North 00°23'32" West 1297.08 feet; thence North 89°02'55" West 1418.74 feet; thence North 07°18'23" West, 487.01 feet; thence North 44°46'00" East, 391.08 feet; thence North 58°53'16" West, 1658.73 feet; thence South 54°18'23" West 924.04 feet; thence South 48°53'44" West, 478.06 feet; thence South 40°26'07" West, 882.11 feet; thence South 27°15'47" West 1552.69 feet; thence South 89°40'31" East, 1015.01 feet; thence South 89°44'19" East, 496.63 feet; thence South 89°43'05" East 2641.92 feet to the point of beginning, except the following described parcel:

Part of the Northeast Quarter of Section 28, Township 16 North, Range 13 West of the Third Principal Meridian, Morgan County, Illinois, being more particularly described as follows:

Commencing at the Northeast corner of Section 28 (Southwest corner Section 22), Township 16 North, Range 13 West of the Third Principal Meridian, Morgan County, Illinois; thence South 89° 02' 55" East (basis of bearing is the Illinois State Plane Coordinate System, NAD 83, Illinois West Zone) along the South line of said Section 22, a distance of 19.06 feet; thence South 48° 18' 27" West a distance of 29.52 feet; thence North 89° 02' 55" West a distance of 19.76 feet; thence South 00° 09' 41" West a distance of 449.00 feet to the true point of beginning;

Thence continuing South 00° 09' 41" West a distance of 780.26 feet to a point on the now vacated North R.O.W. line of T.R. 59; thence North 89° 43' 05" West a distance of 250.00 feet; thence North 00° 09' 41" East a distance of 780.26 feet; thence South 89° 43' 05" East a distance of 250.00 feet to the true point of beginning.

Excepted parcel containing 4.478 acres, more or less.

Said Groundwater Management Zone tract containing 211.94 acres, more or less.

PROFESSIONAL LAND SURVEYOR
KENNETH E. STURGEON
035-003518
JACKSONVILLE ILLINOIS
STATE OF ILLINOIS

SURVEYORS STATEMENT

I, KENNETH E. STURGEON, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF ILLINOIS DO HEREBY STATE THAT THE PLAT AND DESCRIPTION SHOWN HEREON IS A TRUE AND CORRECT REPRESENTATION OF THE SURVEY MADE UNDER MY SUPERVISION.

Kenneth E. Sturgeon 8/15/16

KENNETH E. STURGEON
ILLINOIS PROFESSIONAL LAND SURVEYOR *3518
LICENSE EXPIRES 11/30/16

THIS PROFESSIONAL SERVICE CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR A BOUNDARY SURVEY.

B&A
BENTON & ASSOCIATES INC
Illinois Design Firm
Registration No. 184-000852

No.	Description	Date	Appr.

GROUND WATER MANAGEMENT ZONE
PLAT OF SURVEY
FOR
AMEREN, MEREDOSIA, ILLINOIS

BENTON & ASSOCIATES, INC.
1970 W. Lafayette Ave., Jacksonville IL 62650
(217) 245-4146 (217) 245-4149 Fax
Kirksville Missouri
Macon Illinois
Macon Missouri

Date: August 2016
Designed by: K. Sturgeon
Drawn by: S. Weber
Reviewed by: K. Sturgeon
Approved by: K. Sturgeon

Job No. 12s3250

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Sheet 1 of 2

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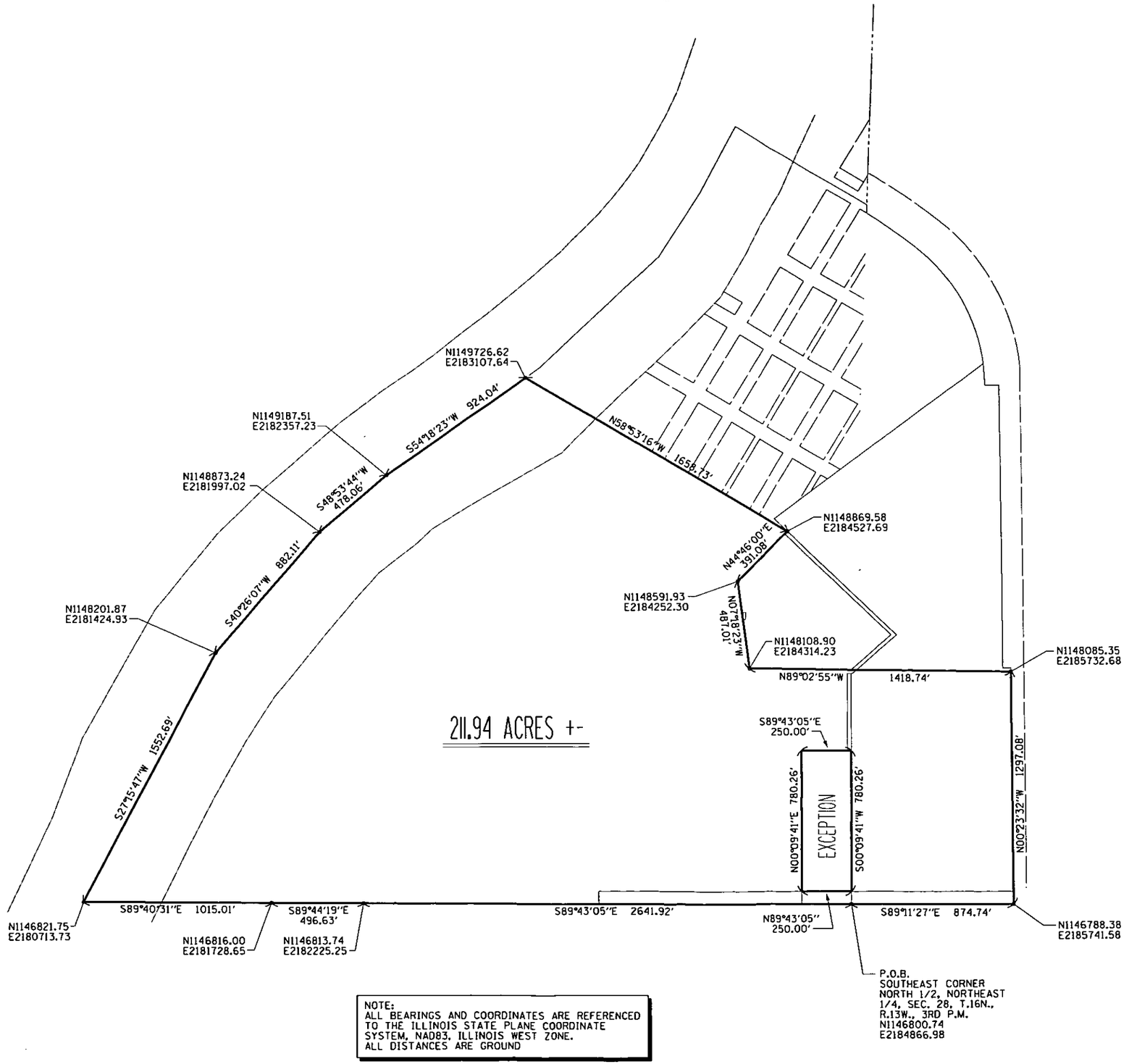

NOTE:
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GRAPHIC SCALE

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Said Groundwater Management Zone tract containing 211.94 acres, more or less.

PROFESSIONAL LAND SURVEYOR
KENNETH E. STURGEON
035-003513
JACKSONVILLE
ILLINOIS
STATE OF ILLINOIS

SURVEYORS STATEMENT

I, KENNETH E. STURGEON, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF ILLINOIS DO HEREBY STATE THAT THE PLAT AND DESCRIPTION SHOWN HEREON IS A TRUE AND CORRECT REPRESENTATION OF THE SURVEY MADE UNDER MY SUPERVISION.

Kenneth E. Sturgeon 8/15/16

KENNETH E. STURGEON
ILLINOIS PROFESSIONAL LAND SURVEYOR *3518
LICENSE EXPIRES 11/30/16

THIS PROFESSIONAL SERVICE CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR A BOUNDARY SURVEY.

BENTON & ASSOCIATES INC
Illinois Design Firm
Registration No. 184-000852

No.	Description	Date	Appr.

GROUND WATER MANAGEMENT ZONE
PLAT OF SURVEY
FOR
AMEREN, MEREDOSIA, ILLINOIS

BENTON & ASSOCIATES, INC.
1970 W. Lafayette Ave., Jacksonville IL 62650
(217) 245-4146 (217) 245-4149 Fax
Kirksville Missouri
Moberly Missouri
Macon Missouri

Date:	August 2016
Designed by:	K. Sturgeon
Drawn by:	S. Weber
Reviewed by:	K. Sturgeon
Approved by:	K. Sturgeon

Job No. 12s3250

X2

Sheet 1 of 2

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ATTACHMENT 1

CONFIRMATON OF CORRECTIVE ACTION FORM

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Joint Committee on Administrative Rules

ADMINISTRATIVE CODE

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE F: PUBLIC WATER SUPPLIES
CHAPTER I: POLLUTION CONTROL BOARD
PART 620 GROUNDWATER QUALITY
SECTION 620.APPENDIX D CONFIRMATION OF AN ADEQUATE CORRECTIVE ACTION PURSUANT TO 35 ILL. ADM. CODE 620.250(A)(2)

Section 620.APPENDIX D Confirmation of an Adequate Corrective Action Pursuant to 35 Ill. Adm. Code 620.250(a)(2)

Pursuant to 35 Ill. Adm. Code 620.250(a) if an owner or operator provides a written confirmation to the Agency that an adequate corrective action, equivalent to a corrective action process approved by the Agency, is being undertaken in a timely and appropriate manner, then a groundwater management zone may be established as a three-dimensional region containing groundwater being managed to mitigate impairment caused by the release of contaminants from a site. This document provides the form in which the written confirmation is to be submitted to the Agency.

Note 1. Parts I and II are to be submitted to IEPA at the time that the facility claims the alternative groundwater standards. Part III is to be submitted at the completion of the site investigation. At the completion of the corrective process, a final report is to be filed which includes the confirmation statement included in Part IV.

Note 2. The issuance of a permit by IEPA's Division of Air Pollution Control or Water Pollution Control for a treatment system does not imply that the Agency has approved the corrective action process.

Note 3. If the facility is conducting a cleanup of a unit which is subject to the requirements of the Resource Conservation and Recovery Act (RCRA) or the 35 Ill. Adm. Code 731 regulations for Underground Storage Tanks, this confirmation process is not applicable and cannot be used.

Note 4. If the answers to any of these questions require explanation or clarification, provide such in an attachment to this document.

Part I. Facility Information

Facility Name Meredosia Power Station

Facility Address 800 South Washington Street; Meredosia, Illinois

County Morgan

Standard Industrial Code (SIC) 4911

1. Provide a general description of the type of industry, products manufactured, raw materials used, location and size of the facility. See Section 2.0(e.) of the GMZ Plan.

2. What specific units (operating or closed) are present at the facility which are or were used to manage waste, hazardous waste, hazardous substances or petroleum?

	YES	NO
Landfill		X
Surface Impoundment	X	
Land Treatment		X
Spray Irrigation		X
Waste Pile		X
Incinerator		X
Storage Tank (above ground)		X
Storage Tank (underground)		X
Container Storage Area		X
Injection Well		X
Water Treatment Units		X
Septic Tanks		X
French Drains		X
Transfer Station		X
Other Units (please describe)		

3. Provide an extract from a USGS topographic or county map showing the location of the site and a more detailed scaled map of the facility with each waste management unit identified in Question 2 or known/suspected source clearly identified. Map scale must be specified and the location of the facility must be provided with respect to Township, Range and Section. See Section 2.0(g.) of the GMZ Plan.

4. Has the facility ever conducted operations which involved the generation, manufacture, processing, transportation, treatment, storage or handling of "hazardous substances" as defined by the Illinois Environmental Protection Act? Yes ___ No X If the answer to this question is "yes" generally describe these operations.

5. Has the facility generated, stored or treated hazardous waste as defined by the Resource Conservation and Recovery Act? Yes___ No X If the answer to this question is "yes" generally describe these operations.

6. Has the facility conducted operations which involved the processing, storage or handling of petroleum? Yes ___ No X If the answer to this question is "yes" generally describe these operations.

7. Has the facility ever held any of the following permits?

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a. Permits for any waste storage, waste treatment or waste disposal operation. Yes ___ No X If the answer to this question is "yes", identify the IEPA permit numbers.

b. Interim Status under the Resources Conservation and Recovery Act (filing of a RCRA Part A application). Yes ___ No X If the answer to this question is "yes", attach a copy of the last approved Part A application.

c. RCRA Part B Permits. Yes ___ No X If the answer to this question is "yes", identify the permit log number.

8. Has the facility ever conducted the closure of a RCRA hazardous waste management unit? Yes ___ No X

9. Have any of the following State or federal government actions taken place for a release at the facility?

a. Written notification regarding known, suspected or alleged contamination on or emanating from the property (e.g., a Notice pursuant to Section 4(q) of the Environment Protection Act)? Yes ___ No X If the to this question is "yes", identify the caption and date of issuance.

b. Consent Decree or Order under RCRA, CERCLA, EPAct Section 22.2 (State Superfund), or EPAct Section 21(f) (State RCRA). Yes ___ No X

c. If either of Items a or b were answered by checking "yes", is the notice, order or decree still in effect? Yes ___ No X

10. What groundwater classification will the facility be subject to at the completion of the remediation?

Class I X Class II ___ Class III ____ Class IV ____
If more than one Class applies, please explain.

11. Describe the circumstances which the release to groundwater was identified.
See Section 2.0(j.) of the GMZ Plan.

Based on my inquiry of those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true and accurate.

Facility Name	Signature of Owner/Operator
Location of Facility	Name of Owner/Operator
EPA Identification Number	Date

PART II: Release Information

1. Identify the chemical constituents release to the groundwater. Attach additional documents as necessary. See Section 3.0(a.) of GMZ Plan.

Chemical Description	Chemical Abstract No.
-	-
-	-
-	-

2. Describe how the site will be investigated to determine the source or sources of the release. See Section 3.0(c.) of the GMZ Plan.

3. Describe how groundwater will be monitored to determine the rate and extent of the release. See Section 3.0(d.) of the GMZ Plan.

4. Has the release been contained on-site at the facility? Yes

5. Describe the groundwater monitoring network and groundwater and soil sampling protocols in place at the facility. See Section 3.0(d.) of the GMZ Plan.

6. Provide the schedule for investigation and monitoring. See Section 3.0(e.) of the GMZ Plan.

7. Describe the laboratory quality assurance program utilized for the investigation. The laboratory quality assurance program is attached to this form.

8. Provide a summary of the results of available soil testing and groundwater monitoring associated with the release at the facility. The summary or results should provide the following information: dates of sampling; types of samples taken (soil or water); locations and depths of samples; sampling and analytical methods; analytical laboratories used; chemical constituents for which analyses were performed; analytical detection limits; and concentrations of chemical constituents in ppm (levels below detection should be identified as "ND"). A summary of the results of available groundwater testing data is included in Appendix B of the GMZ Plan.

Based on my inquiry of those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of knowledge and belief, true and accurate and confirm that the actions identified herein will be undertaken in accordance with the schedule set forth herein.

Facility Name	Signature of Owner/Operator
Location of Facility	Name of Owner/Operator
EPA Identification Number	Date

Part III: Remedy Selection Information

1. Describe the selected remedy. The ash ponds will be clean closed.

2. Describe other remedies which were considered and why they were rejected. Other remedies were not considered.

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3. Will waste, contaminated soil or contaminated groundwater be removed from the site in the course of this remediation? Yes ___ No _X_ If the answer to this question is "yes", where will the contaminated material be taken?

4. Describe how the selected remedy will accomplish the maximum practical restoration of beneficial use of groundwater. See Section 5.0 of the GMZ Plan. 5a + C

5. Describe how the selected remedy will minimize any threat to public health or the environment. See Section 5.0 of the GMZ Plan. 5b add [illegible] @ 3 yrs

6. Describe how the selected remedy will result in compliance with the applicable groundwater standards. See Section 5.0 of the GMZ Plan. 5b refer Attachment B

7. Provide a schedule for design, construction and operation of the remedy, including dates for the start and completion. See Section 5.0 of the GMZ Plan. 5d [illegible] refer me

8. Describe how the remedy will be operated and maintained. See Section 5.0 of the GMZ Plan. refer to Attachments D + E

9. Have any of the following permits been issued for the remediation?

   a. Construction or Operating permit from the Division of Water Pollution Control. Yes __ No ___ deferred for approval of plan

   b. Land treatment permit from the Division of Water Pollution Control. Yes ___ No ___ If the answer to this question is "yes", identify the permit number. deferred

   c. Construction or Operating permit from the Division of Air Pollution Control. Yes ___ No ___ If the answer to this question is "yes", identify the permit number. deferred

10. How will groundwater at the facility be monitored following completion of the remedy to ensure that the groundwater standards have been attained? See Appendix C of the GMZ Plan. refer to Attachment B

Based on my inquiry of those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true and accurate and confirm that the actions identified herein will be undertaken in accordance with the schedule set forth herein.

_____ Facility Name	_____ Signature of Owner/Operator
_____ Location of Facility	Name of Owner/Operator
_____ EPA Identification Number	Date

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ATTACHMENT 2

GROUNDWATER SAMPLING PROCEDURES

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Appendix B – Groundwater Sampling Procedure

The following procedure shall be used in sampling groundwater at the site. This sampling procedure applies to the routine quarterly and/or modified semi-annual or annual sampling events. A groundwater sampling field data sheet, comparable to the example located in Exhibit B-1, may be used to document the sampling activities at each well. If site conditions at the time of sampling could influence the results, sampling should be postponed until a later date. However, under no circumstances shall the sampling deviate from the schedule in Section 3.1.

To ensure samples are identified and collected at the correct location, monitoring wells should be marked with the monitoring identification designated in the groundwater monitoring program. Brass monument tags with the well identification stamped into the metal shall be installed on each well.

Wells must have permanently marked reference points from which groundwater levels and well depths will be measured. Elevations of reference points must be established relative to the *North American Vertical Datum of 1929 or 1983*, whichever is available. All sampling points should use the same datum.

Upgradient wells should be sampled first to avoid cross contamination. In general, this procedure is intended to sample the least potentially contaminated monitoring point first, and subsequently sample all other monitoring points with increasing contamination potentials.

The three principal steps in collecting groundwater samples from monitoring wells are measuring static groundwater levels; evacuating or purging well bores and casings; and collecting and preserving samples. Each step must be performed consistently from well to well, and from one sampling event to the next if accurate data and representative samples are to be obtained.

General Procedures

The date, time, ambient air temperature, general weather conditions, and individuals present, including sample team members and any observers shall be recorded on the groundwater sampling sheet for each well. The sampling equipment and containers should be stored so that contact with the ground surface is minimized.

All parts of sampling equipment coming in contact with groundwater must be thoroughly washed with a non-phosphate detergent and triple rinsed with deionized or distilled water before use. Decontamination shall be conducted initially upon arrival at the site and after each monitoring well has been sampled. Sampling equipment shall be calibrated in accordance to the manufacturer's specifications at the start of each day or as required by the manufacturer.

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Water Level Gauging

Static elevations of groundwater should be measured prior to purging each well. Initially, depths to static groundwater levels should be measured from the specified reference point of each well during each sampling event in order to calculate the initial groundwater volume. Groundwater elevations in wells are obtained by subtracting measured depths to groundwater from the specified reference point elevation. Water levels at all monitoring wells should be collected on the same day to prevent time distortion of the water surface data.

Monitoring well depths should be measured as the distance from the reference point to the well bottom. Record these depths at each sampling event after low-flow purging. A decrease in well depth, from the known installed total depth, may indicate that sediments have been deposited in the well. If accumulated sediment obstructs approximately 10 percent of the screened interval length, then the well should be redeveloped.

The most common device used to measure well depth and groundwater level is an electronic water level meter. Electronic water level meters are battery-powered devices with a probe that is lowered into the well until an audible signal and/or light indicates contact with the water surface has been made.

The difference between installed total well depth and depth to static groundwater level is the stabilized height of the groundwater column in the well. Accumulated sediment is not subtracted when calculating the volume of groundwater in the well, resulting in a greater and more conservative estimate of purge volume. These measurements are used to determine the static well volume (in gallons) of groundwater for each well as follows:

1. In order to obtain the height (H) of the groundwater column, measure the well total depth (TD) and subtract the measured depth to static water level (MSD)

$$H = TD - MSD$$

2. Use the following formula to calculate the static well volume (in gallons) of groundwater:

$$V = 5.875 \times D^2 \times H$$

Where:
V = Well volume (gallons)
D = Inside well diameter (feet)
H = Height of groundwater column (feet)

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Monitoring Well Purging – Pump Method

Low flow sampling methods will be used to obtain representative samples from the groundwater bearing zone being monitored in wells that demonstrate consistent and sufficient yields. A dedicated pumping device installed permanently in the well or a portable pumping device will be used to conduct low flow sampling. The pump intake must be near the middle of the well screen. Pumping flow rates must be less than natural recovery rate of the well generally less than 0.5 liters per minute. The goal is to minimize drawdown in the well. Drawdown is limited to less than 0.3 feet or 10% of the total water column. Continuous monitoring of water level and water quality indicator parameters for stabilization will be obtained during purging.

Indicator parameters for stabilization will begin to be obtained after one equivalent volume of tubing has been removed from the well. For this facility, the following parameters and stabilization requirements are:

- pH ± 0.05 S.U.
- temperature ± 0.5°F
- specific conductivity ± 5%
- dissolved oxygen ± 10% (optional)
- redox potential ± 10% (optional)
- turbidity ± 10% (optional)

Samples should be directly placed into the appropriate laboratory containers and handled according to the Sample Handling section and laboratory protocols. If a well is dry or exhibits slow recharge, the well will be allowed to recharge for a minimum of 12 hours. Samples shall be collected until all sample containers have been filled or the well becomes dry. The sampling conditions including dry well conditions shall be documented on the groundwater sampling field data sheet.

Monitoring Well Purging – Bailer Method

Bailers shall only be used for sample collection in the event of a non-functioning pump. Only new, disposable bailers with new string attached shall be used for sampling. Stabilization indicator parameter readings will be collected at each 0.5 gallon interval until stabilization is achieved in accordance with the Low Flow sampling method described above. Well volumes will be calculated in accordance with well gauging formulas described above.

Sample Collection Procedures

Sample handling and preservation techniques depend on the parameters to be analyzed. Groundwater samples should be collected, preserved and containerized in their order of sensitivity to volatilization (most sensitive to least sensitive). The purpose of sample preservation is to stabilize parameters of interest by retarding chemical or biological changes. Methods of preservation are generally limited to pH adjustment, chemical addition and cooling.

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Samples requiring preservation should be preserved immediately upon collection or be placed in sealed containers with preservative added by the laboratory. Proper preservation will help ensure that samples are representative of groundwater.

Every sample must be cooled to 4° C (approximately 39° F) immediately after being containerized and preserved. Every sample must also be maintained at 4° C until analyzed. Laboratory protocol regarding appropriate containers, preservatives, and holding times should be followed.

Groundwater samples that are to be analyzed for total recoverable metals must not be field filtered. However, if dissolved metals analyses are required, then the samples must either be field filtered through a 0.45-micron filter immediately upon collection and prior to preservation and transport to a laboratory or filtered by the laboratory upon receipt.

Field measurements for the indicator parameters of pH, temperature and specific conductivity should be taken on a portion of the sample that has been placed in a separate clean container that will not be analyzed for any other parameters. This procedure avoids cross contamination from field instrument probes.

Sample Documentation and Transportation

Before samples are transported to the laboratory, a chain-of-custody record shall be provided. Chain-of-custody records document in a legally defensible manner the history of collection, transfer and transport of each sample. Every individual, who is responsible for the samples from the time of collection to the time they are received by a laboratory, must be documented in the Chain-of-Custody record. The Chain-of-Custody document records allow tracing the possession and handling of individual samples from the time of field collection through the time of laboratory analyses. The sample labels shall be completed in indelible ink and sample seals (if required) should be applied to each container prior to packing and shipment. Samples shall be transported to the laboratory in sealed, insulated shipping containers, ice chests, or coolers. The samples should be shipped/delivered to the laboratory as soon as practical, preferably within 24 hours of sample collection.

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ATTACHMENT 3

LABORATORY QUALITY ASSURANCE PROGRAM

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BOW REFERENCE SHEET --- SAME FACILITY

Facility Number:	**W1370300005**
Facility Name:	**Ameren Energy - Meredosia**
USEPA Number:	
File Category:	**06L – Groundwater Closure**

FOR ADDITIONAL INFORMATION ON THIS, SEE CATEGORY UNDER THIS SAME FILE HEADING:	**06L – Groundwater Closure** **(CD)**

DATE OF OTHER DOCUMENT		DESCRIPTION OF OTHER DOCUMENT:
08/22/2016		**Closure Plan – Fly Ash Pond and Bottom Ash Pond**
		CD: Teklab QA Manual

IEPA-DIVISION OF RECORDS MANAGEMENT
RELEASABLE
AUG 18 2017
REVIEWER: JKS

ATTACHMENT D

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POST-CLOSURE CARE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 4, 2016

J024917.01

POST-CLOSURE CARE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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POST-CLOSURE CARE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

1.0 INTRODUCTION

This Post-Closure Care Plan for the AmerenEnergy Medina Valley Cogen, LLC, Meredosia Power Station Fly Ash and Bottom Ash Ponds Coal Combustion Waste Surface Impoundments (Meredosia) has been prepared in general accordance with the requirements of the site-specific rule in 35 Illinois Administrative Code (IAC) Part 840. Supporting documents are listed in Section 6.0 of this report and are being submitted concurrently with the Post-Closure Care Plan.

A written record of monitoring will be made and retained at the main office of the owner since the site is in the process of being decommissioned and demolished. This written record typically includes completed standard inspection forms and photographs. The inspector will assess the condition and need for repair of cover components, embankments, monitoring wells, and surface water control features.

2.0 SITE LAYOUT

The Meredosia Power Station is located at 800 South Washington Street, Meredosia, Illinois. The facility is currently being decommissioned and will be demolished. The Fly Ash and Bottom Ash Ponds are located southwest of the coal pile and plant facilities. The site location and topography are shown on Plate 1. The structures and ash ponds are shown on Plate 2.

3.0 POST-CLOSURE MAINTENANCE PROGRAM

The post-closure operation and maintenance program includes site inspections of surface disturbances, failures, adequacy of sand infill, storm water drainage channel maintenance, and repairs as required. This Post-Closure Plan applies the Fly Ash Pond, the Bottom Ash Berm, groundwater monitoring wells associated with the former ash ponds, and surface water drainage from the former ash ponds.

Site monitoring and repair records will be created and retained at the main office of the owner until the Illinois Environmental Protection Agency (IEPA) approves a certified Post-Closure Completion Report.

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3.1 Frequency of Inspections

Quarterly site inspections of the Fly Ash Pond, the Bottom Ash Berm, and associated features will be performed for the first five (5) years after completion of closure activities and submittal of the Construction Quality Assurance (CQA) Acceptance Report. After the five year period, site inspections will be performed at the same rate as groundwater sampling (Groundwater Monitoring Plan, Geotechnology, 2016), with a minimum frequency of once per year. Site inspections will occur until the IEPA approves a Post-Closure Completion Report.

3.2 Erosion Control Maintenance

The embankments for both ash ponds will be capped with ClosureTurf® and HydroTurf®, which do not require vegetation. Ash pond embankments below the 100-year flood elevation will also have rip-rap protection. Some areas that are currently vegetated near the ash ponds may be impacted during construction activities. These areas will be regraded and vegetated.

3.3 Drainage Channel Maintenance

Drainage channels on the cover and along the ash pond embankments will be lined with HydroTurf®, which minimizes erosion and sedimentation issues. Drainage channels outside of the ash pond will be natural or rock-lined. Metal culverts will be installed under roads as needed. However, soil or sand at the connections from the HydroTurf® to the drainage channels outside the ash ponds may erode due to the sudden change in gradient at connections with other drainage ways. Repair of energy dissipaters at the connections or localized material infill may be required. The repair material will consist of material similar to the infill and will be capped with a liner material or vegetated.

Storm water from the cap will exit the surface water control system into existing waterways onsite. These waterways will be monitored and repaired as necessary to reduce pooling and erosion. Eroded areas will be infilled with material similar to that which was eroded and capped with like material or vegetated.

3.4 Final Cover Maintenance

The ash in the Fly Ash Pond and the Bottom Ash Pond has consolidated for a minimum of four years. The ClosureTurf® and HydroTurf® systems are not sensitive to settlement, but if post-closure cover settlement occurs, localized repairs to maintain the integrity of the cover may be needed.

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3.5 Vegetative Repair and Mowing

Vegetation and mowing is not required on the capped areas due to the use of ClosureTurf® and HydroTurf® to cover the ash ponds instead of vegetative cover.

3.6 Miscellaneous Repairs

Minor repairs may be required to maintain the integrity and proper function of fencing, surface water drainage structures, monitoring points, and groundwater monitoring wells. Repairs will be made as warranted.

4.0 GROUNDWATER MONITORING SYSTEM

The groundwater monitoring well locations, system, maintenance program, and monitoring program are provided under a separate cover titled the Groundwater Monitoring Plan (Geotechnology, 2016). Groundwater trend statistical analysis and mitigation of statistically significant increasing trends are addressed in the Groundwater Monitoring Plan. Two years after the ash ponds have been closed, the groundwater monitoring network will be re-evaluated based on the changes in the groundwater impacts.

5.0 OPERATION AND MAINTENANCE PLAN FOR STRUCTURES AND DEVICES

Operation and maintenance plans for currently planned structures are addressed in the associated sections of this report and the referenced reports. Operation and maintenance plans for future structures, if needed, will be prepared at the time those structures are installed.

6.0 REFERENCES

Geotechnology, 2016. "Groundwater Monitoring Plan, Fly Ash and Bottom Ash Ponds, Meredosia Power Station." Geotechnology, Inc., St. Louis, Missouri.

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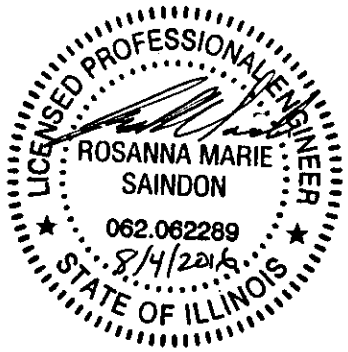
7.0 LICENSED PROFESSIONAL SIGNATURE/SEAL

I hereby affirm that the information contained in this Post-Closure Care Plan is true and accurate to the best of my knowledge and professional opinion.

Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.



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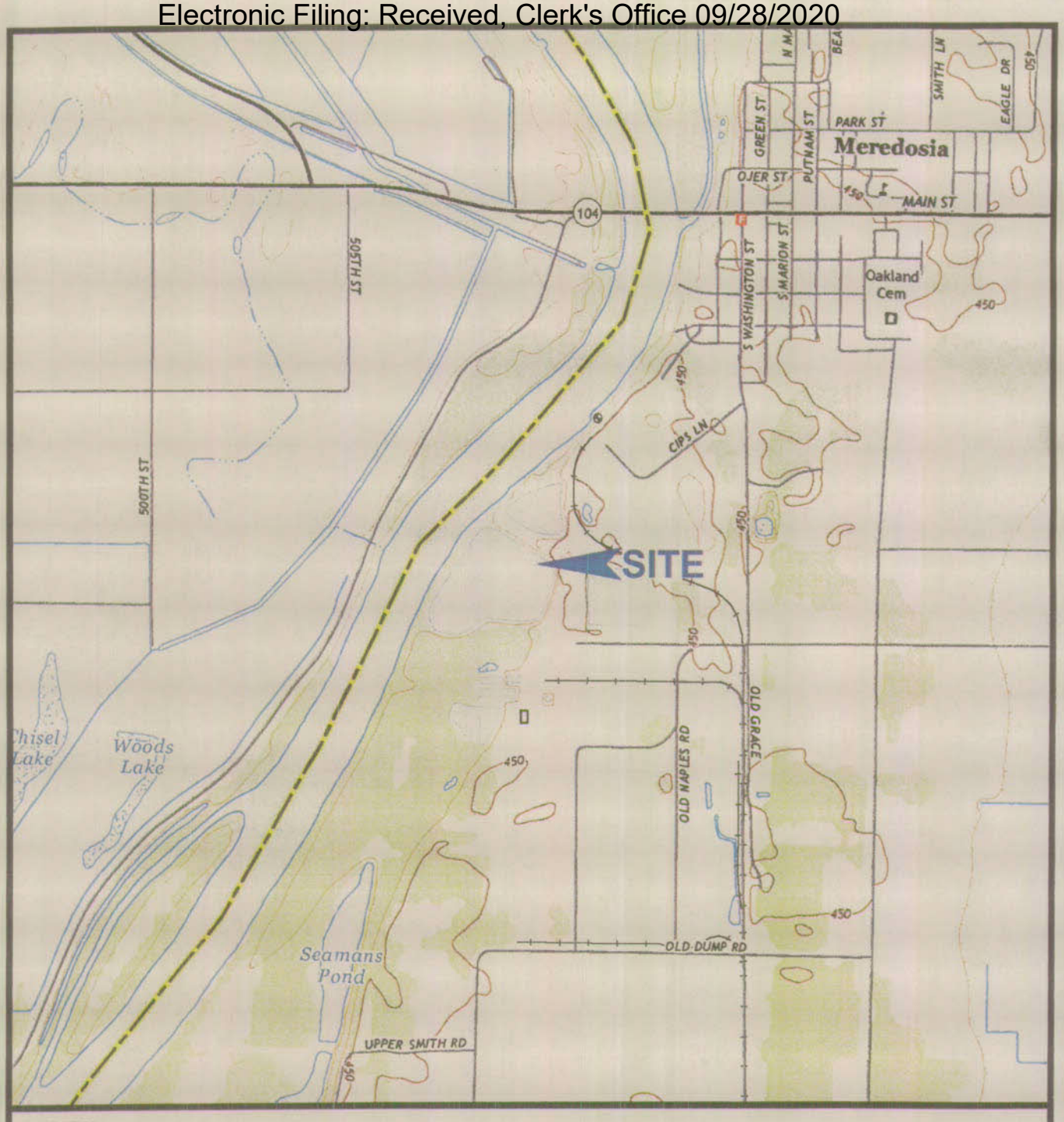


NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

N

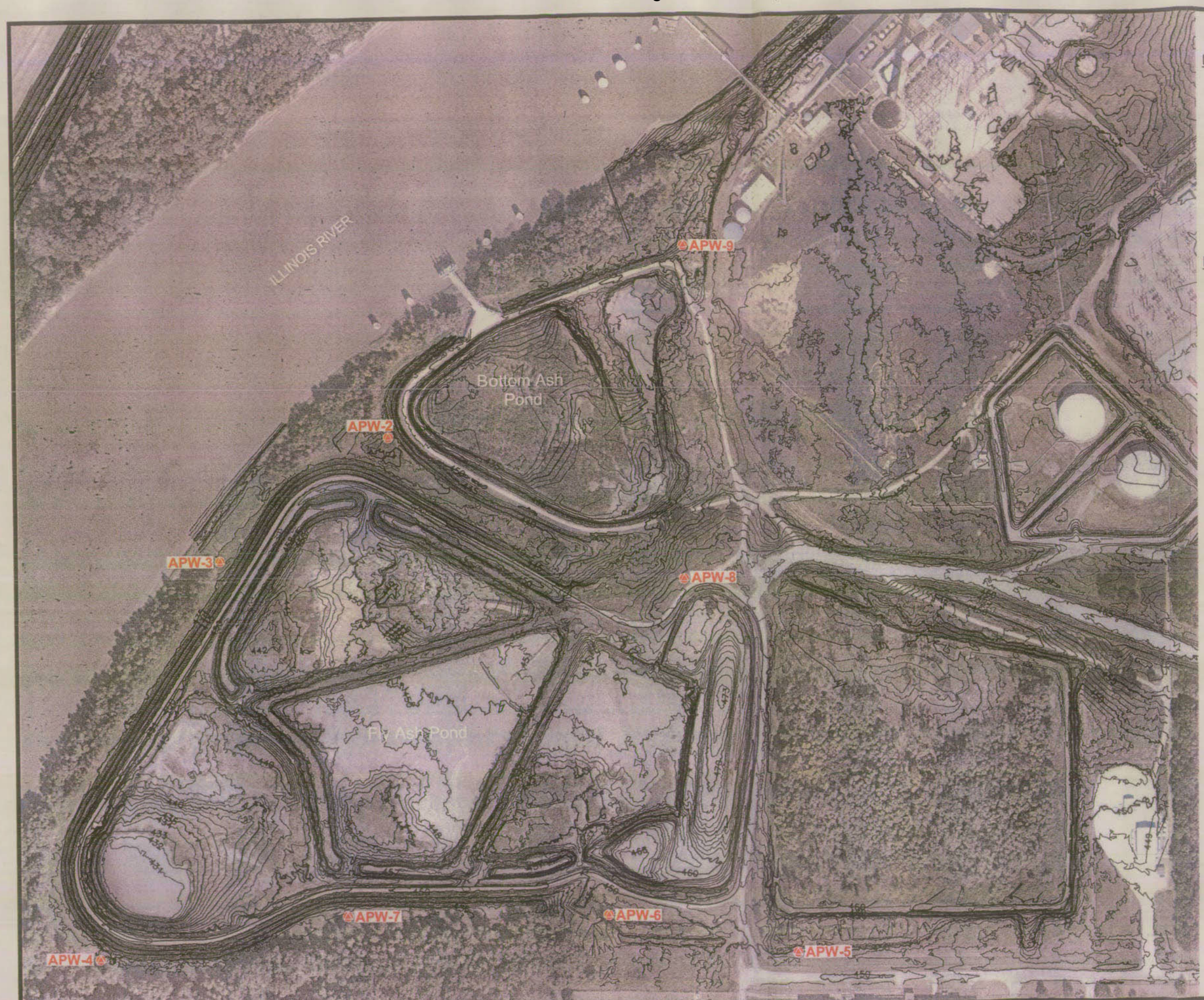
Drawn By: WAH	Ck'd By: AMS	App'vd By: DTK
Date: 2-26-16	Date: 7/1/16	Date: 7/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.01	PLATE 1



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

Monitoring Well Location

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: AMS	App'vd By: DTK
Date: 5-26-16	Date: 7/1/16	Date: 7/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE PLAN AND MONITORING WELL LOCATIONS

Project Number J024917.01	PLATE 2

ATTACHMENT E

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CONSTRUCTION QUALITY ASSURANCE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.01

August 15, 2016

J024917.01

CONSTRUCTION QUALITY ASSURANCE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

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CONSTRUCTION QUALITY ASSURANCE PLAN
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CONSTRUCTION QUALITY ASSURANCE PLAN
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CONSTRUCTION QUALITY ASSURANCE PLAN
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

1.0 INTRODUCTION

Geotechnology, Inc. prepared this Construction Quality Assurance (CQA) plan for the Fly and Bottom Ash Ponds closure at the Meredosia Power Station in Meredosia, Morgan County, Illinois. The CQA Plan was prepared in general accordance with the Coal Combustion Waste (CCW) surface impoundment closure guidance of 35 Illinois Administrative Code (IAC) 840.146 entitled Site-Specific Closures of Coal Combustion Waste Surface Impoundments Subpart A: Closure of Ash Pond D, Hutsonville Power Station Construction Quality Assurance Program.

This CQA plan includes information related to responsible personnel, project activities, monitoring, sampling, and testing of the coal combustion residual (CCR) cap. The purpose of the CQA plan is to achieve a reasonable degree of certainty that the construction of the CCR surface impoundment cap achieves the specified design parameters.

The CQA Plan requires preparation of an acceptance report at the end of construction by the CQA Officer. The acceptance report includes CQA documentation and a certification by the CQA Officer that the CQA Plan for the facility was followed. This CQA Plan is intended to supplement the project plans and specifications. Where a conflict exists, the current approved CQA Plan will govern.

The testing methods, acceptance requirements, and testing frequencies that guide the implementation of this plan are listed in Table 1. Appendix A includes example testing and observation forms. Alternative forms approved by the Ameren Missouri (Ameren) Project Manager that include the same information are acceptable. Appendix B includes the Watershed Geosynthetics ClosureTurf® and HydroTurf® reference material.

2.0 PROJECT PERSONNEL RESPONSIBILITY AND AUTHORITY

The project organization chart (Figure 1) illustrates the project personnel involved in the Fly and Bottom Ash Ponds closure activities. Project personnel responsibility and authority are presented below.

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2.1 Owner. AmerenEnergy Medina Valley Cogen, LLC (Owner) currently holds permits for National Pollutant Discharge Elimination System (NPDES) and operation of the Fly and Bottom Ash Ponds. The Owner has an agreement with Ameren Missouri (Ameren) to complete this work. Ameren will submit the project closure plan, construction plan, specifications, CQA plan, groundwater monitoring plan, and post-closure care plan to the Illinois Environmental Protection Agency (IEPA) and Illinois Department of Natural Resources (IDNR) for approval prior to construction.

The Ameren designated representative is the Ameren Project Manager. The Ameren Project Manager coordinates overall construction and acts as the Owner's primary point of contact with the General Contractor. The Ameren Project Manager coordinates all matters involving contract issues, including approving changes to the project plans and specifications.

2.2 Design Engineer. The Design Engineer is responsible for development of plans and specifications that fulfill the requirements of the Owner and regulatory agencies. The Design Engineer is responsible for:

- responding to the Contractor requests for information (RFIs) during construction;
- addressing identified conflicts in the project plans and specifications; and
- developing modifications to the plans and specifications that may be required to address changed field conditions, field cost savings, design improvements, or other necessary or desired modifications as approved by the Owner.

2.3 Site Supervisor. The Site Supervisor is the field representative for the Owner that observes contractor activities and reports to the Owner. The Site Supervisor is responsible for:

- maintaining records of Contractor personnel on-site, equipment on-site, and material deliveries, as provided by contractors and suppliers;
- recording closure activity progress in daily reports;
- obtaining photographs of closure activities;
- attending progress and/or deficiency meetings;
- developing and maintaining a submittal log;
- coordinating schedules with the Owner, General Contractor, and CQA Personnel;
- assisting the Owner by reviewing work orders and field changes;

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- coordinating with the Owner, General Contractor, and CQA Personnel regarding Owner-approved additional work and/or field changes; and

- observing construction activities, and reporting to the Owner if discrepancies between the activities and the project plans and/or specifications occur.

2.4 CQA Personnel.

2.4.1 CQA Officer. Ameren will retain a CQA Officer for the project who will report directly to the Ameren Project Manager. The CQA Officer will be a Professional Engineer registered in the State of Illinois, who is a person other than the Owner or an employee of the Owner. The CQA Officer will supervise and be responsible for monitoring, testing, and other activities required in the CQA plan. The CQA Officer will also supervise firms who will perform the monitoring, testing, and sampling required by the CQA plan.

The CQA Officer will be present at the beginning of primary project tasks and at various times during construction. The time that the CQA Officer must be at the project site will depend on the construction methods used by the contractors. The CQA Officer will exercise professional judgment to be present at the project site as required to assume responsibility for the monitoring and testing performed by those persons under his/her direct supervision. The CQA Officer will have enough on-site staff (CQA Representatives) to adequately perform the quality assurance activities in the CQA Plan. If the CQA Officer cannot perform a required duty, a CQA Officer-In-Absentia, qualified for that portion of the work, may be designated by the CQA Officer.

The CQA Officer, with on-site support personnel as required, will provide observation of the monitoring, testing, and/or sampling of the following construction activities for the facility:

- placement and compaction of the subgrade to specified parameters;
- placement of final cover, including installation of the geosynthetics; and
- construction of surface water control features.

The CQA Officer will verify that the sampling, monitoring, and testing for the major elements of the construction are in compliance with the established design requirements before the next sequential item for construction is initiated. The elements of work requiring compliance verification include:

- the subgrade prior to placement of the ClosureTurf® and other geosynthetic materials; and

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- the geomembrane components of the ClosureTurf® and HydroTurf® have completed and passed testing prior to installation of the geotextile/turf component.

The CQA Officer will review the monitoring, sampling, and testing completed for the work item to assess compliance with design requirements. The CQA Officer will also visually observe the work item before completing and signing the CQA Certification form (Appendix A). The contractor or installer for the subsequent construction activity will not be allowed to initiate work for the next task until the forms are completed and signed by the CQA Officer.

The completed and signed CQA Certification forms will be filed as project records in accordance with the provisions of Section 9.0.

2.4.2 Document Controller. The Document Controller files all CQA records related to the monitoring, sampling, and testing specified in the CQA Plan. In addition, the Document Controller will control the CQA Plan distribution so that current documents are being used by the CQA staff. The duties of the Document Controller may be performed by other members of the CQA team.

Requirements for control of the CQA Plan and for filing of the project records are discussed in Section 9.0.

2.5 Testing and Monitoring Firms. The CQA Officer will provide guidance to the testing and monitoring firms during quality assurance sampling, monitoring, and/or testing discussed in the CQA Plan. Limited monitoring and independent sampling and testing are required for the geosynthetic liner installation. Product suppliers and installers of geosynthetic materials are responsible for the sampling and testing required.

2.5.1 Soil Testing (Laboratory and Field). One or more soil testing firms qualified by the IDOT or IEPA (as appropriate) will be retained to perform the field and laboratory testing outlined in CQA Plan. Materials will be sampled by the testing firm or persons designated by the CQA Officer.

Each firm will provide proof of calibration to the CQA Officer for measuring and/or testing equipment used in the field or laboratory. Proof of calibration for commercial grade equipment, such as rulers and tape measures that provide adequate accuracy for the intended purpose is not required.

Field and laboratory forms proposed for data collection will be subject to review by Ameren prior to use. Incomplete or otherwise unacceptable forms will be modified by the testing firm to meet the intent of the CQA Plan.

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2.5.2 Surveyor. One or more surveyors will survey specified elevations, slopes, and grades as required in the CQA Plan. The firm(s) selected will complete the work using or under the supervision of an Illinois Professional Land Surveyor.

Each surveyor will be required to provide proof of calibration to the CQA Officer for each surveying device that will be used. Proof of calibration for commercial grade equipment, such as rulers, tape measures or other devices that provide adequate accuracy for their intended purpose is not needed.

2.5.3 Geosynthetic Testing. A geosynthetic monitoring firm may be retained to perform quality assurance observations for geosynthetic monitoring, testing, and sampling performed by the suppliers and installers. Additional geosynthetic samples may be collected for independent testing.

The geosynthetic testing laboratory will be independent of both the manufacturer and the installer of the geosynthetics. The Ameren Project Manager and CQA Officer will review and approve the geosynthetic testing laboratory quality assurance (QA) plan prior to start of services.

Field and laboratory forms proposed for data collection will be subject to review by Ameren prior to use. Incomplete or otherwise unacceptable forms will be modified by the testing firm to meet the requirements of the CQA Plan.

2.6 Contractors, Suppliers, and Installers. The General Contractor is responsible for obtaining all necessary construction permits and the appropriate subcontractors, suppliers, and installers to complete the work in accordance with the contract. Acceptance of work by the CQA Officer does not relieve the General Contractor of obligations to furnish all work in accordance with the contract.

Contractors, subcontractors, suppliers, and installers are responsible for completing their portions of the work within specified schedules and in accordance with the requirements of the plans and specifications. The contractors, subcontractors, suppliers, and installers will accommodate the monitoring, sampling, and testing outlined in the CQA Plan. At least 7 days of notice is required to schedule CQA personnel and to review testing results.

The geosynthetic suppliers and installers will provide the quality assurance monitoring, sampling, and testing as required in the CQA Plan. The geosynthetic installers will be required to submit "certificates of acceptance" for certain items of work that precede their construction activities. The "certificates of acceptance" are discussed in Section 4.3.2.

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3.0 PROJECT MEETINGS

Periodic meetings will be held to provide coordination among the involved personnel. Descriptions of pre-construction meetings, routine progress meetings and work deficiency meetings are presented in the following paragraphs.

3.1 Pre-Construction Meetings. Pre-construction meetings will occur before site grading and geosynthetic installations. The Ameren Project Manager, CQA Officer, Site Supervisor, General Contractor, and the appropriate subcontractors will attend.

At a minimum, project plans, specifications, and CQA items that will be discussed during the pre-construction meeting will include:

- protocols for monitoring, testing, and sampling;
- items of work requiring CQA Officer certification or installer acceptance before subsequent work items can be initiated (see Section 4.0); and
- established protocol for handling construction deficiencies, corrective measures, and retesting (see Section 6.0).

The General Contractor's Project Manager shall coordinate meeting times, provide an agenda, and provide meeting minutes as required in the Project Specifications. The meeting documentation review by attendees will occur before documents are filed as project records in accordance with Section 9.0.

3.2 Progress Meetings. The Ameren Project Manager or CQA Officer will schedule progress meetings to discuss on-going and up-coming construction activities. Attendees will include the Ameren Project Manager, CQA Officer, Site Supervisor, General Contractor, and appropriate subcontractors. At a minimum, topics regarding progress and the following CQA items will be reviewed:

- protocol for monitoring, testing, and sampling;
- items of work requiring CQA Officer certification or installer acceptance before subsequent work items can be initiated (see Section 4.0);
- established protocol for handling construction deficiencies, corrective measures, and retesting (see Section 6.0); and
- upcoming scheduled activities and appropriate personnel.

The General Contractor's Project Manager shall coordinate meeting times, provide an agenda, and provide meeting minutes as required in the Project Specifications. The meeting documentation review by attendees will occur before documents are filed as project records in accordance with Section 9.0.

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3.3 Work Deficiency Meetings. The CQA Officer will require special meetings when a project issue or work deficiency is anticipated or encountered. Attendees will include the Ameren Project Manager, Site Supervisor, General Contractor, and appropriate subcontractors. The purpose of these meetings is to define and resolve the project issue or work deficiency in the following manner:

- define the project issue or work deficiency and its probable causes or influence on the project;
- discuss alternative actions to address the project issue or work deficiency;
- assign parties to implement the selected action;
- implement the selected action to resolve the project issue or work deficiency; and
- verify the implemented action has been effective through appropriate monitoring.

The General Contractor's Project Manager shall coordinate meeting times, provide an agenda, and provide meeting minutes as required in the Project Specifications. The meeting documentation review by attendees will occur before documents are filed as project records in accordance with Section 9.0.

4.0 SAMPLING AND TESTING REQUIREMENTS

4.1 Introduction. Prequalification and placement sampling and testing requirements for the various materials and construction activities are summarized in Table 1. Frequencies for the material placement testing listed in Table 1 are based on the volume of material used in construction and are recommended minimums. The CQA Officer will select the specific testing locations by exercising professional judgment. The testing and sampling locations will represent the construction activity.

The geosynthetic installers will be responsible for the required sampling for the Geosynthetic Prequalification and Placement Testing presented in Table 1. Independent laboratory testing will be coordinated through the CQA Officer.

Custody of samples and transfer from the sampling location to the testing facility will be established and documented through the use of a Chain of Custody Record. The sampling party will document sample description, date, time, material type, and testing method, then relinquish sample custody to the testing firm by signing and dating the form. The sampling party will retain a copy for their records. The samples will be shipped or delivered to the testing firm with the signed Chain of Custody Record.

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The testing firm will document sample receipt by signing and dating the Chain of Custody Record. The testing firm will return the original signed Chain of Custody Record to the Document Controller with the corresponding test results. The Document Controller will retain the signed original Chain of Custody form as a project record in accordance with Section 9.0.

The sampling and testing results will be documented on a daily basis by each testing firm or installer providing the quality assurance activities. The original copies of the sampling and testing results will be provided to the CQA Officer.

4.2 Subgrade.

4.2.1 Fly Ash Pond Subgrade. The CQA Officer will direct the sample collection and laboratory testing for the standard Proctor test in accordance with the American Standard of Testing and Materials (ASTM) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (ASTM D698-12). The subgrade material will be coal combustion residuals, but embankment material and other fill material may be included. A separate standard Proctor test for each material type will be required. The CQA Officer will direct field moisture/density testing of the top one foot of subgrade in accordance with Table 1.

4.2.2 Bottom Ash Road Subgrade. The CQA Officer will direct the sample collection and laboratory testing for the standard Proctor test in accordance with the ASTM Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (ASTM D698-12). The subgrade material will be coal combustion residuals, but embankment material and other fill material may be included. A separate standard Proctor test for each material type will be required. The CQA Officer will direct field moisture/density testing of each 6-inch lift of subgrade in accordance with Table 1.

Since the berm will be widened to account for heavy vehicle traffic, lifts will be placed horizontally, compacted, tested, then graded. Additional material will be blended into the current berm to reduce the chance of slope failure.

4.2.3 Bottom Ash Pond Backfill. The CQA Officer will direct the sample collection and laboratory testing of backfill material for the Bottom Ash Pond. One pre-qualification sample will be required per source for testing in accordance with Table 1. One confirmation sample will be required per 20,000 cubic yards of backfill placed in the Bottom Ash Pond per source in accordance with Table 1. If non-virgin material is being used, full IEPA Tiered Approach to Corrective Action (TACO) contaminants of concern will be tested.

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The CQA Officer will direct the sample collection and laboratory testing for the standard Proctor test in accordance with the ASTM Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (ASTM D698-12). The CQA Officer will direct field moisture/density testing of each 1-foot lift of subgrade in accordance with Table 1.

4.2.4 Subgrade Survey. The prepared subgrade will be surveyed on a 100-foot grid pattern and at breaks in grade. Prepared subgrade not within the control tolerance requirement of 0.0 to +0.4 feet of design grade (or as accepted by the CQA Officer and Ameren Project Manager) will be corrected. The maximum grade for the slopes is 10-percent. The surveyor will document the measured grades on "as-built" drawings furnished to the CQA Officer.

The CQA Officer will review the survey data for conformance to the requirements, and, if in agreement with design requirements, will provide approval for the work using the CQA Certification Form.

4.2.5 Post-Placement. Prior to placing geosynthetics, the entire subgrade will be proofrolled using a smooth drum roller. CQA Representatives will provide visual observation during proofrolling. Soft or pumping areas will be removed and replaced with acceptable material. Subgrade completion observation activities may include additional testing of subgrade material, observing subgrade surfaces, and additional surveys to measure elevations, slopes, and subgrade boundaries where discrepancies with the construction drawings are suspected.

4.3 ClosureTurf® and HydroTurf®. Where not otherwise specified, Geosythetic procedures shall be in accordance with the September 2015 Watershed Geosynthetics ClosureTurf® and HydroTurf® Installation Guidance Documents (Appendix B). Installers will be certified by Watershed Geosynthetics on both ClosureTurf® and HydroTurf® installation and CQA procedures. ClosureTurf® and HydroTurf® are composed of three main components:

1. The geomembrane liner component is 50-mil structured high-density polyethylene (HDPE) Agru Super Grip Net with the spikes placed on subgrade;

2. The synthetic turf component is made of woven polypropylene geotextiles tufted with polyethylene yarn; and

3. Infill is Sand (ClosureTurf®) or HydroBinder (HydroTurf®).

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4.3.1 Manufacturer Guaranteed Properties for Geosynthetics. The manufacturer will submit documentation that the materials have been tested for the parameters listed in the manufacturers list of guaranteed properties. The test results, including identification of all individual geomembrane rolls tested will be submitted to the CQA Officer for review. The manufacturer will certify that all geomembrane rolls meet the manufacturer's guaranteed properties.

4.3.2 Prequalification Testing for Geosynthetics. The geosynthetic manufacturer will supply an inventory list of geomembrane rolls to the Owner's geosynthetics QA monitoring firm and/or CQA Officer, who will select geomembrane rolls to be prequalified for the type and frequency of prequalification testing in Table 1.

The geomembrane manufacturer will procure and submit samples from the designated prequalification geomembrane rolls to the independent geosynthetic laboratory for verification of selected manufacturer's guaranteed properties. Submitted samples will be 2 feet long by the entire width of the geomembrane roll. The machine direction, manufacturer's roll identification number, and date the sample was obtained will be marked on the sample by the geosynthetic laboratory prior to shipment.

Geomembrane prequalification testing shall be completed prior to delivery. If prequalification testing is not completed prior to delivery, the Contractor takes responsibility for any failed prequalification testing and the additional costs associated with having it delivered prior to acceptance.

4.3.3 Installer Certification of Placement Surface. The prepared subgrade surface shall be cleared of stones, sand, and similar materials that could damage the geosynthetics, cause clogging of drains or filters, or hamper seaming of geosynthetics. The geosynthetic installer accepts responsibility for inspecting the subgrade (on a daily basis) to verify unsuitable materials are not present within the prepared subgrade area to be covered each day. The geosynthetic installer will complete and sign the Installer Certificate of Acceptance form, which documents acceptance of the prepared subgrade for geosynthetic placement. The geosynthetic installer will provide the original signed document to the CQA Officer for signature of receipt.

Completed and signed forms will be filed as project records in accordance with the provisions in Section 9.0.

4.3.4 Placement Testing For Seam Overlap. The contractor and geosynthetic installer will arrange geomembrane sections to minimize field seams. A preliminary drawing illustrating the panel layout will be provided to the Ameren Project Manager and CQA Officer prior to placement for approval.

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Seam overlaps will be field-measured by the geosynthetic installer to verify the requirements in Table 1 are met for the seams. Seam overlap will be "shingled" in the downslope direction. The CQA Officer will provide appropriate personnel to obtain independent measurements of a representative number of seam overlaps.

The geosynthetic installer will provide the CQA Officer with "as-built" drawings of the geomembrane installation showing the panels, seam locations, and destruct locations, at a minimum.

4.3.5 Trial Weld Seams. Trial weld sample seams will be required before membrane seams can be welded. Trial weld sample seams must be 3 feet long and 12 inches wide, with the seam centered lengthwise. Both wedge and extrusion welder are required to produce a trial weld sample seam at daily startup, immediately after any break, anytime the machine is turned off for more than 30 minutes, and anytime the machine is operating for more than five hours. If at any time the CQA Officer or approved representative believes that an operator or welding apparatus is not functioning properly, an additional trial seam must be produced and tested.

Trial weld sample seams will be tested in the field for peel and shear using a field tensiometer. Four 1-inch coupons will be required for testing: two to be tested for peel and two to be tested for shear. The requirements for field testing are located in Table 1 and Geosynthetics Research Institute (GRI) Test Method GM-19 Table 1(a) (Appendix B)

4.3.6 Placement Non-Destructive Testing. The geosynthetic installer will conduct non-destructive testing as seaming progresses (Table 1). Seams will be non-destructively tested over the full length using an air pressure test, vacuum test unit, spark test, or other method approved by the CQA Officer.

The CQA Officer will provide appropriate personnel to monitor non-destructive testing performed by the installer.

The geosynthetic installer will submit all non-destructive field testing results to the CQA Officer for filing as project records in accordance with Section 9.0.

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Air Pressure Testing (For Double Fusion Seams Only)

Equipment

The air pressure test equipment includes:

- an air pump (manual or motor driven) equipped with pressure gauge, accurate to 1 pounds per square inch (psi), capable of generating and sustaining a pressure between 25 psi and 30 psi and mounted on a cushion to protect the geomembrane;
- a rubber hose with fittings and connections; and
- a sharp hollow needle, or other approved pressure feed device.

Procedure

The air pressure test procedure is as follows:

1. Seal both ends of the seam.
2. Insert a needle or other approved pressure feed device into the air channel created by the fusion weld.
3. Insert a protective cushion between the air pump and the geomembrane.
4. Pressurize the seam to between 25 psi and 30 psi. Close the valve and sustain the pressure for at least five minutes.
5. A pressure loss of 2 psi or less is a passing test.
6. A pressure loss of more than 2 psi is a failing test. Locate the faulty area, then repair and retest.
7. At the conclusion of the passing air pressure test, slit the opposite end of the seam and monitor the drop in pressure. This indicates that the entire seam was tested.
8. Remove needle or other approved pressure feed device and seal.

Vacuum Testing (Extruded Welds)

Equipment

The vacuum test equipment includes:

- a vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket on the bottom, a valve assembly, and a vacuum gauge;

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- a vacuum tank and pump assembly equipped with a pressure controller and pipe connections or equipment capable of performing the same function;
- a rubber pressure or vacuum hose with fittings and connections;
- a bucket; and
- a soapy solution.

Procedure

The vacuum test procedure is as follows:

1. Energize the vacuum pump to approximately 5 psi.
2. Wet the extrusion weld area with the soapy solution.
3. Place the vacuum box over the wetted area.
4. Close the bleed valve and open the vacuum valve.
5. Check that a leak-tight seal is created.
6. Examine the geomembrane through the viewing window for the presence of soap bubbles for at least 10 seconds.
7. If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve. Move the box over the next adjoining area and repeat the procedures in steps 1 through 6.
8. Mark, repair, and retest areas where soap bubbles appear.

Spark Testing (Extrusion Welds at Penetrations)

Equipment

The spark test equipment includes:

- an electrically conductive tape or wire placed beneath the seam prior to welding;
- a hand-held holiday spark tester; and
- a conductive wand that generates a high voltage.

Procedure

The spark test procedure is as follows:

1. Place the electrically conductive tape or wire beneath the seam prior to welding.

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2. A trial seam containing a non-welded segment shall be subject to a calibration test to ensure that such a defect will be identified under the planned machine settings and procedures (i.e., exposed wire will cause a spark to occur).
3. Upon completion of the weld, enable the spark tester and hold approximately 1 inch above the weld, moving slowly over the entire length of the weld in accordance with ASTM 6365.
4. If there is no spark, the weld is a passing test. A spark indicates a hole in the seam.
5. Mark, repair, and retest areas where sparks occur.
6. Care should be taken if flammable gases may be present in the area of testing.

4.3.7 Placement Destructive Testing. Destructive testing is used to evaluate seam strength. Destructive samples will be collected and field tested by the geosynthetic installer at randomly selected geomembrane locations as seaming work progresses at the direction of the CQA Representative. The remaining destructive sample will be sent to the independent geosynthetic testing laboratory for analysis.

The geosynthetic installer will submit results of destructive testing to the CQA Officer for filing as project records in accordance with Section 9.0.

Destructive samples will be collected within 24 hours of being chosen by the CQA Representative unless extenuating circumstances, previously approved by the Ameren Project Manager and CQA Officer, occur.

Location and Frequency

The CQA Representative shall select destructive testing locations based on:

1. Selected destructive testing will be at minimum frequency of one test location per 500 feet of seam length. This minimum frequency is the average taken throughout the entire area of placement and does not include retests.
2. A destructive test will be completed for each welding machine used per day.
3. A destructive test will be completed for individual repairs that are more than 150 feet long.

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4. Additional test locations will be chosen during seaming at the CQA Representative's discretion. Selection of such locations may be prompted by suspicion of excess crystallinity, contamination, offset welds, or any other potential cause of imperfect welding.
5. All samples obtained for destructive testing will include a 12-inch by 12-inch sample provided to the Owner for archive storage.

Destructive Sampling Procedure

The destructive sampling procedure is as follows:

1. Assign a number and label each sample (12 inches by 48 inches with the seam centered lengthwise).
2. Collect the sample within 24 hours of being marked.
3. Record the sample location(s) on layout ("as-built") drawing.
4. Record the reason for taking the sample(s) at this location.
5. Repair the sample location(s) the same day.
6. Vacuum test each repair.

Field Testing

The geosynthetic installer shall use a tensiometer to field-test a minimum of four 1-inch wide strips from the samples: two for peel and two for shear. The geosynthetic installer shall log the date, time, ambient temperature, number of seaming unit, name of seamer, welding apparatus temperature, and pass or fail description. The requirements and frequency for field testing is located in Table 1 and GRI Test Method GM-19 Table 2(a) (Appendix B).

Quality Assurance Laboratory Testing.

Field testing prequalifies destructive samples for independent laboratory testing. The quality assurance laboratory shall be selected by the CQA Officer with approval from the Ameren Project Manager.

Laboratory testing will include five tests each of shear strength and peel adhesion. Laboratory testing methods will be in accordance with ASTM D 4437 "Standard Practice for Non-destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes". Acceptance will be based upon the criteria in GRI Test Method GM-19 Table 1(a) (Appendix B).

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Procedures For Destructive Test Failure.

Failed destructive tests, in the field or quality assurance laboratory, will be remedied by either of the following options:

1. The geosynthetic installer may reconstruct the seam between two passed test locations; or
2. The geosynthetic installer may trace the welding path to an intermediate location at least 10 feet beyond the point of the failed test in each direction, and take a sample for an additional field test at each location. If these additional samples pass, then the seam shall be reconstructed between these locations. If either sample fails, then the process shall be repeated to establish the zone in which the seam should be reconstructed.

Acceptable reconstructed seams must be bounded by two locations with passing laboratory destructive tests. In cases where the reconstructed seam exceeds 150 feet, an additional destructive sample of the repaired area shall be obtained. The geosynthetic installer shall document all actions taken regarding destructive test failures.

4.3.8 Manufacturer Guaranteed Properties for the Turf Component. The manufacturer will submit documentation that the materials have been tested for the parameters listed in the manufacturer's list of guaranteed properties. The test results including identification of all individual geomembrane rolls tested will be submitted to the CQA Officer for review. The manufacturer will certify that all geomembrane rolls meet the manufacturer's guaranteed properties.

4.3.9 Prequalification Testing for the Turf Component. The geomembrane manufacturer will supply an inventory list of turf rolls to the Owner's geosynthetics QA monitoring firm and/or CQA Officer, who will select geomembrane rolls to be prequalified for the type and frequency of prequalification testing in Table 1.

The geosynthetic manufacturer will procure and submit samples from the designated prequalification turf rolls to the independent geosynthetic laboratory for verification of selected manufacturer's guaranteed properties. Submitted samples will be 2 feet long by the entire width of the turf roll.

Turf prequalification testing shall be completed prior to delivery.

4.3.10 Field Monitoring of the Turf Component. The CQA Officer or designated representative will observe the turf as it is placed and sewn. Vehicles and equipment are not permitted on slopes exceeding 15 percent until the infill (sand for ClosureTurf® and pozzolanic mixture for HydroTurf®) is in place. In flatter slopes, all-terrain vehicles

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(ATVs) and similar vehicles will be allowed prior to infill placement if the tire pressure is less than 5 psi. After infill placement, tire pressures should be limited on slopes to 35 psi or less.

Wrinkles will be smoothed out or removed to the extent possible prior to field seaming. Wrinkles that can fold over must be repaired either by cutting out excess material, or by allowing the liner to contract by temperature reduction. The CQA Officer or designated representative will observe geomembrane for wrinkles and notify the Contractor if wrinkles are being formed that may fold over or are above the vertical 4-inch maximum tolerance level on slopes, or above the 2-inch maximum tolerance level in ditches. The CQA Representative is then responsible for documenting corrective action to remove the wrinkles.

4.3.11 Sand Prequalification Testing for ClosureTurf®. One sand prequalification sample and testing results will be provided by the contractor to the CQA Officer at least one week prior to sand delivery on site. Laboratory testing will occur in accordance with the testing listed in Table 1.

4.3.12 Sand Conformance Testing for ClosureTurf®. Sand conformance samples will be obtained by the CQA Officer or designated representative. Laboratory testing will occur in accordance with the type and frequency of testing listed in Table 1.

During placement, the geosynthetics will be observed to verify that they are not damaged. The average thickness of the sand layer will be measured and recorded at the frequency listed in Table 1. Sand thickness will be measured with a digital caliper. A standard washer will be used as a plate for the point of entry into the sand infill for consistent depth control.

4.3.13 Hydrobinder Prequalification Testing for HydroTurf®. The cement-sand mixture will be a brand of Portland Cement conforming to ASTM C 150 (AASHTO M 85) and shall be Type I or Type II. The contractor will provide information to the CQA Officer on which mix will be used at least one week prior to delivery on site.

4.3.14 Hydrobinder Conformance Testing for HydroTurf®. The CQA Officer or Representative will observe that the hydrobinder infill is placed in a method that does not damage the underlying geosynthetics in dry conditions. After the mixture is worked into the turf, the average thickness of the layer will be measured and recorded at the frequency listed in Table 1. The mixture will be observed by a CQA Representative during hydration, which must occur the same day as infill placement.

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4.4 Anchor Trench. The anchor trench shall be excavated in accordance with the project plans and specifications prior to geosynthetic placement in that area. The corners of the anchor trench shall be slightly rounded where the geosynthetic enters the trench to minimize sharp bends in the geosynthetic. Fill placed on the geosynthetic shall adhere to the same standards as the subgrade, and must be free of debris, rocks, sand, or other material which could damage the geosynthetic.

4.5 Surface Water Management System. The surveyor shall document the elevations and grades of the constructed berms and channels on an "as-built" drawing. The surveyor will provide this data to the CQA Officer. The CQA Officer shall check the information against the requirements and frequency provided in Table 1.

5.0 CORRECTIVE MEASURES

The CQA Officer will reject and require replacement of material that fails prequalification or material placement requirements (Table 1). The lateral and/or vertical extent of corrective measures will be based on the frequency of testing and CQA Officer's professional judgment.

6.0 DOCUMENTATION

6.1 Daily Reports. The CQA Officer, or designated representative, shall prepare and sign a daily report for each day that materials or placement of materials are being observed, sampled, or tested.

6.2 Weekly Summary Reports. The CQA Officer or designated representative shall prepare and sign a weekly summary report for each week that materials or placement of materials are being observed, sampled, or tested. The daily reports, test data, photographic records, and test results will be included in the weekly summary report. The weekly report will be filed by the Document Controller in accordance with Section 9.0.

6.3 Photographs. Photographs will be included in the weekly summary report to provide a visual record of work progress, testing activity, and construction work. The photographs shall include:

- general location, date and time of the photograph;
- description of the item photographed;
- direction of view (north, south, east, or west); and
- name of photographer.

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7.0 ACCEPTANCE REPORT

The CQA Officer shall prepare and submit an acceptance report to the IEPA. The acceptance report shall contain:

- material testing results;
- geosynthetic quality assurance and an "as-built" drawing including panel placement, seams, destructive sample locations, and repairs;
- "as-built" drawings as specified herein;
- weekly summary reports;
- certification by the CQA Officer that the CQA Plan has been followed during construction; and
- signature of the CQA Officer.

8.0 CONSTRUCTION MANAGEMENT ACTIVITIES

8.1 Request For Information (RFI). The General Contractor or subcontractor may, after exercising due diligence to locate required information, request from the CQA Officer or Design Engineer clarification or interpretation of the contract documents. The General Contractor or subcontractor will initiate the RFI in a timely manner using the Request for Information form (Appendix A) in accordance with project specifications. RFIs will be filed as project records in accordance with Section 9.0.

8.2 Review of Contractor Submittals. The General Contractor will submit shop drawings, product data, and samples (Table 2) to the CQA Officer or Ameren Project Manager in accordance with the project specifications and the CQA Plan in a timely manner to reduce work delays. Copies of submittals and the log will be filed as project records in accordance with Section 9.0.

8.3 Field Change Order. The contractor shall prepare requests for Field Change Order (FCO) in accordance with the project specifications and submit the FCO requests to the Ameren Project Manager. Copies of the FCO and logs of authorized FCOs will be retained as project records in accordance with Section 9.0.

9.0 DOCUMENT CONTROL AND PROJECT RECORDS

9.1 CQA Plan. The CQA Officer shall control the preparation, issue, and revision of CQA Plan. The CQA Plan, including all changes, will be reviewed for adequacy and approved for release by the Ameren Project Manager. The Document Controller will issue current copies of the CQA Plan and maintain records associated with its preparation.

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9.2 Project Records. The Document Controller shall maintain and protect documents during construction activities against damage, deterioration, and loss. Records will be readily identifiable and retrievable. Original CQA documents from the field and laboratories will be furnished to the Document Controller for filing and maintenance.

Project records will be made available to the Ameren Project Manager as requested during construction and, when requested, will be turned over to Ameren at completion of the construction contract. Ameren will retain the weekly summary reports provided by the CQA Officer until the completion of the post-closure care period and must make those reports available at reasonable times for viewing and photocopying by the IEPA.

Records include, but are not limited to, the following:

- CQA Plan;
- CQA Plan documentation;
- meeting minutes;
- weekly summary reports;
- daily reports;
- manufacturer's QA results and certifications;
- certificates of acceptance by geosynthetic installers;
- CQA certifications;
- certificates of calibration for monitoring, measuring and test equipment;
- "as-built" drawings;
- laboratory test results and chain of custody records;
- laboratory certifications of manufacturer's guaranteed properties for geosynthetics;
- Field Change Order requests;
- Log of Authorized Field Change Orders;
- shop drawing submittals;
- log of shop drawing submittals;
- RFI from contractor/installer;
- RFI responses; and
- acceptance reports.

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TABLE 1
SUMMARY OF TESTING FREQUENCY
MEREDOSIA POWER STATION - FLY ASH AND BOTTOM ASH PONDS

Test	Test Frequency[1]	Specification Criteria	Responsible Party
FLY ASH POND SUBGRADE			
Standard Proctor	1 per 10,000 cubic yard (minimum 1 per material type)	ASTM D 1557	CQA Officer
Field Moisture/Density	5 per acre per 6-inch compacted lift, top 1 foot of subgrade (on approximately 100-foot grid)	>90% maximum dry density from appropriate standard Proctor	
Survey[2]	CQA survey locations provided in project specifications. In general, survey points include 100-foot spacing along grade breaks and 200-foot grid between slope breaks.	>2% and ≤10% grade, positive drainage, no sharp changes in slope	
BOTTOM ASH BERM/ROAD SUBGRADE			
Standard Proctor	1 per 10,000 cubic yard (minimum 1 per material type)	ASTM D 1557	CQA Officer
Field Moisture/Density	5 per acre per 6-inch compacted lift (on approximately 100-foot grid)	>90% maximum dry density from appropriate standard Proctor	
vey[2]	CQA survey locations provided in project specifications. In general, survey points include 100-foot spacing along grade breaks and 200-foot grid between slope breaks.	>2% and ≤10% grade, positive drainage, no sharp changes in slope	
SURFACE WATER MANAGEMENT SYSTEM			
Survey[2]	CQA survey locations provided in project specifications. In general, survey points include inlets, outlets, grade breaks, and every 100 or 200 linear feet along channel (based on channel grade)	Field established for positive drainage	CQA Officer

Notes:

[1] Based on project plans, specifications, and CQA Plan.

[2] CQA survey locations are not intended to be sufficient for as-built surveys or construction staking. Electronic files of the design surface are available for use from Ameren Missouri.

[3] This is in addition to the manufacturer's internal QC testing to be provided to the CQA officer before delivery of the product.

[4] Sample 2 feet long by the full roll width.

[5] For Class 1 High Survivability.

TABLE 1 - CONTINUED
SUMMARY OF TESTING FREQUENCY
MEREDOSIA POWER STATION - FLY ASH AND BOTTOM ASH PONDS

Test	Test Frequency[1]	Specification Criteria	Responsible Party
BOTTOM ASH POND BACKFILL - PREQUALIFICATION			
Grain Size Analysis - ASTM C-33-03	1 per source	Sand or Gravel	Contractor
RCRA Metals and CCW Ions as TCLP: SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury SW 846 6010B - Boron SW 846 M4500-CLE - Chloride SW 846 9036 - Sulfate	1 per source (virgin material)	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code (IAC) 620.410(a).	
BTEX Constituents as TCLP: SW846 6260B - Benzene, Ethylbenzene, Toluene, Xylene	1 per source (virgin material)	Below the Class I Groundwater Standards at 35 IAC 620.410(b).	
pH - SW846 9045C	1 per source (virgin material)	Below the Class I Groundwater Standards at 35 IAC 620.410(e).	
IEPA TACO COCs	1 per source (non-virgin material)	Below the Class I Groundwater Standards at 35 IAC 620.410(e).	
BOTTOM ASH POND BACKFILL - MATERIAL PLACEMENT TESTING			
ndard Proctor	1 per 10,000 cubic yards (minimum 1 per material type)	ASTM D 1557	CQA Officer
Field Moisture/Density	5 per acre per 1-foot compacted lift (on approximately 100-foot grid)	>85% maximum dry density from appropriate standard Proctor	
Grain Size Analysis - ASTM C-33-03	1 per 20,000 cubic yards	Sand or Gravel	
RCRA Metals and CCW Ions as TCLP: SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury SW 846 6010B - Boron SW 846 M4500-CLE - Chloride SW 846 9036 - Sulfate	1 per 20,000 cubic yards	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code (IAC) 620.410(a).	
BTEX Constituents as TCLP: SW846 6260B - Benzene, Ethylbenzene, Toluene, Xylene	1 per 20,000 cubic yards	Below the Class I Groundwater Standards at 35 IAC 620.410(b).	
pH - SW846 9045C	1 per 20,000 cubic yards	Below the Class I Groundwater Standards at 35 IAC 620.410(e).	
Applied Sand Thickness	Approximately 100 foot grid intervals	Between 0.50 inches and 0.75 inches.	

Notes:

[1] Based on project plans, specifications, and CQA Plan.

QA survey locations are not intended to be sufficient for as-built surveys or construction staking. Electronic files of the design face are available for use from Ameren Missouri.

[3] This is in addition to the manufacturer's internal QC testing to be provided to the CQA officer before delivery of the product.

[4] Sample 2 feet long by the full roll width.

[5] For Class 1 High Survivability.

TABLE 1 - CONTINUED
SUMMARY OF TESTING FREQUENCY
MEREDOSIA POWER STATION - FLY ASH AND BOTTOM ASH PONDS

Test	Test Frequency[1]	Specification Criteria	Responsible Party
50-MIL HDPE SUPERGRIPNET - PREQUALIFICATION[3]			
Density - ASTM D792	1 per 100,000 square feet per resin lot, with a minimum of 1 per resin lot.[4]	GRI Test Method GM13 (Appendix B)	The contractor and/or manufactuter shall provide samples to the independent laboratory chosen by the CQA officer for testing (testing cost to owner).
Carbon Black Content - ASTM D4218	1 per 100,000 square feet per resin lot, with a minimum of 1 per resin lot.[4]	GRI Test Method GM13 (Appendix B)	
Carbon Black Dispersion - ASTM D5596	1 per 100,000 square feet per resin lot, with a minimum of 1 per resin lot.[4]	GRI Test Method GM13 (Appendix B)	
Thickness - ASTM D5994	1 per 100,000 square feet per resin lot, with a minimum of 1 per resin lot.[4]	GRI Test Method GM13 (Appendix B)	
Tensile Strength and Elongation - ASTM D6693/Type IV Specimen	1 per 100,000 square feet per resin lot, with a minimum of 1 per resin lot.[4]	GRI Test Method GM13 (Appendix B)	
50-MIL HDPE SUPERGRIPNET - MATERIAL PLACEMENT TESTING			
Seam Overlap	All Seams	3-inch (Minimum)	Testing and sampling performed by installer. Destructive samples provided to CQA Officer for third party testing.
Wrinkle Height	All Panels	May Not Fold 4-inch (Maximum) on Slopes 2-inch (Maximum) on Ditches	
Non-Destructive Testing	All Seams	As per Section 4.4.4 of CQA Plan	
Destructive Testing	Minimum One Every 500 Feet (not including retesting)	As per Section 4.4.5 of CQA Plan	

Notes:

[1] Based on project plans, specifications, and CQA Plan.

[2] CQA survey locations are not intended to be sufficient for as-built surveys or construction staking. Electronic files of the design surface are available for use from Ameren Missouri.

[3] This is in addition to the manufacturer's internal QC testing to be provided to the CQA officer before delivery of the product.

[4] Sample 2 feet long by the full roll width.

[5] For Class 1 High Survivability.

TABLE 1 - CONTINUED
SUMMARY OF TESTING FREQUENCY
MEREDOSIA POWER STATION - FLY ASH AND BOTTOM ASH PONDS

Test	Test Frequency[1]	Specification Criteria	Responsible Party
GEOTEXTILE/TURF COMPONENT - PREQUALIFICATION[3]			
Total Product Weight	1 per 400,000 square feet.[4]	ClosureTurf Engineered Turf Component Product Datasheet	The contractor and/or manufactuter shall provide samples to the independent laboratory chosen by the CQA officer for testing (testing cost to owner).
Tensile Strength of Yarn - ASTM D2256	1 per 400,000 square feet.[4]	ClosureTurf Engineered Turf Component Product Datasheet	
Tensile Strength of Product - ASTM D4595	1 per 400,000 square feet.[4]	ClosureTurf Engineered Turf Component Product Datasheet	
Tensile Strength of Product - ASTM D4595	1 per 400,000 square feet.[4]	ClosureTurf Engineered Turf Component Product Datasheet	
Grab Tensile Strength - ASTM D4632	1 per 400,000 square feet.[4]	GRI Test Method GT13(a)[5] (Appendix B)	
Trapezoid Tear Strength - ASTM D4533	1 per 400,000 square feet.[4]	GRI Test Method GT13(a)[5] (Appendix B)	
CBR Puncture Strength - ASTM D6241	1 per 400,000 square feet.[4]	GRI Test Method GT13(a)[5] (Appendix B)	
Permittivity - ASTM D4491	1 per 400,000 square feet.[4]	GRI Test Method GT13(a)[5] (Appendix B)	
Apparent Opening Size - ASTM D4751	1 per 400,000 square feet.[4]	GRI Test Method GT13(a)[5] (Appendix B)	
Ultraviolet Stability - ASTM D7238	1 per 400,000 square feet.[4]	GRI Test Method GT13(a)[5] (Appendix B)	
GEOTEXTILE/TURF COMPONENT - MATERIAL PLACEMENT TESTING			
Seam Overlap	All Seams	3-inch (Minimum)	Testing and sampling performed by installer. Destructive samples provided to CQA Officer for third party testing.
Wrinkle Height	All Panels	May Not Fold 4-inch (Maximum) on Slopes 2-inch (Maximum) on Ditches	

Notes:

[1] Based on project plans, specifications, and CQA Plan.

[2] CQA survey locations are not intended to be sufficient for as-built surveys or construction staking. Electronic files of the design surface are available for use from Ameren Missouri.

[3] This is in addition to the manufacturer's internal QC testing to be provided to the CQA officer before delivery of the product.

[4] Sample 2 feet long by the full roll width.

[5] For Class 1 High Survivability.

TABLE 1 - CONTINUED
SUMMARY OF TESTING FREQUENCY
MEREDOSIA POWER STATION - FLY ASH AND BOTTOM ASH PONDS

Test	Test Frequency[1]	Specification Criteria	Responsible Party
SAND INFILL - PREQUALIFICATION			
Grain Size Analysis - ASTM C-33-03	1 per sand source	Fine Aggegates	Contractor
RCRA Metals and CCW Ions as TCLP: SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury SW 846 6010B - Boron SW 846 M4500-CLE - Chloride SW 846 9036 - Sulfate	1 per sand source	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code (IAC) 620.410(a).	
BTEX Constituents as TCLP: SW846 6260B - Benzene, Ethylbenzene, Toluene, Xylene	1 per sand source	Below the Class I Groundwater Standards at 35 IAC 620.410(b).	
pH - SW846 9045C	1 per sand source	Below the Class I Groundwater Standards at 35 IAC 620.410(e).	
SAND INFILL - MATERIAL PLACEMENT TESTING			
Grain Size Analysis - ASTM C-33-03	1 per 5,000 cubic yards	Fine Aggegates	CQA Officer
RCRA Metals and CCW Ions as TCLP: SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury SW 846 6010B - Boron SW 846 M4500-CLE - Chloride SW 846 9036 - Sulfate	1 per 5,000 cubic yards	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code (IAC) 620.410(a).	
BTEX Constituents as TCLP: SW846 6260B - Benzene, Ethylbenzene, Toluene, Xylene	1 per 5,000 cubic yards	Below the Class I Groundwater Standards at 35 IAC 620.410(b).	
pH - SW846 9045C	1 per 5,000 cubic yards	Below the Class I Groundwater Standards at 35 IAC 620.410(e).	
Applied Sand Thickness	Approximately 100 foot grid intervals	Between 0.50 inches and 0.75 inches.	
ALTERNATE INFILL HYDROBINDER - PREQUALIFICATION			
Manufacturer's Certification	1 per source	Per Specifications	Contractor
ALTERNATE INFILL HYDROBINDER - MATERIAL PLACEMENT TESTING			
Verification that Material Used is the Same as Material Submitted	1 per source	Per Approved Submittal	CQA Officer
Applied Thickness	Approximately 100 foot grid intervals	Between 0.75 inches and 1.0 inches.	

Notes:

[1] Based on project plans, specifications, and CQA Plan.

[2] CQA survey locations are not intended to be sufficient for as-built surveys or construction staking. Electronic files of the design surface are available for use from Ameren Missouri.

[3] This is in addition to the manufacturer's internal QC testing to be provided to the CQA officer before delivery of the product.

[4] Sample 2 feet long by the full roll width.

[5] For Class I High Survivability.

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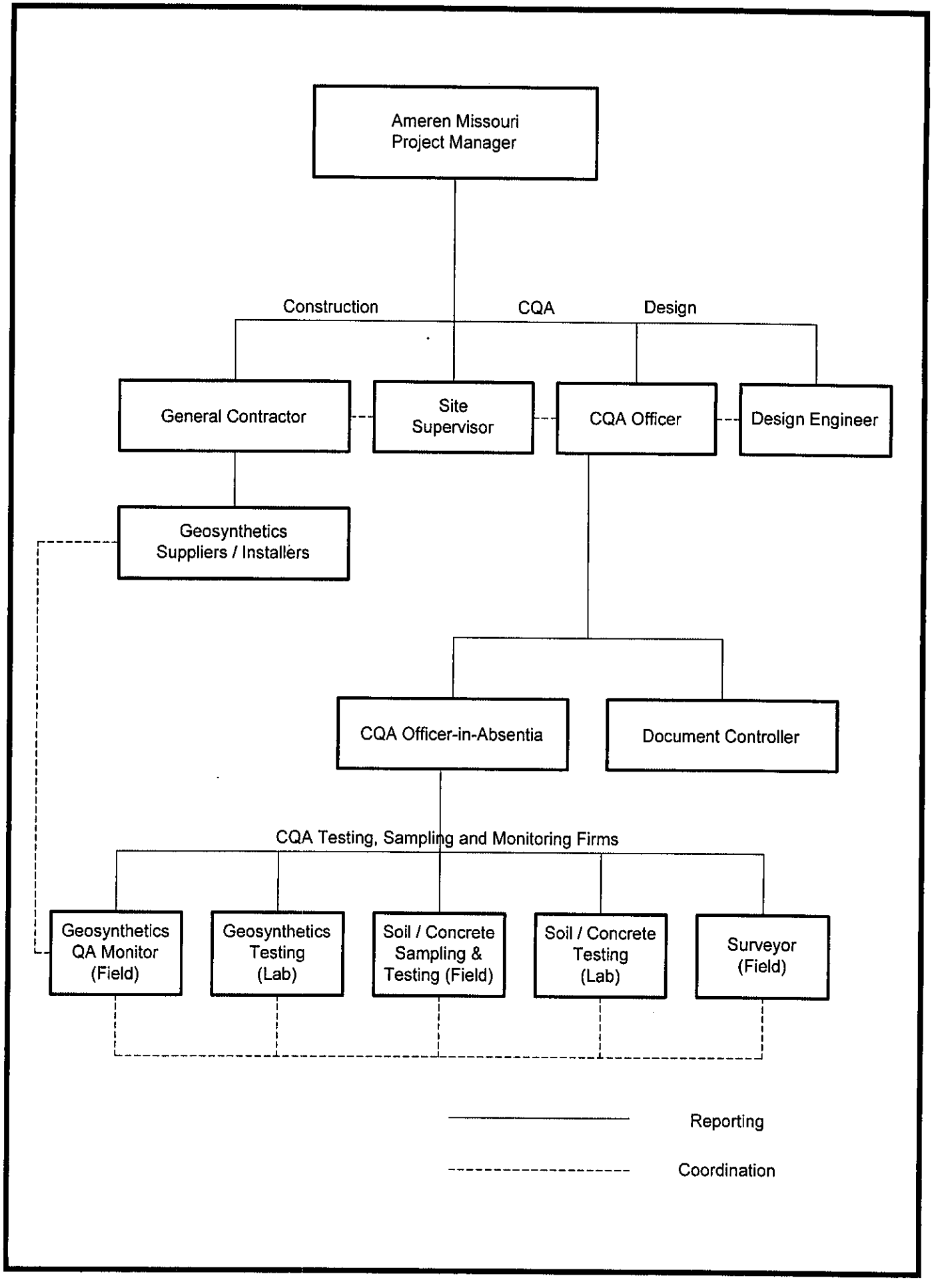
TABLE 2

SUMMARY OF CQA DOCUMENTATION

MEREDOSIA POWER STATION - FLY ASH AND BOTTOM ASH PONDS

Submittal	Responsible Party
Request for Information	General Contractor
Field Change Orders	General Contractor
Log of Authorized Field Change Orders	General Contractor
Shop Drawing Submittals	General Contractor
Calibration Forms	Soil Testing and Surveying Firms
Chain of Custody	Testing Firms
Laboratory Test Results	As appropriate
CQA Subgrade Certification Points	CQA Surveying Firm
"As-built" Surface Water Management System/Final Grade	General Contractor's Surveying Firm
Manufacturer's Guaranteed Properties for Geosynthetics	General Contractor's Geosynthetic Manufacturer
Geosynthetic Roll Inventory	General Contractor's Geosynthetic Manufacturer
Geosynthetic Manufacturer's Guarantee of Product	General Contractor's Geosynthetic Manufacturer
Alternate Fill - HydroBinder Manufacturer's Certification	General Contractor's Geosynthetic Installer
Certificates of Acceptance	General Contractor's Geosynthetic Installer
"As-built" Drawing of Exposed Geomembrane Installation	General Contractor's Geosynthetic Installer
Non-Destructive Field Testing Results	General Contractor's Geosynthetic Installer
Destructive Field Testing Results	General Contractor's Geosynthetic Installer
Meeting Summaries	General Contractor
Daily Reports	CQA Officer
Weekly Summary Reports	CQA Officer
Photographs	CQA Officer
CQA Certification Form	CQA Officer
CQA Acceptance Report	CQA Officer


Ameren Missouri
Project Manager
Construction
CQA
Design
General Contractor
Site
Supervisor
CQA Officer
Design Engineer
Geosynthetics
Suppliers / Installers
CQA Officer-in-Absentia
Document Controller
CQA Testing, Sampling and Monitoring Firms
Geosynthetics
QA Monitor
(Field)
Geosynthetics
Testing
(Lab)
Soil / Concrete
Sampling &
Testing (Field)
Soil / Concrete
Testing
(Lab)
Surveyor
(Field)
Reporting
Coordination

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APPENDIX A

FORMS

Electronic Filing: Received, Clerk's Office 09/28/2020

REQUEST FOR INFORMATION

RFI #: _____ **DATE:** _____

FROM: _____ **TO:** _____

COMPANY: _____ **COMPANY:** _____

PHONE: _____ **PHONE:** _____

FAX: _____ **FAX:** _____

RE: _____

CHECK CATEGORY:

☐ Information not shown on contract documents:

Contract Drawing Reference: _____
Shop Drawing Reference: _____
Specification Reference: _____

☐ Interpretation of Requirements
☐ Conflict in Requirements
☐ Coordination Problem
☐ Other Category

Possible Cost Impact: _____
Possible Time Impact: _____

DESCRIPTION (Use Attached Sheets as Necessary) _____

_____

_____

_____

CC: File

ATTACHMENTS: ☐ Yes ☐ No

_____

_____

_____

RESPONSE

(Use Attached Sheets as Necessary)

_____

_____

_____

_____

_____

_____

DATE: _____ **RESPONSE BY:** _____

Chain of Custody Record

Meredosia Power Station - Closure of Fly Ash and Bottom Ash Ponds

Client				Analysis and/or Method Requested								
Address												
City, State, Zip Code												
Phone / Facsimile No.												
Client Project												
Location												
Sampler(s) / Phone	/											
Turnaround Time	Standard [ ] Rush [ ] Date Required:											
P.O. # or Invoice To												
Contact Person												Remarks or Observations
Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers								

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment

Special Instructions:

Copies: CQA Officer, Testing Firm, and Sampler

Meredosia Power Station - Closure of Fly Ash and Bottom Ash Ponds

DAILY INSPECTION REPORT

TESTING FIRM/INSTALLER: _____ **DATE:** _____

1. CONSTRUCTION ACTIVITIES AND LOCATIONS:

_____

_____

_____

_____

_____

_____

2. TYPE, LOCATION, AND PROCEDURES FOR INSPECTION/SAMPLING/TESTING::

_____

_____

_____

_____

3. TEST DATA

☐ **Attached** ☐ **None Taken**

4. PHOTOGRAPHIC RECORDS

☐ **Attached** ☐ **None Taken**

5. RESULTS OF ACTIVITY:

☐ **Pass** ☐ **Fail** ☐ **Corrective Actions Required** ☐ **See Attached Results**

☐ **See Explanatory Notes on Continuation Sheet** ☐ **Other:** _____

Prepared By: _____

_____
Signature of CQA Officer or Designated Representative

Original Report/Attachments To: Document Controller

Copies to: _____

_____

_____

_____

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DAILY INSPECTION REPORT

ADDITIONAL NOTES:

DATE: _____

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WEEKLY SUMMARY REPORT

1. SUMMARY OF WEATHER CONDITIONS: **Date:** _____

AM Conditions: _____

PM Conditions: _____

Weather Delays: _____

2. EQUIPMENT & PERSONNEL ON SITE:

Equipment: _____

Personnel: _____

Visitors: _____

3. CONSTRUCTION ACTIVITIES AND LOCATIONS:

_____

_____

_____

_____

_____

4. SUMMARY OF MEETINGS HELD/ATTENDEES:

☐ **None** ☐ **See Sheet 2 of 2** ☐ **See Attached Meeting Minutes**

5. MATERIALS USED & TESTING OR INSPECTION RESULTS:

Materials Used: ☐ Stockpiled Soil ☐ GCL ☐ Geomembrane ☐ Geotextile ☐ Aggregate

☐ Off-Site Borrow Soil ☐ CCB Material ☐ HDPE Pipe ☐ Riprap

☐ Other: _____

Testing and/or Inspection Results: ☐ None ☐ See Attached Daily Inspection Reports

Calibration Records for Equipment: ☐ None ☐ See Attached

Prepared By: _____ _____

Signature of CQA Officer-in-Absentia (if applicable)

_____ _____

Signature of CQA Officer

Original Report/Attachments To: Document Controller

Copies to: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

WEEKLY SUMMARY REPORT

ADDITIONAL NOTES:

Date: _____

INSTALLER CERTIFICATE OF ACCEPTANCE

INSTALLER: _____ **DATE :** _____

GEOSYNTHETIC MATERIAL: _____

AREA ACCEPTED: _____

_____

_____

_____

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: _____

Printed Name of Installer's Authorized Representative: _____

Title of Installer's Authorized Representative: _____

Date: _____

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: _____

Date: _____

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

Meredosia Power Station- Closure of Fly Ash and Bottom Ash Ponds

CQA CERTIFICATION

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of next sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

_____

_____

_____

_____

_____

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

_____

_____

_____

_____

_____

3. NEXT SEQUENTIAL WORK TO BEGIN:

_____

_____

_____

_____

_____

_____

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** _____
(Signature)

Distribution: Original To: Document Controller Copies To: _____

APPENDIX B

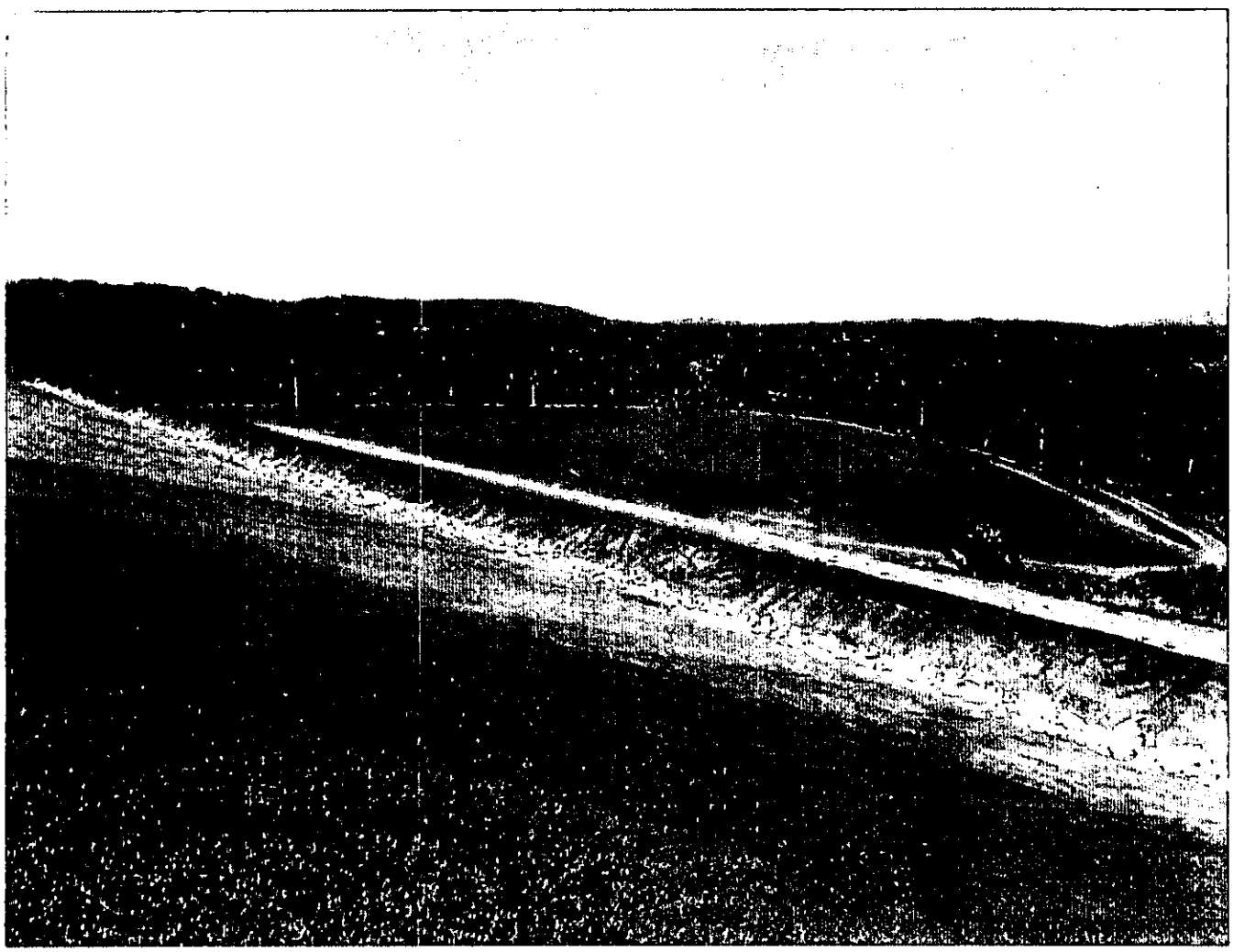
GEOSYNTHETIC TESTING STANDARDS

ClosureTurf®

Installation Guidelines Manual

May 2016

Before utilizing this document as an installation tool, Installer should download the latest version of the Installation Guidelines Manual from the website at www.watershedgeo.com.



WG WatershedGeo®
Unearthing Solutions

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1.0 Introduction

ClosureTurf® is a patented, 3 Component System* that serves as the final cover system on landfills. The 3 components of this unique system are:

Component 1 - An Agru Super Gripnet® LLDPE (or HDPE) geomembrane liner, or other liner approved for use by WatershedGeo.

Component 2 - An Engineered Turf

Component 3 - A sand infill (and/or alternatively, Hydrobinder®, or AmorFill™ -E infill)

*A Watershed Geosynthetics® patented (patent no. 8,585,322) gas collection system is a separate component to be utilized on sites that produce gas emissions. Malfunction Relief Valves are provided at one per acre of ClosureTurf® on landfills where gas emissions are expected.

1.1 Purpose and Scope

The ClosureTurf® Installation Guidelines document has been prepared to provide the Engineer / Contractor / Installer general guidance to the proper installation of the ClosureTurf® System. This document should be used in conjunction with the ClosureTurf® CSI (Construction Standards Institute) Specifications for the proper installation of the product.

2.0 Disclaimer

This manual is meant as a guideline only. Watershed Geosynthetics LLC cannot anticipate the many ways this product may be applied either in design or installation. Varying site conditions will require close coordination between the engineer and the installer to account for site conditions and adjust accordingly. When required by state and/or local regulations, a licensed professional engineer or architect will be required.

ClosureTurf® (US Patent No. 7,682,105, 8,585,322, 9,163,375 and 9,199, 287; Canadian Patent No. 2,663,170; and other Patents Pending) and trademark are the property of Watershed Geosynthetics LLC. All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind,

expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

3.0 Definitions

Whenever the terms listed below are used, the intent and meaning will be interpreted as indicated.

Acclimation

Physiological/thermal adjustment. Required in the geomembrane deployment process.

ArmorFill™

Armor-Fill™ Liquid Emulsion is a proprietary Polymer Emulsion product used to bind the ASTM-C33 sand infill component of the ClosureTurf® System.

ASTM

ASTM International, known until 2001 as the American Society for Testing and Materials, is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

ClosureTurf®

A patented 4 component system consisting of a Watershed Geosynthetics specific Gas Management System (if applicable), a Structured Geomembrane (LLDPE or HDPE), an Engineered Turf, and a specific grade of sand infill (or alternatively a HydroBinder® infill material).

Construction Quality Assurance (CQA)

Construction Quality Assurance includes but is not limited to observations and documentation of materials and workmanship necessary to show that a particular project is being constructed according to site-specific specifications and within regulatory guidelines.

Construction Quality Assurance (CQA) Personnel

Construction Quality Assurance (CQA) personnel are representatives of the Professional of Record (POR) who work under direct supervision of the POR. The CQA personnel are responsible for quality assurance monitoring, applicable conformance sampling and performing onsite tests and observations.

Construction Quality Assurance Professional of Record (POR)

The POR is an authorized representative of the Owner and has overall responsibility for CQA efforts and to confirm the project was constructed in general accordance with site-specific specifications approved by the regulatory authority and contract documents. The POR must be

licensed as a Professional Engineer in the State the project is located and experienced in geosynthetics.

Construction Quality Control (CQC) Personnel

CQC Personnel are representatives of the Geosynthetics Installer who work under direct supervision of the Geosynthetics Installer. The Geosynthetics Installers' CQC Personnel are responsible for construction quality control, applicable conformance sampling and performing onsite tests and observations.

Contract Documents

Written, printed, or electronic matter that provides information or evidence that serves as an official record and are issued by the owner or operator. The documents include bidding requirements that include but are not limited to, contract forms, contract conditions, contract specifications, CQA plan, contract drawings, addenda, and contract modifications.

Contract Specifications

The requirements which are to be followed in the construction of the ClosureTurf® System. The standard specifications, supplemental specifications, special provisions, and all written or printed agreements and instructions that pertain to the method and manner of performing the work.

Contractor

One that agrees to furnish materials or perform services at a specified price, especially for construction work.

Design Engineer

An individual licensed to practice as a Professional Engineer or a Professional Service Firm that is responsible for the preparation of the project construction drawings and specifications.

Earthwork

A general engineering term relating to the relocation and utilization of soil during the process of construction.

Engineered Turf

A component of the ClosureTurf® System. A synthetic structured material consisting of one or more geotextiles tufted with polyethylene yarns that resemble grass blades.

Final Cover System Evaluation Report (FCSER)

Upon substantial completion of closure activities, the POR is responsible for the documentation of construction activities relating to the project, and any other inspections or verifications required by the regulatory authority. The FCSER will be signed and stamped by the POR and include documentation necessary for certification closure.

Fish Mouth

A semi-conical opening of the seam that is formed by an edge wrinkle in one sheet of the geomembrane component.

Geomembrane

A synthetic lining material that is a component of the ClosureTurf® System. Used as the primary barrier to infiltration and exfiltration of covered materials.

GSI

Geosynthetic Institute

475 Kedron Avenue

Folsom, PA 19033-1208 USA

TEL (610) 522-8440

FAX (610) 522-8441

HydroTurf®

A patented 3 component system consisting of a Structured Geomembrane Liner, a specialized Engineered Turf, and HydroBinder® infill material.

HydroBinder®

A proprietary pozzolanic infill utilized where higher surface water velocities may occur as well as in anchor trenches where specified.

Geosynthetics Contractor / Installer

The entity responsible for geosynthetic installation.

Independent Testing Laboratory

An organization, person, or company that tests products and materials, etc. according to agreed requirements. The entity shall be independent of ownership or control by the Owner or any party to the construction of the final cover or the manufacturer of the final cover products used. The entity shall also have proper legal authority where required to issue opinions and document the results of tests requested by the Owner.

Installation Supervisor

The person on-site who works for the Geosynthetics Installer and is in charge of the Geosynthetics Personnel and following the site specifications for the installation of the geosynthetics.

Manufacturing Quality Control (MQC)

A planned system of inspection and verification to ensure the quality of the final product.

Nonconformance

A deficiency in characteristics, documentation, or procedures that render the quality of an item or activity unacceptable or indeterminate. Examples of non-conformances include, but are not limited to, physical defects, test failures, and inadequate documentation.

Operator

The entity in control and responsible for the facility.

Owner

The entity that owns facility and land.

Owner's or Operators Representative

An official representative of the Owner or Operator responsible for planning, organizing, and controlling construction activities.

Panel

A general reference to a unit area of either the Structured Geomembrane (LLDPE or HDPE), or the Engineered Turf component of the ClosureTurf® System.

Quality Assurance

A planned and systematic pattern of procedures and documentation to ensure that items of work or services meet the requirements of the contract documents.

Quality Control

These actions provide a means to measure and regulate the characteristics of an item or service to comply with the requirements of the contract documents.

Relief Valve

A mechanical device used specifically to relieve gas buildup pressure underneath the ClosureTurf® system.

Representative Sample

(With respect to geomembrane destructive testing) - A random specimen of either the Structured Geomembrane (LLDPE or HDPE) or the Engineered Turf component consisting of 1 or more cut pieces (commonly referred to as coupons) from the same rectangular portion of material, oriented along a seam that is removed for field or laboratory testing purposes.

Ripple

Smaller in nature than a wrinkle. A result of thermal/or manufacturing that cannot be folded over.

Snapping

A manual method to an open ended seam to remove tenting as a result of the welding of the geomembrane seams.

Spike

A systematic design for interface friction located on the bottom of the Super Gripnet®.

Specimen

(With respect to geomembrane destructive testing) - A specimen is the individual test strip (sometimes called coupon) from a sample location. A sample location can consist of many specimens.

Studs

A systematic design for drainage located on the top side of the Super Gripnet®.

Surficial Collection Foot

A manufactured device utilized specifically for collection of gas beneath the Super Gripnet®.

Surficial Strip

A strip of Super Gripnet® used for gas conveyance below the ClosureTurf® system.

Tenting

A vertical ridge that is caused by wedge welding geomembrane.

Wrinkle

A portion of the geomembrane that does not lay relatively flat and is not a result of subgrade irregularity and which can be folded over.

4.0 Subgrade Preparation

Prior to ClosureTurf® system installation, the subgrade (e.g., protective cover soil) will be inspected. Observe the following:

- The protective cover soil is substantially free of surface irregularities and protrusions.
- The protective cover soil surface does not contain stones or other objects that could damage any of the ClosureTurf® components.
- The surface will be substantially smooth and free of foreign and organic material, sharp objects, particles or other deleterious material.

- Maximum particle size (e.g. rocks) will be specified by the by the design and contract specifications.
- The anchor trench dimensions have been checked, and the trenches are free of sharp objects and other deleterious material.
- Construction stakes and hubs have been removed and the resultant holes have been backfilled.
- The geosynthetics contractor, POR or his representative, and the permittee or his representatives have certified in writing that the surface on which the ClosureTurf® System will be installed is acceptable.
- Final grades on the slopes as well as benches dimensions and grades conform to the design grades.
- Survey shots and as-built drawings will be carefully reviewed and evaluated to insure the surface grades will drain as intended in the design drawings.

5.0 Installation - Surficial Gas Management System

5.1 Minimum Requirements

The gas management plan will include at a minimum, the use of provided ClosureTurf® Malfunction Relief Valves, (See Figure 3) to meet the specific needs of the intended site. The minimum required gas emission venting device will be installed at a rate of at least one vent per acre of installed ClosureTurf® (See Figure 1). Watershed Geosynthetics LLC supplies the minimum number of Malfunction Relief Valves with delivery of the ClosureTurf® product.

5.2 Surficial Collection Design (Where Applicable)

While it should be noted that not all projects will incorporate a surficial collection design, the ClosureTurf® system serves as an effective tool for control of fugitive emissions and can be incorporated into a conventional gas collection system or in some cases as a standalone gas collection and control system. A ClosureTurf® surficial collection design will incorporate the use of surficial collection strips (See Figure 1) that provide high flow capacity (See Figure 2) and a larger radius of influence. The system design will also incorporate the surficial collection foot (See Figure 4) that serves as a wellhead base, geomembrane interface and gas conveyance path from the strips to the collection wellhead (not provided).

5.2.1 Surficial Strips (Where Applicable)

Surficial strips are to be placed prior to the placement of geomembrane. Surficial Strips may consist of SuperGripnet®, single sided geocomposite or other techniques that will allow for the proper flow of gas without causing ballooning. The placement of the strips will be determined by the design engineer and included in the gas management plan.

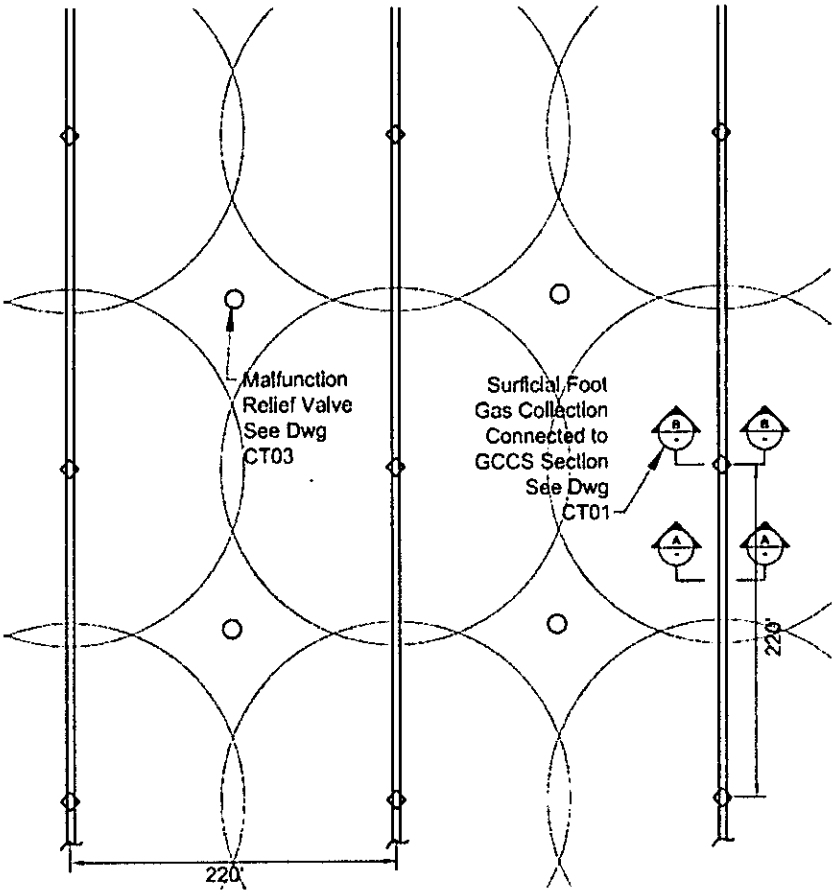
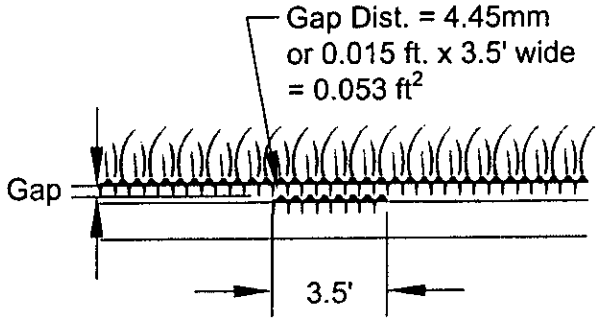


Figure 1: Typical Surficial Collection Strip Placement



Use Super Gripnet or Single Sided Geocomposite for Strips

Figure 2: Effective Cross Sectional Area: Surficial Strips

5.2.2 ClosureTurf® Malfunction Relief Valve

The Malfunction Relief Valve is a mandatory component of the ClosureTurf® System. The primary purpose of this component is to provide for necessary release of pressure in the event the gas collection system malfunctions. The Malfunction Relief Valves will be placed at one per acre as indicated by the site's gas management plan and installed during construction of the ClosureTurf® system.

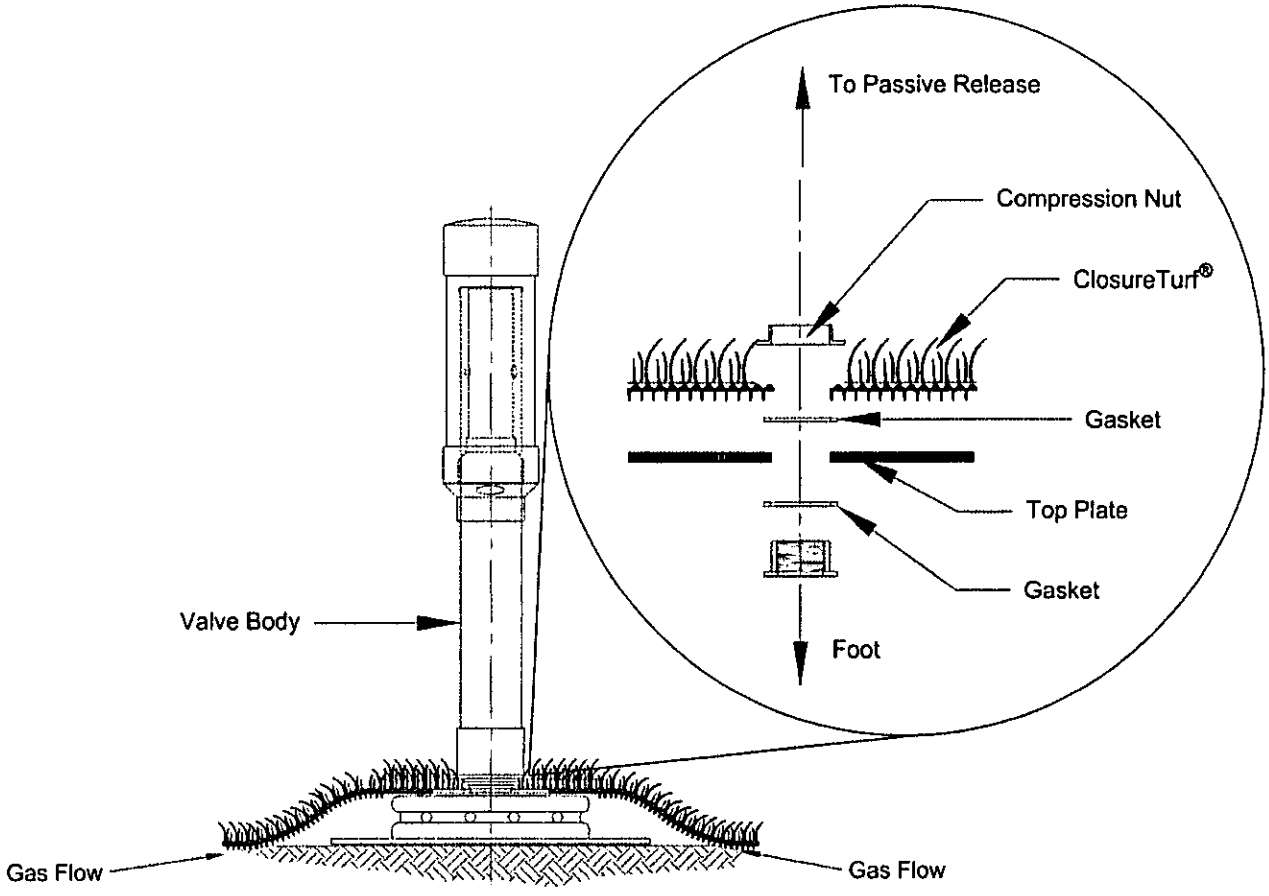


Figure 3: ClosureTurf® Malfunction Relief Valve (Patent Pending)

5.2.3 ClosureTurf® Collection Foot

This device is designed to be the interface between the surficial collection strips, the geomembrane and a gas collection wellhead (not provided). The unit allows vacuum to flow in from beneath the geomembrane and from the surficial collection strips to create a larger radius of influence for gas collection. Placement will be determined by the gas collection system design.

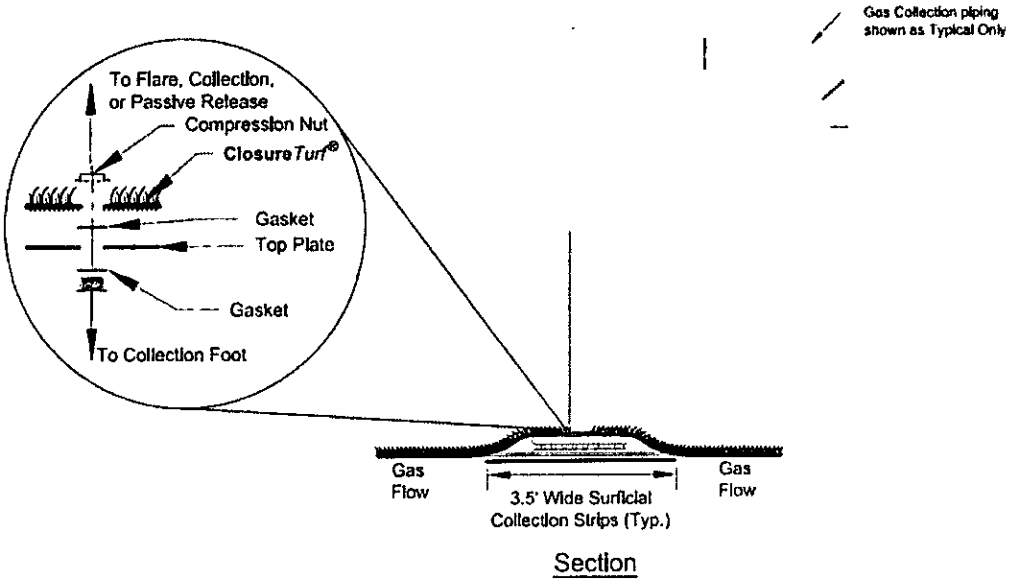


Figure 4: ClosureTurf® Surficial Collection Foot Connection to GCCS System

6.0 Installation - Geomembrane Liner

Installation of the Geomembrane Liner must be completed by a geosynthetics contractor approved by Watershed Geosynthetics. Qualification requirements for geosynthetics personnel are shown in WatershedGeo Installation Specification 01 73 19. Each component of the ClosureTurf® system will require specific testing and submittals before, during and after installation of the component. For information concerning submittals, see contract specifications. It is the responsibility of the contractor to ensure that each prior component installation has been approved by the POR before continuing with installation of the next ClosureTurf® component.

6.1 Delivery – Geomembrane Liner

Upon delivery of the geomembrane, observe that:

- The geomembrane is delivered in rolls and not folded. Any evidence of folding or other shipping damage is cause for rejection of the material.
- Equipment used to unload and store the rolls or pallets does not damage the geomembrane component.
- The geomembrane is stored in an acceptable location in accordance with the specifications and stacked no more than five rolls high.
- The geomembrane component is protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat, or other damage.
- Manufacturing documentation required by the specifications has been received and reviewed for compliance with the technical specifications. This documentation will be included in the FCSER.
- The geosynthetics receipt log form has been completed for materials received.
- Geomembrane component that is damaged or has been rejected due to improper manufacturer documentation will be removed from the site or stored at a location separate from the accepted geomembrane component.

6.2 Installation - Panel Deployment and Field Seaming

ClosureTurf® installation requires some additional care and techniques beyond those of the typical geomembrane installation. General panel deployment techniques as well as special techniques are listed below.

General

- Observe that the geomembrane component is placed in direct and uniform contact with underlying protective cover soil or subgrade soil.
- Observe the sheet surface as it is deployed and record panel defects and repair of the defects (e.g. panel rejected, patch installed, etc.) on the repair sheet. Repairs must be made in accordance with the contract specifications and located on a repair drawing.
- Observe that support equipment is not allowed on the geomembrane component during handling (See Section 6.4).
- Observe that the subgrade beneath the geomembrane component has not deteriorated since previous acceptance.
- Observe that there are no stones, construction debris, soil clogs or other deleterious items on the subgrade that could cause damage to the geomembrane component.
- The geomembrane component will not be deployed during inclement weather conditions as defined in the site specific specifications.
- Observe that people working on the geomembrane component do not smoke, wear boots/shoes that could damage the ClosureTurf® system components, or engage in activities that could damage the ClosureTurf® system components.
- Observe that the method used to deploy the sheet reduces wrinkles but does not cause bridging and that the sheets are anchored to prevent lifting or movement by the wind (geosynthetics contractor is responsible for any damage to or from windblown geomembrane).
- Observe that horizontal or cross seams on the side slopes are staggered so that long horizontal seams across the slope are not produced.
- The POR shall be responsible for approving the integrity of horizontal seams.

Acclimation and Adjustments

- The geomembrane component requires acclimation to ambient temperature after being deployed and before seaming operations begin.
- Acclimation time is dependent on the current weather conditions.
- By allowing the panels to acclimate, excessive wrinkling can be avoided.
- Final panel adjustments can be completed after the panel has properly acclimated to ambient temperature.
- After the panel has acclimated and before seaming operations begin, wrinkles will be worked toward the toe of slope.
- Once the above items are addressed, a final adjustment is required to pull the liner at the bottom of the slope.

Wedge Welding

- After proper acclimation and final adjustments/wrinkle removal, wedge welding may proceed.
- Wedge welding machines are a low profile machine with a vertical height (wedge height) not to exceed 3 inches, measured from flat surface to top of heating wedge.
- Wedge welding will be completed in accordance with the contract specifications.
- Sand bags will be applied as the wedge welding progresses to reduce tenting.

Snapping

- As a result of wedge welding, "ridges" or "tenting" of the seams may occur. A process called "snapping" must be employed to remove the excess slack caused by the welding process.
- Normally, this technique requires several people lined up along the open seam at the edge of the geomembrane and applying clamps to the edge. The panel is then "snapped" into positon and when applied properly, the excess slack is removed.
- The snapping technique will be applied while the welding seam is still warm.
- Previously applied sand bags along the wedge welded seam will reduce rebound tenting.

6.3 Anchor Trench Backfill

ClosureTurf® only relies on the anchor trenches to serve as a termination point. Top anchor trenches should be backfilled as quickly as practical after Engineered Turf Component is installed (prior to sand infill placement).

Vertical anchor trenches as well as anchor trenches along the toe will not be backfilled until sand infill of the engineered turf is in place. Anchor trench dimensions will be shown in the drawings.

Backfilling or sand bag loading the bottom and side anchor trenches should be considered and applied when cool temperatures are anticipated to assist with creep reduction.

6.4 Equipment on ClosureTurf® Geomembrane

Construction equipment on the ClosureTurf® geomembrane component will be limited to reduce the potential for geosynthetics damage. Observe/provide the following:

- Use power source generators capable of providing constant voltage to all required equipment under combined-line load.
- Secondary containment to catch spilled fuel under equipment where applicable.
- No equipment with tire or track pressures exceeding 5 psi will be allowed on the partially constructed ClosureTurf® system until after the completed installation of the sand infill component.
- No equipment will be left running and unattended over the constructed geomembrane component.
- Equipment operators shall check for sharp edges, embedded rocks, or other foreign materials stuck into or protruding from tires prior to operating equipment on the geomembrane component.
- Path driven on geomembrane component will be as straight as possible with no sharp turns, sudden stops or quick starts.

6.5 Wrinkles

Wrinkles occur during the geomembrane installation due to changes in geomembrane temperatures and deployment methods. The wrinkles may interfere with the installation of the engineered turf layer as well as the final appearance of the ClosureTurf® system. Observe that:

- Snapping procedures are followed.
- Wrinkles are repaired if they can be folded over as defined the morning after the seam is developed and the liner is in a cool state.

7.0 Installation – Engineered Turf

Qualification requirements for the personnel who the Engineered Turf component are shown in WatershedGeo Installation Specification 01 73 19.

7.1 Delivery – Engineered Turf

Box trucks will deliver 27 rolls per truck. Rolls will be strapped in groups of 9 allowing equipment (i.e. pick-up truck, skid steer) to pull the grouped rolls to the front of the truck. Rolls can be pulled directly to the ground or carpet stingers can move the rolls to a designated area. Observe the following:

Observe the following:

- The engineered turf is wrapped in rolls with protective covering.
- The rolls are not stacked more than 3 high.
- The rolls are not damaged during unloading.
- Protect the engineered turf from mud, soil, dirt, dust, debris, cutting, or impact forces.
- Each roll must be marked or tagged with proper identification.
- Rolls that have been rejected due to damage are be removed from the site or stored at a location separate from accepted rolls, designated by the Owner/Operator.
- Rolls that do not have proper manufacturer's documentation will be stored at a separate location until documentation has been received and approved.

7.2 Installation – Engineered Turf - Surface Preparation

Prior to installation of Engineered Turf, observe the following:

- ClosureTurf® geomembrane has been installed in accordance with the contract specifications.
- The geomembrane installation documentation has been completed and approved by the POR for areas were the Engineered Turf is to be installed.
- The supporting surface (i.e., the geomembrane) does not contain stones, debris, membrane grindings or large scraps left over from the installation process that could damage or impede surface water flow through the Engineered Turf.

7.2.1 Installation – Engineered Turf – Deployment & Field Seaming

During deployment of Engineered Turf, observe the following:

- Observe the turf as it is deployed.
- Verify that equipment used does not damage the turf or underlying geomembrane by handling, trafficking, leakage of hydrocarbons, or by other means.
- Verify that during deployment, the Engineered Turf filaments point upslope a majority of the time.
- Verify that the turf is anchored to prevent movement by the wind (the contractor is responsible for any damage resulting to or from windblown Engineered Turf).
- Verify that the turf remains free of contaminants such as soil, grease, fuel, etc.
- Observe that the turf is laid substantially smooth and substantially free of tension, stress, folds, wrinkles, or creases.
- Observe the deployment of the panels to insure proper flipping in order to expose the turf surface up after seaming operations. After the first panel of the project is deployed, deployment will be done on the adjacent turf panel to avoid damage.

7.2.1.1 Installation – Engineered Turf – Sewn Seam Method

- A single stitch prayer type seam is constructed using an American Newlong sewing machine or equivalent.
- The thread will be Polyester or equivalent.
- Sewing will occur between the 1st and 2nd row of tufts from the edge.

7.2.1.2 Installation – Engineered Turf – Fusion Seaming Method

- Engineered Turf fusion seaming device will be a DemTech VM20/4/A fusion welder only.
- Fusion seams require a minimum of 5 inches of overlap.
- Frayed or loose geotextile strands will be cut off or removed.
- Prior to starting the production fusion seaming, trial seams must be performed as outlined in Section 7.2.1.3 below.
- Demonstrate the preparation methods and equipment utilized for removal of the salvage from the outside edge of the rolls of turf (i.e. trimming & cutting devices).
- Mechanical trimming and cutting devices will be utilized for salvage trimming.
- Demonstrate and control the fraying of geotextile strands when performing the removal of salvage.
- Any damage that occurs due to production seaming will be repaired as outlined in WG Installation Guidance Documents.
- Any defects will be repaired as outlined in 7.2.2.

7.2.1.3 Installation – Engineered Turf – Fusion Seaming Method Trial Seam Requirements

1. Prior to turf component welding, CQA personnel shall observe and document the following:
    a. Turf welding apparatus are tested;
    b. at daily start-up; and
    c. immediately after any break; or

d. anytime the machine is turned off for more than 30 minutes.

2. Procedures:

a. The turf trial weld will be completed under conditions similar to those under the panels that will be welded.

b. If at any time, the CQA Personnel believe that an operator or fusion welding apparatus is not functioning properly, a Field Trial Seam Test must be performed.

c. Any dispute concerning proper installation techniques or the proper function of fusion welding equipment will be resolved by the OWNER'S REPRESENTATIVE.

d. The trial weld must be allowed to cool to ambient temperature before seam snapping or panel adjustments are applied.

3. Trial Sample Test Results:

a. Trial weld samples must comply with "VISUAL PASSING CRITERIA" Visual passing criteria is verified when a manual peel/pull test is performed and the top turf panel tufts transfer to the bottom turf panel. The transfer of approx. 75% of the tufts constitutes a passing trial weld.

4. Field Seam Test Failure:

a. Less than approx.75% of the top turf panel tufts do not transfer to the bottom turf panel.

5. Additional Trial Sample Testing Requirements:

a. Two consecutive trial welds meet the visual passing criteria.

6. The trial weld sample must be a minimum of 3 feet long and 12 inches wide, with the seam centered lengthwise.

7. If a welding apparatus exceeds 5 hours in the second half of the day, another trial seam must be performed.

8. CQA documentation of trial seam procedures will include the following:

a. The names of the seaming personnel;

b. The name of the fusion seaming technician;

c. the welding apparatus number, time, date;

d. ambient air temperature; and

e. welding apparatus temperature & speed setting.

7.2.2 Installation – Engineered Turf Repairs and Tie-In Procedures

When Repairs and Tie-Ins to Engineered Turf occur, observe the following:

- Tie-In's to Engineered Turf will be completed by using a fusion seam.
- Seaming equipment for Engineered Turf will be a DemTech VM 20/4/A welder.
- A hand held heat gun should be used in smaller/concentrated areas.

7.2.3 Installation – Equipment on Engineered Turf

No equipment will be allowed on slopes exceeding 15% until Sand Infill is in place. On slopes less than 15%, such as top decks, ATV type vehicles will be allowed prior to infill placement if the rubber tire or track pressure is less than 5 psi. Post construction (full specified sand infill thickness) drivability tire pressures on slopes greater than 10% should be limited on the ClosureTurf® system to less than 35 psi.

Allowable rubber tire or track pressures on top decks may increase to as much as 120 psi as long as sustained traffic load is not expected.
In all phases of construction, equipment used on the ClosureTurf® product will not be allowed to change speed or direction in a manner that could displace or damage the ClosureTurf® system.
High traffic areas will require sand to be placed at the full height of the turf. ArmorFill may also be utilized in high traffic areas to reduce sand migration due to the increased sand thickness.

8.0 Installation - Sand Infill

This component of the ClosureTurf® system is a specialized mixture of sand infill that is placed between the tufts of the Engineered Turf component.

Observe that the following general requirements regarding Sand Infill are met:

- Sand Infill will meet ASTM C-33 specifications.
- Areas that are to receive sand infill must be inspected and accepted by the POR or CQA Personnel before placement of sand infill takes place.

8.1 Submittals and Testing - Sand Infill

See contract specifications for Sand Infill MQC Submittals and submittal/testing requirements regarding the Sand Infill.

8.2 Installation - Sand Infill Deployment

Observe that the following installation guidelines regarding the Sand Infill:

- Sand infill thickness will be verified at a frequency of 20 measurements per acre of final cover installed.
- The sand infill layer will be placed to a ½ inch minimum thickness not to exceed ¾ inch thick.
- The sand infill will be worked into Engineered Turf as infill between the synthetic yarn blades.
- No equipment will be allowed on slopes exceeding 15% until the sand infill is in place.
- Conveyor systems and/or Express Blowers are the preferred method to spread and place the sand infill.
- Contractor shall explain in detail in the pre-construction meeting the method of sand infill deployment to be used.
- The sand infill deployment method will be approved prior to installation of the sand infill.
- For slopes 3H: 1V or steeper the sand infill shall be placed using long reach conveyor belts or using water or air express blower methods that demonstrate achievable results.
- The sand infill placement will be done in front of the deployment equipment to improve the bearing capacity of the previously installed ClosureTurf® components.
- Sand infill placement cannot occur with snow or ice on the Engineered Turf component.
- Verify that underlying geosynthetics installations are not damaged during placement operations. Mark damaged geosynthetics and verify that damage is repaired.

The method for measuring the Sand Infill thickness will be performed utilizing a digital caliper with depth rod capabilities, or a POR approved alternate measuring device.

8.3 - Alternate Infill - ClosureTurf® with HydroBinder® Infill for Ditches and Downslope Channels

Alternate Infill - HydroBinder® is provided by Watershed Geosynthetics or approved supplier. When the ClosureTurf® system is installed and HydroBinder® infill is placed in lieu of sand infill, it creates a ditch/downslope lining armor that will allow high flow velocities to convey without damage or maintenance to the underlying ClosureTurf® components. Typical ClosureTurf® installation procedures are used for the first three ClosureTurf® components, and then the HydroBinder® infill is placed dry and hydrated after placement. Figure 4 shows a typical ClosureTurf® with HydroBinder® infilled ditch section.

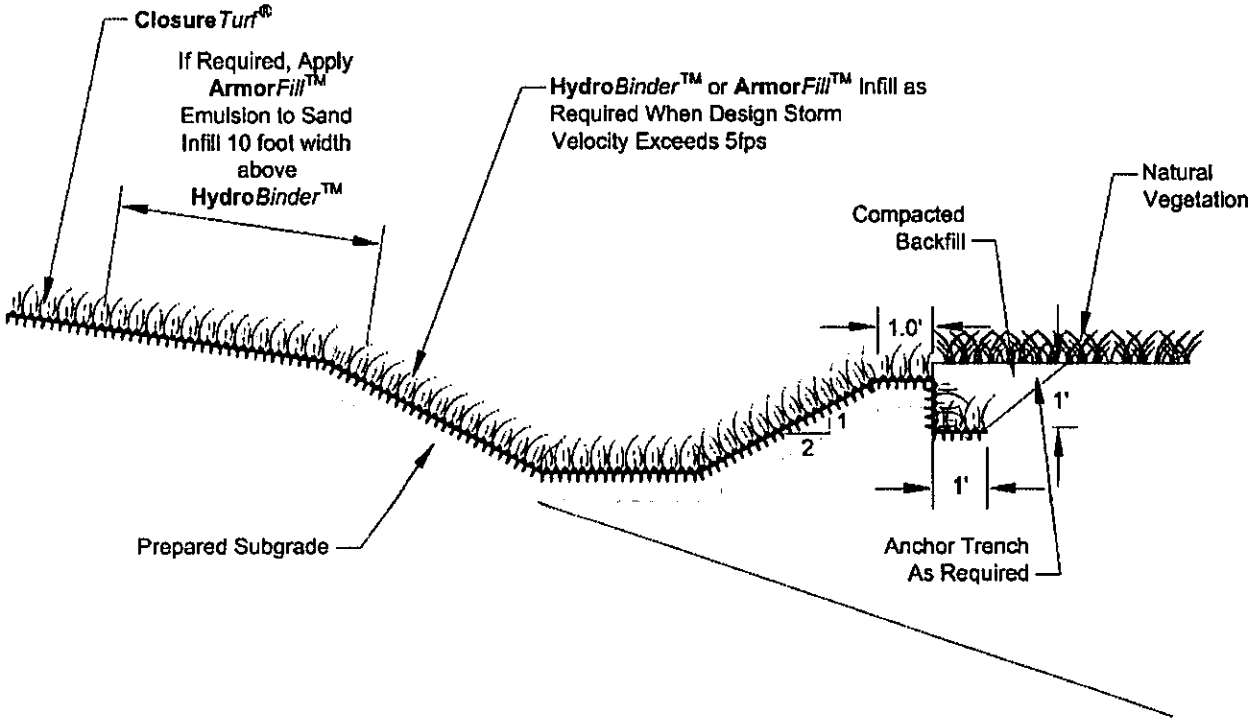


Figure 4: Typical ClosureTurf® with HydroBinder® Infilled Ditch Section

8.4.1 Installation – Alternate Infill - HydroBinder®

Verify the following regarding installation of HydroBinder® Infill:

- The HydroBinder® infill layer may be placed using any appropriate equipment capable of completing the work while meeting loading requirements specified herein.
- Manual hand spreading is acceptable when equipment isn't practical.
- Contractor / Installer will explain in detail in the pre-construction meeting the method of HydroBinder® infill deployment.
- Installation of HydroBinder® infill will only be performed by a Watershed Geosynthetics' licensed and approved installer using techniques and equipment approved by Watershed Geosynthetics.
- The HydroBinder® will be installed into the turf while it is in a dry state.
- The HydroBinder® will be worked into the tufts so the tufts are in an upright position.
- The HydroBinder® infill layer will be placed to a ¾ inch minimum thickness not to exceed 1 inch thick.

- Do not backfill anchor trenches until turf has been installed with HydroBinder® infill.
- The hydration process must occur the day of the HydroBinder® infill placement.
- The desired HydroBinder® infill thickness will be achieved prior to the hydration process.
- The cemented infill is hydrated thoroughly however care must be taken to avoid displacement of the non-hydrated infill.
- The objective is to soak the area to start the hydration process but not to inundate with water beyond saturation.
- Once hydration is completed as described, backfill and compaction of the vertical anchor trenches should take place.
- The HydroBinder® will be at minimum performance levels within 24 hours.

8.4.2 Installation – Alternate Infill - ArmorFill™

Verify the following regarding installation of ArmorFill™ Infill:

- Installation of ArmorFill™ will be completed by an installer certified by Watershed Geosynthetics.
- Apply ArmorFill™ under dry weather conditions and when precipitation is not expected for at least 24 hours after installation.
- Apply ArmorFill™ on a previously installed ClosureTurf® system that is free of leaves and other material that may inhibit the penetration of the ArmorFill™ into the sand component.
- Apply ArmorFill™ only after approval of the finished ClosureTurf® product installation.
- Verify ArmorFill™ and water mix ratio by logging volume mixed of each component.
- Verify that ArmorFill™ has saturated the sand by inserting a probe and displacing a 1 inch area of sand.
- Check saturation randomly at a rate of 20 probes per acre.
- Verify proper application rate by marking a known area and applying the proper volume to that area.
- Adjust delivery rate to match the delivery volume per area.
- Mix in a hydraulic conveyance system such as a water truck or portable tank.
- Utilize a small agitation pump to mix and recirculate the ArmorFill™ within the tank to impede separation of the mix.
- Place ½ of the water component in the tank, then add the full strength ArmorFill™ and complete the mix by then adding the other ½ of the water into the tank.
- ArmorFill™ application equipment will have a 2 inch diameter hose with a spray adjustment nozzle and cut off function in the nozzle head.
- Reduce the number of equipment set-ups required and take care with the application hose so as

previously applied ArmorFill™ is not displaced by dragging of the hose.

- Spray product evenly.
- Apply ArmorFill™ at a rate of approximately 2600 gallons of the mixed product per acre (Approx. 0.06 gallons per square foot)
- Do not apply ArmorFill™ in inclement weather or in freezing temperatures.
- At the completion of ArmorFill™ placement activities, clean the equipment thoroughly and purge the tank and hoses of the product.
- All waste product will be disposed of in accordance to site regulations
- Avoid unnecessary foot traffic on the applied product for 24 hours.
- No vehicle traffic is allowed on the applied product for 7 calendar days.

8.5 Installation – Coverage - ArmorFill™

For most applications, use a 6:1 mix ratio unless otherwise stated by the Engineer.

8.5.1 Installation – Coverage - HydroBinder®

Table 1

Approximate Coverage Area for HydroBinder™ Infill

Product	Bag Size	Yield (Cubic Feet)	Coverage in Sq. Ft. for 3/4 in. Thick[1]	Coverage in Sq. Ft. for 1 in. Thick[1]	Amount of Water to Mix per Bag (gal)	Amount of Water (gal) to Apply per Sq. Ft. (3/4 in. Thick)[1]	Amount of Water (gal) to Apply per Sq. Ft. (1 in. Thick)[1]
HydroBinder Infill	40 lbs.	0.3	4.8	3.6	0.6	0.12	0.16
	60 lbs.	0.45	7.2	5.4	0.9	0.12	0.16
	80 lbs.	0.6	9.6	7.2	1.2	0.12	0.16
	1 Cubic Yard (Super Sack)	27	432	324	55	0.13	0.17

[1] - Values are approximate

8.6 Post Installation - Maintenance and Monitoring

The ClosureTurf® System is designed to be a very low maintenance final cover. If maintenance issues or damage occurs to the ClosureTurf® System, please refer to the following guidelines.

8.6.1 Exposed Geotextiles

If the engineered turf backing becomes exposed, then the ASTM C-33 graded infill is to be placed and brushed into the exposed turf backing areas. WG suggested guidance is to evaluate the closure system at a frequency of no less than once every 5 years.

Additionally, UV resistant coating can be applied to the exposed area and sand immediately applied onto the coating material, this provides a flexible UV barrier for the underlying geotextiles. The UV coating product is manufactured by Quikrete, product number 8640 and Sakrete, product number 60205006, concrete sealants and can be purchased at most Lowes & Home Depot Home Improvement stores. ArmorFill™ can also be utilized for this purpose.

8.6.2 Damage to the Geomembrane or Engineered Turf Components

If damage occurs to the geomembrane or geotextile Components, call an approved ClosureTurf® installer for repairs. Contact WatershedGeo® at 770 777 0386 for a list of qualified installers.

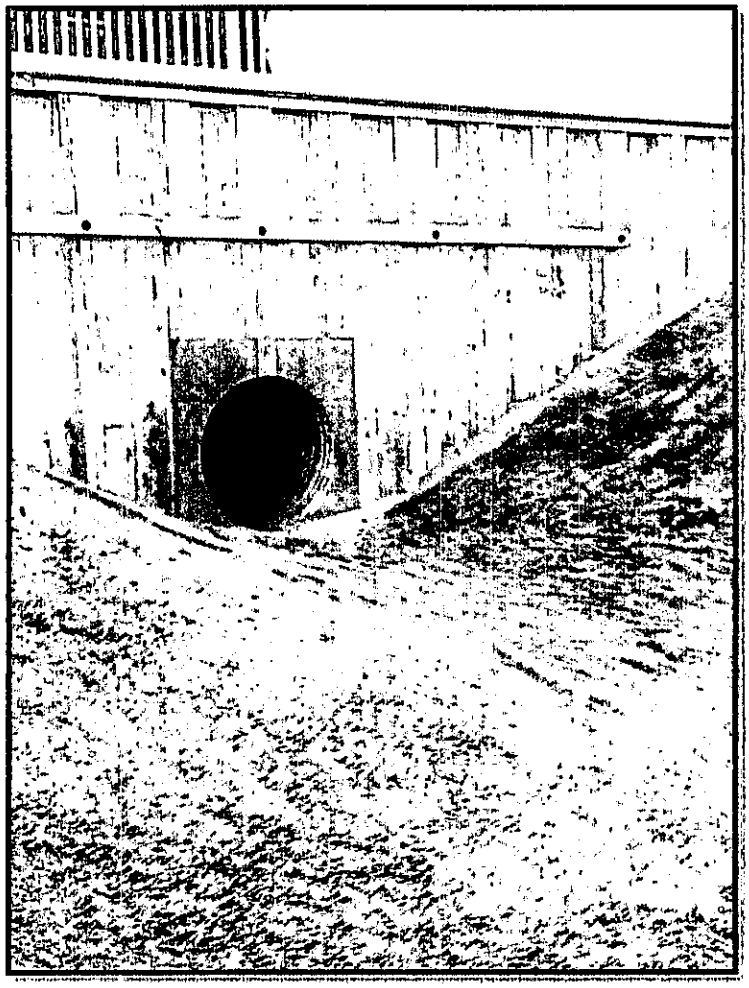
Electronic Filing: Received, Clerk's Office 09/28/2020

HydroTurf®

INSTALLATION GUIDELINES MANUAL

March 2015, Revision 2.1

Before utilizing this document as an installation tool, Installer should download the latest version of the Installation Guidelines Manual from the website at www.watershedgeo.com.



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Unearthing Solutions

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WatershedGeo Unearthing Solutions

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1.0 Introduction

HydroTurf® Advanced Revetment Technology is a patented system which is used as a hardened armoring for protection against erosion from hydraulic forces. There are two HydroTurf® Systems. These systems are as follows:

HydroTurf® CS is shown in Figure 1. The components of this system are as follows:

- Structured LLDPE (or HDPE) Geomembrane Liner
- Engineered Synthetic Turf
- HydroBinder® Infill
- Penetrating Colloidal Concrete Treatment (PCCT) -Optional for Freeze / Thaw Protection

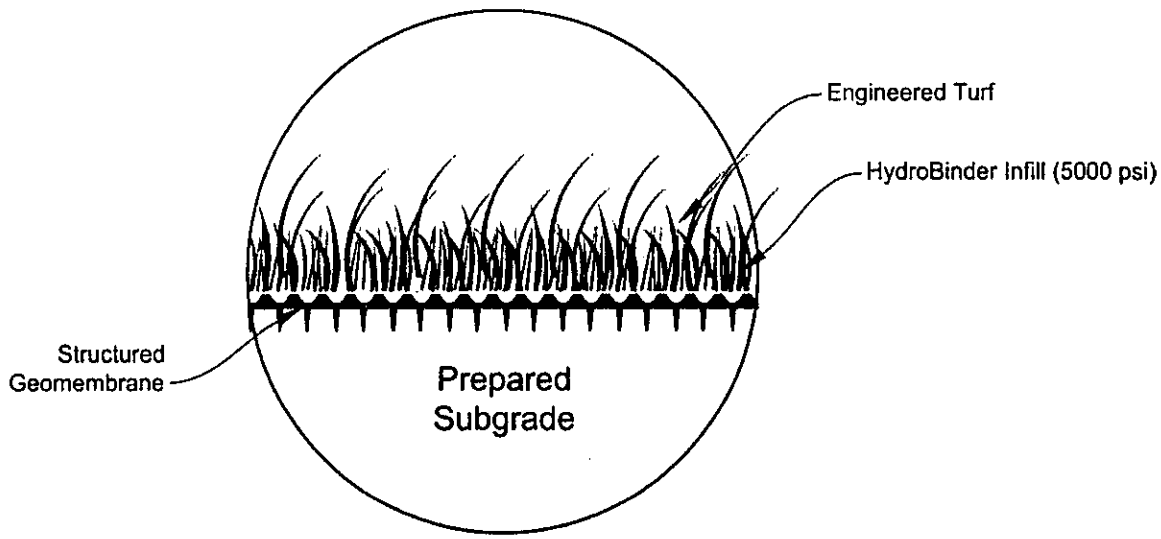

Figure 1 – Section of HydroTurf® CS

HydroTurf® Z is shown in Figure 2. The components of this system are as follows:

- Engineered Synthetic Turf with Integrated Polyethylene Backing
- HydroBinder® Infill
- Penetrating Colloidal Concrete Treatment (PCCT) -Optional for Freeze / Thaw Protection

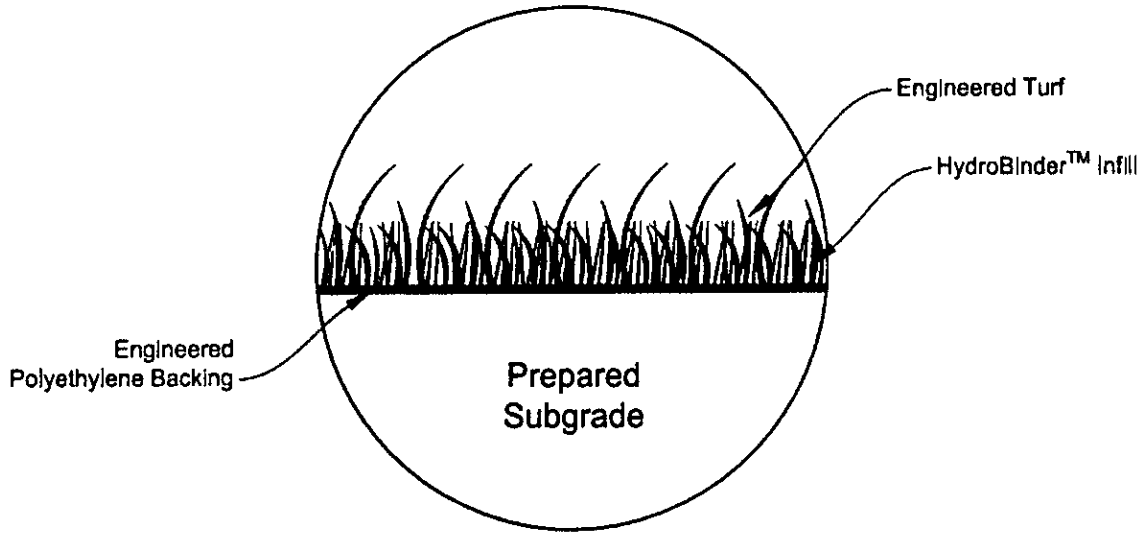

Figure 2 – Section of HydroTurf® Z

2.0 Limitations

This manual is meant as a guideline only. Watershed Geosynthetics LLC cannot anticipate the many ways this product may be applied either in design or installation. Varying site conditions will require close coordination between the engineer and the installer to account for site conditions and adjust accordingly. When required by state and/or local regulations, a licensed professional engineer or architect will be required.

HydroTurf® (US Patent Nos. 7,682,105, 8,585,322; Canadian Patent No. 2,663,170; and other Patents Pending) and registered trademark are the property of Watershed Geosynthetics LLC. All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

3.0 Subgrade Preparation (HydroTurf® CS and Z)

Prior to HydroTurf® system installation, the soil subgrade shall be inspected by the Engineer and geosynthetics contractor. The following shall be observed:

- The soil subgrade shall be compacted to the requirements as specified by the engineer. The subgrade shall be firm and unyielding.
- The soil subgrade shall be smooth and uniform, and shall be substantially free of surface irregularities and protrusions.
- The soil surface shall be free of foreign and organic material, sharp objects, particles or other deleterious material, and shall not contain stones or other objects that could damage any of the HydroTurf® components.
- Maximum particle size (e.g. stones) shall be specified by the design and site-specific specifications.
- The anchor trench dimensions have been checked, and the trenches are free of sharp objects and other deleterious material.
- Construction stakes and hubs have been removed and the resultant holes have been backfilled.
- Final grades on the slopes as well as benches dimensions and grades conform to the design grades.
- Survey shots and as-built drawings shall be carefully reviewed and evaluated to ensure the surface grades will drain as intended in the design drawings.

4.0 Structured Geomembrane Liner Component (HydroTurf® CS only)

Installation of the Structured Geomembrane LLDPE (or equivalent HDPE) Liner must be completed by an approved geosynthetics contractor who can demonstrate significant experience with installation of structured geomembranes. Each component of the HydroTurf® system will require specific testing and submittals before, during or after installation of the component. It is the responsibility of the contractor to ensure that each prior component installation has been approved by the owner's representative before continuing with installation of the next HydroTurf® component.

4.1 Geomembrane Panel Deployment

Engineer shall ensure that all Pre-Installation procedures have been followed before proceeding with deployment of geomembrane. As geomembrane component panel deployment proceeds, the Engineer and the Geosynthetics Contractor shall:

- Ensure the geomembrane component is placed in direct and uniform contact with underlying protective cover soil or subgrade soil.
- Observe the geomembrane surface as it is deployed and record panel defects and repair of the defects (e.g. panel rejected, patch installed, etc.) on the repair sheet. Repairs must be made in accordance with the technical specifications and located on a repair drawing.
- Support equipment is not allowed on the geomembrane component during handling.
- Confirm that the surface beneath the geomembrane component has not deteriorated since previous acceptance.
- Confirm that there are no stones, construction debris, soil clogs or other deleterious items on the subgrade that could cause damage to the geomembrane component.
- The geomembrane component shall not be dragged across a surface that could damage the material. If the geomembrane component is dragged across an unprotected surface, it must be inspected for scratches and repaired or rejected, as necessary.

- The geomembrane component shall not be deployed during inclement weather conditions as defined in the project specific specifications.
- Personnel working on the geomembrane component shall not smoke, wear boots/shoes that could damage the HydroTurf® system components, or engage in activities that could damage the HydroTurf® system components.
- The method used to deploy the geomembrane shall minimize ripples and eliminate wrinkles but does not cause bridging, and that the geomembrane is anchored to prevent lifting or movement by the wind (geosynthetics contractor is responsible for any damage to or from windblown geomembrane). A wrinkle is a portion of the geomembrane that does not lay relatively flat and is not the result of a subgrade irregularity. A wrinkle is large enough that it can be folded over. A ripple is the result of manufacturing or thermal expansion. It is smaller in nature than a wrinkle and cannot be folded over.
- Excess geomembrane materials should be walked-out or removed to the extent practical.
- The geosynthetics contractor shall apply tension techniques to pull out excess material / slack prior to seaming.
- The geomembrane component shall acclimate to the ambient temperature prior to welding. The ambient temperature is defined as the temperature of previously deployed and welded geomembrane panels.
- Additional acclimation time will be required when temperatures drop below 50 degrees Fahrenheit and when solar heating is reduced.
- The horizontal or cross seams on the side slopes shall be staggered so that long horizontal seams across the slope are not produced.

4.2 Geomembrane Field Seaming/Welding

Geomembrane field seaming and welding operations shall be performed as follows:

- Wedge welding machines shall be a low profile machine with a vertical height to not exceed 3 inches to the highest point of the wedge. Installer shall demonstrate that each wedge welding machine meets this requirement.
- The geosynthetics contractor shall have the number of welding apparatuses and spare parts necessary to perform the work.
- Equipment used for welding will not damage any HydroTurf® system components.
- The extrusion welding machine is purged prior to beginning a weld until the heat degraded extrudate is removed.
- The ambient temperature, measured 6 inches above the geomembrane surface, is between 35°F and 104°F, or geomembrane manufacturer's recommended temperature limits if they are more stringent.
- The contact surfaces of the sheets are clean, free of dust, grease, dirt, debris, and moisture prior to welding.
- The weld is substantially free of dust, soil / mud, rocks, and other debris.
- The seams are overlapped a minimum of 3 inches for extrusion and hot wedge welding, or in accordance with geomembrane manufacturer's recommendations, whichever is more stringent.
- Panels shall be overlapped (shingled) in the downgrade direction.
- No solvents or adhesives are present in the seam area.

- The procedure used to temporarily hold the panels together does not damage the panels and does not preclude CQA testing.
- The panels are being welded in accordance with the plans and site specific specifications.
- There is no obvious free moisture in the weld area.
- Observe that at the end of each day or installation segment, unseamed edges are anchored with sandbags or other approved anchoring device.
- Penetration anchors shall not be used to secure the geomembrane.
- Once two panels have been seamed together or at the approx. 1/3 seaming process a seam "snapping" process should be applied. This method is performed with manual labor by utilizing 3-4 technicians on the open side of the panel applying a pulling pressure to snap out the tented welded seam.
- The "snapping" requirement is important in that it allows the engineered turf component to lie more evenly over the geomembrane component.

4.3 Defects

Any portion of the geomembrane with a detected flaw, must be repaired in accordance with the project specifications (e.g., material requirements, installation, testing, etc.).

5.0 Engineered Turf Component (HydroTurf® CS and Z)

The installation of HydroTurf® engineered turf consists of the placement and seaming of the engineered turf component over the structured geomembrane liner (HydroTurf® CS) or over the soil subgrade (HydroTurf® Z).

Box trucks will deliver up to 27 rolls engineered turf per truck. Nine (9) rolls will be strapped together allowing equipment (i.e. pick-up truck, skid steer) to pull the strapped rolls to the front of the truck. Rolls can be moved to a designated area by using a carpet stinger or lifted by straps.

During unloading, the contractor and / or CQA personnel shall confirm that the following is practiced and performed:

- The engineered turf is wrapped in rolls with protective covering.
- The rolls are not stacked more than 3 high.
- The rolls are not damaged during unloading.
- Protect the engineered turf from damage (i.e., mud, soil, dirt, dust, debris, cutting, impact forces, etc.).
- Each roll must be marked or tagged with proper identification.
- Rolls that have been rejected due to damage are to be removed from the site or stored at a location separate from accepted rolls, designated by the Owner/Operator.

5.1 Surface Preparation (HydroTurf® CS)

Prior to installation of Engineered Turf, the following shall be completed:

- The geomembrane component of the HydroTurf® CS has been installed in accordance with the site specific specifications.
- The required geomembrane installation documentation has been completed and approved by the Engineer prior to installation of the Engineered Turf.
- The surface of the geomembrane does not contain soil / mud, stones, debris or large scraps left over from the installation process.

5.2 Engineered Turf Deployment (HydroTurf® CS and Z)

Engineered Turf shall be deployed as follows:

- Observe the engineered turf as it is deployed and record defects and disposition of the defects (panel rejected, patch installed, etc.). Repairs are to be made in accordance with the specifications.
- Equipment used shall not damage the engineered turf, underlying geomembrane or subgrade by handling, trafficking, leakage of hydrocarbons, or by other means.
- The panels shall be deployed from the top of the slope in a way that the leading edge of the roll stays at the top of the slope with the Engineered Turf filaments pointing upwards. Also, the turf has colored marker fibers (yellow) on one side of the roll. These colored fibers shall be lined up on the same side of every panel. This will ensure that the turf filaments are pointing in the same direction.
- The turf shall be ballasted to prevent movement by the wind or other means (the contractor is responsible for any resulting damage).
- The turf shall remain free of contaminants such as soil / mud, debris, grease, fuel, etc.
- The turf shall be laid smooth and substantially free of tension (but not loose), stress, folds, ripples / wrinkles, or creases. The geomembrane (for HydroTurf® CS) or the turf (for HydroTurf® Z) shall be in intimate contact with the underlying subgrade
- On slopes, the turf shall be secured with sandbag anchoring at the top of the slope and then rolled down the slope.

5.3 Engineered Turf Seaming

5.3.1 Sewing (HydroTurf® CS)

Seaming of the engineered turf component of HydroTurf® CS may be performed by sewing. This is described as follows:

- The panels shall be deployed to ensure proper flipping in order to expose the turf surface up after seaming (sewing) operations. After the first panel of the project is deployed, deployment shall be done on the adjacent turf panel to avoid damage.
- The panels shall be deployed in a manner to ensure that the turf filaments are pointing upslope and in the same direction as the adjacent panel.
- The adjacent panels are sewn together with a single stitch prayer type seam. This is constructed using a heavy-duty textile stitching machine (i.e., Nulong sewing machine or equivalent).

- The thread shall be 207 Polyester or equivalent.
- Sewing shall occur between the 1st and 2nd row of tuft stiches of the engineered turf in order to avoid exposure of the black geotextile backing after flipping the panel. Incorrect sewing, which creates "fishmouths" and / or exposed geotextile backing, shall be repaired.

5.3.2 Heat-Bond Welding (HydroTurf® Z)

Seaming of the engineered turf component of HydroTurf® Z may be performed by heat-bond welding. This is described as follows:

- Panels shall be deployed such that the seam overlaps are shingled with the flow of water. The panel on the up-flow / upstream side shall have the overlap placed on top of the down-flow / downstream panel.
- The panels shall be deployed in a manner to ensure that the turf filaments are pointing upslope and in the same direction as the adjacent panel.
- The DemTech 4-inch, single-wedge welder (Model No. VM-20/4/A Pro-Wedge Welder 120V, VM20 Outfitted with 100-KIT/4S/VC/A.2 Welding Kit, 4-in, 220V, S.S.) shall be used to heat-bond the seams for the engineered synthetic turf.
- Since the temperature and speed controls of the DemTech VM-20 machine are variable and can be increased / decreased depending on weather and environment conditions, the temperature and speed shall be confirmed with a trial seam. This trial seam shall be field tested. Trial seams shall be performed at the being of each day and during the day when the weather (i.e., temperature) conditions change.
- Field testing of this trial seam consists of the following:
  - Observe the weld and confirm that the geotextile backings are not melting. If they are melting, then the machine is too hot.
  - Observe and feel the welded seam in order to confirm that there is a stiff, inner core which is continuous along the weld.
  - Observe and confirm that the welds may not be pulled or peeled apart. If it can, there was not enough heat during the welding process. Pulled or peeled seams shall be re-seamed or patched with a cap.
  - All seams shall be continuous. These seams shall be verified by the installer that they are continuous by running their fingers along the seam. If there is any penetration of their fingers into the seam, the installer will need to use a hand-held Leister at the location of the penetration in the seam in order to weld it continuously. The seam will need to be re-inspected by the installer.
- Production field seams shall be performed in the same manner as trial seams. The field seams shall be inspected every hour at a minimum. This inspection of the field seams shall be the same as the inspection for the trial seams.
- Burnouts shall be patched.
- All seams not passing the visual inspection shall be repaired.
- After seaming operations, the edges of the synthetic turf panels shall be sufficiently anchored with sandbags in the top of slope perimeter anchor trenches unless otherwise noted on the construction drawings.

5.3.3 Repairs and Tie-Ins Procedures for Engineered Turf (HydroTurf® CS and Z)

When Repairs, caps and tie-ins of engineered turf are needed, the following shall be performed:

- Repairs to engineered turf shall be completed by using a heat-bonded seam.
- All tie-in seams along flatter slope (i.e. 15% or less) with length greater than 25 feet shall use the DemTech VM-20 single wedge welder (outfitted with the synthetic turf welding kit) so a continuous, consistent pressure is achieved throughout the seam.
- A hand-held heat gun (i.e. Leister) with a pressure wheel should be used in shorter or smaller concentrated areas (i.e., butt seams, caps or patches). The hand leister shall be immediately followed by a press wheel providing a constant pressure.
- Hand leistering shall be field tested with a trial seam to confirm proper seaming.
- The quality of these trial and field welds shall be confirmed by the following visual observations:
  - Observe the weld and confirm that the geotextile backings are not melting. If they are melting, then the machine is too hot.
  - Observe and feel the welded seam in order to confirm that there is a stiff, inner core which is continuous along the weld.
  - Observe and confirm that the welds may not be pulled or peeled apart. If it can, there was not enough heat during the welding process. Pulled or peeled seams shall be re-seamed or patched with a cap.
  - All hand-leistered seams shall be continuous. These seams shall be verified by the installer that they are continuous by running their fingers along the seam. If there is any penetration of their fingers into the seam, the installer will need to use a hand-held Leister at the location of the penetration in order to weld the seam continuously. The seam will need to be re-inspected by the installer.

5.4 Equipment on Engineered Turf (HydroTurf® CS and Z)

No equipment shall be allowed on slopes exceeding 15% until HydroBinder® Infill is in place. On flatter slopes, ATV type vehicles and / or rubber tracked skid steer machines will be allowed prior to infill placement if their ground pressure is less than 5 psi. Post construction and after 28 days of curing of the HydroBinder®, vehicle (ground) tire pressures should be limited on the HydroTurf® system to less than 35 psi. Driving should be limited to areas where the subgrade under the HydroTurf® is well-compacted, firm and unyielding.

6.0 HydroBinder® Infill (HydroTurf® CS and Z)

HydroBinder® Infill is a dry, high-strength cementitious mix. It is provided by Watershed Geosynthetics with the HydroTurf™ system. When the HydroTurf™ system is installed and HydroBinder® infill is placed, it creates a hardened revetment armoring that can resist the forces from high hydraulic flow velocities. The HydroBinder® infill is placed dry, groomed into the engineered synthetic turf and hydrated after placement.

6.1 Placement of HydroBinder™ Infill (HydroTurf™ CS and Z)

HydroBinder® Infill shall be placed as follows:

- HydroBinder® is delivered to the jobsite on pallets in either 3000# bulk bags (1 per pallet) or 80# bags (42 per pallet). It is delivered on a flatbed with 16 pallets (typical) per truckload.
- The HydroBinder® shall be installed into the turf while it is in a dry state.
- Prior to placing the HydroBinder®, the engineered turf shall be dry. If the turf is wet from rain or dew, the installer shall wait until it is dry. The installer may attempt to speed up the drying process by using a blower (i.e., leaf blower, industrial blower, etc.).
- HydroBinder™ shall not be installed in inclement, wet or rainy weather, or the threat of inclement weather. Also, the HydroBinder® shall not be installed in freezing temperatures.
- The HydroBinder® infill shall be placed at a minimum thickness of ¾-in. This thickness is achieved by placing approximately 6 to 7 lbs/sf of the dry HydroBinder® over the engineered turf.
- The infill is to be placed / spread using a manual drop spreader, top-dresser and/or drop spreader attached to low ground pressure equipment with adequate dust control.
- Manual hand spreading is acceptable when equipment is not practical.
- If weep holes are required for draining the internal drainage layer through the engineered turf (HydroTurf® CS), remove the HydroBinder® in the areas of the weep holes prior to hydration or block the weep hole locations prior to infilling. Blocks may consist of pipe, dowels, etc. Weep holes are typically ½ to ¾-in diameter and are located at the toe of slope on 2-ft centers.

6.2 Brushing of the HydroBinder™ Infill (HydroTurf® CS and Z)

The HydroBinder® infill will need to be worked into the tufted fibers of the engineered turf such that the turf fibers are in an upright position. This can be achieved as follows:

- The infill shall be worked into the tuft fibers so the tuft fibers are in an upright position with the infill at a measurable ¾ inch minimum depth. This is achieved with common mechanical turf broom, power broom, shop broom, yard rakes, or greens groomer rakes.
- Brushing should be performed in all four directions starting with the direction against the lay of the fibers. Multiple passes may be required.
- The HydroBinder® may need to be placed in 2 to 4 lifts with brushing in between lifts to effectively work the material into the tufts and achieve fibers that are upright.
- The engineered turf shall be visually inspected to confirm that the turf fibers are upright and that there are no trapped fibers.
- Thickness measurements of the HydroBinder® infill shall be taken using a caliper or equivalent device. Measurements shall be taken at a minimum frequency of 5 measurements per 1,000 sf (for smaller projects) or 20 per acre (for larger projects) of installed area.
- The desired HydroBinder® infill thickness shall be achieved prior to the hydration process.

6.3 Hydration of the HydroBinder® Infill (HydroTurf® CS and Z)

The HydroBinder® infill shall be hydrated in place as follows:

- The hydration process shall occur on the same day as the HydroBinder® infill placement.
- The infill shall be hydrated thoroughly with a light and consistent spray of water to avoid displacement of the non-hydrated infill. Estimated application rate is between 0.12 and 0.20 gallons per square foot of area.
- The installer shall not overhydrate the infill so that water begins to runoff and cause loss of cement infill during the process. The general objective is to soak the area to start the hydration process but not to inundate with water beyond saturation of the infill.
- Visual verification can be performed that the HydroBinder® infill has been fully hydrated, and not over hydrated. Visually observe that the top of the HydroBinder has a wet sheen (denoting saturation) but that water is not ponding on top. Also, excavate (with finger or small tool) into the HydroBinder® to confirm full hydration of the section has been achieved.
- To improve curing, the hydrated area may be covered with plastic sheeting.
- If freezing temperatures are expected during the night, the hydrated area should be covered with burlap and / or plastic sheeting.
- The HydroBinder® infill shall harden within 24 hours following hydration, and shall reach its maximum compressive strength at 28 days. If the HydroBinder has not hardened in 24 hours, it will need to be removed and replaced.
- Personnel access on the HydroTurf® shall be prohibited for 24-hr following the hydration of the HydroBinder®.
- Once hydration is completed and the HydroBinder® has set up, backfill and compaction of the anchor trenches may be performed.

6.4 Cold Weather Placement and Curing of the HydroBinder® Infill (HydroTurf® CS and Z)

Cold weather placement and curing techniques for HydroBinder® shall be consistent with industry standard techniques used for concrete and cement products. The following guidelines are suggested:

- Follow the procedures in American Concrete Institute (ACI) 306 – Guide to Cold Weather Concreting.
- ACI 306 defines cold weather as three consecutive days of the following:
  - Average daily temperature falls below 40 dg F; or
  - The air temperature does not rise above 50 deg F for more than half of a day in one 24 hour period.
- At the time of HydroBinder® placement, the subgrade and surface of the engineered turf shall be at a temperature of at least 36 deg F and rising.
- Ensure that frost or frozen surfaces are thawed with no standing water.
- If the temperature can fall below 32 °F within 24 hours of application, heated tarps and/or insulated blankets are required to maintain the temperature above 50 deg F.
- Heated tarps and/or insulated blankets are required to maintain the temperature above 50 deg F for a period of at least 7 days.

- Heated tarps may dry out the HydroBinder®. Do not allow it to dry out. You may need to add moisture and use impermeable covers.

The project design engineer and/or resident engineer shall provide technical specifications and guidance for cold weather concreting based upon your specific project particulars (i.e., geographical location, weather, and time of year), and the engineer should review and approve all proposed installation methods.

6.5 Penetrating Colloidal Concrete Treatment for the HydroBinder® Infill (Optional for HydroTurf® CS and Z)

Penetrating colloidal concrete treatment (PCCT) is an optional liquid application and treatment for the freeze / thaw protection of the HydroBinder® infill. It should be applied to the HydroBinder® when specified. The PCCT shall be applied as follows:

- PCCT shall ideally be stored in a location that is dry and between 35 °F to 100 °F (2 °C to 38 °C) ambient temperature. Optimal storage is at the middle of the temperature range. Protect the PCCT from freezing.
  - The following shall be followed when applying the PCCT:
    - The PCCT product and the HydroBinder® surface shall be at temperature of at least 36 deg F (2 deg C) and rising.
    - Do not apply on frozen substrate or when temperature can fall below 32 °F within 24 hours of application.
    - Ensure that frost or frozen surfaces are thawed with no standing water.
    - Areas of standing water shall be removed prior to application.
    - Do not apply unprotected during periods of high winds.
    - PCCT shall not be applied in inclement, wet or rainy weather, or the threat of inclement weather.
    - Do not apply when substrate is 90°F (32°C) or higher. If surface temperature is higher than 90°F (32°C) then pre-wetting with water is required. Be sure to remove any puddles before applying of SCP.
    - When hot temperature and direct sunlight conditions exist, apply a fine mist spray of water on the surface after application of PCCT.
  - Apply PCCT as soon as the HydroBinder® infill is hard enough to walk on without damage to the surface.
  - Use a 1,500-psi (10.5 MPa) airless sprayer set at a pressure that will not damage the surface [i.e., approximately 400 to 900 psi (2.5 to 6.5 MPa)].
  - Hold wand and spray the PCCT 6 inches (15 cm) from the surface of the HydroBinder® at a 90º angle.
  - PCCT must be applied using an overlapping spray pattern of 50% on the previous run.
  - Any area that absorbs product faster than 10 minutes will need to be reapplied until the product no longer absorbs faster than 15 minutes.
  - If PCCT has absorbed thoroughly in the majority of the area, but there is pooling in the low areas, use a broom to spread additional PCCT into the areas already penetrated. Do not allow PCCT to dry in pools. Remove excess PCCT with a damp mop. Apply at a rate of approximately 160 ft^2 per gallon of PCCT. If necessary, spray a second application of PCCT.

- For sloped applications, work from lowest to highest elevation. Very light and repeated spray passes should be made on the same area until the concrete surface no longer accepts PCCT. Move onto next area after achieving "point of rejection".

7.0 Backfilling of the Anchor Trenches (HydroTurf® CS and Z)

Backfilling of the anchor trenches for the HydroTurf® CS shall be performed as follows:

- The structured geomembrane component shall be in intimate contact with the anchor trench inside wall and bottom. Wrinkles, ripples, fish mouths, and/or bunching shall be removed and properly patched.
- The structured geomembrane shall not extend up the outside wall of the anchor trench. It shall be trimmed short of the outside wall and shall extend a minimum of ¾ of the width of the anchor trench.
- The engineered synthetic turf component shall be in intimate contact with the structured geomembrane. Wrinkles, ripples, fish mouths, and/or bunching shall be removed and properly patched.
- The engineered synthetic turf shall be trimmed so that it does not extend onto the bottom of the anchor trench. It shall be trimmed just short of the bottom and shall extend a minimum of ¾ of the depth of the anchor trench.
- During filling of the anchor trench with compacted soil or concrete backfill, the contractor shall maintain that the geomembrane is in intimate contact with the trench wall and bottom and that the engineered synthetic turf is in intimate contact with the structured geomembrane.
- Soil backfill shall be compacted in accordance with the specifications for engineered fill. Concrete backfill shall be vibrated in place in accordance with standard industry techniques.

Backfilling of the anchor trenches for the HydroTurf® Z shall be performed as follows:

- The engineered synthetic turf component shall be in intimate contact with the anchor trench inside wall and bottom. Wrinkles, ripples, fish mouths, and/or bunching shall be removed and properly patched.
- The engineered synthetic turf shall not extend up the outside wall of the anchor trench. It shall be trimmed short of the outside wall and shall extend a minimum of ¾ of the width of the anchor trench.
- During filling of the anchor trench with compacted soil or concrete backfill, the contractor shall maintain that the geomembrane is in intimate contact with the trench wall and bottom and that the engineered synthetic turf is in intimate contact with the structured geomembrane.
- Soil backfill shall be compacted in accordance with the specifications for engineered fill. Concrete backfill shall be vibrated in place in accordance with standard industry techniques.

ClosureTurf™
Brought to you by Agru America

50 mil SUPER GRIPNET®

Product Data	Test Method	LLDPE Values	HDPE Values
Thickness (min. avg.), mil (mm)	ASTM D5994	50 (1.25)	50 (1.25)
Thickness (lowest indiv.), mil (mm)	ASTM D5994	45 (1.15)	45 (1.15)
Drainage Stud Height (min. avg.), mil (mm)	ASTM D7466	130 (3.30)	130 (3.30)
Friction Spike Height (min. avg.), mil (mm)	ASTM D7466	175 (4.45)	175 (4.45)
Density, g/cc	ASTM D792, Method B	0.939 (max)	0.94 (min)
Tensile Properties (avg. both directions)	ASTM D6693, Type IV		
Strength @ Yield (min. avg.), lb/in width (N/mm)	ASTM D6693, Type IV	N/A	110 (19.3)
Elongation @ Yield (min. avg.), % (GL=1.3in)	ASTM D6693, Type IV	N/A	13
Strength @ Break (min. avg.), lb/in width (N/mm)	ASTM D6693, Type IV	110 (19.3)	110 (19.3)
Elongation @ Break (min. avg.), % (GL=2.0in)	ASTM D6693, Type IV	300	200
Tear Resistance (min. avg.), lbs. (N)	ASTM D1004	30 (133)	33 (169)
Puncture Resistance (min. avg.), lbs. (N)	ASTM D4833	55 (245)	80 (356)
Carbon Black Content (range in %)	ASTM D4218	2-3	2-3
Carbon Black Dispersion (Category)	ASTM D5596	Only near spherical agglomerates for 10 views: 9 views in Cat. 1 or 2, and 1 view in Cat. 3	
Stress Crack Resistance (Single Point NCTL), hours	ASTM 5397, Appendix	N/A	300
Oxidative Induction Time, minutes	ASTM D3895, 200°C, 1 atm O_2	≥140	≥140
Melt Flow Index, g/10 minutes	ASTM D1238, 190°C, 2.16 kg	≤1.0	≤1.0
Oven Aging with HP OIT, (% retained after 90 days)	ASTM D5721 ASTM D5885, 150°C, 500 psi O_2	60	80
UV Resistance with HP OIT, (% retained after 1600 hours)	ASTM D7238 ASTM D5885, 150°C, 500 psi O2	20 hr. Cycle @ 75° C/4 hr. dark condensation @ 60° 35	50
2% Secant Modulus (max), lb/in (N/mm)	ASTM D5323	3,000 (520)	N/A
Axi-Symmetric Break Resistance Strain, % (min)	ASTM D5617	30	N/A

Agru America's geomembranes are certified to pass Low Temp. Brittleness via ASTM D746 (-80°C), and Dimensional Stability via ASTM D1204 (± 2% @ 100°C)

TURF COMPONENT

Product Data	Test Method	Values
CBR Puncture	ASTM D6241	900 lb, (MARV)
Tensile Product (MD/XD)	ASTM D4595	1,000 lb/ft min (MARV)
Rainfall Induced Erosion	ASTM D96459	< 0.45% Infill Loss 6 in/hr
Aerodynamic Evaluation	GTRI Wind Tunnel	120 mph with maximum uplift of 0.12 lb/sf
DuraTurf™ Fiber UV Stability	ASTM G147	> 60% retained tensile strength at 100 years (projected)
Backing System UV Stability (Exposed)	ASTM G1545 Modified Cycle 1.UVA340	110 lbs/ft retained tensile strength at 6500 hours (projected)
Steady State Hydraulic Overtopping (ClosureTurf™ with HydroBinder™)	ASTM D7277/D7276	5 ft overtopping resulting in 29 ft/s velocity and 8.8 psf shear stress for Manning N Value of 0.02
Full Scale Wave Overtopping Test Cumulative Volume (ClosureTurf™ with HydroBinder™)	Colorado State University Wave Simulator	165,000 ft3/ft
Full Scale Wave Overtopping Test Wave Overtopping Discharge(ClosureTurf™ with HydroBinder™)	Colorado State University Wave Simulator	4.0 ft3/s/ft
Transmissivity w/ underlying structured geomembrane Normal stress 50 psf and 0.33 gradient (m2/sec)	ASTM D4716	2.5E -03m^2/sec., min.
Internal Friction of combined components	ASTM D5321	35°, min.
Sand Infill Gradation and Ballast	ASTM D6913	ASTM C-33 Fine Aggregates

SUPPLY INFORMATION (Standard Roll Dimensions)

	Thickness		Width		Length		Area (approx.)		Weight (avg)	
	mil	mm	ft	m	ft	m	ft^2	m^2	lbs	kg
Super Gripnet	50	1.25	23	7	300	91.44	6900	640	2855	1300
Turf Component	N/A	N/A	15	4.6	300	91.44	4500	418	840	381

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Revision 3: December 19, 2012
Revision Schedule on pg. 9

GRI GT13(a) – ASTM Version*

Standard Specification for

"Test Methods and Properties for Geotextiles Used as Separation Between Subgrade Soil and Aggregate"

This specification was developed by the Geosynthetic Research Institute (GRI) with the cooperation of the member organizations for general use by the public. It is completely optional in this regard and can be superseded by other existing or new specifications on the subject matter in whole or in part. Neither GRI, the Geosynthetic Institute, nor any of its related institutes, warrant or indemnifies any materials produced according to this specification either at this time or in the future.

1. Scope

1.1 This specification covers geotextile test methods properties for subsequent use as separation between subgrade soil and aggregate predominantly in pavement systems.

Note 1: While separation occurs in every geotextile application, this pavement-related specification focuses on subgrade soils being "firm" as indicated by CBR values in ASTM D1883 higher than 3.0 (soaked) or 8.0 (unsoaked).

1.2 This specification sets forth a set of physical, mechanical and endurance properties that must be met, or exceeded, by the geotextile being manufactured.

1.3 In the context of quality systems and management, this specification represents a manufacturing quality control (MQC) document. However, its general use is essentially as a recommended design document.

1.4 This specification is intended to assure both good quality and performance of fabrics used as geotextile separators but is possibly not adequate for the complete

*This GRI standard is developed by the Geosynthetic Research Institute through consultation and review by the member organizations. This specification will be reviewed at least every 2-years, or on an as-required basis. In this regard it is subject to change at any time. The most recent revision date is the effective version.

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specification in a specific situation. Additional tests, or more restrictive values for the tests indicated, may be necessary under conditions of a particular application.

1.5 This standard specification does not address installation practice. This item is addressed in the geosynthetics literature dealing with this particular application and under unique situations might require modifications, e.g., higher values and/or additional test properties.

2. Referenced Documents

2.1 ASTM Standards

D 1883 Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils
D 4354 Practice for Sampling of Geosynthetics for Testing
D 4533 Test Method for Trapezoidal Tearing Strength of Geotextiles
D 4632 Test Method for Grab Breaking Load and Elongation of Geotextiles
D 4759 Practice for Determining the Specification Conformance of Geosynthetics
D 4873 Guide for Identification, Storage and Handling of Geotextiles
D 5261 Test Method for Measuring Mass per Unit Area of Geotextiles
D 6241 Test Method for Static Puncture Strength of Geotextiles and Geotextile Related Product Using a 50-mm Probe
D 7238 Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus

2.2 AASHTO Specification

M288-05 Geotextile Specification for Highway Applications

3. Definitions

3.1 Formulation - The mixture of a unique combination of ingredients identified by type, properties and quantity. For geotextiles, a formulation is defined as the exact percentages and types of resin(s), additives and/or carbon black.

3.2 Manufacturing Quality Control (MQC) - A planned system of inspections that is used to directly monitor and control the manufacture of a material which is factory originated. MQC is normally performed by the manufacturer of geosynthetic materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications [ref. EPA/600/R-93/182].

3.3 Minimum Average Roll Value (MARV) – For geosynthetics, a manufacturing quality control tool used to allow manufacturers to establish published values such that the user/purchaser will have a 97.7% confidence that the property in question will meet published values. For normally distributed data, "MARV" is calculated

as the typical value minus two (2) standard deviations from documented quality control test results for a defined population from one specific test method associated with one specific property.

3.4 Minimum Value -- The lowest sample value from documented manufacturing quality control test results for a defined population from one test method associated with one specific property.

3.5 Maximum Value -- The highest sample value from documented manufacturing quality control test results for a defined population from one test method associated with one specific property.

3.6 Separation – The placement of a flexible porous geosynthetic between dissimilar materials so the integrity and functioning of both materials can remain intact or be improved.

Note 2: For separation of stone base courses overlying soil subgrades this primary function simultaneously prevents the stone from intruding down into the soil and the soil from pumping up into the stone.

4. Material Classification and Formulation

4.1 This specification covers geotextiles used as separation materials.

4.2 The polymer types are mainly polypropylene, but also polyester or polyethylene. Other polymers are also possible in this regard.

4.3 The type of geotextile style is not designated. However a distinction can be made based on the elongation criteria of 50%.

Note 3: It is assumed that nonwoven fabrics break at elongations higher than 50%. Woven fabrics always break at elongations significantly lower than 50%.

5. Specification Requirements

5.1 The geotextiles for use as separator shall conform to Tables 1or 2. Table 1 is given in English units and Table 2 is in SI (Metric) units. The conversion from English to SI units is "soft", i.e., rounded off to an approximate value. All test methods are based on ASTM Standards.

Note 4: The numeric relationships between this specification based on ASTM Test Methods and GRI –GT13(b) based on ISO Test Methods have been developed at the Geosynthetic Institute.

5.2 The required values for most properties in Tables 1 and 2 are to be minimum average roll values (MARV). The exceptions are AOS which is a maximum average roll value (MaxARV), and UV stability which is a minimum average value.

5.3 The required class is determined by the severity of installation conditions (i.e., size of equipment, condition of subgrade, thickness of covering lift, etc.). Table 3 gives guidance in this respect.

6. Workmanship and Appearance

6.1 The finished geotextile shall have good appearance qualities. It shall be free from such defects that would affect the specific properties of the geotextile, or its proper functioning.

6.2 General manufacturing procedures shall be performed in accordance with the manufacturer's internal quality control guide and/or documents.

7. MQC Sampling, Testing, and Acceptance

7.1 Geotextiles shall be subject to sampling and testing to verify conformance with this specification. Sampling shall be in accordance with the most current modification of ASTM Standard D 4354, using the section titled, "Procedure for Sampling for Purchaser's Specification Conformance Testing." In the absence of purchaser's testing, verification may be based on manufacturer's certifications as a result of testing by the manufacturer of quality assurance samples obtained using the procedure for Sampling for Manufacturer's Quality Assurance (MQA) Testing. A lot size shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.

7.2 Testing shall be performed in accordance with the method referenced in this specification for the indicated application. The number of specimens to test per sample is specified by each test method. Geotextile product acceptance shall be based on ASTM D4759. Product acceptance is determined by comparing the average test results of all specimens within a given sample to the specification MARV. Refer to ASTM D 4759 for more details regarding geotextile acceptance procedures.

8. MQC Retest and Rejection

8.1 If the results of any test do not conform to the requirements of this specification, retesting to determine conformance or rejection should be done in accordance with the manufacturing protocol as set forth in the manufacturer's quality manual.

9. Shipment and Storage

9.1 Geotextile labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style, and roll number. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

9.2 Each geotextile roll shall be wrapped with a material that will protect the geotextile, including the ends of the roll, from damage due to shipment, water, sunlight and

contaminants. The protective wrapping shall be maintained during periods of shipment and storage.

Note 5: The project specification shall be very explicit as to the maximum exposure time between the geotextile being removed from the wrapper and being backfilled with soil or covered with another geosynthetic.

9.3 During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, temperatures in excess of 160°F (71°C), and any other environmental condition that may damage the property values of the geotextile.

10. Certification

10.1 The contractor shall provide to the engineer a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns, and other pertinent information to fully describe the geotextile.

10.2 The manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.

10.3 The manufacturer's certificate shall state that the finished geotextile meets the requirements of the specification as evaluated under the manufacturer's quality control program. A person having legal authority to bind the manufacturer shall attest to the certificate.

10.4 Either mislabeling or misrepresentation of materials shall be reason to reject those geotextile products.

English Units

Table 1(a) – Geotextile Properties Class 1 (High Survivability)

Property[1]	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	lb	315	203
Trapezoid Tear Strength	D 4533	lb	112	79
CBR Puncture Strength	D 6241	lb	630	440
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	in.	0.024	0.024
Ultraviolet Stability[2]	D 7238	% Str. Ret. @ 500 lt. hrs.	50	50

Table 1(b) – Geotextile Properties Class 2 (Moderate Survivability)

Property[1]	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	lb	248	158
Trapezoid Tear Strength	D 4533	lb	90	56
CBR Puncture Strength	D 6241	lb	500	320
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	in.	0.024	0.024
Ultraviolet Stability[2]	D 7238	% Str. Ret. @ 500 lt. hrs.	50	50

Table 1(c) – Geotextile Properties Class 3 (Low Survivability)

Property[1]	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	lb	180	113
Trapezoid Tear Strength	D 4533	lb	68	41
CBR Puncture Strength	D 6241	lb	380	230
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	in.	0.024	0.024
Ultraviolet Stability[2]	D 7238	% Str. Ret. @ 500 lt. hrs.	50	50

Notes:

(1) All values are minimum average roll values (MARV) except AOS which is a maximum average roll value (MaxARV) and UV stability which is a minimum average value.

(2) Evaluation to be on 50 mm strip tensile specimens after 500 hours exposure.

SI Metric Units

Table 2(a) – Geotextile Properties Class 1 (High Survivability)

Property[1]	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	N	1400	900
Trapezoid Tear Strength	D 4533	N	500	350
CBR Puncture Strength	D 6241	N	2800	2000
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	mm	0.60	0.60
Ultraviolet Stability[2]	D 7238	% Str. Ret. @ 500 lt. hrs.	50	50

Table 2(b) – Geotextile Properties Class 2 (Moderate Survivability)

Property[1]	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	N	1100	700
Trapezoid Tear Strength	D 4533	N	400	250
CBR Puncture Strength	D 6241	N	2250	1400
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	mm	0.60	0.60
Ultraviolet Stability[2]	D 7238	% Str. Ret. @ 500 lt. hrs.	50	50

Table 2(c) – Geotextile Properties Class 3 (Low Survivability)

Property[1]	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	N	800	500
Trapezoid Tear Strength	D 4533	N	300	180
CBR Puncture Strength	D 6241	N	1700	1000
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	mm	0.60	0.60
Ultraviolet Stability[2]	D 7238	% Str. Ret. @ 500 lt. hrs.	50	50

Notes:

(1) All values are minimum average roll values (MARV) except AOS which is a maximum average roll value (MaxARV) and UV stability which is a minimum average value.

(2) Evaluation to be on 50 mm strip tensile specimens after 500 hours exposure.

Table 3 - Required Degree of Survivability as a Function of Subgrade Conditions, Construction Equipment and Lift Thickness
(Class 1, 2 and 3 Properties are Given in Table 1 and 2; Class 1 + Properties are Higher than Class 1 but Not Defined at this Time)

	Low ground-pressure equipment ≤ 25 kPa (3.6 psi)	Medium ground-pressure equipment > 25 to ≤ 50 kPa (>3.6 to ≤ 7.3 psi)	High ground-pressure equipment > 50 kPa (> 7.3 psi)
Subgrade has been cleared of all obstacles except grass, weeds, leaves, and fine wood debris. Surface is smooth and level so that any shallow depressions and humps do not exceed 450 mm (18 in.) in depth or height. All larger depressions are filled. Alternatively, a smooth working table may be placed.	Low (Class 3)	Moderate (Class 2)	High (Class 1)
Subgrade has been cleared of obstacles larger than small to moderate-sized tree limbs and rocks. Tree trunks and stumps should be removed or covered with a partial working table. Depressions and humps should not exceed 450 mm (18 in.) in depth or height. Larger depressions should be filled.	Moderate (Class 2)	High (Class 1)	Very High (Class 1+)
Minimal site preparation is required. Trees may be felled, delimbed, and left in place. Stumps should be cut to project not more than ± 150 mm (6 in.) above subgrade. Fabric may be draped directly over the tree trunks, stumps, large depressions and humps, holes, stream channels, and large boulders. Items should be removed only if placing the fabric and cover material over them will distort the finished road surface.	High (Class 1)	Very high (Class 1+)	Not recommended

*Recommendations are for 150 to 300 mm (6 to 12 in.) initial lift thickness. For other initial lift thicknesses:
300 to 450 mm (12 to 18 in.): reduce survivability requirement one level;
450 to 600 mm (18 to 24 in.): reduce survivability requirement two levels;
> 600 mm (24 in.): reduce survivability requirement three levels

Note 1: While separation occurs in every geotextile application, this pavement-related specification focuses on subgrade soils being "firm" as indicated by CBR values higher than 3.0 (soaked) or 8.0 (unsoaked).

Source: Modified after Christopher, Holtz, and DiMaggio

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Adoption and Revision Schedule

GRI-GT13(a) – ASTM Version

"Test Methods and Properties for Geotextiles Used as Separation Between Subgrade Soil and Aggregate"

Original:	March 10, 2004
Revision 1:	May 6, 2005: Editorial changes
Revision 2:	August 29, 2008: Editorial changes
Revision 3:	December 19, 2012: Changed ASTM D4355 to ASTM D7238 and editorial changes

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Revision 10: April 11, 2011
Revision schedule on pg. 11

GRI Test Method GM13*

Standard Specification for

"Test Methods, Test Properties and Testing Frequency for
High Density Polyethylene (HDPE) Smooth and Textured Geomembranes"

This specification was developed by the Geosynthetic Research Institute (GRI), with the cooperation of the member organizations for general use by the public. It is completely optional in this regard and can be superseded by other existing or new specifications on the subject matter in whole or in part. Neither GRI, the Geosynthetic Institute, nor any of its related institutes, warrant or indemnifies any materials produced according to this specification either at this time or in the future.

1. Scope

1.1 This specification covers high density polyethylene (HDPE) geomembranes with a formulated sheet density of 0.940 g/ml, or higher, in the thickness range of 0.75 mm (30 mils) to 3.0 mm (120 mils). Both smooth and textured geomembrane surfaces are included.

1.2 This specification sets forth a set of minimum, physical, mechanical and chemical properties that must be met, or exceeded by the geomembrane being manufactured. In a few cases a range is specified.

1.3 In the context of quality systems and management, this specification represents manufacturing quality control (MQC).

Note 1: Manufacturing quality control represents those actions taken by a manufacturer to ensure that the product represents the stated objective and properties set forth in this specification.

1.4 This standard specification is intended to ensure good quality and performance of HDPE geomembranes in general applications, but is possibly not adequate for the complete specification in a specific situation. Additional tests, or more restrictive

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values for test indicated, may be necessary under conditions of a particular application.

Note 2: For information on installation techniques, users of this standard are referred to the geosynthetics literature, which is abundant on the subject.

2. Referenced Documents

2.1 ASTM Standards

D 792 Specific Gravity (Relative Density) and Density of Plastics by Displacement
D 1004 Test Method for Initial Tear Resistance of Plastics Film and Sheeting
D 1238 Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
D 1505 Test Method for Density of Plastics by the Density-Gradient Technique
D 1603 Test Method for Carbon Black in Olefin Plastics
D 3895 Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis
D 4218 Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
D 4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D 5199 Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
D 5397 Procedure to Perform a Single Point Notched Constant Tensile Load – (SP-NCTL) Test: Appendix
D 5596 Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
D 5721 Practice for Air-Oven Aging of Polyolefin Geomembranes
D 5885 Test method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry
D 5994 Test Method for Measuring the Core Thickness of Textured Geomembranes
D 6370 Standard Test Method for Rubber-Compositional Analysis by Thermogravimetry (TGA)
D 6693 Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
D 7466 Test Method for Measuring the Asperity Height of Textured Geomembranes

2.2 GRI Standards

GM10 Specification for the Stress Crack Resistance of Geomembrane Sheet
GM 11 Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Device

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2.3 U. S. Environmental Protection Agency Technical Guidance Document "Quality Control Assurance and Quality Control for Waste Containment Facilities," EPA/600/R-93/182, September 1993, 305 pgs.

3. Definitions

Manufacturing Quality Control (MQC) - A planned system of inspections that is used to directly monitor and control the manufacture of a material which is factory originated. MQC is normally performed by the manufacturer of geosynthetic materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications.
ref. EPA/600/R-93/182

Manufacturing Quality Assurance (MQA) - A planned system of activities that provides assurance that the materials were constructed as specified in the certification documents and contract specifications. MQA includes manufacturing facility inspections, verifications, audits and evaluation of the raw materials (resins and additives) and geosynthetic products to assess the quality of the manufactured materials. MQA refers to measures taken by the MQA organization to determine if the manufacturer is in compliance with the product certification and contract specifications for the project.
ref. EPA/600/R-93/182

Formulation, n - The mixture of a unique combination of ingredients identified by type, properties and quantity. For HDPE polyethylene geomembranes, a formulation is defined as the exact percentages and types of resin(s), additives and carbon black.

4. Material Classification and Formulation

4.1 This specification covers high density polyethylene geomembranes with a formulated sheet density of 0.940 g/ml, or higher. Density can be measured by ASTM D1505 or ASTM D792. If the latter, Method B is recommended.

4.2 The polyethylene resin from which the geomembrane is made will generally be in the density range of 0.932 g/ml or higher, and have a melt index value per ASTM D1238 of less than 1.0 g/10 min.

4.3 The resin shall be virgin material with no more than 10% rework. If rework is used, it must be a similar HDPE as the parent material.

4.4 No post consumer resin (PCR) of any type shall be added to the formulation.

5. Physical, Mechanical and Chemical Property Requirements

5.1 The geomembrane shall conform to the test property requirements prescribed in Tables 1 and 2. Table 1 is for smooth HDPE geomembranes and Table 2 is for single and double sided textured HDPE geomembranes. Each of the tables are given in English and SI (metric) units. The conversion from English to SI (metric) is soft.

Note 3: The tensile strength properties in this specification were originally based on ASTM D 638 which uses a laboratory testing temperature of 23°C ± 2°C. Since ASTM Committee D35 on Geosynthetics adopted ASTM D 6693 (in place of D 638), this GRI Specification followed accordingly. The difference is that D 6693 uses a testing temperature of 21°C ± 2°C. The numeric values of strength and elongation were not changed in this specification. If a dispute arises in this regard, the original temperature of 23°C ± 2°C should be utilized for testing purposes.

Note 4: There are several tests often included in other HDPE specifications which are omitted from this standard because they are outdated, irrelevant or generate information that is not necessary to evaluate on a routine MQC basis. The following tests have been purposely omitted:

- Volatile Loss
- Dimensional Stability
- Coeff. of Linear Expansion
- Resistance to Soil Burial
- Low Temperature Impact
- ESCR Test (D 1693)
- Wide Width Tensile
- Water Vapor Transmission
- Water Absorption
- Ozone Resistance
- Modulus of Elasticity
- Hydrostatic Resistance
- Tensile Impact
- Field Seam Strength
- Multi-Axial Burst
- Various Toxicity Tests

Note 5: There are several tests which are included in this standard (that are not customarily required in other HDPE specifications) because they are relevant and important in the context of current manufacturing processes. The following tests have been purposely added:

- Oxidative Induction Time
- Oven Aging
- Ultraviolet Resistance
- Asperity Height of Textured Sheet (see Note 6)
- Trouser Tear (see Note 7)

Note 6: The minimum average value of asperity height does not represent an expected value of interface shear strength. Shear strength associated with geomembranes is both site-specific and product-specific and should be determined by direct shear testing using ASTM D5321/ASTM D6243 as prescribed. This testing should be included in the particular site's CQA conformance testing protocol for the geosynthetic materials involved, or formally waived by the Design Engineer, with concurrence from the Owner prior to the deployment of the geosynthetic materials.

Note 7: There are other tests in this standard, focused on a particular property, which are updated to current standards. The following are in this category:

- Thickness of Textured Sheet
- Puncture Resistance
- Stress Crack Resistance
- Carbon Black Dispersion (In the viewing and subsequent quantitative interpretation of ASTM D 5596 only near spherical agglomerates shall be included in the assessment).

Note 8: There is a GRI test currently included in this standard. Since this topic is not covered in ASTM standards, this is necessary. It is the following:

- UV Fluorescent Light Exposure

5.2 The values listed in the tables of this specification are to be interpreted according to the designated test method. In this respect they are neither minimum average roll values (MARV) nor maximum average roll values (MaxARV).

5.3 The properties of the HDPE geomembrane shall be tested at the minimum frequencies shown in Tables 1 and 2. If the specific manufacturer's quality control guide is more stringent and is certified accordingly, it must be followed in like manner.

Note 9: This specification is focused on manufacturing quality control (MQC). Conformance testing and manufacturing quality assurance (MQA) testing are at the discretion of the purchaser and/or quality assurance engineer, respectively.

6. Workmanship and Appearance

6.1 Smooth geomembrane shall have good appearance qualities. It shall be free from such defects that would affect the specified properties of the geomembrane.

6.2 Textured geomembrane shall generally have uniform texturing appearance. It shall be free from agglomerated texturing material and such defects that would affect the specified properties of the geomembrane.

6.3 General manufacturing procedures shall be performed in accordance with the manufacturer's internal quality control guide and/or documents.

7. MQC Sampling

7.1 Sampling shall be in accordance with the specific test methods listed in Tables 1 and 2. If no sampling protocol is stipulated in the particular test method, then test specimens shall be taken evenly spaced across the entire roll width.

7.2 The number of tests shall be in accordance with the appropriate test methods listed in Tables 1 and 2.

7.3 The average of the test results should be calculated per the particular standard cited and compared to the minimum value listed in these tables, hence the values listed are the minimum average values and are designated as "min. ave."

8. MQC Retest and Rejection

8.1 If the results of any test do not conform to the requirements of this specification, retesting to determine conformance or rejection should be done in accordance with the manufacturing protocol as set forth in the manufacturer's quality manual.

9. Packaging and Marketing

9.1 The geomembrane shall be rolled onto a substantial core or core segments and held firm by dedicated straps/slings, or other suitable means. The rolls must be adequate for safe transportation to the point of delivery, unless otherwise specified in the contract or order.

10. Certification

10.1 Upon request of the purchaser in the contract or order, a manufacturer's certification that the material was manufactured and tested in accordance with this specification, together with a report of the test results, shall be furnished at the time of shipment.

ENGLISH UNITS

Table 1(a) – High Density Polyethylene (HDPE) Geomembrane -Smooth

Properties	Test Method	Test Value							Testing Frequency (minimum)
		30 mils	40 mils	50 mils	60 mils	80 mils	100 mils	120 mils	
Thickness (min. ave.)	D5199	nom.	Nom.	Nom.	Nom.	Nom.	Nom.	Nom.	Per roll
• lowest individual of 10 values		-10%	-10%	-10%	-10%	-10%	-10%	-10%	
Density mg/l (min.)	D 1505/D 792	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	200,000 lb
Tensile Properties *(1)* (min. ave.)	D 6693								20,000 lb
• yield strength	Type IV	63 lb/in.	84 lb/in.	105 lb/in.	126 lb/in.	168 lb/in.	210 lb/in.	252 lb/in.	
• break strength		114 lb/in.	152 lb/in.	190 lb/in.	228 lb/in.	304 lb/in.	380 lb/in.	456 lb/in.	
• yield elongation		12%	12%	12%	12%	12%	12%	12%	
• break elongation		700%	700%	700%	700%	700%	700%	700%	
Tear Resistance (min. ave.)	D 1004	21 lb	28 lb	35 lb	42 lb	56 lb	70 lb	84 lb	45,000 lb
Puncture Resistance (min. ave.)	D 4833	54 lb	72 lb	90 lb	108 lb	144 lb	180 lb	216 lb	45,000 lb
Stress Crack Resistance *(2)*	D5397 (App.)	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	per GRI-GM10
Carbon Black Content (range)	D 4218 *(3)*	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	20,000 lb
Carbon Black Dispersion	D 5596	note *(4)*	note *(4)*	note *(4)*	note *(4)*	note *(4)*	note *(4)*	note *(4)*	45,000 lb
Oxidative Induction Time (OIT) (min. ave.) *(5)*									200,000 lb
(a) Standard OIT	D 3895	100 min.	100 min.	100 min.	100 min.	100 min.	100 min.	100 min.	
— or —									
(b) High Pressure OIT	D 5885	400 min.	400 min.	400 min.	400 min.	400 min.	400 min.	400 min.	
Oven Aging at 85°C *(5), (6)*	D 5721								
(a) Standard OIT (min. ave.) - % retained after 90 days	D 3895	55%	55%	55%	55%	55%	55%	55%	per each formulation
— or —									
(b) High Pressure OIT (min. ave.) - % retained after 90 days	D 5885	80%	80%	80%	80%	80%	80%	80%	
UV Resistance *(7)*	GM 11								
(a) Standard OIT (min. ave.)	D 3895	N.R. *(8)*	N.R. *(8)*	N.R. *(8)*	N.R. *(8)*	N.R. *(8)*	N.R. *(8)*	N.R. *(8)*	per each formulation
— or —									
(b) High Pressure OIT (min. ave.) - % retained after 1600 hrs *(9)*	D 5885	50%	50%	50%	50%	50%	50%	50%	

(1) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
Yield elongation is calculated using a gage length of 1.3 inches
Break elongation is calculated using a gage length of 2.0 in.

(2) The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(3) Other methods such as D 1603 (tube furnace) or D 6370 (TGA) are acceptable if an appropriate correlation to D 4218 (muffle furnace) can be established.

(4) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3

(5) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.

(6) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.

(7) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

(8) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.

(9) UV resistance is based on percent retained value regardless of the original HP-OIT value.

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SI (METRIC) UNITS

Table 1(b) – High Density Polyethylene (HPDE) Geomembrane - Smooth

Properties	Test Method	Test Value							Testing Frequency (minimum)
		0.75 mm	1.00 mm	1.25 mm	1.50 mm	2.00 mm	2.50 mm	3.00 mm	
Thickness - mils (min. ave.) • lowest individual of 10 values	D5199	nom. (mil) -10%	nom. (mil) -10%	nom. (mil) -10%	nom. (mil) -10%	nom. (mil) -10%	nom. (mil) -10%	nom. (mil) -10%	per roll
Density (min.)	D 1505/D 792	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	90,000 kg
Tensile Properties *(1)* (min. ave.) • yield strength • break strength • yield elongation • break elongation	D 6693 Type IV	 11 kN/m 20 kN/m 12% 700%	 15 kN/m 27 kN/m 12% 700%	 18 kN/m 33 kN/m 12% 700%	 22 kN/m 40 kN/m 12% 700%	 29 kN/m 53 kN/m 12% 700%	 37 kN/m 67 kN/m 12% 700%	 44 kN/m 80 kN/m 12% 700%	9,000 kg
Tear Resistance (min. ave.)	D 1004	93 N	125 N	156 N	187 N	249 N	311 N	374 N	20,000 kg
Puncture Resistance (min. ave.)	D 4833	240 N	320 N	400 N	480 N	640 N	800 N	960 N	20,000 kg
Stress Crack Resistance *(2)*	D 5397 (App.)	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	per GRI GM-10
Carbon Black Content - %	D 4218 *(3)*	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	2.0-3.0%	9,000 kg
Carbon Black Dispersion	D 5596	note *(4)*	note *(4)*	note *(4)*	note *(4)*	note *(4)*	note *(4)*	note *(4)*	20,000 kg
Oxidative Induction Time (OIT) (min. ave.) *(5)* (a) Standard OIT — or — (b) High Pressure OIT	 D 3895 D 5885	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	90,000 kg
Oven Aging at 85°C *(5), (6)* (a) Standard OIT (min. ave.) - % retained after 90 days — or — (b) High Pressure OIT (min. ave.) - % retained after 90 days	D 5721 D 3895 D 5885	 55% 80%	 55% 80%	 55% 80%	 55% 80%	 55% 80%	 55% 80%	 55% 80%	per each formulation
UV Resistance *(7)* (a) Standard OIT (min. ave.) — or — (b) High Pressure OIT (min. ave.) - % retained after 1600 hrs *(9)*	 D 3895 D 5885	 N. R. *(8)* 50%	 N.R. *(8)* 50%	 N.R. *(8)* 50%	 N.R. *(8)* 50%	 N.R. *(8)* 50%	 N.R. *(8)* 50%	 N.R. *(8)* 50%	per each formulation

(1) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction
Yield elongation is calculated using a gage length of 33 mm
Break elongation is calculated using a gage length of 50 mm

(2) The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(3) Other methods such as D 1603 (tube furnace) or D 6370 (TGA) are acceptable if an appropriate correlation to D 4218 (muffle furnace) can be established.

(4) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3

(5) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.

(6) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.

(7) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

(8) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.

(9) UV resistance is based on percent retained value regardless of the original HP-OIT value.

ENGLISH UNITS

Table 2(a) – High Density Polyethylene (HDPE) Geomembrane - Textured

Properties	Test Method	Test Value							Testing Frequency (minimum)
		30 mils	40 mils	50 mils	60 mils	80 mils	100 mils	120 mils	
Thickness mils (min. ave.) • lowest individual for 8 out of 10 values • lowest individual for any of the 10 values	D 5994	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	per roll
Asperity Height mils (min. ave.) *(1)*	D 7466	10 mil	10 mil	10 mil	10 mil	10 mil	10 mil	10 mil	every 2nd roll *(2)*
Density (min. ave.)	D 1505/D 792	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	200,000 lb
Tensile Properties (min. ave.) *(3)* • yield strength • break strength • yield elongation • break elongation	D 6693 Type IV	 63 lb/in. 45 lb/in. 12% 100%	 84 lb/in. 60 lb/in. 12% 100%	 105 lb/in. 75 lb/in. 12% 100%	 126 lb/in. 90 lb/in. 12% 100%	 168 lb/in. 120 lb/in. 12% 100%	 210 lb/in. 150 lb/in. 12% 100%	 252 lb/in. 180 lb/in. 12% 100%	20,000 lb
Tear Resistance (min. ave.)	D 1004	21 lb	28 lb	35 lb	42 lb	56 lb	70 lb	84 lb	45,000 lb
Puncture Resistance (min. ave.)	D 4833	45 lb	60 lb	75 lb	90 lb	120 lb	150 lb	180 lb	45,000 lb
Stress Crack Resistance *(4)*	D 5397 (App.)	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	per GRI GM10
Carbon Black Content (rnnge)	D 4218 *(5)*	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	20,000 lb
Carbon Black Dispersion	D 5596	note *(6)*	note *(6)*	note *(6)*	note *(6)*	note *(6)*	note *(6)*	note *(6)*	45,000 lb
idative Induction Time (OIT) (min. ave.) *(7)* Standard OIT — or — (b) High Pressure OIT	 D 3895 D 5885	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	 100 min. 400 min.	200,000 lb
Oven Aging at 85°C *(7), (8)* (a) Standard OIT (min. ave.) - % retained after 90 days — or — (b) High Pressure OIT (min. ave.) - % retained after 90 days	D 5721 D 3895 D 5885	 55% 80%	 55% 80%	 55% 80%	 55% 80%	 55% 80%	 55% 80%	 55% 80%	per each formulation
UV Resistance *(9)* (a) Standard OIT (min. ave.) — or — (b) High Pressure OIT (min. ave.) - % retained after 1600 hrs *(11)*	GM11 D 3895 D 5885	 N.R. *(10)* 50%	 N.R. *(10)* 50%	 N.R. *(10)* 50%	 N.R. *(10)* 50%	 N.R. *(10)* 50%	 N.R. *(10)* 50%	 N.R. *(10)* 50%	per each formulation

(1) Of 10 readings; 8 out of 10 must be ≥ 7 mils, and lowest individual reading must be ≥ 5 mils; also see Note 6.
(2) Alternate the measurement side for double sided textured sheet
(3) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
Yield elongation is calculated using a gage length of 1.3 inches
Break elongation is calculated using a gage length of 2.0 inches
(4) P-NCTL test is not appropriate for testing geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials.
The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.
(5) Other methods such as D 1603 (tube furnace) or D 6370 (TGA) are acceptable if an appropriate correlation to D 4218 (muffle furnace) can be established.
(6) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3
(7) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
(8) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.
(9) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.
(10) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
(11) UV resistance is based on percent retained value regardless of the original HP-OIT value.

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Table 2(b) – High Density Polyethylene (HDPE) Geomembrane - Textured

Properties	Test Method	Test Value							Testing Frequency (minimum)
		0.75 mm	1.00 mm	1.25 mm	1.50 mm	2.00 mm	2.50 mm	3.00 mm	
Thickness mils (min. ave.) • lowest individual for 8 out of 10 values • lowest individual for any of the 10 values	D 5994	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	nom. (-5%) -10% -15%	per roll
Asperity Height mils (min. ave.) *(1)*	D 7466	0.25 mm	0.25 mm	0.25 mm	0.25 mm	0.25 mm	0.25 mm	0.25 mm	every 2nd roll *(2)*
Density (min. ave.)	D 1505/D 792	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	0.940 g/cc	90,000 kg
Tensile Properties (min. ave.) *(3)* • yield strength • break strength • yield elongation • break elongation	D 6693 Type IV	11 kN/m 8 kN/m 12% 100%	15 kN/m 10 kN/m 12% 100%	18 kN/m 13 kN/m 12% 100%	22 kN/m 16 kN/m 12% 100%	29 kN/m 21 kN/m 12% 100%	37 kN/m 26 kN/m 12% 100%	44 kN/m 32 kN/m 12% 100%	9,000 kg
Tear Resistance (min. ave.)	D 1004	93 N	125 N	156 N	187 N	249 N	311 N	374 N	20,000 kg
Puncture Resistance (min. ave.)	D 4833	200N	267 N	333 N	400 N	534 N	667 N	800 N	20,000 kg
Stress Crack Resistance *(4)*	D 5397 (App.)	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	300 hr.	per GRI GM10
Carbon Black Content (range)	D 4218 *(5)*	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	9,000 kg
Carbon Black Dispersion	D 5596	note *(6)*	note *(6)*	note *(6)*	note *(6)*	note *(6)*	note *(6)*	note *(6)*	20,000 kg
Oxidative Induction Time (OIT) (min. ave.) *(7)* (a) Standard OIT — or — (b) High Pressure OIT	D 3895 D 5885	100 min. 400 min.	100 min. 400 min.	100 min. 400 min.	100 min. 400 min.	100 min. 400 min.	100 min. 400 min.	100 min. 400 min.	90,000 kg
Oven Aging at 85°C *(7), (8)* (a) Standard OIT (min. ave.) - % retained after 90 days — or — (b) High Pressure OIT (min. ave.) - % retained after 90 days	D 5721 D 3895 D 5885	55% 80%	55% 80%	55% 80%	55% 80%	55% 80%	55% 80%	55% 80%	per each formulation
UV Resistance *(9)* (a) Standard OIT (min. ave.) — or — (b) High Pressure OIT (min. ave.) - % retained after 1600 hrs *(11)*	GM11 D 3895 D 5885	N.R. *(10)* 50%	N.R. *(10)* 50%	N.R. *(10)* 50%	N.R. *(10)* 50%	N.R. *(10)* 50%	N.R. *(10)* 50%	N.R. *(10)* 50%	per each formulation

(1) Of 10 readings; 8 out of 10 must be ≥ 0.18 mm, and lowest individual reading must be ≥ 0.13 mm; also see Note 6.

(2) Alternate the measurement side for double sided textured sheet

(3) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
Yield elongation is calculated using a gage length of 33 mm
Break elongation is calculated using a gage length of 50 mm

(4) The SP-NCTL test is not appropriate for testing geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials.
The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(5) Other methods such as D 1603 (tube furnace) or D 6370 (TGA) are acceptable if an appropriate correlation to D 4218 (muffle furnace) can be established.

(6) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3

(7) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.

(8) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.

(9) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

(10) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.

(11) UV resistance is based on percent retained value regardless of the original HP-OIT value.

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Adoption and Revision Schedule
for
HDPE Specification per GRI-GM13

"Test Methods, Test Properties, Testing Frequency for
High Density Polyethylene (HDPE) Smooth and Textured Geomembranes"

Adopted:	June 17, 1997
Revision 1:	November 20, 1998; changed CB dispersion from allowing 2 views to be in Category 3 to requiring all 10 views to be in Category 1 or 2. Also reduced UV percent retained from 60% to 50%.
Revision 2:	April 29, 1999: added to Note 5 after the listing of Carbon Black Dispersion the following: "(In the viewing and subsequent quantitative interpretation of ASTM D5596 only near spherical agglomerates shall be included in the assessment)" and to Note (4) in the property tables.
Revision 3:	June 28, 2000: added a new Section 5.2 that the numeric table values are neither MARV or MaxARV. They are to be interpreted per the the designated test method.
Revision 4:	December 13, 2000: added one Category 3 is allowed for carbon black dispersion. Also, unified terminology to "strength" and "elongation".
Revision 5:	May 15, 2003: Increased minimum acceptable stress crack resistance time from 200 hrs to 300 hrs.
Revision 6:	June 23, 2003: Adopted ASTM D 6693, in place of ASTM D 638, for tensile strength testing. Also, added Note 2.
Revision 7:	February 20, 2006: Added Note 6 on Asperity Height clarification with respect to shear strength.
Revision 8:	Removed recommended warranty from specification.
Revision 9:	June 1, 2009: Replaced GRI-GM12 test for asperity height of textured geomembranes with ASTM D 7466.
Revision 10	April 11, 2011: Added alternative carbon black content test methods

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Revision schedule is on pg. 13

GRI Test Method GM19*

Standard Specification for

Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes

This specification was developed by the Geosynthetic Research Institute (GRI), with the cooperation of the member organizations for general use by the public. It is completely optional in this regard and can be superseded by other existing or new specifications on the subject matter in whole or in part. Neither GRI, the Geosynthetic Institute, nor any of its related institutes, warrant or indemnifies any materials produced according to this specification either at this time or in the future.

1. Scope

1.1 This specification addresses the required seam strength and related properties of thermally bonded polyolefin geomembranes; in particular, high density polyethylene (HDPE), linear low density polyethylene both nonreinforced (LLDPE) and scrim reinforced (LLDPE-R) and flexible polypropylene both nonreinforced (fPP) and scrim reinforced (fPP-R).

1.2 Numeric values of seam strength and related properties are specified in both shear and peel modes.

Note 1: This specification does not address the test method details or specific testing procedures. It refers to the relevant ASTM test methods where applicable.

1.3 The thermal bonding methods focused upon are hot wedge (single and dual track) and extrusion fillet.

*This GRI standard is developed by the Geosynthetic Research Institute through consultation and review by the member organizations. This specification will be reviewed at least every 5-years, or on an as-required basis. In this regard it is subject to change at any time. The most recent revision date is the effective version.

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Note 2: Other acceptable, but less frequently used, methods of seaming are hot air and ultrasonic methods. They are inferred as being a subcategory of hot wedge seaming.

1.4 This specification does not suggest a specific distance between destructive seam samples to be taken in the field, i.e., the sampling interval. A separate GRI Standard Practice is focused on this issue, see GRI-GM29.

1.5 This specification is only applicable to laboratory testing.

1.6 This specification does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards

D6392 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods

D7747 Standard Test Method for Determining Integrity of Seams Produced Using Thermo-Fusion Methods for Reinforced Geomembranes by the Strip Tensile Method

2.2 EPA Standards

EPA 600/2.88/052 (NTIS PB-89-129670)
Lining of Waste Containment and Other Containment Facilities

2.3 GRI Standards

GM13 Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes

GM14 Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attributes

GM17 Test Properties and Testing Frequency for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes

GM18 Test Properties and Testing Frequency for Flexible Polypropylene (fPP and fPP-R) Geomembranes

GM20 Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using Control Charts

GM25 Test Property and Testing Frequency for Scrim Reinforced Linear Low Density Polyethylene Geomembranes

GM29 Practice for Field Integrity Evaluation of Geomembrane Seams (and Sheet) Using Destructive and Nondestructive Testing

3. Definition

3.1 Geomembrane, n – An essentially impermeable geosynthetic composed of one or more synthetic sheets used for the purpose of liquid, gas or solid containment.

3.2 Hot Wedge Seaming – A thermal technique which melts the two opposing geomembrane surfaces to be seamed by running a hot metal wedge or knife between them. Pressure is applied to the top or bottom geomembrane, or both, to form a continuous bond. Seams of this type can be made with dual bond tracks separated by a nonbonded gap. These seams are referred to as dual hot wedge seams or double-track seams.

3.3 Hot Air Seaming – This seaming technique introduces high-temperature air or gas between two geomembrane surfaces to facilitate localized surface melting. Pressure is applied to the top or bottom geomembrane, forcing together the two surfaces to form a continuous bond.

3.4 Ultrasonic Seaming - A thermal technique which melts the two opposing geomembrane surfaces to be seamed by running a ultrasonically vibrated metal wedge or knife between them. Pressure is applied to the top or bottom geomembrane, or both, to form a continuous bond. Some seams of this type are made with dual bond tracks separated by a nonbonded gap. These seams are referred to as dual-track seams or double-track seams.

3.5 Extrusion Fillet Seaming – This seaming technique involves extruding molten resin at the edge of an overlapped geomembrane on another to form a continuous bond. A depreciated method called "extrusion flat" seaming extrudes the molten resin between the two overlapped sheets. In all types of extrusion seaming the surfaces upon which the molten resin is applied must be suitably prepared, usually by a slight grinding or buffing.

4. Significance and Use

4.1 The various methods of field fabrication of seams in polyolefin geomembranes are covered in existing ASTM standards mentioned in the referenced document section. What is not covered in those documents is the numeric values of strength and related properties that the completed seam must meet, or exceed. This specification provides this information insofar as minimum, or maximum, property values are concerned when the field fabricated seams are sampled and laboratory tested in shear and peel. A separate GRI standard, GRI-GM29 (DRAFT), provides guidance as to the spacing that destructive samples should be taken in typical field installation projects.

5. Sample and Specimen Preparation

5.1 The spacing for taking field seam samples for destructive testing is provided in GRI-GM29 (DRAFT), a standard-of-practice. The process describes a progression from the most restrictive interval of 1 per 500 feet (1 per 150 m) to the complete use and reliance of the electrical leak location survey (ELLS) method. Intermediate between these extremes are variations depending upon the installers experience and performance.

5.2 The size of field seam samples is to be according to the referenced test method, e.g., ASTM D6392 or site-specific CQA plan.

5.3 The individual test specimens taken from the field seam samples are to be tested according to the referenced test method, i.e., ASTM D6392 for HDPE, LLDPE and fPP, and ASTM D751 (modified to a 150 mm + seam width gage length) for fPP-R. The specimens are to be conditioned prior to testing according to these same test methods and evaluated accordingly.

6. Assessment of Seam Test Results

6.1 HDPE seams – For HDPE seams (both smooth and textured), the strength of four out of five 1.0 inch (25 mm) wide strip specimens in shear should meet or exceed the values given in Tables 1(a) and 1(b). The fifth must meet or exceed 80% of the given values. In addition, five out five specimens should meet the shear percent elongation, calculated as follows, and exceed the values given in Tables 1(a) and 1(b):

$$E = \frac{L}{L_o}(100) \qquad (1)$$

where

E = elongation (%)
L = extension at end of test (in. or mm)
L_o = original average length (usually 1.0 in. or 25 mm)

Note 3: The assumed gage length is considered to be the unseamed sheet material on either side of the welded area. It generally will be 1.0 in. (25 mm) from the edge of the seam to the grip face.

For HDPE seams (both smooth and textured), the strength of four out of five 1.0 in. (25 mm) wide strip specimens tested in peel should meet or exceed the values given in Tables 1(a) and 1(b). The fifth must meet or exceed 80% of the given values.

In addition, the peel separation (or incursion) should not exceed the values given in Tables 1(a) and 1(b) for all five out of five specimens. The value shall be based on

the proportion of area of separated bond to the area of the original bonding as follows:

$$S = \frac{A}{A_o}(100) \qquad (2)$$

where

S = separation (%)
A = average area of separation, or incursion (in^2 or mm^2)
A_0 = original bonding area (in^2 or mm^2)

Note 4: The area of peel separation can occur in a number of nonuniform patterns across the seam width. The estimated dimensions of this separated area is visual and must be done with care and concern. The area must not include squeeze-out which is part of the welding process.

Regarding the locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in ASTM D6392 (in this regard, SIP is an acceptable break code);

Hot Wedge: AD and AD-Brk > 25%
Extrusion Fillet: AD1, AD2
Exception: AD-WLD (unless strength is achieved)

Note 5: Separation-in-plane (SIP) is a locus-of-break where the failure surface propagates within one of the seamed sheets during destructive testing (usually in the peel mode). It is not merely a surface skin effect producing a few ductile fibrils (sometimes called ductile drawdown). SIP is acceptable if the required strength, shear elongation and peel separation criteria are met.

In this regard, five out of five specimens shall result in acceptable break patterns.

6.2 LLDPE seams – For LLDPE seams (smooth, textured and scrim reinforced), the strength of four out of five 1.0 in. (25 mm) wide strip specimens in shear should meet or exceed the values given in Tables 2(a) through 2(d). The fifth must meet or exceed 80% of the given values. Note that the unreinforced specimens are 1.0 in. (25 mm) wide strips and the scrim reinforced specimens are 4.0 in. (100 mm) wide grab tests. In addition, the shear percent elongation, calculated as follows, should exceed the values given in Tables 2(a) through 2(d). All five out of five should meet the shear elongation requirement.

$$E = \frac{L}{L_o}(100) \qquad (1)$$

where
E = elongation (%)
L = extension at end of test (in. or mm)
L_o = original average length (usually 1.0 in. or 25 mm)

Note 3 (Repeated): The assumed gage length is considered to be the unseamed sheet material on either side of the welded area. It generally will be 1.0 in. (25 mm) from the edge of the seam to the grip face.

Shear elongation is not relevant to scrim reinforced geomembranes and as such is listed as "not applicable" in Tables 2 (c) and (d).

For LLDPE seams (smooth, textured and scrim reinforced), the strength of four out of five 1.0 in. (25 mm) wide strip specimens tested in peel should meet or exceed the values given in Tables 2(a) through 2(d). The fifth must meet or exceed 80% of the given values.

In addition, the peel separation (or incursion) should not exceed the values given in Tables 2(a) through 2(d). All five out of five specimens shall meet the peel separation value. The value shall be based on the proportion of area of separated bond to the area of the original bonding as follows:

$$S = \frac{A}{A_o}(100) \qquad (2)$$

where

S = separation (%)
A = average depth of separation, or incursion ($in.^2$ or mm^2)
A_0 = original bonding distance ($in.^2$ or mm^2)

Note 4 (Repeated): The area of peel separation can occur in a number of nonuniform patterns across the seam width. The estimated dimensions of this separated area is visual and must be done with care and concern. The area must not include squeeze-out which is part of the welding process.

Regarding the locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in ASTM D6392 (in this regard, SIP is an acceptable break code);

Hot Wedge: AD and AD-Brk > 25%
Extrusion Fillet: AD1, AD2
Exception: AD-WLD (unless strength is achieved)

Note 5 (Repeated): Separation-in-plane (SIP) is a locus-of-break where the failure surface propagates within one of the seamed sheets during destructive testing (usually in the peel mode). It is not merely a surface skin effect producing a few ductile fibrils (sometimes called ductile drawdown). SIP is acceptable if the required strength, shear elongation and peel separation criteria are met.

In this regard, five out of five specimens shall result in acceptable break patterns.

6.3 fPP Seams – For fPP seams (both nonreinforced and scrim reinforced), the strength of four out of five specimens in shear should meet or exceed the values given in Tables 3(a) and 3(b). The fifth must meet or exceed 80% of the given values. Note that the unreinforced specimens are 1.0 in. (25 mm) wide strips and the scrim reinforced specimens are 4.0 in. (100 mm) wide grab tests. In addition, the shear percent elongation on the unreinforced specimens, calculated as follows, should exceed the values given in Tables 3(a) and 3(b). All five out of five specimens should meet the shear elongation requirement.

$$E = \frac{L}{L_o}(100) \quad (1)$$

where
E = elongation (%)
L = extension at end of test (in. or mm)
L_o = original gauge length (usually 1.0 in. or 25 mm)

Note 3 (Repeated): The assumed gage length is considered to be the unseamed sheet material on either side of the welded area. It generally will be 1.0 in. (25 mm) from the edge of the seam to the grip face.

Shear elongation is not relevant to scrim reinforced geomembranes and as such is listed as "not applicable" in Tables 3(a) and 3(b).

For fPP seams (both nonreinforced and scrim reinforced), the strength of four out of five specimens in peel should meet or exceed the values given in Tables 3(a) and 3(b). The fifth must meet or exceed 80% of the given values. Note that the unreinforced specimens are 1.0 in. (25 mm) wide strips and the scrim reinforced specimens are grab tests. In addition, the peel percent separation (or incursion) should not exceed the values given in Tables 3(a) and 3(b). All five out of five specimens should meet the peel separation value. The values should be based on the proportion of area of separated bond to the area of the original bonding as follows.

$$S = \frac{A}{A_o}(100) \quad (2)$$

where

S = separation in (%)
A = average depth of separation, or incursion (in.^{2} or mm^2)
A_o = original bonding distance (in.^{2} or mm^2)

Note 4 (Repeated): The area of peel separation can occur in a number of nonuniform patterns across the seam width. The estimated dimensions of this separated area is visual and must be done with care and concern. The area must not include squeeze-out which is part of the welding process.

Regarding the locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in ASTM D6392 (in this regard, SIP is an acceptable break code);

Hot Wedge: AD and AD-Brk > 25%
Extrusion Fillet: AD1, AD2
Exception: AD-WLD (unless strength is achieved)

Note 5 (Repeated): Separation-in-plane (SIP) is a locus-of-break where the failure surface propagates within one of the seamed sheets during destructive testing (usually in the peel mode). It is not merely a surface skin effect producing a few ductile fibrils (sometimes called ductile drawdown). SIP is acceptable if the required strength, shear elongation and peel separation criteria are met.

In this regard, five out of five specimens shall result in acceptable break patterns.

7. Retest and Rejection

7.1 If the results of the testing of a sample do not conform to the requirements of this specification, retesting to determine conformance or rejection should be done in accordance with the construction quality control or construction quality assurance plan for the particular site under construction.

8. Certification

8.1 Upon request of the construction quality assurance officer or certification engineer, an installer's certification that the geomembrane was installed and tested in accordance with this specification, together with a report of the test results, shall be furnished at the completion of the installation.

Table 1(a) – Seam Strength and Related Properties of Thermally Bonded **Smooth and Textured** High Density Polyethylene (HDPE) Geomembranes **(English Units)**

Geomembrane Nominal Thickness	30 mils	40 mils	50 mils	60 mils	80 mils	100 mils	120 mils
Hot Wedge Seams[1]							
shear strength[2], lb/in.	57	80	100	120	160	200	240
shear elongation at break[3], %	50	50	50	50	50	50	50
peel strength[2], lb/in.	45	60	76	91	121	151	181
peel separation, %	25	25	25	25	25	25	25
Extrusion Fillet Seams							
shear strength[2], lb/in.	57	80	100	120	160	200	240
shear elongation at break[3], %	50	50	50	50	50	50	50
peel strength[2], lb/in.	39	52	65	78	104	130	156
peel separation, %	25	25	25	25	25	25	25

Notes for Tables 1(a) and 1(b):

1. Also for hot air and ultrasonic seaming methods
2. Value listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values
3. Elongation measurements should be omitted for field testing

Table 1(b) – Seam Strength and Related Properties of Thermally Bonded **Smooth and Textured** High Density Polyethylene (HDPE) Geomembranes **(S.I. Units)**

Geomembrane Nominal Thickness	0.75 mm	1.0 mm	1.25 mm	1.5 mm	2.0 mm	2.5 mm	3.0 mm
Hot Wedge Seams[1]							
shear strength[2], N/25 mm.	250	350	438	525	701	876	1050
shear elongation at break[3], %	50	50	50	50	50	50	50
peel strength[2], N/25 mm	197	263	333	398	530	661	793
peel separation, %	25	25	25	25	25	25	25
Extrusion Fillet Seams							
shear strength[2], N/25 mm	250	350	438	525	701	876	1050
shear elongation at break[3], %	50	50	50	50	50	50	50
peel strength[2], N/25 mm	170	225	285	340	455	570	680
peel separation, %	25	25	25	25	25	25	25

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Table 2(a) – Seam Strength and Related Properties of Thermally Bonded **Smooth and Textured** Linear Low Density Polyethylene (LLDPE) Geomembranes (English Units)

Geomembrane Nominal Thickness	20 mils	30 mils	40 mils	50 mils	60 mils	80 mils	100 mils	120 mils
Hot Wedge Seams[1]								
shear strength[2], lb/in.	30	45	60	75	90	120	150	180
shear elongation[3], %	50	50	50	50	50	50	50	50
peel strength[2], lb/in.	25	38	50	63	75	100	125	150
peel separation, %	25	25	25	25	25	25	25	25
Extrusion Fillet Seams								
shear strength[2], lb/in.	30	45	60	75	90	120	150	180
shear elongation[3], %	50	50	50	50	50	50	50	50
peel strength[2], lb/in.	22	34	44	57	66	88	114	136
peel separation, %	25	25	25	25	25	25	25	25

Notes for Tables 2(a) and 2(b):
1. Also for hot air and ultrasonic seaming methods
2. Values listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values
3. Elongation measurements should be omitted for field testing

Table 2(b) – Seam Strength and Related Properties of Thermally Bonded **Smooth and Textured** Linear Low Density Polyethylene (LLDPE) Geomembranes (S.I. Units)

Geomembrane Nominal Thickness	0.50 mm	0.75 mm	1.0 mm	1.25 mm	1.5 mm	2.0 mm	2.5 mm	3.0 mm
Hot Wedge Seams[1]								
shear strength[2], N/25 mm	131	197	263	328	394	525	657	788
shear elongation[3], %	50	50	50	50	50	50	50	50
peel strength[2], N/25 mm	109	166	219	276	328	438	547	657
peel separation, %	25	25	25	25	25	25	25	25
Extrusion Fillet Seams								
shear strength[2], N/25 mm	131	197	263	328	394	525	657	788
shear elongation[3], %	50	50	50	50	50	50	50	50
peel strength[2], N/25 mm	95	150	190	250	290	385	500	595
peel separation, %	25	25	25	25	25	25	25	25

Table 2(c) – Seam Strength and Related Properties of Thermally Bonded **Scrim Reinforced** Linear Low Density Polyethylene (LLDPE-R) Geomembranes (English Units)

Geomembrane Nominal Thickness	36 mil[4]	45 mil[4]
Hot Wedge Seams[1]		
shear strength[2], lb	200	200
shear elongation[3], %	n/a	n/a
peel strength[2], lb	20	20
peel separation, %	n/a	n/a
Extrusion Fillet Seams		
shear strength[2], lb	200	200
shear elongation[3], %	n/a	n/a
peel strength[2], lb	20	20
peel separation, %	n/a	n/a

1. Also for hot air and ultrasonic seaming methods
2. Values listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values
3. Elongation measurements should be omitted for field testing
4. Values are based on grab tensile strength and elongation per D7747 for laboratory tested specimens

Table 2(d) – Seam Strength and Related Properties of Thermally Bonded **Scrim Reinforced** Linear Low Density Polyethylene (LLDPE-R) Geomembranes (S.I. Units)

Geomembrane Nominal Thickness	36 mil[4]	45 mil[4]
Hot Wedge Seams[1]		
shear strength[2], N	890	890
shear elongation[3], %	n/a	n/a
peel strength[2], N	90	90
peel separation, %	n/a	n/a
Extrusion Fillet Seams		
shear strength[2], N	890	890
shear elongation[3], %	n/a	n/a
peel strength[2], N	90	90
peel separation, %	n/a	n/a

1. Also for hot air and ultrasonic seaming methods
2. Values listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values
3. Elongation measurements should be omitted for field testing
4. Values are based on grab tensile strength and elongation per D7747 for laboratory tested specimens

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Table 3(a) – Seam Strength and Related Properties of Thermally Bonded **Nonreinforced and Scrim Reinforced** Flexible Polypropylene (fPP) Geomembranes (English Units)

Geomembrane Nominal Thickness	30 mil-NR	40 mil-NR	36 mil-R[4]	45 mil-R[4]
Hot Wedge Seams[1]				
shear strength[2], lb/in. (NR); lb (R)	25	30	200	200
shear elongation[3], %	50	50	n/a	n/a
peel strength[2], lb/in. (NR); lb (R)	20	25	20	20
peel separation, %	25	25	n/a	n/a
Extrusion Fillet Seams				
shear strength[2], lb/in. (NR); lb (R)	25	30	200	200
shear elongation[3], %	50	50	n/a	n/a
peel strength[2], lb/in. (NR); lb (R)	20	25	20	20
peel separation, %	25	25	n/a	n/a

1. Also for hot air and ultrasonic seaming methods
2. Values listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values
3. Elongation measurements should be omitted for field testing
4. Values are based on grab tensile strength and elongation per D7747 for laboratory tested specimens

Table 3(b) – Seam Strength and Related Properties of Thermally Bonded **Nonreinforced and Scrim Reinforced** Flexible Polypropylene (fPP) Geomembranes (S.I. Units)

Geomembrane Nominal Thickness	0.75 mm-NR	1.0 mm-NR	0.91 mm-R[4]	1.14 mm-R[4]
Hot Wedge Seams[1]				
shear strength[2], N/25 mm (NR); N (R)	110	130	890	890
shear elongation[3], %	50	50	n/a	n/a
peel strength[2], N/25 mm (NR); N (R)	85	110	90	90
peel separation, %	25	25	n/a	n/a
Extrusion Fillet Seams				
shear strength[2], N/25 mm (NR); N (R)	110	130	890	890
shear elongation[3], %	50	50	n/a	n/a
peel strength[2], N/25 mm (NR); N (R)	85	110	90	90
peel separation, %	25	25	n/a	n/a

1. Also for hot air and ultrasonic seaming methods
2. Values listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values
3. Elongation measurements should be omitted for field testing
4. Values are based on grab tensile strength and elongation per D7747 for laboratory tested specimens

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Adoption and Revision Schedule
for
Seam Specification per GRI-GM19

"Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes"

Adopted: February 18, 2002

Revision 1: May 15, 2003; Increased selected shear and peel test requirements, per the following:

Material	Test	Seam Type	Current GM19	Proposed GM19	Difference
HDPE	Shear	Hot Wedge	95% yield	95% yield	no change
		Extrusion	95% yield	95% yield	no change
	Peel	Hot Wedge	62% yield	72% yield	16% increase
		Extrusion	62% yield	62% yield	no change
LLDPE	Shear	Hot Wedge	1300 psi break	1500 psi break	15% increase
		Extrusion	1300 psi break	1500 psi break	15% increase
	Peel	Hot Wedge	1100 psi break	1250 psi break	14% increase
		Extrusion	1100 psi break	1100 psi break	no change

Revision 2: January 28, 2005; added Note 6 (in three locations) stating that incursion is measured on an area basis and not depth as in ASTM D6392.

Revision 3: June 4, 2010; Removed Note 6 on peel incursion since ASTM D6392 (2008) now uses area of incursion whereas previously they used linear length of incursion. Thus ASTM is now in agreement with GM19 in this regard.

Revision 4: November 15, 2010; Added Note 6 (in three locations) stating what separation-in-plane (SIP) is, and is not, and that it is acceptable if the required strength, shear elongation and peel separation criteria are met.

Revision 5: July 12, 2011; AD1 and AD2 breaks are now unacceptable even if strength is achieved.

Revision 6: October 3, 2011; Added LLDPE-R to the various geomembrane types, in particular, Tables 2(c) and 2(d) and made editorial changes.

Revision 7: November 3, 2013; clarified issues of 4 out of 5 passing strength and 5 out of 5 passing locus-of-break, shear elongation and peel separation.

Revision 8: February 12, 2015; upgraded standards and terminology

ATTACHMENT F

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CONSTRUCTION SPECIFICATION
POS-SPEC-000167

FOR

MEREDOSIA ASH POND CLOSURES

AT

MEREDOSIA ENERGY CENTER

Technical Specifications and Drawings Prepared by:

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for

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MISSOURI



8/12/16

Rev	Date	Revisions	Originator	Reviewer	Approver
0	08-12-2016	Submittal to I-EPA	S. Hilderbrand	A. Saindon	M. Wagstaff

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Project Manual for the Meredosia Ash Pond Closures
at Meredosia Energy Center

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02250	SITE DRAINAGE	02250-1 to 02250-2
02511	CRUSHED STONE PAVING	02511-1 to 02511-3
02800	HDPE GEOMEMBRANES AND POLYPROPYLENE TURF GRASS	02800-1 to 02800-3
02821	CHAIN LINK FENCES AND GATES	02821-1 to 02821-3
02936	SEEDING AND MULCHING	02936-1 to 02936-2
APPENDICES		
A	SAFETY AND CONTRACTOR REQUIREMENTS	A-1 to A-56
B	JOB WORKING RULES AND CONTRACT WORK LIMITATIONS	B-1 to B-5
C	DESIGN FOR SAFETY GUIDE	C-1 to C-15
D	CONTRACTOR SCHEDULE REQUIREMENTS	D-1 to D-2
E	SAFETY DATA SHEETS	E-1
F	LEADED PAINT DISTURBANCE	NOT USED
G	ASBESTOS REMOVAL	NOT USED
H	FERC STANDARDS OF CONDUCT	NOT USED
I	CHEMICALS OF INTEREST REPORTING	NOT USED

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SECTION	SECTION TITLE	SHEET #
J	VENDOR DRAWING TRANSMITTAL/CAD REQUIREMENTS	NOT USED
K	PLANT ACCESS, PARKING AND SECURITY	K-1 to K-2
L	CYBER SECURITY	NOT USED
M	HAULING HEAVY EQUIPMENT	NOT USED
N	PIPE AND FITTINGS: APPROVED MANUFACTURER LIST	NOT USED
Q	QMS – APPLICATION AID	NOT USED
R	RADIOGRAPHY SAFETY REQUIREMENTS	NOT USED
W	WELDING & NDE REQUIREMENTS	NOT USED
X	FOREIGN MATERIAL EXCLUSION REQUIREMENTS	NOT USED
Y	SAFETY REQUIREMENTS FOR ELEVATED PLATFORMS	NOT USED
Z	CONFINED SPACE LOCATIONS	NOT USED
AA	BID FORM	AA-1 to AA-8
BB	CONSTRUCTION QUALITY ASSURANCE PLAN	-
CC	SWPPP Report	-

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SECTION 1A - SUPPLEMENTAL GENERAL CONDITIONS
FOR AMEREN MISSOURI POWER OPERATIONS

For General Conditions of Contract – Construction:

http://www.ameren.com/BusinessPartners/Suppliers/Documents/GCCconstruction.pdf

For Supplemental General Conditions of Contract:

http://www.ameren.com/BusinessPartners/Suppliers/Documents/SupplementalGCCs.pdf

In addition to the above Contract Conditions, the following requirements apply:

1.0 GENERAL

1.1 This section of the specification clarifies and supplements the Ameren General Conditions of Contract (GCC) and other Contract documents. Specific duties set forth herein do not constitute an exclusive list of requirements, but complement the Ameren GCC. In the event of a conflict between this specification and the Ameren GCC, this specification shall be controlling.

1.2 Contractor shall assure that all tiers of Subcontractors comply with all requirements of Contract documents.

1.3 For any work performed for Ameren Missouri Power Operations, Contractor agrees to comply with Ameren's Supplemental Terms and Conditions, commonly referred to as Section 1A-Supplemental General Conditions for Ameren Missouri Power Operations.

2.0 DEFINITIONS

2.1 Accident/Incident An incident is defined as a near miss, vehicle accident, or property damage to Company-owned/leased equipment or facilities. Refer to Occupational Safety and Health Administration (OSHA) 29CFR1904 for definitions of reportable incidents and injuries.

2.2 Asbestos Containing Material (ACM) Material that contains asbestos in concentration greater than 1% and must be handled according to Ameren procedures and Federal and State regulations.

2.3 Barricade A physical obstruction such as barricade tape, chains, cones, concrete barriers, fencing, or "A" frame type wood and/or metal structures intended to warn and limit access to a work area. Barricade tape alone cannot be used to protect certain hazards such as unattended floor openings or fall hazards.

2.4 Competent Person An individual, who is trained and certified in applicable standards, is capable of identifying workplace hazards relating to specific operations, performs inspections of industrial and construction jobsite equipment, and has authority to take corrective actions when needed.

2.5 Computer Based Training (CBT) Computer Based Training is used for safety and job work rules orientation of new employees before they are permitted unescorted access to Company property.

2.6 Confined Space An enclosed area that is not normally designed or intended for human occupancy, has a restricted entrance or exit by way of location or size, and can represent a risk for the health and safety of anyone who enters, due to atmospheric, engulfment, entrapment, mechanical, electrical, or any other recognized hazard. See OSHA 29CFR1910.146 and Power Operations Administrative Procedure AUE-ADM-2415.

2.7 Hot Work Work that will generate sparks, such as; cutting, grinding, welding, and brazing. A permit may be required for hot work that is hazardous due to location or other factors.

2.8 Corporate Safety Department Ameren's Corporate Safety Department sets standards for safety and health issues and monitors compliance with Ameren policies, as well as with Federal, State and Local regulations.

2.9 Extra Work is defined in Article 1 of the GCCs.

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2.10 Extra Work Order (EWO) is defined in Article 1 of the GCCs.

2.11 Job Working Rules Rules of conduct for Contractors working at Ameren facilities that include various types of prohibited behavior: off-limit areas, driving and parking instructions, and safety information that may be specific for the plant, such as fire alarms and evacuation procedures.

2.12 Single Point of Contact (SPOC) is defined in Article 1 of the GCCs.

2.13 Specifications are defined in Article 1 of the GCCs.

2.14 Work is defined in Article 1 of the GCCs.

2.15 Worker's Protection Assurance (WPA) or Hold Card Procedure Ameren's equipment lock-out procedure that ensures equipment and systems are in a safe state prior to service or testing. Employees must have WPA training and adhere to WPA procedures. Contractor supervisors must have plant-specific training prior to starting jobs requiring WPA protection.

3.0 INTENT OF SPECIFICATIONS AND DRAWINGS

3.1 The Contract Documents shall be interpreted as being complementary, requiring a complete Project. Any requirement occurring in any one of the Contract Documents is as binding as though occurring in all Contract Documents. Generally, Specifications address quality, types of materials and Contract conditions, while Plans show placement, sizes, and fabrication details of materials. Reference Article 2.01 of the GCCs.

4.0 BENCH MARKS

4.1 Company will furnish one site bench mark with its assigned elevation. Contractor shall furnish field layouts and shall be responsible for the use of field dimensions and elevations. All such Work shall be subject to approval at the discretion of the SPOC.

5.0 DRAWINGS, DETAILS & INSTRUCTIONS PROVIDED BY CONTRACTOR

5.1 Contractor shall submit to the Company copies of shop drawings, equipment details; installation, operating, and maintenance instructions, wiring diagrams, parts lists, cable termination sign-off sheets, etc. Reference Article 3.02 of the GCCs.

5.1.1 These submittals shall cause no delay in the performance of work. The minimum turn-around time for design changes shall be incorporated on drawings and shall not delay the performance of work. As-built drawings shall be submitted in accordance with Company's schedule.

5.1.2 Contractor shall submit five (5) copies of the above information, four (4) of which Company will retain. One (1) copy will be returned.

5.1.3 In addition to the copies listed above, Contractor shall submit drawings electronically in an approved CAD format. Ameren typically uses Bentley Microstation V7 or V8 (.dgn files).

5.1.4 Company will review submittals for general design features. Contractor is responsible for dimensions, quantities, accuracy, fit, adequacy of details, and coordination with other trades. Contractor must request deviations from contract documents in writing and receive written approval from Company.

5.1.5 Contractor must request field changes in writing and receive written approval from Company. Contractor shall promptly submit as-built drawings to Company.

5.2 Professional Engineering (PE) License Seals

5.2.1 All design documentation meant for fabrication, permitting, erection, or construction such as design drawings, specifications, and calculations shall have a Professional Engineering (PE) seal applied, signed and dated by Contractor's registered professional engineer(s).

5.2.1.1 The license shall be current, valid, and in good standing for the appropriate state where the work is taking place.

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5.2.2 Documents where seals are not required include review items (not to be constructed), sketches, samples, design control documents, operations manuals, vendor material design documents, engineered product drawings (not related to permitting) and other documents agreed upon in writing between Ameren and Contractor.

5.2.2.1 Contractor shall be responsible to contact the main Ameren contact up-front to clarify the requirements to seal any project specific documentation.

6.0 LABOR CONDITIONS

6.1 Contractor's Work shall be performed under the National Maintenance Agreement (NMA), unless an exception is agreed upon in writing by the Construction Project Lead or his management, Contractor must furnish a copy of the site extension approval(s) granted by the International Union(s). Site extension requests for the NMA may be filed online at www.nmapc.org.

6.2 There shall be no limit on the work output of any employee, and no restrictions on what tools or equipment may safely be used to increase productivity. There shall be no minimum, other than what may be required by safety regulations, on the number of employees assigned to any crew or to any service.

6.3 Featherbedding practices of any kind will not be tolerated.

6.4 Actual work hours will be agreed upon during pre-job conferences; lunch breaks will be an unpaid one-half hour. No additional organized breaks are allowed. There shall be no non-working stewards. If a steward is included in the labor force, the steward must be a qualified worker and shall exercise no supervisory functions.

6.5 Contractors must conform to Construction Users Round Table (CURT) Tripartite Initiative report, dated June 2004, with respect to absenteeism, excessive overtime and work disruptions.

6.6 Contractor employees must be rested and fit for duty when they report to the Company's site. Contractor employees must not work in excess of 16 consecutive hours without prior approval of Contractor's Superintendent and Company, and then only when additional steps have been taken to ensure worker safety.

6.7 Contractor shall provide break/lunch facilities at a location in close proximity to the majority of the Work such locations to be approved by the SPOC or other Ameren Management personnel.

6.8 There shall be no slowdowns, illegal strikes, or unauthorized work stoppages of any kind. Contractor understands that its work must be completed in a timely fashion notwithstanding the presence of a labor strike or any pickets at or around the job site.

6.9 In the event that Company's employees, another contractor's or subcontractor's employees or Contractor's employees engage in a strike or established pickets, Contractor is expected to continue to meet its obligations under the terms of the contract and/or obligations with Company. Any such picketing activity is not an excuse for non-performance or delay in completing the project

6.10 Medical services provided by Ameren: On specified projects, contractors are not to include costs within bids associated with the following medical services:

- Random and for-cause substance abuse (SA) testing,
- First-aid expenses that can be addressed by an onsite nurse, if an onsite nurse is provided.

7.0 CONTRACTOR MANAGEMENT REQUIREMENTS

7.1 Prior to mobilization, Contractor shall submit an organizational chart and resumes for the entire management team that will utilize, on or offsite, for the project.

7.2 Contractor shall adhere to the Job Working Rules (Appendix B).

7.3 Contractor supervisory employees who will be responsible for requesting and signing the WPA must receive site-specific training before working onsite. The SPOC will arrange for the required WPA supervisor training to be located at the Ameren POS Training Center training facility.

7.4 Contractor supervisor shall comply with the specific plant's WPA procedure which is included as Appendix A, Section 2 of this specification. WPA procedure provides details of program and outlines responsibilities for supervisors.

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CAUTION: The presence of WPA process does not relieve workers of the responsibility to verify that equipment is actually de-energized or in the designated state. Instruct employees to walk down the job, check energy sources and isolation points such as: voltages, temperatures, pressures, etc. to confirm status.

7.5 Contractor Site Representative shall read, understand, and sign the Contractor Agreement of Understanding Form (Appendix A, Attachment A18), prior to beginning work onsite.

7.6 Contractor supervisors shall instruct employees to observe WPA rules and comply with WPA tags at all times.

7.7 Contractor shall participate in individual Construction Progress meetings. The meetings are typically held weekly, but the SPOC may specify another frequency during the course of the Contract.

7.8.1 A Contractor representative with sufficient authority to make binding work and schedule commitments shall attend these meetings.

7.8.2 The individual progress meeting will typically concentrate on safety and housekeeping, schedule and work progress, job related problems, and site coordination.

7.8.3 Contractor shall come to the progress meeting with an updated schedule showing actual progress and the critical path of the work. See Contractor Schedule Requirements (Appendix D) for additional schedule requirements.

7.8.4 Contractor shall take and distribute meeting minutes within two (2) working days of the meeting.

7.9 A Contractor representative with sufficient authority to make binding commitments may also be required to attend a weekly Outage Coordination Meeting.

7.10 Contractor personnel, Business agents, Vendor/Sales representatives, etc., shall use the entrance designated for their Contractor, park in the Construction parking lot, and be escorted onsite unless they have a Contractor badge. Construction badge holders may use Contractor entrance or Ameren employee entrance, and park in the Construction parking lot or main parking lot depending on purpose of visit.

8.0 DELIVERY AND STORAGE

8.1 Contractor shall be responsible for receiving, unloading, inspecting and hauling materials unless otherwise stated in the Contract documents.

8.2 Contractor and the name of the project must be indicated on materials delivered to the site.

8.3 Contractor shall provide facilities to store materials and equipment on the jobsite. The SPOC will designate storage locations that will not interfere with Company's personnel or operations.

8.4 Payment for material or equipment stored onsite will not be made to Contractor until the material or equipment is installed. Contractor may apply for early payment only if early delivery and storage of the material or equipment will benefit Ameren.

8.5 A carrier that is compliant with the Depart of Transportation's (DOT) Hazardous Materials Security Plan must be used for deliveries of hazardous materials to Ameren. For a list of approved carriers visit http://vics.keyship.net/Ameren. Fill out the required fields & check the HazMat option. A list of qualified carriers will populate. Any vehicle carrying hazardous materials onto Company facilities will be refused entry until proof of compliance is provided.

8.6 If materials are provided by Ameren, they will be stored by Ameren until Contractor is onsite. Contractor will be responsible for loss or damage after acceptance of equipment or material provided by Company. Contractor shall inventory and haul excess material retained by Company to designated Company storage location(s) after completion of Work.

8.7 Contractor shall restore construction storage areas to a reasonable condition that satisfies the SPOC.

8.8 Material Receipt

8.8.1 Contractor must resolve all issues with contractor-procured material.

8.8.2 Contractor must identify, inspect, test and store material to purchase order requirements.

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8.8.3 Contractor must ensure all receiving quality documentation is supplied to Ameren's SPOC upon receipt.

8.8.4 Contractor must have a program in place to ensure receipted critical plant material and equipment is not relocated or improperly stored without proper authorization from Ameren's SPOC.

8.8.5 Contractor will be provided a list of critical materials and equipment during pre-construction meetings.

8.8.6 Contractor must handle, store, and identify Critical Material in accordance with the paragraph below:

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MATERIAL HANDLING, STORAGE & IDENTIFICATION INSTRUCTIONS FOR CONTRACTORS

AUE-ADM-4203, Receiving Storage & Handling of Critical Materials

All Ameren purchased critical material received by a contractor or sub-contractor has specific requirements that must be met to comply with Ameren's Quality Management Program in accordance with AUE-ADM-4203. Contractor requirements contained in AUE-ADM-4203 are provided below. Contractors will be evaluated on their quality control and material management. A list of critical materials shall be provided to the contractor during Pre-Construction Meetings.

1) Notify Responsible Engineer (RE) of Ameren material received and the PO number. Ensure receiving documentation remains with the material until clear direction is provided by RE.

   NOTE: Steps 2-5 shall be directed by Responsible Engineer (RE)

2) Receiving documentation, number of containers, and intended storage location shall be taken to Storeroom personnel.

3) Storeroom shall create a Receipt Order (RO) number for traceability and provide identification labels for attachment to each container. Information will always include the RO tracking# and may include PO #, Job #, RE, PM, Storage Level, and intended location.

4) The RO number shall be clearly marked on all boxes, containers, equipment, and packing slip(s).

5) An Ameren Material Receipt Inspection Report (MRIR) shall be printed with the inspection requirements and shall be used to document inspection results. Contractors may perform additional inspections as directed by RE.

6) After successful acceptance, MRIR Inspector(s) shall sign the MRIR and each traceable barcode label; and shall attach labels to containers.

7) Hold tags shall be attached to any materials not accepted.

WARNING: Contact Responsible Engineer or Ameren Designee immediately if unidentified material is discovered, labels become unreadable, material needs to be relocated, or if material location or storage level differs from label.

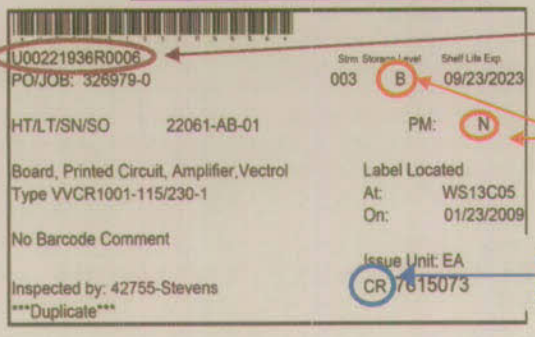
If during staging, prep work, etc., the material is repackaged or removed from labeled containers and the potential for identification or material loss exists, transfer the RO or barcode number, at a minimum, to the materials.

Storage Level B – Indoor storage. Temperatures controlled between 40°F and 140°F. This level includes the storeroom, turbine floor, or any other location inside the plant.

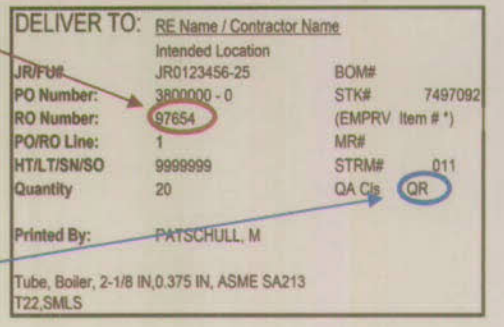
Storage Level C – Covered storage. Temperature control not required. These locations include secondary storerooms, covered parking areas, etc.

Storage Level D – Outside storage. Store in well drained areas in a manner allowing air circulation to minimize trapped water. Provide adequate protection from forces due to rain, wind and storms

CRITICAL MATERIAL BARCODE



DELIVERY MATERIAL TAG



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9.0 REMOVALS AND PREPARATORY WORK

9.1 Contractor shall cooperate with the SPOC in scheduling removal work so there is no disruption to Company's personnel or operations.

9.2 Contractor shall provide protective enclosures, covers, water stops, etc. to prevent water or other weather-related damage to facilities during construction.

9.3 Before mobilizing tools, material and equipment, Contractor will install appropriate trash cans, cigarette butt receptacles, and dumpsters in designated areas.

9.4 Materials authorized to be removed become the property of Contractor, unless otherwise specified in the Contract documents, and shall be promptly removed from the worksite. An inventory of materials being removed must be submitted to the SPOC. If materials are retained, the SPOC will designate where materials shall be stored. Retained materials shall be neatly stored and protected from the elements.

9.5 Before mobilizing tools, material and equipment, Contractor shall install protection on both sides of all walkways in work area from top rail to toe board. This protection may include, but not limited to, orange fencing, plywood and sheet metal. However, openings in fencing shall be no larger than one inch square. Contractor shall install decking on open floor work areas, seal decking along edges and install toe boards, and install debris nets to further contain fallings objects. All wood subject to ignition sources shall have fire retardant cloth or tarps installed over the wood. Cloth shall be secured to avoid tripping hazards. All safety barriers shall be removed after the completion of the project.

9.6 For additional safety requirements to be performed prior to working on elevated platforms, walkways and scaffolds above 6 feet, refer to Safety Requirements for Working on Elevated Platforms (Appendix Y).

10.0 CUTTING& PATCHING AND TEMPORARY BUILDINGS, ETC.

10.1 Contractor shall do all cutting, fitting, or patching that may be necessary to make the several parts come together properly and fit to receive the Work of other Contractors and Subcontractors.

10.2 All temporary buildings/structures such as tool rooms, break rooms, lunch rooms, etc., shall be constructed with non-combustible materials.

11.0 TEMPORARY HEAT

11.1 Contractor shall provide temporary heat to protect Work materials against damage from dampness and cold to the satisfaction of the SPOC.

12.0 QUALITY REQUIREMENTS

12.1 The Quality Management System Manual, AUE-MAN-QMS-1001, provides the basis for the Ameren Missouri Power Operations Quality Management System (QMS) and provides the assurance that processes are in place to achieve our business objectives. The QMS performance standards and performance criteria provide requirements to achieve a controlled and systematic approach to quality management activities and promote continuous improvement. Contractors and Subcontractors can obtain a copy of the QMS from the Ameren Missouri Project Manager.

12.2 The Contractor's quality management program and supportive procedures are subject to Ameren review and audit. If a gap exists between the QMS, and the Contractor's quality management program and supportive procedures, the Contractor will be required to comply with the QMS.

12.3 Contractors and Subcontractors agree to comply with the applicable QMS requirements for the work scope included in this Ameren Missouri contract. The Contractor shall provide a copy of the Contractor's quality management program and supportive procedures with the bid submittal, if the Contractor is not on the Ameren Missouri 'Generation Approved Supplier List – Critical (GASLC)'.

12.4 The QMS Application Aid (QMS-AA) per Appendix Q contains the applicable QMS requirements in this Ameren Missouri contract. The Contractor shall complete and return the QMS-AA with the bid submittal, if the Contractor is not on the Ameren Missouri GASLC.

12.5 The Contractor shall upon award develop and provide to Ameren a 'Project-specific Quality Management Plan' which is compliant with the QMS-AA.

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12.6 The Contractor's awarded work scope, including that of its Subcontractors, shall be performed to the requirements of the QMS-AA.

12.7 Ameren will be allowed to make quality inspections at Contractor's and Subcontractor's facilities at no cost to Ameren. Ameren will be allowed to view applicable Contractor's and Subcontractor's quality procedures and procedure generated records and documents.

12.8 Design Documents and Calculations:

12.8.1 Contractors and Sub Contractors shall meet the technical requirements included in Section 1D of this specification and the QMS-AA.

13.0 OWNER APPROVAL OF PROCEDURE

13.1 Ameren must consent to deviations from the procedures, methods and materials agreed to in the Contract. Reference Articles 2.01 and 4.01 of the GCCs.

13.2 Ameren reserves the right of approval over all procedures, methods, and materials to be employed by Contractor or its Subcontractors for this Work. Reference Articles 2.01 and 4.01 of the GCCs.

14.0 CONFIDENTIALITY

14.1 Contractor shall hold Ameren's Confidential Information confidential and shall not use or disclose to others during or subsequent to the performance of the Work (except as is necessary to perform the Work). Reference Article 9.02 of the GCCs.

14.2 Publication or advertising of information directly derived from Project or Work or data obtained in connection with services rendered under the Contract must first be approved in writing by Ameren (Ameren personnel need approval from Ameren Corporate Communications). Contractor shall not release any information for publication or advertising purposes relative to the material, equipment and/or services furnished under the Contract Documents without the prior written consent of Ameren. Ameren reserves the right to release all advertising or publicity concerning the Project or Work. Except as to signs required by building department regulations or any other governmental requirements, Contractor shall not display or permit any signs or advertisements to be displayed about the Project site nor publicize in any manner its performance of the Work without the express written permission of Ameren. Reference Article 9.02 of the GCC.

14.3 Contractor shall restrict the knowledge of all confidential information regarding the Work to as few as possible of its employees who are directly connected with performance of the Work and have a definite need for such knowledge. Upon request by Ameren's Representative, Contractor shall cause such persons or groups of persons involved in the Work on Contractor's behalf as Ameren may designate to sign individual secrecy agreements in a form satisfactory to Ameren. Reference Article 9.02 of the GCCs.

15.0 ACCOUNTING / INVOICING REQUIREMENTS / ACIP

15.1 Contractor shall furnish complete accounting information and cooperate with Ameren's accounting practices.

15.2 For Time and Material contracts prior to commencing work, Contractor shall furnish Company with a written estimate for Company approval. Once approved, Contractor shall promptly notify Company of any facts and circumstances that may adversely impact the estimate. Further, Contractor shall not exceed ninety percent (90%) of the time and materials estimate without Company approval. All overtime for Time and Material contracts shall be approved by Company in advance of working. Reference Articles 6 and 8 of the GCCs.

15.3 Company reserves the right not to honor charges associated with timesheets that are not provided daily.

15.4 Material invoices must be submitted as Work progresses. Total cost updates will be provided on a weekly basis.

15.5 If Work indicated or specified in Contract Documents is increased, Company may have Contractor perform Extra Work.

15.5.1 Contractor must obtain written approval from the SPOC prior to performing any Extra Work. Each Extra Work Order (EWO) shall be invoiced separately and shall reference the EWO number and Purchase Order (PO) number.

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15.5.2 If work is performed on a time and material basis, then work shall be charged at the rates indicated on the Labor Rate Sheets in the Contract.

15.5.3 Ameren will pay Contractor the cost of extra work as follows:

NOTE:	Subcontractor labor and material charges shall be subject to the provisions of Items 15.5.3.1, 15.5.3.2 and 15.5.3.3 below.

15.5.3.1 Labor:

- Direct cost of payroll labor, including first line foreman, excluding job Superintendent and General Foreman
- Fringe benefits including welfare and pension
- Insurance
- Taxes including FICA, Federal, State and Local tax
- Overhead, including costs for home office, field office, consumables, and small tools with an original value under $1,200, as agreed by Company and Contractor at the award of Contract
- Profit, as agreed by Company and Contractor at the award of Contract

15.5.3.2 Material and third party rental equipment:

- Direct cost of material or rental equipment

Subcontractors:

- Direct cost of Subcontractor

Contractor-Owned Rental Equipment (excluding third party rental equipment):

- Contractor shall submit for approval an equipment rental rate schedule including all equipment, tools, and supplies required to perform the Work specified. These equipment rental rates will be used for extra work.

15.5.3.3 Ameren Coordinated Insurance Program (ACIP)

- If the project is part of the Ameren Coordinated Insurance Program (ACIP), all contractors of all tiers will be required to provide completed enrollment and monthly reporting forms for duration of their work on project. All prime contractors will be responsible for their subcontractors of all tiers with respect to compliance of enrollment and reporting requirements.
- If the project is part of the ACIP, contractors of all tiers must be enrolled and have a copy of ACIP certificate of insurance prior to mobilization onsite. Ameren will not allow non-enrolled contractors to access site prior to enrollment in ACIP.

END OF SECTION 1A

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SECTION 1B – SUMMARY OF WORK

1.0 INTRODUCTION

1.1 Definitions

1.1.1 The term "Company" means the entity identified in the Company's Purchase Order, its agents, employees, representatives, successors, and assigns. The terms "Purchaser," "Owner," and "Buyer," if used in the Contract Documents, are considered synonymous and refer to the Company.

1.1.2 The term "Engineer" means the Engineer duly appointed to represent the Company as specified from time to time by the Company who may be employed by the Company or who may be employed by others.

1.1.3 The term "Contractor" means the entity identified in the Company's Purchase Order, and its agents, employees and authorized representatives undertaking the performance of the Work as defined in this Specification. The terms "vendor," "supplier," "manufacturer," or "fabricator" if used in the Contract Documents, are considered synonymous and refer to Contractor.

1.1.4 The term "Sub Contractor" means any individual, partnership, firm, corporation or business entity, other than an employee of Contractor, who contracts or agrees with Contractor (or another Sub Contractor or any tier thereof) to furnish any services, labor, materials or equipment for, or in connection with, the performance of the Work.

1.1.5 The term "Construction Project Lead" means the Company's representative as specified from time to time and located at job site.

1.2 Location

1.2.1 The Meredosia Energy Center is located at:

800 South Washington Street
Meredosia, IL 62665

1.2.2 This project is located at the Meredosia Energy Center in Morgan County, Illinois. The Bottom Ash Pond and the Fly Ash Pond are located on the western side of the site adjacent to the Illinois River. See figure on sheet 1B-7 for a location map showing the Bottom Ash Pond and the Fly Ash Pond.

1.3 Contacts

1.3.1 All commercial matters shall be directed to the Ameren purchasing agent designated on the Request for Proposal or listed on the purchase order.

1.3.2 All technical questions regarding this specification shall be directed to:

Ameren Energy Missouri
Michael Wagstaff, P.E.
3750 S. Lindbergh Blvd.
Sunset Hills, MO 63127

2.0 SUMMARY OF WORK

2.1 Project Objectives – The Project Objective is the closure of the Bottom Ash Pond and Fly Ash Pond at the Meredosia Energy Center. Material will be removed from the Bottom Ash Pond, including the southern berm and the top three feet of the northern berm, and will be placed in the larger Fly Ash Pond. Existing steam line piping, light poles, culverts, fencing and outfall structure associated with the Bottom Ash Pond will be demolished and removed in an approved manner. Electric power poles will be removed and relocated. All of these components are located either within the ash pond or along the berms.

2.2 The Closure documents for Ameren Energy Medina Valley Cogen's Meredosia Ash Pond Closures at Meredosia Energy Center has been prepared in accordance with the requirements of the site specific Rule in 35 Illinois Administrative Code Part 840, Subpart A. The following supporting documents will be submitted to the IEPA.

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2.2.1 Closure Work Plan
2.2.2 Closure Plan
2.2.3 Hydrogeologic Report
2.2.4 Construction Quality Assurance Plan
2.2.5 Groundwater Monitoring Plan
2.2.6 Post-Closure Care Plan

2.3 Copies of the above documents, including IAC Part 840, Subpart A, are available upon request.

2.4 General Requirements

2.4.1 Contractor shall be responsible for furnishing all material (except those items of material specifically stated to be furnished by the Company), tools, equipment, labor, supervision and any other incidental items or services required to perform all of the work described herein.

2.4.2 Contractor shall be responsible for any and all engineering, drafting, field sketches, and field layout required for temporary supports, rigging, removals, and installation of all material.

2.4.3 Contractor shall be responsible for receiving, storage and security of all materials supplied by Contractor and material provided by Company. Contractor will be required to unload material in Construction Staging Area as shown on the plan (Sheet T-002) and/or designated by the Construction Project Lead. Contractor will also be required to obtain items, where specified, from the storeroom. Contractor is responsible for developing an inventory list of material received. Contractor shall provide adequate protection for equipment/material stored outside from forces due to rain, wind and storms. As an example, material such as precipitator collector plates – which would be subject to damage during a high wind event – would require Contractor to perform analysis of potential wind loading and create a detailed storage plan. For this example, Ameren shall review and provide approval of specific storage plan.

2.4.4 Contractor will be responsible for proper disposal of all demolition or surplus construction materials.

2.4.5 Contractor Design shall use the Design for Safety Guide (Appendix C).

2.4.6 Ameren **will not** provide a nurse and first aid trailer for Ameren and Contractor personnel.

2.5 Description of Work

2.5.1 The description of work, in general, includes but is not limited to:

- Installation and maintenance of a Stormwater Pollution Prevention Plan (SWPPP)
- Erosion control fences and blankets
- Clearing and Grubbing
- Removal of Improvements (Demolition)
- Excavation, Compaction and Grading of Ash
- Excavation, Compaction and Grading of Soil Materials
- Electric Poles relocated and dusk to dawn lights installed by local utility company
- Dust Control
- Installation of ClosureTurf™ and HydroTurf™
- Installation of Rip Rap and Energy Dissipators
- Installation of Crushed Stone Access Road
- Seeding and Mulching

2.5.2 Other Requirements:

- In order to facilitate procurement of a Construction Quality Assurance (CQA) contractor by a separate contract, a Level 2/3 construction schedule will be requested to be submitted by the apparent low bidder(s) within two weeks of receipt of bids. This schedule will be used as the basis for the CQA contractor whose scope is defined in the attached Construction Quality Assurance Plan and specifications. Please see "Appendix D - Contractor Schedule Requirements".
- A Construction Staging Area has been shown on the plans. This area shall be returned to original condition at the end of construction activities.

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- Ameren's Construction Project Lead will have an office in the Ameren trailer. A meeting room for weekly team meetings is also available in this building.
- Contractor's trailer location (proposed) shall be located in the Staging Area as shown on the plan. See sheet T-002. This area shall be returned to original condition at the end of construction activities.
- Existing monitoring wells shall be protected with snow fences. In the event a monitoring well is impacted by construction activities the Owner shall be notified immediately.
- Contractor is responsible for keeping as-built plan markups during construction. All markups shall be provided to the Owner at substantial completion of the project.

3.0 COMPANY AND MANUFACTURER'S DRAWINGS

3.1 The following drawings are intended to indicate the scope of the work to be done and details necessary for the items of work set forth in this specification, and are part of this specification. These drawings in general are to scale, but figures shall always be followed and drawings are not to be scaled. Contractor shall make any requests for additional drawings in writing to the Engineer.

3.1.1 Drawings prepared by CDG Engineers, Inc. dated August 12, 2016, include the following:

T-001	TITLE SHEET
T-002	PLANT VICINITY MAP
T-003	GENERAL NOTES
C-101	SITE INDEX MAP
C-102	SITE PLAN
C-103	SITE PLAN
C-104	SITE PLAN
C-105	SITE PLAN
C-106	SITE PLAN
C-107	SITE PLAN
C-108	NOT USED
C-109	NOT USED
C-110	SITE PROFILE
C-111	PROFILES
C-301	DETAILS
C-302	DETAILS
C-303	DETAILS
C-304	DETAILS
C-305	DETAILS
C-601	DRAINAGE AREA MAP
C-602	SWPPP PLAN
C-603	SWPPP DETAILS

3.1.2 The following drawings are intended as references and will be on a cd/dvd prepared by Ameren and included in back of the project manual:

B-331-O-E	Plan Ash Storage Pond
B-332-O-D	Bottom Ash Storage Pond Details
B-333-O-C	Fly Ash Storage Pond Details
K-584-A	Rev. 1 Meredosia closed ash ponds
K-584-A	Rev. 2 Meredosia closed ash ponds

4.0 WORK, MATERIALS AND EQUIPMENT SUPPLIED BY COMPANY

4.1 Not applicable.

5.0 WORK, MATERIALS AND EQUIPMENT FURNISHED BY CONTRACTOR

5.1 All supervision, components, labor, materials, equipment, tools, and any incidental items described herein (except those specifically stated above) necessary to completely install each portion or component of the work shall be furnished by Contractor.

6.0 UTILITIES AND FACILITIES

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6.1 Contractor shall supply sanitary facilities, drinking water and shower facilities (if needed) equipped with water heaters.

6.2 The Company will provide telephone, fax, computer, and power hook-up connections for Contractor supplied trailers.

6.3 Temporary lighting, wiring, plumbing, globes, guard lights, barricades or any other items required for protection, facility of work, local regulation, or by law for public protection shall be provided by Contractor.

6.4 The Company shall furnish one source of 480 volt, three phase electric power per major work area as directed by the Construction Project Lead. Contractor shall furnish the tie-in and any extensions required. Contractor shall not use the Company's 120-volt outlets, unless directed otherwise by the Construction Project Lead. Contractor shall provide 480/120-volt transformers as required.

6.4.1 Contractor shall provide with bid proposal a list of his estimated temporary (construction) power requirements.

6.5 Non-potable (construction) water will be provided by the Company for Contractor for the purposes of clean up/wash down. Potable water for drinking will be provided by the Contractor.

6.6 Construction Staging Area/Lay down areas for equipment and material will be designated as close to work site as possible. Areas for tool, office, and change house trailers will be designated as close to work site as possible. Contractor's lay down area will be as determined by the Construction Project Lead.

7.0 RECORDING OF HISTORICAL DATA

7.1 Contractor shall make revisions to plans and specifications (red lines) during the course of the work. Plans and specifications shall be turned over to the Owner at Substantial Completion of the project.

8.0 CONTRACTOR'S FIELD SAFETY PROGRAM

8.1 Contractor shall comply with the Safety and Housekeeping procedures stated in Safety and Contractor Requirements (Appendix A), Attachment A18 and Attachment A19.

8.2 The Company has computerized the WPA request process. All organizations working on plant site shall be required to use the WPA computers to request WPA tags to be hung. The Company will provide training to one or two individuals per organization with training to be located at the Ameren POS Training Center.

9.0 TRANSFER OF INFORMATION (OSHA Safety Requirement)

9.1 Ameren shall inform the Contractor of known characteristics and conditions as it relates to the safety of the work being performed on all equipment associated with generation of electricity. This will be accomplished before work begins, after the contract is awarded during Ameren's pre-construction meeting.

9.2 The transfer of information will be shared with the primary contractor awarded the work. That primary contractor will share the same information with any sub-contractors hired by the primary contractor.

9.3 If any unique and/or hazardous conditions exist which were not mentioned by Ameren, Contractors must inform Ameren of those conditions in a timely manner.

10.0 PARTICIPATION IN COORDINATION ACTIVITIES

10.1 Contractor shall provide a representative for and participate in coordination and information exchange activities with representatives of the Company and other contractors involved with the plant improvements, including the following activities:

10.1.1 Exchange of information necessary for the work specified herein to interface with other Contractors.

10.1.2 Participation in multi-contact coordination, construction, installation, and startup meetings. One construction meeting per week and one multi-contractor outage coordination meeting per week is anticipated during the majority of the outage. Initial shutdown and startup meetings are on a more frequent basis; often daily.

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10.1.3 Participation in safety walk-down meetings. Safety meetings may occur bi-weekly. The Construction Project Lead will inform Contractor of meeting dates and times as necessary.

10.1.4 Contractor shall electronically track safety findings from safety walk-downs and document corrective actions taken.

10.2 Contractor shall provide daily schedule updates to the designated Company representative (Project Scheduler) for inclusion into the integrated outage schedule.

11.0 CONTRACTOR'S COST TRACKING PROGRAM

11.1 In addition to daily timesheets, Contractor shall furnish manpower and cost information to the Construction Project Lead for all "time & material" work on a weekly basis. Time & Material information is to be submitted on Contractor-supplied forms.

12.0 GENERAL INFORMATION

12.1 Upon completion, all work defined in this document shall be of a uniformly neat and workmanlike appearance. All costs of repair to meet this condition shall be to Contractor's account.

12.2 Contractor shall follow the manufacturer's or fabricator's guidelines and requirements for installation of all materials and equipment, except as modified by this Specification.

12.3 Contractor shall be aware that there may be other contractors onsite during the Work as described in this Specification as well as Company GCMS and Plant forces. Contractor shall coordinate his work to minimize interferences with the work of other contractors and/or crafts.

12.4 Contractor's employees shall park in designated parking areas only. Employees shall observe Ameren site requirements for driving and parking on-site. Employees are to report to the main entrance prior to proceeding to parking area.

12.5 Upon admittance into the Plant, Contractor (including each and every employee or sub-contractor's employees) shall be subjected to a computer based training (CBT) program that describes the Plant Construction Job Work Rules. These work rules are similar to those listed in Supplemental General Conditions Section 1A, Item 2.4. The training lasts approximately ¾ hour for the average worker. Employees cannot begin work until the training is completed.

12.6 Contractors must recognize the difference between special instrument air connections and service air connections and shall not use instrument air for their air supply needs.

12.7 Job Working Rules

Contractor must enforce the Ameren Job Working Rules (Appendix B) as well as the Contractor's own work rules. If the rules conflict, then the more restrictive rule applies.

Equipment skids supplied by the contractor shall have a P&ID diagram with equipment identifications, critical settings and pressure ratings identified. The skid pumps, blowers, motors, valves, instruments and other equipment shall have labels attached with the device number shown on the P&ID. The device numbers will be provided by Ameren and be compatible with plant equipment labels and numbering schemes.

13.0 EXTRA WORK ORDERS

13.1 Extra work will be authorized by an approved Extra Work Order (EWO). Contractor shall not start any additional work without written approval from the Company.

13.2 Extra work may be authorized on a lump sum firm price, time and materials (T&M), or a T&M-not-to-exceed basis. The Company will select the terms of the EWO.

13.2.1 Pricing for lump sum firm price and T&M-not-to-exceed work shall be based on the Engineering Inspection Report supplied by the Construction Project Lead.

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13.2.2 The Company may accept or reject Contractor's proposal for any EWO. If an EWO proposal is rejected the Company may try to negotiate the price, reduce or cancel the work scope, or obtaining pricing from another contractor.

13.2.3 If Contractor's submitted EWO proposal is acceptable to the Company an approved EWO will be issued authorizing the work.

13.3 Invoices for all approved Extra Work Orders shall reference the purchase order number of the original contract, the EWO Number, and have a copy of the approved EWO attached.

END OF SECTION 1B

Ameren MISSOURI

Specification #000167
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Meredosia Energy Center Location Map



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SECTION 1C – INFORMATION REQUIRED FROM BIDDERS

1.0 INFORMATION REQUIRED WITH BID PROPOSAL

1.1 Proposed Construction Schedule

- Contractor shall attend a mandatory **Pre-Bid Conference** at the Meredosia Energy Center on _____.
- Contractor shall submit a **Lump Sum Firm Price Bid Proposal** by _____.
- Contractor shall submit **Level 3 Schedule** by _____.
- Anticipated **Contract Award** for construction is _____.
- **Contractor shall complete all work by** _____.

1.2 Contractor shall submit the following items with the Bid Proposal:

- Pricing
- Project Schedule
- Preliminary Project Execution Plan
- Insurance Certification Statement
- Field Construction Safety Program
- Laydown and access requirements
- Diverse Supplier Business Plan
- Statement of Qualifications
- Contractor Safety & Health Data Form
- Bid Form

1.3 Pricing

1.3.1 Contractor to submit a Lump Sum Firm Price Bid Proposal

1.3.2 Contractor shall submit with bid proposal a schedule of time and material (T&M) rates as well as T&M rates for all planned subcontractors. The submitted schedules of T&M rates will be used for any additional work the Company may request or approve during the course of the specified work.

1.3.3 Break out cost for safety personnel per Safety and Contractor Requirements Appendix A, Item 4.2.

1.4 Project Schedule

1.4.1 A Level 2/3 Schedule shall be prepared.

1.5 Preliminary Project Execution Plan

1.5.1 Contractor shall submit with bid proposal a preliminary work plan describing how the project will be executed.

1.6 Insurance Certification Statement

1.6.1 Contractor shall submit acceptable Insurance Certification.

1.7 Field Construction Safety Program

1.7.1 Safety Program for Field Operations shall be submitted.

1.8 Laydown and Access requirements

1.8.1 A Staging Area is shown on the plans. (See sheet T-002) Contractor to address the adequacy of this area for their operations.

1.9 Diverse Supplier Business Plan

1.9.1 In order to support Ameren's policy on Supplier Diversity, Attachment A22 shall be filled out and submitted with bid. 2nd Tier Supplier shall be defined as work as set forth in bid proposal not being

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self-performed. Ameren does not certify Diverse Suppliers and relies upon third party certifying organization. Ameren recognizes certification from the National Minority Council (NMSDC) and its affiliate councils, the Women's Business Enterprise National Council (WBENC) and its affiliate councils, and Federal, State and Local government certifying agencies.

Note: editable versions of Attachment A22 with instructions and reporting guidelines will be sent out as part of bid package. Questions on filling out form will be directed towards Ameren Supplier Diversity professionals at (888) 256-1150 or at http://www.ameren.com/BusinessPartners/SupplierDiversity/Pages/SupplierDiversityHome.as.

1.10 Statement of Qualifications

1.11 Contractor Safety & Health Data Form

1.11.1 Contractor shall submit with bid proposal a completed Contractor Safety & Health Data Form (Appendix A, Attachment A9).

1.12 Bid Form

1.12.1 Contractor shall submit the Bid Form found in Appendix AA of this specification.

1.13 Exceptions

1.13.1 Any contract award resulting from this Specification will incorporate all provisions specified herein. It is understood that Contractor agrees to all provisions of Specification unless exceptions are specifically listed in bid proposal.

1.14 Quality

1.14.1 Copies of the Contractor's quality management program and supportive procedures.

2.0 INFORMATION REQUIRED AFTER CONTRACT AWARD

2.1 Schedule

2.1.1 Contractor shall submit a construction schedule as described in Contractor Schedule Requirements (Appendix D). Failure to provide a schedule may result in rejection of the bid.

2.1.2 Contractor shall provide continuous (daily) updates of his project work schedule beginning after he mobilized at jobsite and continuing through completion of work. Failure to provide a schedule may result in charges to Contractor.

2.2 Revised Project Execution Plan

2.2.1 Contractor shall submit after award of contract a detailed work plan describing how the project will be executed. Included in the work plan shall be items/details such as:

2.2.1.1 Method of construction of the dewatering system.

2.2.1.3 Location of Contractor's proposed borrow area.

2.2.1.4 Quality control plan

2.2.1.6 List of subcontractors

2.2.1.7 Site-specific safety plan. At a minimum, Attachment A21 – Site-Specific Safety Plan (SSSP), shall be filled out in its entirety. The SSSP shall be submitted to Ameren for review, comment and approval. Editable version of Attachment A21 is to be supplied after issuance of PO.

2.2.1.8 Site-specific demolition plan (may be incorporated into the Safety Plan)

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2.3 Contractor Project Management

2.3.1 Contractor shall provide an organizational chart depicting names and roles of individuals involved with project from Project Manager to Foreman level.

2.3.2 Contractor shall provide necessary resources to provide scheduling information and updates as defined in Contractor Schedule Requirements (Appendix D).

2.3.3 Contractor shall provide a full time Project Manager onsite unless an exemption is provided in writing by the Managing Supervisor of Construction.

2.6 Contractor and subcontractors shall submit a Quality Plan which is in compliance with the Quality Requirement in Supplemental General Conditions Section 1A, Item 12, prior to start of work. .

2.7 Diverse Supplier 2nd Tier Report

2.7.1 In accordance with Item 1.6.1 above, Attachment A23 shall be filled out with actual spent cost and issued per timeline agreed upon between Contractor and Ameren. Typical timeline for reporting will be monthly.

Note: editable version of Attachment A23 with instructions and reporting guidelines will be sent out as part of Contract Award. Questions on filling out form will be directed toward Ameren Supplier Diversity professionals at (888) 256-1150 or at http://www.ameren.com/BusinessPartners/SupplierDiversity/Pages/SupplierDiversityHome.as.

END OF SECTION 1C

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SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:

1. Coordination drawings
2. Requests for Information (RFIs)
3. Project meetings

B. Related Requirements:

1. Section 01700 "Execution Requirements" for procedures for coordinating general installation and field-engineering services shall be followed, including establishment of benchmarks and control points.

1.2 DEFINITIONS

A. REQUEST FOR INFORMATION (RFI): An RFI is a request from Owner, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: The Contractor will prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products,
2. Number and title of related Specification Section(s) covered by subcontract, and
3. Drawing number and detail references, as appropriate, covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

A. Coordination: The Contractor will coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Additionally, the Contractor shall coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation as indicated below.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. The Contractor shall prepare memoranda for distribution to each party involved that outlines special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: The Contractor shall coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule,
2. Preparation of the schedule of values,

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3. Installation and removal of temporary facilities and controls,
4. Delivery and processing of submittals,
5. Progress meetings,
6. Preinstallation conferences,
7. Project closeout activities, and
8. Startup and adjustment of systems.

1.5 COORDINATION DRAWINGS

A. General Coordination Drawings: The Contractor shall prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information should be drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

   a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to the Engineer indicating the proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, the Contractor shall prepare and submit an RFI in the form specified below:

1. All RFIs to be submitted by the Contractor; Engineer will not reply to RFIs submitted by subcontractors, vendors or suppliers.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the Work or work of subcontractors.
3. Submit separate RFIs for each item requiring information or interpretation.

B. The Contractor will prepare RFIs on forms supplied by Owner.

C. The Content of the RFI should include a detailed, legible description of item needing information or interpretation and the following:

1. Project name,
2. Project number,
3. Date,
4. Name of Contractor,
5. Name of Engineer,
6. RFI number, numbered sequentially,
7. RFI subject,
8. Specification Section number and title and related paragraphs, as appropriate,
9. Drawing number and detail references, as appropriate,
10. Field dimensions and conditions, as appropriate,
11. Contractor's suggested resolution. (If Contractor's resolutions impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature, and
13. Attachments: Include sketches, descriptions, measurements, photos, product data, shop drawings, coordination drawings, and other information necessary to adequately describe items needing interpretation.

D. Engineer's Action: The Engineer will review each RFI, determine action required, and respond. Allow seven working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

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a. Requests for approval of submittals,
b. Requests for approval of substitutions,
c. Requests for coordination information already indicated in the Contract Documents,
d. Requests for adjustments in the Contract Time or the Contract Sum,
e. Requests for interpretation of Engineer's actions on submittals, and
f. Incomplete RFIs or inaccurately prepared RFIs.

2. The Engineer's action may include a request for additional information, in which case Engineer's time for response will date from the time of receipt of additional information.

a. If Contractor believes the RFI response warrants a change in the Contract Time or the Contract Sum, the Engineer must be notified in writing within 10 days of receipt of the RFI response.

E. RFI Log: The Contractor will prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. The log will be submitted monthly and will include the following:

1. Project name,
2. Name and address of Contractor,
3. Name and address of Engineer,
4. RFI number including RFIs that were dropped and not submitted,
5. RFI description,
6. Date the RFI was submitted, and
7. Date the Engineer's and Construction Manager's response was received.

F. On receipt of the Engineer's action, update the RFI log and immediately distribute the RFI response to the affected parties. Review the response and notify the Engineer within seven (7) days if Contractor disagrees with the response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. General: The Contractor will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify the Owner and Engineer of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda and distribute the agenda to all invited attendees.
3. Minutes: The Entity responsible for conducting meeting will record significant discussions and agreements achieved. The meeting minutes will be distributed to everyone concerned, including the Owner, and Engineer, within three (3) days of the meeting.

B. Preconstruction Conference: The Contractor will schedule and conduct a preconstruction conference before starting construction, at a time convenient to the Owner and Engineer, but no later than 15 days after execution of the Contract.

1. Attendees: Authorized representatives of the Owner, Contractor and/or Contractor superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
2. Agenda: Items of significance will be discussed that could affect progress, and may include the following:

a. Tentative construction schedule,
b. Critical work sequencing and long-lead items,
c. Designation of key personnel and their duties,
d. Procedures for processing field decisions and Extra Work Orders,
e. Procedures for RFIs,
f. Procedures for testing and inspecting,
g. Procedures for processing Applications for Payment,

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h. Distribution of the Contract Documents,
i. Submittal procedures,
j. Preparation of record documents,
k. Use of the premises and existing building,
l. Work restrictions,
m. Working hours,
n. Owner occupancy requirements,
o. Responsibility for temporary facilities and controls,
p. Procedures for disruptions and shutdowns,
q. Construction waste management and recycling,
r. Parking availability,
s. Office, work, and storage areas,
t. Equipment deliveries and priorities,
u. First aid, and
v. Security,

3. Minutes: The Contractor will record and distribute meeting minutes.

C. Progress Meetings: The Contractor will conduct progress meetings at monthly intervals.

1. Attendees: In addition to representatives of the Owner, Contractor, and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. The Contractor shall review present and future needs of each entity present, including the following:

1) Interface requirements,
2) Sequence of operations,
3) Status of submittals,
4) Deliveries,
5) Access,
6) Site utilization,
7) Temporary facilities and controls,
8) Quality and work standards,
9) Status of correction of deficient items,
10) Field observations,
11) Status of RFIs,
12) Status of proposal requests,
13) Pending changes,
14) Status of Change Orders and Extra Work Orders,
15) Pending claims and disputes, and
16) Documentation of information for payment requests.

3. Minutes: The Contractor will record and distribute the meeting minutes to each party present and to the parties requiring information.

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a. Schedule Updating: The Contractor's construction schedule will be revised after each progress meeting where revisions to the schedule have been made or recognized. The revised schedule will be issued concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

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SECTION 01322 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs, and
2. Periodic construction photographs.

B. Related Requirements:

1. Section 01770 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

1.2 INFORMATIONAL SUBMITTALS

A. Key Plan: The Contractor shall submit key plan of Project site with notation of vantage points marked for location and direction of each photograph. Include same information as corresponding photographic documentation.

B. Digital Photographs: The Contractor shall submit unaltered, original, full-size image files as attachment to weekly reports.

1. Digital camera should have a minimum sensor resolution of 8 megapixels.
2. Identification: Provide the following information with each image description in the file metadata tag:

a. Name of Project,
b. Date photograph was taken, and
c. Description of vantage point, indicating location, and direction (by compass point).

C. Include date photograph was taken if not date stamped by camera.

D. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

E. Unique sequential identifier keyed to accompanying key plan.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, with minimum size of 8 megapixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall have a camera on site at all times for Ameren's Construction Project Lead's use. Camera should have a date stamp feature and software to download photos to computer.

B. General: Photographs should be taken using the maximum range of depth of field, and in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. The Contractor shall maintain key plan with each set of construction photographs that identifies each photographic location.

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C. Digital Images: The Contractor shall submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: The date and time will be included in file name for each image.
2. Field Office Images: One set of images will be maintained accessible in the field office at Project site, available at all times for reference. The images should be identified in the same manner as those submitted to Engineer and Owner.

D. Preconstruction Photographs: Before commencement of excavation, commencement of selective demolition, and starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Special attention should be given to existing pipeline foundations that are to remain undisturbed.

E. Periodic Construction Photographs: Take 20 photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

F. Project Closeout Photographs: After construction has been completed, the Contractor shall document the condition of the existing oil pipeline foundations. The same vantage points should be utilized for the photographs.

G. Additional Photographs: The Engineer may request photographs in addition to periodic photographs specified.

1. Five (5) day notice will be given, where feasible.

2. In emergency situations, take additional photographs within 24 hours of request.

3. Circumstances that could require additional photographs include, but are not limited to, the following:

a. Immediate follow-up when on-site events result in construction damage or losses,
b. Photographs to be taken at fabrication locations away from Project site,
c. Substantial Completion of a major phase or component of the Work, or
d. Extra record photographs at time of final acceptance.

END OF SECTION 01322

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SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 01781 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: The Contractor shall submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and Construction Manager and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Engineer's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.

1. The Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

a. The Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

B. Refer to Submittal Requirement chart at the end of this section for the submittal required for each section.

C. Coordination: The Contractor shall coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

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1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.

E. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer and Construction Manager.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer or Construction Manager observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

    a. Contractor to submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer and Construction Manager.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer and Construction Manager will return without review submittals received from sources other than Contractor.

    a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

        1) Project name.
        2) Date.
        3) Destination (To:).
        4) Source (From:).
        5) Name and address of Engineer.
        6) Name of Contractor.
        7) Name of firm or entity that prepared submittal.
        8) Names of subcontractor, manufacturer, and supplier.
        9) Category and type of submittal.
        10) Submittal purpose and description.
        11) Specification Section number and title.
        12) Specification paragraph number or drawing designation and generic name for each of multiple items.
        13) Drawing number and detail references, as appropriate.
        14) Indication of full or partial submittal.
        15) Transmittal number, numbered consecutively.
        16) Submittal and transmittal distribution record.

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17) Remarks.
18) Signature of transmitter.

F. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

   a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-06100.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:

   a. Project name.
   b. Date.
   c. Name and address of Engineer.
   d. Name of Contractor.
   e. Name of firm or entity that prepared submittal.
   f. Names of subcontractor, manufacturer, and supplier.
   g. Category and type of submittal.
   h. Submittal purpose and description.
   i. Specification Section number and title.
   j. Specification paragraph number or drawing designation and generic name for each of multiple items.
   k. Drawing number and detail references, as appropriate.
   l. Location(s) where product is to be installed, as appropriate.
   m. Related physical samples submitted directly.
   n. Indication of full or partial submittal.
   o. Transmittal number, numbered consecutively.
   p. Submittal and transmittal distribution record.
   q. Other necessary identification.
   r. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

   a. Project name.
   b. Number and title of appropriate Specification Section.
   c. Manufacturer name.
   d. Product name.

G. Options: Identify options requiring selection by Engineer.

H. Deviations: Identify deviations from the Contract Documents on submittals.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's and Construction Manager's action stamp.

J. Distribution: The Contractor shall furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: The Contractor shall retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's and Construction Manager's action stamp.

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PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Submit electronic submittals via email as PDF electronic files.

    a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Engineer, through Construction Manager, will return two copies.
3. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Engineer and Construction Manager will not return copies.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Statement of compliance with specified referenced standards.
    d. Testing by recognized testing agency.
    e. Application of testing agency labels and seals.
    f. Notation of coordination requirements.
    g. Availability and delivery time information.

4. Submit Product Data before or concurrent with Samples.
5. Submit Product Data in the following format:

    a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Engineer's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 22 by 34 inches.
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Submit product schedule in the following format:

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a. PDF electronic file.

E. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Construction Quality Assurance Plan.

F. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01770 "Closeout Procedures."

G. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.

H. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.

I. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

J. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

K. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

L. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

M. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

N. Schedule of Tests and Inspections: Comply with requirements specified in Section 01400 "Quality Requirements."

O. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

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PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01770 "Closeout Procedures."

C. Approval Stamp: The Contractor shall stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

A. General: The Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: The Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330

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Section	Item	Catalog Cuts	Closeout	Coordination Drawings	Design Mixtures	Field Quality Control	Informational	Installer Certifications	Material Test Report	Product Certificates	Product Data	Sample Warranty	Samples	Source Quality Control	Shop Drawings & Design Calculations	Testing and Inspection Reports
01310	Subcontract List						X									
01322	Key Plan						X									
01322	Digital Photographs						X									
01500	Site Plan						X									
01500	Erosion & Sediment Control Compliance						X									
01500	Fire-Safety Program						X									
01700	Survey Certification						X									
01770	Contractor's List Incomplete Items		X													
01770	Certified List Incomplete Items		X													
01770	Certificates of Release		X													
01770	Inspection for Substantial Completion (min 10 days prior)		X													
01770	Final Completion		X													
01781	Record Drawings		X													
01781	Record Specifications		X													
01781	Record Product Data		X													
02060	Pre-demolition Photos or Video (before work begins)						X									
02060	Schedule of selective demolition						X									
02060	Flowable Fill				X					X						X
02200	Earthwork												X			X
02240	Dewatering plan						X									
02250	Site Drainage – Rock Blanket and Energy Dissipator										X					
02250	Geotextile Filter										X		X			
02511	Crushed Stone Paving												X			
02800	HDPE Geomembranes and Polypropylene Turf Grass		X			X		X	X	X		X	X	X	X	X
02821	Chain-Link Fences and Gates	X									X					
02936	Seeding and Mulching									X	X					
02950	Abandonment of Storm Sewer	X							X		X					

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Ameren Energy Generating

SECTION 01356 - SWPPP DESIGN, INSTALLATION, MAINTENANCE AND REMOVAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. A Stormwater Pollution Prevention Plan (SWPPP) has been provided by Ameren. A copy of these plans have been provided, see drawings C-602 and C-603.

B. Refer to Appendix CC for the SWPPP report.

C. Implement, maintain and remove SWPPP. Maintenance of the SWPPP includes adjustments to the SWPPP as deemed necessary by Ameren and any adjustments necessary to control stormwater pollution.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide all equipment and materials, suitable and in adequate quantity, required to accomplish the work as specified herein.

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. Contractor shall install and maintain SWPPP BMP's during construction as necessary to control and prevent pollution of stormwater runoff leaving the site. Adjust SWPPP as directed and as necessary to prevent stormwater pollution. At an appropriate time after project completion, and only after all disturbed areas are fully vegetated or otherwise protected from erosion in a permanent fashion, remove SWPPP BMPs.

B. Contractor to provide and maintain a proper washdown station.

C. All BMPs shall be inspected weekly by the Contractor and after rainfall events of 1 inch or more. Contractor inspections must be scheduled at least once per week and no later than 48 hours after a rainfall that causes stormwater runoff to occur on-site. A typed inspection report must be delivered to the Engineer after each Contractor inspection.

END OF SECTION 01356

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SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer or Construction Manager.

B. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

C. Construction Quality Assurance (CQA) contractor hired under separate contract by the owner to implement the Construction Quality Assurance Plan.

D. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

G. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

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1.4 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Description of the Work and test and inspection method.
6. Identification of product and Specification Section.
7. Complete test or inspection data.
8. Test and inspection results and an interpretation of test results.
9. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
11. Name and signature of laboratory inspector.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

D. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

E. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

F. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.6 QUALITY CONTROL

A. Contractor Responsibilities: Check the CQA plan for responsibilities concerning all tests and inspections.

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1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
2. Notify testing agencies and/or CQA Contractor at least three (3) working days in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

B. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. CQA Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.7 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer, through the Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, this includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01700 "Execution Requirements."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

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SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 1B "Summary of Work" for limitations on work restrictions and utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Engineer, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

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B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Engineer, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 1B "Summary of Work."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel.

D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead unless otherwise indicated.

F. Telephone Service: Owner will provide telephone, fax, and computer connections for Contractor supplied construction trailers.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Engineers' offices.
f. Owner's office.
g. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone.

3.3 SUPPORT FACILITIES INSTALLATION

A. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

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1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 02200 "Earthwork."

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

E. Waste Disposal Facilities: Paper waster form construction office trailers and waste from installation of new materials to be hauled off by licensed trash haulers. No paper or cardboard waster to be left on site or buried in designated disposal area.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to the SWPPP.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

END OF SECTION 01500

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SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 01330 "Submittal Procedures."
    b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01330 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

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1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
4. Protect stored products from damage.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01770 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

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1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2. Manufacturers:

   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of engineers and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

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SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Correction of the Work.

B. Related Requirements:

1. Division 1 Section 01770 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by Illinois licensed land surveyor certifying that location and elevation of improvements comply with requirements.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in the State of Illinois and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

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B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Section 01310 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owner or Engineer promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Construction Manager when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including grading, fill and topsoil placement, and utility slopes.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Contractor.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

B. Survey Control Points: Survey Control points have been established for this project, but are not limited by the established list. Contractor may establish additional control points as deemed necessary during construction.

C. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

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3.5 INSTALLATION

A. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

B. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

C. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

D. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
2. Proceed with patching after construction operations requiring cutting are complete.

E. Patching: Patch construction by filling, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

3.7 PROGRESS CLEANING

A. Site: Maintain Project site free of waste materials and debris.

B. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

C. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

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3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and property adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 01700

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SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 01781 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name where applicable.

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C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Instruct Owner's personnel in maintenance of products.
3. Complete final cleaning requirements.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer and Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by SPOC that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Company requirements.
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in maintenance of products.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Engineer and Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Submit list of incomplete items in the following format:

a. PDF electronic file. Engineer, through Contractor, will return annotated copy.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

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2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
4. Remove tools, construction equipment, machinery, and surplus material from Project site.
5. Remove labels that are not permanent.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective materials, refinishing damaged surfaces. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 01770

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SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one set(s) of file prints.

b. Final Submittal:

1) Submit record digital data files and three set(s) of record digital data file plots.

B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy of each submittal.

D. Photographs of the oil pipeline foundations after construction.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 RECORD SPECIFICATIONS

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A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders and record Drawings where applicable.

B. Format: Submit record Product Data as paper copy.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's and Construction Manager's reference during normal working hours.

END OF SECTION 01781

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SECTION 02060 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes all items described in these specifications and as shown on Site Plan drawings C-101 through C-107.

B. Section Includes:

1. Demolition, removal, and disposal of selected site elements as indicated on drawings:
   a. Above grade steam line and foundations,
   b. Chain link fencing, including but not limited to the mesh, posts, supports, barbed wire, foundations, etc.
   c. Sluice piping and inflow structure at Bottom Ash Pond,
   d. Light poles and wiring around Bottom Ash Pond,
   e. Underground electric lines, boxes, panels, components and monitoring equipment on Berm of Fly Ash Pond,
   f. Other piping and miscellaneous items.
2. Salvage of existing items to be reused or recycled.
3. Temporary removal and replacement.
4. Removal and disposal of Outflow structure and pipe from Bottom Ash Pond.
5. Removal and disposal of Inflow structure, concrete vault structure and inlet pipe(s) from Bottom Ash Pond.
6. Removal and disposal of Outflow structure and plug outlet pipe with flowable fill in the Fly Ash Pond.
7. Removal of underground electric service and utility poles at dock and along north edge of Bottom Ash Pond.

1.2 DEFINITIONS

A. Demolish: Remove existing construction items and legally dispose of.

B. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 PREINSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Pre-demolition Photographs or Video: Submit before Work begins.

B. Schedule of selective demolition activities with starting and ending dates for each activity.

C. Submittals shall be as outlined in Section 01330 Submittals.

1.5 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

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E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1.6 SALVAGE

A. Contractor may salvage any materials within the scope of demolition, such as, metal piping, chain-link fencing, rock blanket, power poles, light poles, etc.

B. Salvage materials must be approved by Ameren personnel before leaving project site.

1.7 SUBMITTALS

A. Submit design mixture and testing certification of Flowable Fill.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

C. Flowable Fill: Density in place shall be 65 to 100 psi for non-air-entrained or conventionally air-entrained mixtures. Mixture to meet ASTM C403 standards. Provide mix design and specifications to engineers for review prior to beginning work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated electrical or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

D. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.

1. Comply with requirements specified in Section 01322 "Photographic Documentation."

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 1B "Summary of Work."

B. Existing Services/Systems To Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off indicated utilities with utility companies.

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3. If systems are required to be removed, relocated, or abandoned, provide temporary systems that bypass area of selective demolition and that maintain continuity of systems to other parts of building.
4. Contractor to coordinate with local utility to remove and relocate the utility poles along the north side of the Bottom Ash Pond. New dusk to dawn lights and underground service to dock will be installed.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 01500 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to facilities to remain.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
2. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: All demolished materials from the site are to stay on-site and/or be disposed of in an approved manner.

1. Demolished materials remaining on-site shall be disposed of within the Fly Ash Pond as approved by Owner.
2. Do not allow demolished materials to accumulate on-site.
3. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. The Contractor can salvage any materials within the scope of the demolition.

3.6 CLEANING

A. Clean adjacent areas, on-site or off-site, of debris caused by selective demolition operations. Return adjacent areas to condition existing before demolition operations began.

END OF SECTION 02060

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SECTION 02200 - EARTH WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Moving and shaping ash to the grading shown on the drawings.
2. Excavate the Bottom Ash Pond to elevation 424 and deposit into Fly Ash Pond and backfill with off-site borrow soil to elevation 430.
3. Excavating and shaping Eastern Fly Ash Stockpile area with off-site borrow soil as shown on drawings.
4. Moving, filling, and shaping of materials deposited into Fly Ash Pond.
5. Preparing subgrades for synthetic turf, turf, grasses and roadway.
6. Excavating and backfilling for synthetic turf, turfs, ditches and structures.
7. Excavating and backfilling for anchor trenches.
8. Shaping proposed ditches.
9. Scraping coal pile and removing approximately 18-24 inches and depositing into the Fly Ash Pond.
10. Hauling in and filling with off-site borrow soil.

1.2 DEFINITIONS

A. Ash Material: Consists of Coal Fines, Bottom Ash, Fly Ash, Ash/Soil/Rock mixture.

B. Backfill: Ash or Soil material used as fill.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

I. Synthetic Turf: A synthetic grass system for closure of mine spoils and landfills; turf is a combination of polypropylene grass tufts underlain by impermeable HDPE geomembrane, i.e. "Closureturf™" or "Hydroturf™".

J. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 QUALITY ASSURANCE

A. Pre-excavation Conference: Conduct conference at Project site.

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1.4 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

1.5 SUBMITTALS

A. Submit soil material samples as required by CQA Plan and as outlined in Section 01330 Submittals.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soils:

1. General Fill: Soil Classification Groups CL, ML, GW, GP, GM, SC, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
2. Ash Pond Subgrade within 1 foot of design grade - Soil Classification Groups CL, ML, SC, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; no bottom ash; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
3. Bottom Ash Pond Backfill: Soil Classification Groups GW, GM, GP, GC, SC, SW, SP, SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
4. Access Road on Bottom Ash Berm: Bottom Ash Berm Widening under ClosureTurf™ shall be constructed with Bottom Ash Material only.

B. Unsatisfactory Soils:

1. Unsatisfactory soils also include satisfactory soils not maintained within 4 percent of optimum moisture content at time of compaction.

C. Sand Infill for ClosureTurf™: Natural or manufactured sand material, fine aggregate meeting grain size distribution ASTM C 33 and Specification No. 02800-2.4C.

D. Hydrobinder Infill for HydroTurf™: Proprietary blended material manufactured by Agru America or approved equivalent.

E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

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1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION OF BOTTOM ASH POND

A. Excavate to elevation 424.0 and deposit material into the Fly Ash Pond.

B. Backfill Bottom Ash Pond with approved materials.

3.4 REMOVAL OF MATERIAL FROM COAL PILE

A. Remove material from top 18" – 24" of Coal Pile.

B. Deposit material into Fly Ash Pond.

C. Grade Coal Pile to drain.

3.5 MOVING, FILLING, AND SHAPING FLY ASH POND

A. Deposit on-site Ash Materials into Fly Ash Pond.

B. Demolition items, as approved by Owner, shall be disposed of within the Fly Ash Pond.

1. Allow a minimum of 3 feet of Ash Material cover over demolition items to ensure HDPE Geomembrane is protected from possible punctures, etc.

C. Grade and shape Ash Material as shown on drawings

D. Encapsulate Fly Ash Pond with ClosureTurf™ product, see specification section 02800.

3.6 SUBGRADE INSPECTION

A. Proof-roll subgrade with a loaded pneumatic-tired dump truck or equivalent to identify soft areas and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that is too wet to compact to specified dry unit weight.

3.9 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

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C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D1557:

1. Under turf or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
2. For trench backfill, compact each layer of initial and final backfill soil material at 90 percent.
3. For crushed rock backfill, compact each layer of initial and final backfill material to 95 percent.

3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away to prevent ponding. Finish subgrades to required elevations as shown on the drawings.

C. In order to accommodate a final balanced cut and fill, the Contractor may adjust the final grade elevations provided that the profile slopes of the ditches are not reduced less that the minimum slopes as shown on the drawings.

D. Any additional cut shall be distributed evenly throughout the grading area of the Fly Ash Pond so as to produce a balance. There shall be no haul-off of material from this site.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.12 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. All waste materials, including trash and debris will be disposed of off-site in an approved manner.

END OF SECTION 02200

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SECTION 02230 - SITE CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removing existing vegetation.
2. Clearing and grubbing.
3. Stripping and stockpiling topsoil.
4. Removing above- and below-grade site improvements.
5. Disconnecting, capping or sealing site utilities.
6. Temporary erosion- and sedimentation-control measures.
7. Cleaning and shaping existing ditches.

1.2 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property; cleared materials shall be disposed of on-site in the designated disposal area.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads and other adjacent occupied or used facilities during site-clearing operations.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other diggings unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 02200 "Earth Work."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

C. Protect existing site improvements from damage during construction.

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1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E. Refer to Section 01356 for the SWPPP requirements for soil and sedimentation control.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Engineer.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Engineer's written permission.
3. Should any underground utilities be encountered, stop work immediately and notify SPOC.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Remove top 6 inches of topsoil. Store topsoil for later use.
2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Use only hand methods for grubbing within protection zones.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other waste materials. Remove subsoil and non-subsoil materials including clay lumps, gravel and other objects more than 2 inches in diameter.

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D. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including debris, and dispose of them in the designated on-site location.

END OF SECTION 02230

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SECTION 02240 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes dewatering of the Ash Ponds and water disposal, which is Contractor's responsibility, if needed.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 FIELD CONDITIONS

A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1.4 SUBMITTAL

A. Informational: Dewatering Plan

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

2.2 DEWATERING PLAN

A. The Contractor shall prepare a dewatering plan and submit it to Ameren. The plan must be approved by Ameren prior to implementation.

B. The Contractor shall dewater and monitor settlement of the ash as necessary in order to achieve final placement of the ash in accordance with the plans.

C. Geotechnical studies indicate known supersaturated and liquefiable materials on-site.

D. Dewatering well points within the Bottom Ash Pond need to be pumped and drained to a settling basin within the Fly Ash Pond prior to being discharged to the regulated NPDES Outfall 004 location in the Fly Ash Pond (shown on T-002).

E. There is a standing pond of water located at the southwest end of the Fly Ash Pond. This pond is equipped with an existing NPDES outflow structure. The structure is used to control the overflow elevation of the standing water. The Contractor may utilize this water for dust control during grading operations.

F. Water that is removed from Ash Ponds, from dewatering operations, must be discharged in an approved manner under the direction of Ameren personnel.

G. Water conditioning by Ameren personnel (Or contractor hired by Ameren) is available in order to balance pH and remove suspended solids (TSS).

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary grading to facilitate dewatering and control of surface water.

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B. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 02230 "Site Clearing," during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.

C. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 WATER DISPOSAL

A. Dispose of water removed from excavations in such a manner as:

1. Will not endanger portions of work under construction or completed.
2. Will cause no inconvenience to Owner or to others working near site.

B. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas.

C. Disposal water must be directed to the permitted site NPDES regulated discharge point for disposal. The southwest corner of the Fly Ash Pond shall be utilized to allow contaminants to settle out prior to discharge.

1. The Owner will have CQA personnel monitoring the discharge stream for contaminants in compliance with the site NPDES Permit. The Contractor shall allow time and access for testing the water prior to final discharge.
2. At no time shall dewatering be discharged to the Illinois River without going through the regulated NPDES Outfall 004 at the southwest corner of the Fly Ash Pond.

3.4 OPERATION

A. Operate system to control groundwater to permit excavation, installation of materials, and placement of fill materials on dry subgrades.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

3.5 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during dewatering and maintain an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

END OF SECTION 02240

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SECTION 02250 – SITE DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Rock Blanket lining ditches and embankments,
2. Energy Dissipators, and
3. Geotextile Filter.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

A. Product Data: Provide quarry name and material gradation prior to delivery. Provide manufacturer's certification for Geotextile Filter.

B. Product Sample: Geotextile Filter (18" x 18")

PART 2 - PRODUCTS

2.1 ROCK BLANKET

A. Rock Blanket shall meet the requirements of IDOT Specification Section 1005.01.

B. Material shall be stone, quarried from undisturbed consolidated deposits of rock reasonably free of shale. Ledges shall be sufficiently thick to produce the desired dimensions.

C. IDOT Gradation: RR-6, Equivalent Diameter of 24 inches.

2.2 ENERGY DISSIPATOR

A. Energy Dissipator shall meet the requirements of IDOT Specification Section 1005.01.

B. Material shall be stone, quarried from undisturbed consolidated deposits of rock reasonably free of shale. Ledges shall be sufficiently thick to produce the desired dimensions.

C. IDOT Gradation: RR-4, Equivalent Diameter of 15 inches.

2.3 GEOTEXTILE FILTER

A. Geotextile Filter Fabric shall meet IDOT spec. sect. 1080.03. Material shall be a nonwoven material not less than six (6) ft. wide, weighing no less than 8 oz./sq.yd.

PART 3 - EXECUTION

3.1 PREPARATION OF DITCH OR EMBANKMENT FOR GEOTEXTILE FILTER

A. Grade and compact to a relatively smooth surface free from sharp objects and large stones.

B. Unroll geotextile as smoothly as possible overlapping edges a minimum of 18 inches.

C. Staple or pin geotextile in place.

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3.2 INSTALLATION OF ROCK BLANKET AND ENERGY DISSIPATORS

A. Place rock blanket/rip rap immediately after installing filter.

B. Install rock in one operation. Do not dump through chutes or use any method that causes segregation of stone sizes.

C. Be careful not to dislodge the underlying filter when placing the stones.

D. If fabric is damaged, remove rock blanket/energy dissipator and repair fabric by adding another layer, overlapping the damaged area by 12 inches.

E. Where rip rap is used for outlet protection, the rip rap should be placed before or in conjunction with the construction of the ditch so that it is in place when the channel begins to operate.

3.3 FIELD QUALITY CONTROL

A. Contractor to ensure a dense, well-graded mass of stone with a minimum of voids present.

END OF SECTION 02250

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SECTION 02511 CRUSHED STONE PAVING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes Roadways and drives; IDOT CA6 limestone.
B. This Section includes the geotextile filter located under the crushed stone roadway.

1.2 RELATED WORK

A. Section 02200 - Earthwork.

1.3 REFERENCES

A. ASTM C136- Sieve Analysis of Fine and Coarse Aggregates.
B. American Association of State Highway and Transportation Officials (AASHTO) T27.

1.4 TESTS

A. Gradation of stone material will be performed in accordance with ASTM C136.
B. Gradation of stone material will be performed in accordance with AASHTO No. T2

1.3 SUBMITTALS

A. Product Data:
1. Aggregate source list: submit a list of proposed aggregate sources.
2. Shipping Tickets for granular material delivered to site.

B. Samples:
1. Submit one (1) sample per source for each aggregate for use on the project. Samples shall be at least 1 lb. and shall be obtained and shipped according to ASTM D75.

PART 2 PRODUCTS

2.1 MATERIALS

A. IDOT CA6. Limestone, clean, tough, and durable, free of thin and elongated pieces of soft and objectionable material, graded in accordance with ASTM C136. The aggregate shall be in accordance with the following gradation:

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	95 +/- 5
1/2 inch	75 +/- 15
No.4	43 +/- 13
No. 16	25 +/- 15
No. 200	8 +/- 4

B. Water: Clean and free of injurious amounts of oil, acid, alkali, salt, organic matter, vegetable matter, or other deleterious substances.

C. Compacted subgrade as defined in section Earthwork 02200.

2.2 GEOTEXTILE FILTER

A. Geotextile Filter Fabric shall meet IDOT sec. 1080.03, it shall be a nonwoven material not less than 6

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ft. wide, weighing no less than 8 oz/sq.yd.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify compacted subgrade is dry and ready to receive the work of this Section. Remove and replace or repair all soft or unstable areas to the satisfaction of the Construction Supervisor.

B. Verify gradients and elevations of sub-base are correct.

C. Beginning of installation means acceptance of existing condition

3.2 PREPARE 12" THICK SUBGRADE

A. Prepare subgrade as directed in section 02200 Earthwork.

3.3 INSTALLING GEOTEXTILE FILTER

A. Place the geotextile on the smooth and level subgrade. All depressions, humps, sharp objects, and large stones should be removed.

B. Fabric shall be laid out and stretched as flat as possible.

C. Overlap adjacent rolls a minimum of 18 inches or as specified by manufacturer.

D. Secure fabric with staples, pins, or other suitable methods. Fabric should be secured along the edges and then at overlapping portions.

3.4 PLACING IDOT CA6,

A. Spread the top layer of stone directly from trucks equipped with hydraulic hoists and adjustable tailgates, or with mechanical spreaders, or with spreader boxes to achieve a compacted thickness of 3 inches unless otherwise shown on the plans. If a mechanical spreader is not used, blade the material a sufficient number of times to form the required gradation. Spread stone to a uniform distribution of sizes throughout, remove any segregated areas, and replace with suitable materials.

B. Rolling shall be performed utilizing a self-propelled (10) ton roller.

C. Begin rolling at edges and progress gradually toward the center.

D. Uniformly overlap each preceding track and thoroughly cover the entire surface. A minimum of FOUR (4) complete passes with the roller is required in all areas accessible by the roller.

E. Check the stone for humps, hollows, or other irregularities. Loosen defective areas, remove surplus or add new material as required, re-roll, and treat as necessary to completely eliminate the defects

F. Where access restraints do not permit the use of the rolling equipment specified above, roll to levels specified above using appropriately sized mechanical rolling/vibrating-plate equipment.

3.5 COORDINATION

A. No paving work shall be done or paving materials placed until all excavation and backfill for all utilities and storm water drainage (under the roads and/or drives) is installed, inspected, and has been allowed to settle.

END OF SECTION 02511

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SECTION 02800 – HDPE GEOMEMBRANES AND POLYPROPYLENE TURF GRASS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes geosynthetic cover system for ash ponds.

B. Section also includes "batten" and/or "flashing" requirements for sealing penetrations in the geomembrane.

1.2 PERFORMANCE REQUIREMENTS

A. Provide geosynthetic cover system that prevents the passage of water.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for geomembrane liners. Show panel layout, seams, penetrations, perimeter anchorage, and methods of attachment and sealing to other construction (batten and flashing). Differentiate between factory and field seams and joints.

C. Samples: Refer to CQA Plan for sample requirements. These samples will be used as control samples for the type of seams to be installed.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Source quality-control reports.

D. Field quality-control reports.

E. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Preinstallation Conference: Conduct conference at Project site.

1.7 WARRANTY

A. Special Warranty: Specified form in which geomembrane manufacturer, geomembrane liner fabricator, and geomembrane liner Installer agree to repair or replace geomembrane liner that fails in material or workmanship or that deteriorates under conditions of normal weather within specified warranty period. Warranty does not include deterioration or failure of geomembrane liner due to exposure to harmful chemicals, gases or vapors, abnormal and severe weather phenomena, fire, earthquakes, floods, vandalism, or abuse by persons, animals, or equipment.

1. Failures include, but are not limited to, the following:

   a. Leaks in geomembrane liner.
   b. Defects in seams.
   c. Cracks and holes in floating cover.

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2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CLOSURETURF™

A. Basis of Design: The intent of the documents and specifications for the product is that the closure geosynthetic cover system shall be "ClosureTurf™" as manufactured by Agru America, Inc.

B. Manufacturers of similar types of material may be submitted for approval of the Engineer prior to bidding.

2.2 HYDROTURF™

A. Basis of Design: The intent of the documents and specifications for the product is that "HydroTurf™" as manufactured by Agru-America, Inc. be used for swales and drainage ways.

B. Manufacturers of similar types of material may be submitted for approval of the Engineer prior to bidding.

2.3 HDPE GEOMEMBRANE

A. Basis of Design: The intent of the documents and specifications for the geomembrane shall be "Super Grip Net Liner" as manufactured by Agru America, Inc.

B. Manufacturers of similar type of material may be submitted for approval by the Engineer prior to bidding.

2.4 MISCELLANEOUS MATERIALS

A. Provide types of adhesive primers, compounds, solvents, and tapes recommended in writing by geomembrane liner manufacturer.

B. Provide manufacturer's standard factory-fabricated assemblies for sealing penetrations. Include joint sealant recommended in writing by geomembrane liner manufacturer and compatible with geomembrane liner, containment conditions, and materials.

C. SAND INFIFLL COMPONENT of the ClosureTurf™ System will meet ASTM C 33; fine aggregate, natural or manufactured sand, gradation shown below:

ASTM C-33-03	
Sieve	Percent Passing
9.5 mm (3/8 in.)	100
4.75 mm (No. 4)	95 to100
2.36 mm (No. 8)	80 to 100
1.18 mm (No. 16)	50 to 85
600 µm (No. 30)	25 to 60
300 µm (No. 50)	5 to 30
150 µm (No. 100)	0 to 10

D. HydroTurf™ HYDROBINDER INFILL COMPONENT is a proprietary cementitious product used as the infill component of the HydroTurf™ system.

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E. Cement: brand of Portland Cement, meeting ASTM C150 and will be Type I or Type II, one brand throughout the duration of the contract, conforming to ASTM C387 for high strength mortars, cementitious infill will have a minimum 28 day compressive strength of 5000psi.

2.5 FABRICATION

A. Fabricate geomembrane liner panels from sheets in sizes as large as possible with factory-sealed seams, consistent with limitations of weight and installation procedures. Minimize field seaming.

2.6 SOURCE QUALITY CONTROL

A. See Construction Quality Assurance Plan.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install per manufacturers recommended installation procedures.

B. Examine substrates, with Installer present, for compliance with requirements for soil compaction and grading; for subgrade free from angular rocks, rubble, roots, vegetation, debris, voids, protrusions, and ground water; and for other conditions affecting performance of geomembrane liner.

C. Examine perimeter anchor trench, where geomembrane liner will be secured, for substrate conditions indicated above and for correct location and configuration.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Provide temporary ballast, until edges are permanently secured, that does not damage geomembrane liner or substrate, to prevent uplift of geomembrane liner in areas with prevailing winds.

F. Prepare surfaces of construction penetrating through geomembrane liner according to geomembrane liner manufacturer's written instructions.

G. Place geomembrane liner over prepared surfaces to ensure minimum handling. Install according to Shop Drawings and in compliance with geomembrane liner manufacturer's written instructions. Begin placing geomembrane liner at Project's upwind direction and proceed downwind. Install geomembrane liner in a relaxed condition, free from stress and with minimum wrinkles, and in full contact with subgrade. Do not bridge over voids or low areas in the subgrade. Fit closely and seal around inlets, outlets, and other projections through geomembrane liner. Permanently secure edges.

H. Install battens and/or flashing on required footings and/or utility/power poles.

I. Field Seams: Comply with geomembrane liner manufacturer's written instructions.

J. Installation in Anchor Trench: Install geomembrane liner in trench according to manufacturer's written instructions. Backfill and compact to lock liner into trench.

K. Protect installed geomembrane liner according to manufacturer's written instructions. Repair or replace areas of geomembrane liner damaged by scuffing, punctures, traffic, rough subgrade, or other unacceptable conditions.

L. Before initial placement of turf cover, inspect seams and patched areas to ensure tight, continuously bonded installation. Repair damaged geomembrane and seams and re-inspect repaired work.

3.2 FIELD QUALITY CONTROL

A. See Construction Quality Assurance Plan.

END OF SECTION 02800

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SECTION 02821 CHAIN-LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes chain-link fences and swing gates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each polymer-coated product and for each color and texture specified, in 6-inch lengths for components and on full-sized units for accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of chain-link fence and gate, from manufacturer.

B. Product Test Reports: For framing strength according to ASTM F 1043.

C. Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:

1. Fabric Height: Seven (7) feet plus embedment length into the ground.

2. Steel Wire Fabric: Wire with a diameter of 9 gauge steel wire.

a. Mesh Size: 1 inch

b. Aluminum-Coated Fabric: ASTM A 491, Type II aluminum coating of 0.4 oz/sf

3. Selvage: Twisted top and knuckled bottom.

2.2 FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:

1. Fence Height: Seven (7) feet.

2. Heavy Industrial Strength: Material, post shall be made of Allied SS-40 or Wheatland WT-40, sized as follows

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a. Line Post: 2.375" OD

b. End, Corner and Pull Post: 4.00" OD

3. Horizontal Framework Members: Intermediate, top and bottom rails complying with ASTM F 1043.

4. Brace Rails: Comply with ASTM F 1043.

5. Metallic Coating for Steel Framing:

a. Type A zinc coating.

2.3 TENSION WIRE

A. Metallic-Coated Steel Wire: 0.177-inch diameter, marcelled tension wire complying with ASTM A 817 and ASTM A 824, with the following metallic coating:

1. Type I, aluminum coated (aluminized).

2.4 SWING GATES

A. General: Comply with ASTM F 900 for gate posts and double swing gate types.

1. Gate Fabric Height: As indicated.

B. Pipe and Tubing:

1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing.

C. Frame Corner Construction: Assembled with corner fittings.

D. Hardware:

1. Hinges: 180-degree outward swing.

2. Latches for drive gates shall be Pioneer Latch Model No. 2507 as manufactured by Merchant Metals, Minneapolis, MN

2.5 FITTINGS

A. General: Comply with ASTM F 626.

B. Barbed Wire Arms: Pressed steel, with clips, slots, or other means for attaching strands of barbed wire, integral with post cap; for each post unless otherwise indicated, and as follows:

1. Provide line posts with arms that accommodate top rail or tension wire.

2. Provide corner arms at fence corner posts.

3. Type I, single slanted arm.

C. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./ sq. ft. zinc.

2.6 BARBED WIRE

A. Steel Barbed Wire: Shall be Copperweld Steel Co. "Alumoweld" Four Point Type Light Weight (three 0.080" diameter strands)

2.7 CEMENT

A. Ultimate strength of 3,000 psi at 28 days; 5.5 sack (minimum) of cement per cubic yard; 6.5 gallons per sack of cement; ¾" maximum aggregate size/ 3%-5% air entrainment; mixed per ASTM C94.

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PART 3 EXECUTION

3.1 INSTALLATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

D. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.

E. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

F. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

a. Exposed Concrete: Extend 1 inch above grade; shape and smooth to shed water.

G. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 30 degrees or more.

H. Line Posts: Space line posts uniformly at 96 inches o.c.

I. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Provide horizontal tension wire at the following locations:

1. Extended along top and bottom of fence fabric.

J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. No gap shall remain between the finish grade and the fence fabric itself. Install edge of fencing fabric into the proposed grades 4-6 inches.

K. Barbed Wire: Install barbed wire uniformly spaced, angled toward security side of fence. Pull wire taut, install securely to extension arms, and secure to end post or terminal arms.

L. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

M. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

END OF SECTION 02821

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SECTION 02936 - SEEDING AND MULCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seeding and mulching.

1.2 DEFINITIONS

A. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

B. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Certification of grass seed.

1. Certification of each seed mixture for grass.

B. Product certificates.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

1.7 SEEDING AND MULCHING LOCATIONS

A. Seeding and mulching shall occur in all areas within the limits of disturbance outside of ClosureTurf™ limits, rock blanket limits and energy dissipator limits. These areas include but not limited to:

1. Coal Pile
2. Bottom Ash Pond
3. Eastern Fly Ash Stockpile
4. Construction Staging Area

B. Contractor shall obtain approval from Owner prior to Seeding and Mulching.

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PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species:

1. Quality: State-certified seed of grass species as listed below for solar exposure.
2. Quality: Seed of grass species as listed below for solar exposure, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:
3. Full Sun:

a. 50 percent Tall (fine blade) Fescue – 4 lbs/1000 sf
b. 50 percent Perennial Rye – 4 lbs/1000 sf

2.2 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.3 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

PART 3 - EXECUTION

3.1 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 4 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

E. Protect seeded areas from hot, dry weather or drying winds by applying planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

END OF SECTION 02936

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APPENDIX A – SAFETY AND CONTRACTOR REQUIREMENTS

1.0 GENERAL CONTRACTOR SAFETY REQUIREMENTS

Contractor and their employees are responsible for their safety.

1.1 Contractor General Requirements

1.1.1 Contractor supervision and personnel shall obtain site-specific training. This will include, but not be limited to:

- Workman's Protection Assurance (WPA) / Hold Tag Equipment Lock-out
- Hot Works
- Confined Spaces
- Commissioning WPA Procedure
- Other Safety Requirements listed in this specification

Note: Contractor employees may be barred from Ameren property for failure to comply with WPA procedures. Contract may be terminated or Contractor may lose future work for failure to enforce WPA. See the following WPA Authorization Form (Attachment A5) for sign-on access to the Ameren automated WPA system at each plant site.

1.1.2 Contractor administers appropriate disciplinary action if their employees violate Job Working Rules.

1.1.3 Contractor must hold daily job briefings.

1.1.4 All rolling equipment must be inspected prior to use.

1.1.5 Ameren reserves the right to bar any individual from Company property.

1.2 Rules to Live By (RTLB)

Rules to Live By (RTLB) is focused on activities that have the potential to produce a fatality or serious injury. While there are many hazards that can produce serious injuries, the items listed below are so significant that a single violation warrants immediate intervention by the Contractor. Actions determined to be in violation of these rules may result in permanent barring from all Ameren facilities. Ameren may conduct an independent investigation as necessary.

- Fall Protection – Failure to use proper fall protection when there is a risk of a fall that is greater than 6 feet
- WPA (Lock Out / Tag Out) – Violation of a tag, lock or tag-out device that is used for employee and contractor protection.
- Electrical Safety – Failure to follow proper procedures and wear proper personal protective equipment when working on energized equipment.
- Confined Space Entry – Failure to evaluate confined space and perform air monitoring checks prior to entry.
- Rigging / Hoisting – Walking or working under a suspended load.
- Trenching and Shoring – Entering excavation greater than 5 feet deep that has not been properly sloped or shored.

1.2.1 It is the expectation that the Contractor will enforce our RTLB program and discipline the RTLB violators. All violators will be removed immediately from the site, after which the Contractor will be required to formally submit on their letterhead a detailed report on the incident, noting internal meeting(s), additional training that was conducted, and what will be done to prevent a recurrence, prior to return of the employee.

1.2.2 Violations of other safe work practices may result in permanent barring from all Ameren Facilities.

1.2.3 Contractors will be assessed $2,000 per RTLB violation that Ameren personnel find during project. Contractor is to donate assessment to a mutually agreed-upon charity.

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1.3 Safe Work Practices

1.3.1 Hard hats with bill facing forward, safety shoes and foam-lined safety glasses with side shields or wrap-around safety glasses **must be worn at all times in all locations** past the Construction Gate. Safety shoes must be compliant with ANSI Z41-1999. Safety glasses must be compliant with ANSI Z87.1-2003 or equivalent.

1.3.2 Wear a hardhat, safety glasses, leather gloves, and a welding helmet when welding.

1.3.3 Wear foam-lined safety goggles over non-safety rated prescription eyewear.

1.3.4 Foam-lined safety glasses shall be worn at all times. Contractor employees who wear prescription safety eyewear shall also have the foam-lined feature.

1.3.5 Face shields must be worn over safety glasses when grinding, chipping, jack hammering, power sawing, handling hazardous chemicals, or performing other tasks that could result in face or eye injury.

1.3.6 Wear appropriate gloves to protect hands from cuts, burns, temperature extremes, chemicals, biological agents or other hazards.

1.3.7 Wear hearing protection when performing noisy work, such as jack-hammering, or where posted.

1.3.8 Hair must be cut or contained above shoulder length and must not interfere with protective headgear.

1.3.9 Shorts, shirts without sleeves or with sleeves rolled up above the shoulder are not permitted.

1.3.10 Gas bottles must be secured to prevent tipping. Gas bottles must be capped or have a regulator installed. Oxy/acetylene bottles must be separated by at least 20-foot or a 5-foot barrier with a one-hour fire rating while in storage.

1.3.11 During welding or "burning":

- Use temporary shielding to protect personnel beside, above and below the work; free falling of sparks below a cutter/welder's feet is not allowed.
- Contain slag, sparks, etc.
- Place weld rod stubs in containers after removal from stingers, and place all other trash in appropriate containers.

1.3.12 Safety harnesses are required when working on surfaces over six (6) feet high that do not have guardrails or other fall protection. Attach lanyards and lifelines to structural members capable of supporting the load requirement (5000 lbs. anchor point).

1.3.13 On portable articulating man lifts, fall arrest is required per manufacturer's specifications. Fall arrest is not required on scissor-type man lifts unless recommended by manufacturer. The lift must be secure and stable prior to use.

1.3.14 For overhead work, rolling scaffolds and mechanical lift platforms are preferred over ladders.

1.3.15 If straight or extension ladders must be used, one worker must hold the ladder until another worker has tied the top to a substantial anchor point. Prior to working above 6 feet off the straight or extension ladder, and leaning beyond the side rails of the ladder, the worker is to don fall protection harness with lifeline, using or establishing an anchor point overhead for clip attachment.

1.3.16 If a step ladder must be used when worker's feet are on or above the fifth rung, then top of ladder must be tied to a substantial anchor or a second worker must hold ladder. When working on step ladder adjacent to and above guard/handrail where there is risk of significant fall over the rail, worker is to don fall protection harness with lifeline, using or establishing an anchor point overhead for clip attachment.

1.3.17 Daily clean-up of the work area is required. Keep stairways and aisles clear at all times. Tie extension cords, welding leads, air hoses, etc., to middle rail of the handrail and/or route overhead.

1.3.18 Barricade at least 6 feet from hole or edge if grating or handrail sections are being removed or installed.

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1.3.19 Barricade below lifting/hoisting activities, including both critical and non-critical lifts.

1.3.20 All electrical junction boxes, duct panels, etc., are to be kept closed whenever possible.

1.3.21 All fuel-powered equipment such as welders, generators, compressors and power tools must be used so that the engine exhaust does not present a hazard to personnel inside the building; if this is not possible, then the equipment must be exhausted outside of the facility. Equipment near doors must be positioned so the exhaust will not enter the facility when the doors are open. In areas where fuel-powered equipment is being used, verify that carbon monoxide levels are safe by using a direct reading instrument that is capable of monitoring for carbon monoxide.

1.3.22 Plant fire hose stations and fire hydrants shall NOT be used for routine work unless specifically authorized by the Plant.

1.3.23 If the plant allows Contractor employees to use elevators, observe the following rules:

- No equipment on elevators may extend through the roof access opening.
- Transport bulk materials in freight elevators and obey the posted weight limits.
- Only tools and materials that can be carried by hand are allowed on passenger elevators.
- Contractor shall coordinate with Site Contact before any plant elevator is used to transport asbestos.
- Construction elevator (when available) is the preferred transport system for asbestos.
- All asbestos shall be double bagged before transported.
- No plant personnel other than asbestos workers shall be on elevators when asbestos is transported.

1.3.24 Qualified electricians are required to wear fire-retardant (FR) PPE when working on exposed, energized circuits. FR PPE must meet arc flash labels and be appropriate for tasks being performed.

1.3.25 Reflective safety vests must be worn by all personnel who work on or near active highways, roads, or parking lots. Vests are also required for other work that places personnel near motor vehicles such as flaggers, riggers, survey crews, etc. ANSI/ISEA 107, Class III high-visibility reflective safety vests shall be worn for maximum visibility. Ameren may require vests on other projects.

1.3.26 Ground Fault Circuit Interrupters (GFCI) shall be used to protect all 120 VAC electrical equipment including electric hand tools & cord sets. Use of 480 VAC GFCI is required when working in wet locations.

1.3.27 Adding slugs within electrical devices requires written approval by Ameren representative. Equipment rated fuses and/or circuit breakers shall not be removed and replaced with ones of different set parameters without written approval by an Ameren representative

1.3.28 Contractor shall follow safety requirements for working on elevated platforms per Elevated Platform Safety Requirements (Appendix Y).

1.3.29 We want this to be a SAFE job. YOU CAN HELP. Report all unsafe acts and conditions to your Supervisor. Consult a Contractor or Ameren Supervisor if there are any questions about work rules or safety requirements.

1.4 Other Safety Requirements

1.4.1 If outages are required, the Contractor shall coordinate with the SPOC to obtain lock-outs and releases in accordance with the Plant's WPA/Hold Card procedures and operating practices. Equipment with a WPA/Hold Card tag shall never be serviced or removed.

1.4.2 Contractors shall comply with all OSHA requirements for work in permit-required confined spaces. Contractors shall obtain information from the SPOC on the location and other pertinent information regarding confined space entry. Any entry involving both Contractor and Ameren employees shall be coordinated through the SPOC. For reference, review Appendix Z for a representative list of identified confined spaces at Ameren Energy Centers. Appendix Z shall be used as a guide and not be considered a complete list.

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1.4.3 Only qualified and authorized persons shall work on energized electrical equipment as per Ameren procedure AUE-ADM-5002, Energized Equipment Electrical Safety Program. If applicable to specified work scope, the SPOC will supply a copy of AUE-ADM-5002.

Contractor shall not work on energized equipment without the express, written consent of the SPOC. In no case shall Contractor work on or near (within reach of) energized equipment without the use of appropriate insulated tools to perform the work. Violators of this policy will be subject to disciplinary action, including a minimum $10,000 fine, and up to and including termination of employment.

1.4.4 All lifting/hoisting activities near overhead, high tension power lines must include awareness of and observance of the following safe working clearances:

Minimum Clearance Distance	
Voltage (kV)	Clearance (feet)
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1,000	45

1.4.5 Ameren must review contractor qualifications before contractor employees may work in areas with high voltage equipment (over 600 volts).

1.4.6 Contractor shall coordinate hot work, (i.e., welding, brazing, heating and cutting), with Company personnel to assure that Ameren safety requirements are met as outlined on Hot Work Permit (Attachment A8).

1.4.6.1 Hot Work Checklist/Permit must be utilized when performing hot work such as welding, cutting, grinding, or any other activity that produces sparks. Contractor may use their own forms or Ameren's but work shall be coordinated through the SPOC.

1.4.7 Plant equipment identified with a nuclear radiation symbol (as seen below) is NOT to be serviced by unauthorized personnel):



1.4.8 All equipment on the project shall be used in accordance with Federal, State, and Local S&H requirements in addition to the manufacturer's instructions and guidelines. Equipment shall not be modified in any way for use other than what the manufacturer intended.

1.4.8.1 Any alterations must be approved by the manufacturer in writing. Only trained and authorized persons shall operate machinery or equipment.

1.4.8.2 Use hand-held power tools only for their intended purpose. Do not use tools that are broken, have dull blades, dull bits, have damaged cords, or have damaged/missing guards. Hand-held power tool switches shall not be modified by any means to maintain power without constant trigger pressure. (Ref. OSHA 29CFR1910.243.

1.4.8.3 All Grinders guards/handles must remain on grinders at all times. If a guard or handle is required to be removed because of a tight work area, a permit must be completed and maintained at work location. See Grinder Plan (Attachment A6).

1.4.9 Ameren expects that all Electrical Contractors will follow the common work practice that a check of all wires being demoed is performed to ensure that all wires are dead and de-terminated before wrecking. If wires are found live, they will be de-energized and re-verification will be made prior to wires being terminated or cut.

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1.4.10 Barricade Tape

NOTE: Do not rely on barricade tape and flags to prevent a fall that is more than 6 feet.

- **When attended, install barricade tape no less than 6 feet from opening.**
- **Use fall protection if personnel are working closer than 6 feet to the opening.**
- **When unattended, cover the floor opening with a temporary cover, or temporary handrails 42 inches in height that include a mid-rail and toe board. Temporary covers must be able to support at least twice the load to which they will be subjected (including people, equipment and/or vehicle traffic).**
- **Temporary covers must be secured when installed in such a way as to prevent accidental movement by wind, traffic, or employees.**

1.4.10.1 Barricade tape must be used to warn employees about a hazard or restrict employees' access to a hazardous area. Barricade tape must have an information tag listing the responsible person, date of erection, and purpose. Barricade signs shall indicate the Contractor, reason, and expiration date/time. Remove the barricade when work is completed. See Barricade Tag (Attachment A4).

1.4.10.2 Any employee may erect barricade tape. The person responsible for the barricade tape must remove it when the hazard no longer exists.

NOTE: Any time red barricade tape is to be used, the Contractor must inform the Construction Project Lead/SPOC, who in turn will notify the Shift Supervisor.

- **Red barricade tape** shall be used to warn personnel DO NOT ENTER dangerous areas. These areas may only be entered with authorization from the person who erected the barricade.
- **Yellow and magenta barricade tape** shall be used to warn personnel DO NOT ENTER an area because radiography is creating a radiation hazard.
- **Yellow barricade tape** shall be used to warn personnel of immediate hazards that have the potential to cause injury. Areas barricaded with yellow may be entered once the hazard is identified and can be avoided.
- **Green barricade tape** shall be used to warn personnel of possible exposure to hexavalant chromium. Respiratory protection is required in these areas.

Contractors are responsible for compliance with the OSHA Regulation on Hexavalant Chromium. "Regulated Areas" shall be clearly demarcated with **Green** barricade tape with a caution tag that clearly states the hazard in the work area (e.g., "Hex Chrome Exposure – Respiratory Protection Required"). In general, regulated areas shall be established a minimum distance from the activity as described below:

1. 5 Feet – Welding on boiler tubes, steam piping and other materials that contain 2.5% chromium or less
2. 10 Feet – Welding on Stainless steel and other materials that contain more than 2.5% chromium.
3. 20 Feet and/or Visible plume – Plasma arc cutting, air arc cutting, chamfer-trodes, cut-trodes and other processes lacking sufficient air monitoring data by Ameren for the protection of our employees.

Contractors are responsible for air monitoring as required for their employee protection and validation of engineering controls. The guidelines for barricading are based on employee exposures based on collection of data by Ameren. These distances are guidelines and may be increased or decreased based on air monitoring data. Air monitoring data for each job shall be furnished to the Industrial Hygienist in the Ameren Corporate Safety Department.

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- A Nuclear Radiation Sign (see Item 1.4.7 above) is used to warn unauthorized personnel not to tamper with or remove instruments or equipment.
- Flashing yellow lights may be used with barricades.
- Other barricades may be used for roadwork and for other special situations.

1.4.10.3 When determining and setting overhead load path barricade boundaries, Contractors shall include within the boundary the potential for dropping load during load swing (failed load path). All elevations affected per this potential 'failed load path' shall be barricaded.

1.4.11 Incident/Accident Reporting

1.4.11.1 In the event of incident/injury to a Contractor or Subcontractor employee, the SPOC shall be notified ASAP and a written report provided no later than 24 hours after incident/injury.

1.4.11.1.1 This notification shall include a detailed description of the accident or injury, including the names of those involved. (Incident/Accident Investigation Report (Attachment A1)) and (Witness Statement (Attachment A2)) must be utilized to provide the required notification.

1.4.11.1.2 OSHA Recordable injuries and minor injuries requiring first aid must be recorded using the First Aid Register (Attachment A3), which must be forwarded to the SPOC.

1.4.11.1.3 On Ameren Coordinated Insurance Program (ACIP) projects, copies of all first reports of injury and supporting investigation information shall be faxed to the designated claims manager and ACIP broker (see Ameren Safety Supervisor for contact numbers).

1.4.11.2 **For any serious incident or injury:**

- **First — Notify the Plant Shift Supervisor or designee immediately**. The Shift Supervisor will make the Emergency call and implement appropriate Plant Emergency Response procedures.
- **Second — Provide First Aid for the injured** as required until professional Emergency Responders arrive.
- **Third — Secure the area** to ensure safety of other personnel.
- **Fourth — Notify the SPOC** via phone, PA, radio, or in person.

1.4.11.3 The accident scene must be secured for accident investigation. Equipment or material can only be moved to prevent further injury until a review of the accident is completed.

1.4.11.4 Follow up verbal messages to the SPOC with written notifications within 24 hours as directed in Item 1.4.11.1.

1.4.12 Imminent Danger Situations

1.4.12.1 Contractor must suspend work immediately upon discovery of any situation that may, in their opinion, reasonably be expected to cause serious physical harm, illness, death, or significant environmental or equipment damage.

1.4.12.2 S&H concern(s) must be corrected, to the satisfaction of the Contractor and Company, before work may resume.

1.4.12.3 Examples of "imminent danger" situations may include, but are not limited to the following:

- Falls from elevations
- Excavations not properly sloped or shored
- Radiation hazards

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- Electrocution hazards
- Injury to the public
- Unsafe operation of vehicles, machinery or heavy equipment
- Improper or non-existent WPA/Hold Card equipment lockout
- Release of hazardous substances (OSHA 40CFR Part 302) into the environment in excess of the reportable quantity
- Release of asbestos outside of containment work areas

1.4.13 Abandoned Piping and Demolishing Abandoned Piping

Ameren expects all Contractors to follow the Guidelines for Abandoned Piping and Demolishing Abandoned Piping (Attachment A20) while performing work on piping and/or utilities which are considered to be abandoned or will be abandoned in place.

1.4.14 Excavations

1.4.14.1 Contractor shall non-destructive excavate all underground construction activities, unless given approval by the SPOC to do otherwise.

1.4.14.2 High Suction Vacuum Contractors working at the Ameren site must have a vacuum relief valve located within equipment, a vacuum break at the point of operation, along with equipment that is grounded while operating.

2.0 WORKERS PROTECTION ASSURANCE PROCEDURE FOR OUTSIDE CONTRACT OR CONSTRUCTION PERSONNEL

GENERAL

It is necessary to assure the safety of outside contract personnel and Ameren personnel throughout construction of new system equipment and/or modification of existing system equipment. The following is a brief outline of procedures, to guide outside contract personnel in dealing with Ameren operating authorities to obtain Worker's Protection Assurances (WPA).

2.1 Definition

2.1.1 Worker's Protection Assurance

WPA is the name given to the process used by Ameren to ensure the safety of those who work on generation, transmission and substation equipment.

2.1.1.1 Its primary purpose is to ensure the SAFETY of the worker.

2.1.1.2 The Ameren WPA system uses a series of Tags and a Sign-On procedure.

2.1.1.3 The reliability and integrity of the WPA process relies upon all persons on the plant site understanding and honoring the WPA Tags and Sign-On procedure.

2.1.1.4 WPA is the Operating Authority's assurance to the person obtaining Worker's Protection Assurance that (see Operating Authority below):

Either 1) The equipment covered by the Worker's Protection Assurance has been completely isolated from energy sources (see Out of Service below).

Or 2) The equipment is placed in a special status requested by the person receiving the Worker's Protection Assurance (see Local Control below).

2.1.2 Types of WPA Authorities

2.1.2.1 Custody Authority

2.1.2.1.2 Custody Authority is the person responsible for and "in charge" of all of the equipment in a system or power plant (usually the Plant Manager).

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2.1.2.2 Jurisdictional Authority

2.1.2.2.1 Jurisdictional Authority is the individual or group of individuals responsible for the overall direction and coordination of Ameren system equipment.

2.1.2.2.2 Jurisdictional Authority of Plant Equipment (coal pile to turbine) is the Plant Operating Supervisor.

2.1.2.2.3 Jurisdictional Authority (generator to Electrical System) is the Transmission Dispatcher / Power Dispatcher.

2.1.2.3 Functional Authority

2.1.2.3.1 Functional Authority is the individual or group of individuals who perform or direct someone else to perform detailed operations, such as switching or valving.

2.1.2.3.2 Functional Authority of Most Plant Equipment (coal pile to turbine) is the Operating Supervisor.

2.1.2.3.3 Functional Authority (Electrical System) is the Transmission Dispatcher.

In a power plant, one person, the Operating Supervisor in the Control Room, approves and issues the WPA.

2.1.2.4 Functional Agents

2.1.2.4.1 One type of Functional Agent is the Unit Operating Engineer (UOE) who creates the documentation.

2.1.2.4.2 Another type of Functional Agent is the Plant Operating Engineer (POE) who performs the work and hangs the tags.

The Plant's UOE and POE always perform the above duties – never Contractor personnel.

2.1.3 WPA Isolation Point

2.1.3.1 A WPA Isolation Point may be any of the following energy-isolating devices:

- Switch
- Circuit Breaker
- Valve
- Coupling
- Drive Belt
- Chain

2.1.4 Boundary

2.1.4.1 A Boundary is a collection of energy-isolation devices that form a "zone of protection or control" around the equipment to be serviced.

- The status of equipment within a WPA Boundary can only be changed after the Holder has Signed-Off the WPA and the WPA tag(s) have been removed.

2.2 Equipment Covered By Worker's Protection Assurance

2.2.1 All system equipment under the jurisdiction of an Operating Authority must be covered by Worker's Protection Assurance when it is to be worked on or tested.

2.2.2 The only equipment that can be covered by Worker's Protection Assurance is equipment under an Operating Authority's jurisdiction.

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2.2.2.1 Equipment connected to energy sources but not released to the jurisdiction of an Operating Authority can only be protected by Worker's Protection Assurance on the isolating device (or devices) between the energy source and the equipment.

In this case it is only possible for the Operating Authority to assure the person receiving Worker's Protection Assurance that the particular isolating device(s) connecting the new equipment to his/her energy sources is protected and he/she cannot assure the person receiving the Worker's Protection Assurance that the equipment is completely isolated. Therefore, it is better for all new equipment to be released to the jurisdiction of an Operating Authority as soon as possible.

2.3 Description and Purpose of Tags

2.3.1 General Notes

2.3.1.1 When you see a WPA tag on equipment, it is telling you to stay clear of the equipment and keep hands off (violating WPA tags will result in disciplinary action up to and including termination).

2.3.1.2 Only the Functional Authority of the equipment may order tags to be placed or removed.

2.3.1.3 Tags will ordinarily be executed and attached by an Operator or his agent.

2.3.1.4 Tags, record sheets and WPA sheets will have the equipment name, etc., along with the serial number of the WPA record.

2.3.2 Function Authority's Hold Off Tag

2.3.2.1 Definition

2.3.2.1.1 The Hold Off is an inviolable order of a Functional Authority that the disconnect device(s) which it is intended to cover must not be closed (or opened in the case of valves) under any circumstances unless definitely ordered or approved by the Functional Authority and then only if the Hold Off tag is first ordered removed.

2.3.2.2 Issued to

2.3.2.2.1 Only to the Functional Authority (never to a worker).

2.3.2.3 Usage

2.3.2.3.1 The Hold Off is an Operating Authority's tool which he may choose to use any time he feels it would contribute to a safer working environment.

2.3.2.3.2 To properly isolate equipment from all sources of normal energy and tag them with Hold Off tags so the Functional Authority may issue an Out of Service or Restraint to a supervisor or workman so work on designated equipment may proceed.

2.3.2.4 Equipment Status

2.3.2.4.1 Operator must obtain the approval of, or be acting under the orders of, his Functional Authority before changing the status of, or working on any equipment bearing a Hold Off tag.

2.3.3 Worker's Hold Off Tag

2.3.3.1 Definition

The Worker's Hold Off is the method by which the Holder of a Local Control isolates equipment he is working on under the Local Control.

2.3.3.2 Workers will create their own Worker's Hold Off tag by legibly signing a blank Power Plant Hold Off Tag. If the Holder of a Local Control wants to work on the equipment, it must first be isolated from its energy supplies. The Holder would open the breaker, close the valves, etc. to isolate the equipment. The Holder must then hang a Worker's Hold Off on

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top of the Local Control to ensure the breaker or valves remain in the de-energized position. A Worker's Hold Off tag when placed has the same meaning as a Functional Authority's Hold Off. The Holder would need to remove the Worker's Hold Off prior to closing the breaker or opening the valves and operating the equipment.

2.3.3.3 A Worker's Hold Off can only be placed over a Local Control Tag. It cannot be placed by itself.

EXAMPLE OF HOLD OFF TAG



EXAMPLE OF WORKER'S HOLD OFF TAG



Worker's Hold Off

Worker's Hold Off tag to be placed over plant-issued Local Control

2.4 Types of Worker's Protection Assurances

The following types of Worker's Protection Assurances are issued during construction at power plants:

2.4.1 Out of Service (Issued under Hold Off Tag)

2.4.1.1 Definition

- The Operating Authority's assurance that the equipment designated is properly isolated from all known energy sources and is appropriately tagged so that it will remain de-energized until the Out of Service is released.

2.4.1.2 Energy Status

- Isolated from all normal sources and emergency back-up energy sources.
- This does not relieve the person obtaining the protection of the responsibility of making prescribed tests or observations to assure himself that the equipment is safe

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to work on. Points of isolation and points not to be changed are tagged, where possible, and those points cannot be changed while the Out of Service is in effect. However, equipment inside the zone of protection and not tagged, may be manually operated or tested, since it is in a de-energized state.

2.4.1.3 Usage

- Maintenance, including complete removal and disassembly.

2.4.1.4 Issued to

- Supervisors or Workers when authorized by Custody Authority.

2.4.1.5 Persons Covered

- Holder and anyone working directly for or with the Holder.

2.4.1.6 Physical Location of Holder

- Does not have to remain on Plant property.

2.4.1.7 Duration

- No time limitations. Remains in effect until equipment is ready to be restored to service.

2.4.1.8 Predominance

- Unlimited number of Out of Services may be issued on a single piece of equipment by various people for various reasons. Multiple tags may be required for isolation.

2.4.2 Restraint

2.4.2.1 Definition

- The Restraint, which is issued on the Functional Authority's Hold Off, is an assurance given by the Functional Authority to the person to whom it is issued that the equipment it covers has been properly isolated from its energy sources and that normal voltage will not be applied while the Restraint is in effect.

2.4.2.2 Energy Status

- Isolated from all normal sources and emergency back-up energy sources.

2.4.2.3 Usage

- The person to whom the Restraint is issued shall have control of the application of test energy in that his/her consent must be obtained before applying external energy of any magnitude, and he/she must be informed when the test is completed. Thus, the person shall be familiar with the status of the equipment at all times, and to this extent the person shall be responsible for seeing that other persons working on equipment with that person or under that person's specific direction are protected against the application of test energy.

- The operator of the high-energy source will direct test and connections required, following established standards or procedures or in special cases, specific instructions of the Functional Authority. The operator of the high-energy test source will communicate directly with the person who has the Restraint, but the operator may at no time apply energy until the Holder of the Restraint has given the operator permission to proceed.

2.4.2.4 Issued to

- Supervisors or Workers when authorized by Custody Authority. In cases where several workers will work on the equipment tested, a qualified worker or supervisor shall be designated to act coordinator on the job, and that person shall obtain the Restraint.

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2.4.2.5 Persons Covered

- Holder and anyone working directly for and with the Holder.

2.4.2.6 Physical Location of Holder

- Must remain on Plant property and in control of the job. If the Holder leaves the site of the test, he/she must remain "on-call." The Holder shall not release the Restraint until all persons are removed from the equipment and informed of the intended release.
- The performance of maintenance will be permitted simultaneously with testing on equipment, provided that adequate safety can be maintained between the two jobs.
- If electrical testing is required, the procedures set forth in the System Operating Manual under Restraint, Item 207, will be followed.

2.4.2.7 Duration

- Released before Holder goes off duty for the day.

2.4.2.8 Predominance

- Only one Restraint and no other WPA.

2.4.3 Local Control

2.4.3.1 Definition

- An authority granted to a person (other than a regular operator) that permits him/her to operate or direct operation of equipment and gives him/her the assurance that no operations will be performed on the equipment unless requested or personally approved by him/her.

2.4.3.2 Energy Status

- May or may not be de-energized. This is why different tags are used. The Functional Authority's Hold Off is not in place for this type of WPA.

2.4.3.3 Usage

- Short duration maintenance or troubleshooting.

2.4.3.4 Issued to

- Supervisors or Workers when authorized by Custody Authority. Worker must give the reason for the request. Worker must specify if equipment is to be energized or isolated for him/her.

2.4.3.5 Persons Covered

- Holder and anyone working directly for or with the Holder.

2.4.3.6 Physical Location of Holder

- Must remain on Plant property and in direct control of the job since he/she is responsible for the safety of his/her workers.

2.4.3.7 Duration

- Released before Holder goes off duty. New equipment before acceptance has no time limit.

2.4.3.8 Predominance

- Only one Local Control and no other WPA.

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EXAMPLE OF LOCAL CONTROL TAG



2.4.4 Clearance

2.4.4.1 Definition

- A Clearance is the assurance to Holder that system or equipment for which it is issued has been properly isolated from its normal energy sources (including any emergency back-up energy sources) and will remain isolated as long as Clearance is in effect.

2.4.4.2 Usage

- Used whenever it is necessary to completely isolate a system or piece of equipment from its normal energy sources (including any emergency back-up energy sources) to perform the desired work.

2.4.4.3 Issued to

- Supervisors or Workers when authorized by Custody Authority.

2.4.4.4 Persons Covered

- Holder and anyone working directly for or with the Holder.

2.4.4.5 Physical Location of Holder

- Must remain on Plant property and in direct control of the job since he/she is responsible for the safety of his/her workers.

2.4.4.6 Duration

- Released before Holder goes off duty.

2.4.4.7 Predominance

- None. An unlimited number of Clearances may be issued concurrently on a system or piece of equipment. Clearances may also be issued concurrently with Out of Services.

2.5 Exception

2.5.1 If a person holding Worker's Protection Assurance on a piece of equipment is not available and it is necessary because of plant or system emergency to place that piece of equipment in service, the Worker's Protection Assurance can be released to the Operating Authority by a person designated by the Holder of the Worker's Protection Assurance provided that:

2.5.1.1 Every attempt has been made to contact the holder of the Worker's Protection Assurance

and

2.5.1.2 A thorough examination by the person releasing the equipment reveals the equipment to be in proper operating order.

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3.0 COMMISSIONING JURISDICTIONAL CONTROL AND EQUIPMENT TAGGING

3.1 Commissioning Team Leader, Commissioning Engineer and Specialist

3.1.1 Ensure the following, once a Construction Turnover Acceptance Form is signed by commissioning team leader:

- Any activities on the turned over system not authorized by a member of the Commissioning Team will promptly cease.
- Any Construction Cards within the boundaries of the turnover are promptly removed.

> **NOTE**
> Plant based WPA will be used if commissioning an existing system in the plant or if the new system is tied to existing plant systems. The sole WPA authority would be the control room.

3.1.2 Request "System Under Test" card or applicable WPA based on boundaries turned over to commissioning.

> **NOTE**
> In case the new system is independent of the existing plant. "System Under Test" card will be used and administered by commissioning.

3.1.3 Maintain AUE-FRM-ADM-2155-07, *System Under Test Card Log.*

3.1.4 In the event that a positive isolation device does not exist in a system being turned over, that system's boundary will be extended into the adjacent system to the first point of positive isolation.





4.0 SAFETY AND HEALTH

4.1 Contractor shall ensure worker and public safety during the course of this project.

4.1.1 Contractors must comply with all applicable Company, Federal, State, and Local health, safety and environmental regulations including, but not limited to, those concerning:

- Safety & Contractor Requirements (Appendix A) and Job Working Rules (Appendix B)
- Public and worker health and safety
- Public's "Right to Know"

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- Fire safety
- Air and water quality
- Flammable materials storage
- Spill control, response and cleanup
- Hazardous and non-hazardous waste handling, identification and disposal

NOTE: Ameren's policies and procedures applicable to Contractors are available on www.ameren.com under Business Partners Suppliers / Standard Contracts

4.1.2 Refer to Ameren's Contractor's Substance Abuse Policy AUE-07-01 (Attachment A15) for minimum substance abuse testing requirements.

4.2 Contractor must have a full-time company corporate Safety Director who oversees and maintains the site safety program and site safety person, unless waived by the Ameren Manager of Construction. This person must also be available for safety-related questions and concerns. A full-time company safety person must also be onsite for each shift for the entire duration of the project. The cost for the safety person shall be broken out in the bids. Resumés of the safety person who will be associated with the project must be submitted with the bid.

4.2.1 Ameren reserves the right to request the safety representative be removed from the project and be replaced with a more competent individual, if they are not fulfilling expectations.

4.3 With contract bid, Contractors shall submit:

- Contractor Safety & Health Data Form (Attachment A9) (unless specifically exempted from this provision by Company).
- Their company's S&H program manual

4.4 After award, Contractor shall submit:

- A project-specific S&H Action Plan, including an Emergency Response Action Plan that is in accordance with Ameren, Federal, State & Local requirements.
- At a minimum, Attachment A21 – Site-Specific Safety Plan (SSSP), shall be filled out in its entirety. The SSSP shall be submitted to Ameren for review, comment and approval. Editable version of Attachment A21 is to be supplied after issuance of PO.

4.5 At mobilization, Contractor shall:

- Appoint a competent onsite S&H representative who will coordinate Contractor S&H activities, hazardous material and waste handling. The S&H representative will work with Ameren personnel on S&H related issues, and implement S&H rules necessary for safe execution of the project.
- Supply to the SPOC the frequencies of all walkie-talkie 2-way radios they intend to use. Frequencies must be listed to four (4) decimal places. Authorization for Two-Way Radios (Attachment A14) must be submitted to the designated SPOC.

4.6 Contractor shall be responsible for tool inspection/maintenance in accordance with the requirements of OSHA standards and manufacturer's recommendations/instructions.

4.7 Handling of Materials and Waste

4.7.1 If project involves use or presence of chemicals or products that are regulated under Section 112 (r) of the Clean Air Act, Sections 302 & 304 of Emergency Planning & Community Right to Know Act, OSHA 29CFR1926.65 or 29CFR1910.120, then Contractor has the choice of adopting the plant's Health and Safety Plan (HSP) or developing a similar plan that is at least as protective and compliant

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If Contractor is responsible for arranging to dispose of a hazardous or otherwise regulated waste where Ameren is identified as the generator of the waste, Company shall review, and approve or reject the waste disposal method and/or facility.

Contractor site personnel shall read and acknowledge by signature that they will comply with the applicable HSP.

Certification of individual training is required prior to hazardous waste operations as defined by OSHA 29CFR1910.120 or equivalent applicable state regulations.

4.7.2 Contractor shall identify as part of the bid, and be prepared to discuss upon award of Contract, the quantities, timetables and characterization, of wastes generated during project.

4.7.3 Contractor shall minimize amount of waste generated and shall discuss waste handling, manifest preparation, record keeping, and disposal with the SPOC in advance of these activities. Contractor should coordinate waste handling Vendors/Subcontractors with Company personnel.

4.7.4 Contractor shall handle, package, label and store wastes in accordance with Ameren, Federal, State and Local requirements.

4.7.5 Contractor shall remove such wastes from the premises in a timely manner for treatment, storage and/or disposal in full compliance with applicable laws, regulations and ordinances, including documentation requirements.

4.7.6 If Contractor is considered the sole generator of waste, then, such waste is sole responsibility of Contractor, and Ameren assumes no responsibility for Contractor's compliance with applicable regulations.

4.7.7 Contractor shall notify the SPOC before using chemical/material that could create noxious or toxic vapors/fumes.

4.7.8 For materials brought onto jobsite, Contractor shall make copies available (upon request) of the Safety Data Sheets (SDS) to the appropriate personnel on the worksite.

Contractor shall provide written notification to the SPOC of any material requiring an SDS that is brought onsite by Contractor in quantities in excess of that material's Superfund Amendments and Reauthorization Act (SARA) Threshold Planning Quantity. Such notification is required for SARA Tier II reporting purposes. Chemical of Interest Reporting (Appendix I) in this specification must be filled out and submitted to the SPOC.

4.7.9 Contractor shall ensure that hazardous chemicals or materials are properly contained, labeled and stored, and that employees are adequately trained to recognize, handle and use hazardous chemicals safely.

Small quantities (i.e., <10 gal.) of hazardous liquids, such as gasoline, diesel fuels or solvents, brought onto site shall be stored in properly labeled safety containers with flame arrestors and self-closing lids. All container labels must include contents information and display hazard symbols clearly on exterior of each container in accordance with NFPA 704M, OSHA 29CFR1910.1200 or other applicable standard.

4.8 Asbestos-Containing Material (ACM) and Lead

4.8.1 In structures built prior to 1981, thermal system insulation, sprayed-on surfacing, and vinyl or asbestos floor tile shall be presumed to be ACM.

- Non-ACM will be labeled as such or otherwise identified by the SPOC and communicated to Contractor.
- Areas containing abatement activities will have warning signs, be barricaded, and will have limited access.

4.8.2 Ameren S&H Management Instruction Asbestos Exposure Controls and Work Practices, ES-REG-203, specifies policies and procedures for contractors performing asbestos abatement work. Hardcopies may be requested from the SPOC.

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Proposals for an ACM abatement project must designate:

- Scaffolding needs.
- Glove bag and containment areas, including remote decontamination areas. Remote decontamination areas require Ameren SPOC approval.
- Potable water and shower requirements and locations.
- Methods to protect scaffolding tubing from contamination after containment is removed.
- Methods to minimize non-ACM dust outside the containment areas.
- Methods to move ACM bags from containment areas to ACM receptacles.
- List of asbestos workers with copies of current training and state license.

4.8.3 Ameren S&H Lead Management Instruction, ES-REG-211, specifies policies and procedures for Contractors performing lead abatement work. Hardcopies may be requested from the SPOC.

4.9 Safety & Health Training Requirements

4.9.1 Documentation of OSHA training for Contractor craft workers and supervisors must be maintained onsite and made available to Ameren. Effective September 1, 2006, the minimum training standard is OSHA 10 for Contractor craft workers and OSHA 30 for Contractor supervisors.

4.9.2 Contractor will maintain documentation of S&H training on project and must provide requested documentation of training to Company. Contractor shall retain verification of satisfactory training for as long as required by law or six months after completion of contract, whichever is greater.

4.9.3 Job safety awareness meetings will be held with Company and applicable contractors on a frequency determined by Company. The meetings will address industrial safety issues from Contractor job safety reviews.

4.10 Safety & Health Surveys

4.10.1 The SPOC and Ameren S&H personnel will conduct periodic S&H surveys of the project. Any discrepancies will be reported to Contractor management for immediate correction.

4.10.2 These S&H surveys do not relieve Contractors of their responsibility to self-inspect their work and equipment and to conduct their work in a safe and environmentally compliant manner.

4.11 Reporting and Investigating Incidents/Accidents

4.11.1 Contractor shall make an immediate report by telephone to the SPOC of any accident involving injury, death, fire, spill, mishandling of oil, regulated/hazardous waste spill, or any other emergency.

4.11.2 In the event of an emergency, Company has authorized the Plant Shift Supervisor and the SPOC to act as emergency coordinators. Contractor shall proceed with appropriate emergency response measures as directed by Plant Shift Supervisor and the SPOC, and take full responsibility for clean-up and disposal of any wastes or materials.

4.11.3 Contractor shall indemnify Company for all related costs and liabilities.

4.11.4 Contractor shall submit a Monthly Contractor Accident Statistics Report (Attachment A10) by the second day of each month for the preceding month's activities.

4.11.5 Contractor shall investigate all types of events listed in above Item 1.4.11 Incident/Accident Reporting, whether they result in an injury or not, and provide the results of said investigation to Company. An accident investigation does not assign blame; it does determine how to eliminate similar accidents in the future. Company reserves the right to monitor Contractor's investigation, and Contractor shall provide the SPOC with all necessary information to all required Company personnel to perform this monitoring function.

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4.11.6 Ameren reserves the right to investigate any accidents that occur on its property or in completing work being performed by a Contractor's employee whether they result in an injury or not. Ameren will conduct further investigations for accidental environmental releases or spills, etc.

4.11.7 A signed Witness Statement (Attachment A2) must be completed by each witness providing factual observations.

4.11.8 An Incident/Accident Investigation Report (Attachment A1) must be submitted to the SPOC within 24 hours to document the investigation. Accident facts, causes, and corrective action shall be documented and communicated to employees through S&H meetings.

4.12 Certifications, Inspections, and Permits

4.12.1 Operations may require a Company permit. Such activities may include but are not limited to: hot work, confined space/vessel entry, excavations, asbestos abatement, lead abatement, etc. Contractor shall determine from the SPOC if any of Contractor's activities require a Company permit or Contractor permit.

4.12.2 Some states and local authorities require permits for activities such as: excavations, heavy lifts, asbestos/lead abatement, air permits, water permits, hazardous waste generation, etc.

4.12.3 Contractors shall be responsible to secure and comply with these permits, unless the SPOC has delegated this to others in writing.

4.12.4 A third-party-certified Competent Person shall make a thorough annual inspection of cranes and powered hoisting equipment. Cranes shall be inspected and have deficiencies corrected prior to being put into service. Documentation of crane inspections must be maintained onsite by Contractor.

- Crane hooks shall be inspected by a Competent Person prior to use. Rigging shall be inspected by a Competent Person before each shift. Defective components shall be removed from service immediately. Anti-Two-Block devices, that automatically disengage crane hoist/boom functions when the hook or block approaches the jib or boom tip, shall be used on all cranes.
- All outriggers on mobile cranes must be fully extended and fully deployed when crane is used to lift or support a load.
- If, due to configuration or physical location, all outriggers cannot be fully deployed, calculations must be made from the "on-rubber" section of the load chart. A certified crane specialist must have written calculations and lift instructions reviewed by Ameren. The SPOC may make an exception for light-weight, lift-and-carry operations.

4.12.5 Operators of forklifts, boom lifts, buses, and other mobile equipment must be trained and certified on the operation of the specific equipment.

4.12.6 Operators of cranes must be trained and certified by National Commission for Certification of Crane Operators (CCO), or Operating Engineers Certification Program (OECP). Crane operators must be qualified on each crane type and rating they operate.

4.12.7 Operators of cranes are responsible for completing the Crane Maintenance Safety Checklist (Attachment A16).

4.12.8 Operators of cranes are responsible for providing documentation to Ameren SPOC of required OSHA crane inspections.

4.12.9 Cranes shall not be used to hoist employees without Ameren SPOC approval. Cranes should not be used to hoist personnel except where the Contractor can demonstrate that the erection, use, and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairways, aerial lift, elevating platform, or scaffold, would be more hazardous, or is not possible because of the project's structural design or worksite conditions.

4.12.10 A Competent Person shall design and a Competent Person shall erect scaffolding. Only the authorized scaffolding erector can make changes to scaffolding.

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4.12.11 A Competent Person must inspect and tag scaffolding prior to initial use, before each work shift, and after any event that could affect its structural integrity. Untagged scaffolds must not be used.

4.13 Critical Lifts

4.13.1 Critical Determination

Contractor shall submit a Critical Lift Plan for any critical lift. Ameren reserves the right to designate any lift as critical. A lift shall be designated as a critical lift if any one of the following conditions exists:

4.13.1.1 Lifting over 50 tons.

4.13.1.2 Lift exceeds 75% of the rated capacity of the crane.

4.13.1.3 Lift requires the use of more than one crane.

4.13.1.3.1 In no case shall a multiple crane lift be performed in excess of 75% of any one of the crane's individual load rated capacity at the planned radius.

4.13.1.4 Lifting a non-rigid object.

4.13.1.5 Lifting over equipment or material that could cause or result in a release of hazardous material to the environment.

4.13.1.6 The lifted item requires exceptional care in handling because it is being lifted above critical operating equipment or material and/or building structure.

4.13.1.7 The lifted item requires exceptional care in handling because of size, weight, close-tolerance installation, high susceptibility to damage or other unusual factor.

4.13.1.8 Lift performed in proximity of live electrical connections.

4.13.1.9 Lifting of personnel in baskets and/or personnel harnesses. This shall be conducted in accordance with OSHA Standard 29CFR 1926.1431.

4.13.1.10 Lifting of equipment by helicopter.

Any lifts proposed by the contractor that meet the above criteria or determined to be critical by the Project Engineer will be subject to a Critical Lift Plan. Examples of lifts that are generally considered critical are: boiler tube panels, feedwater heaters, conveyor systems, coolers and pump skids, turbines and generators.

4.13.2 Critical Lift Plan

Contractor shall provide a detailed lifting and rigging plan for all lifts identified as critical. All critical lifts will require a Professional Engineer's seal. Prior to executing lift, lift plans must be submitted to the Project Engineer, reviewed and accepted by a structural engineer in the POS Civil/Structural Group. Ameren will review submittals for general design features. Contractor is responsible for accuracy of calculations. Also prior to executing lift, any changes made in the field to the approved lift plan must be approved by the contractor's engineer and accepted by the Ameren POS Project and Structural engineers. A copy of the lift plan must be onsite during the lift and must have been reviewed with all personnel involved with the lift, including the Ameren Construction Supervisor. Ameren's Construction Supervisor shall be provided sufficient notice to allow him/her to witness the critical lift. A critical lift plan shall contain the following, as applicable:

4.13.2.1 Identify the items to be lifted.

4.13.2.2 Weight of the lifted item and total weight of the load (for mobile cranes, see the manufacturer's instructions regarding components and attachments that must be considered as part of the load).

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4.13.2.3 Center of gravity location.

4.13.2.4 Documented step-by-step instructions.

4.13.2.5 Special precautions, if any (such as outrigger or track cribbing for mobile cranes).

4.13.2.6 Evaluation of hazards associated with the lift that include ground support, soil conditions, allowable soil bearing capacity, underground utilities that could be damaged or suddenly collapse, maximum permissible wind speed and any other physical obstruction.

4.13.2.7 A list of each piece of equipment (e.g., crane, hoist, fork truck), accessory, and rigging component (e.g., slings, shackles, spreader bars, yokes) to be used for the lift. (This list shall identify each piece of equipment by type and rated capacity).

4.13.2.8 Designated checkpoints, hold points and estimated instrument readings, as relevant, so that job progress can be checked against the plan.

4.13.2.9 Rigging sketch(es), which include the following:

- 4.13.2.9.1 Lift point identification
- 4.13.2.9.2 Method(s) of attachment
- 4.13.2.9.3 Load vectors
- 4.13.2.9.4 Sling angles
- 4.13.2.9.5 Accessories used
- 4.13.2.9.6 Other factors affecting the equipment capacity
- 4.13.2.9.7 Rated capacity of equipment in the configuration(s) in which it will be used. (For cranes, many factors affect rated capacity, including boom length, boom angle and work area.)
- 4.13.2.9.8 Percentage of the total weight of the lift to the rated capacity of the equipment in the configuration(s) in which it will be used (see above). Ameren best practices recommend limiting this percentage to less than 90% and shall not exceed 95%.
- 4.13.2.9.9 If rigging points are attached to existing structural steel, it is the responsibility of the contractor's engineer to confirm that the additional loads do not overstress the existing structure, and to design additional bracing/reinforcement if required. Supporting calculations sealed by a Missouri Professional Engineer shall be included with the critical lift plan.

4.13.2.10 A load-path sketch that shows the load path and height at key points in the job. (For lifts with mobile cranes, include the crane position(s) relative to the load and relative to surrounding obstructions.) Where appropriate, include floor-loading diagrams.

4.13.2.11 A sketch indicating lifting and travel speed limitations. (This may be noted on the load path sketch or on a separate sketch.)

4.13.2.12 A sign-off sheet to verify that all inspections/tests required by OSHA are current for all equipment and rigging.

4.13.2.13 The lift plan shall provide specific information for each lift when multiple items of varying weights and/or shapes are included in the lift plan unless an exception is approved by the Ameren structural engineer.

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4.13.2.14 With their bid proposal, Contractors shall submit a normal weather lay-down plan for each onsite lattice crane, wherein contractors specifically outline the manner in which the crane will be stored in normal weather conditions.

4.13.2.15 With their bid proposal, Contractors shall submit a severe weather lay-down plan for each onsite lattice crane, wherein contractors specifically outline the manner in which the crane will be stored in severe weather conditions.

4.13.2.16 Before construction begins, the selected Contractor shall meet with Ameren representatives and shall outline the means and methods of the Contractor's crane execution plan for each lattice crane expected to be utilized onsite. Execution plan shall include specifics about transition from normal to severe weather crane lay-down plans and critical wind speed for crane position. Cranes shall not be allowed onsite until after the crane execution plan(s) have been reviewed and approved by Ameren representatives.

4.13.2.17 Crane loading shall typically be based on 2,000 pounds per square foot ground pressure, unless known ground conditions dictate/allow otherwise. Ameren representatives shall review and approve planned crane ground loading.

4.13.2.18 When determining and setting load path barricade boundaries, Contractors shall include within the boundary the potential for dropping load during load swing (failed load path). All elevations affected per this potential 'failed load path' shall be barricaded.

4.14 Respiratory Protection

4.14.2 Contractors must provide a copy of their Respiratory Protection Program to the SPOC before they use respirators. The program must comply current Ameren, Federal, State and local requirements including OSHA 29CFR1910.134. The program must properly address the following:

- Respirator selection
- Respirator training and required test fit procedures
- Respirator cleaning, sanitizing, inspection and maintenance
- Respirator user's medical clearance
- Chemical cartridge change-out schedule when applicable.

4.15 S&H Adherence Policy

4.15.2 **Action Level One** – The SPOC will issue a written Notice of S&H Non-Compliance (Attachment A11) and Warning Letter for S&H Non-Compliance (Attachment A12) to Contractor's management and site S&H representative if Contractor fails to comply with an applicable S&H standard.

4.15.3 **Action Level Two** – The SPOC will issue a Written Notice of Temporary Job Suspension (Attachment A13) to Contractor if S&H non-compliance is not corrected by Action Level One, or if Contractor repeatedly fails to comply with applicable S&H regulations. The appropriate Ameren Manager and Contractor's Division Manager, or equivalent, must meet and agree on corrective actions acceptable to Company before Work may resume. Actions may include, but are not limited to:

- Removal of certain Contractor personnel from project.
- Alteration of Contractor's job procedures.
- Having Ameren implement corrective action and backcharge Contractor.

Contractor shall not resume Work until Ameren accepts the proposed corrective actions. Ameren will retain meeting minutes documenting the agreement.

4.15.4 **Action Level Three** – Ameren Management may terminate the contract for cause, if **Action Level One** and **Action Level Two** do not result in Contractor's S&H compliance.

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ATTACHMENT A1

INCIDENT/ACCIDENT INVESTIGATION REPORT

Date of Accident: _____ Time of Accident: _____ Job Number: _____

Contractor Company Name: _____ Date of Investigation: _____

Location of Accident: _____

Did injury result? Yes/No,: _____ Involved Employee Name(s): _____
Involved Employee SS Number _____

Employee Job Classification or Skill: _____ Years In this Skill: _____ Years With Company: _____

Describe Type of Injury: _____

Body Part(s) Involved, If applicable: _____

Injury Classification per OSHA 29CFR1904: _____

Was property damaged? Yes/No _____ Describe damage/owner: _____

Is damaged property secured/maintained? Yes/No _____ Person Maintaining _____

Names of Witnesses/Co-workers (With Social Security No.): _____

Weather/Wind Conditions: _____

List/Describe personal Protective Equipment (PPE) in use by person exposed or injured.

_____

Chemicals Involved:

Name(s) of Chemicals Encountered: _____

_____

Form of Chemicals (Solids, Liquid, Dust, Mist Fume): _____

Describe Radiological Materials (if any): _____

Volume or Quantity Released: _____

Description of Accident: _____

_____

_____

_____

(continued on next page)

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INCIDENT/ACCIDENT INVESTIGATION REPORT (continued)

Contributing Factors: _____

What **Corrective Actions** Were Taken to Secure the Scene? _____

Corrective Actions Being Taken to Prevent Recurrence:

Action Item:	List Responsible Person & Target Date for Implementation Name:	Date:

Job being performed at time of incident/accident: _____

Was permit required for task being performed? Yes/No _____

If so, was permit issued? Yes/No _____ If yes, attach a copy of permit in effect at time of accident.

Indirect cause of accident: _____ _____ _____

Investigation Team Members:

Injured/Involved:	Name	Signature	
Supervisor:	Name	Signature	
Ameren SPOC	Name	Signature	
S&H Representative	Name	Signature	
Name (Others)	Title	Signature	
Name (Others)	Title	Signature	

Contractor Representative(s) Contacted: _____

Ameren Representative(s) Contacted: _____

*Attach additional sheets and supplemental data & information as necessary.

**Distribution: Original must be filed on-site; 1 copy must be sent promptly to the Corporate S&H Dept.
Must Notify: CCMI and Huntleigh McGehee

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ATTACHMENT A2

WITNESS STATEMENT

Name: _____ Title: _____

Social Security Number: _____ Date: _____ Time: _____

Temporary Address: _____ Phone: _____

_____

Permanent Address: _____ Phone: _____

_____

Location at Time of Accident: _____

Your statement shall include, to the best of your knowledge, detailed facts relative to the following five categories:

1. What happened just before, during, and just after the incident?
2. When did it happen?
3. Where did it happen?
4. Why do you think it happened?
5. Who was involved?

_____
Signature

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ATTACHMENT A3

FIRST AID REGISTER

Company: _____ Project Name /Number: _____ Jobsite Location: _____

Month /Year: _____ Site Manager: _____ Page: _____ of _____

Date	Time	Name	Supervisor/Foreman	Type of Injury, Body Part, and Brief Description of Accident	*Class

*Class = Classification FAV = First Aid Visit E1= Doctor's Visit REC – OSHA Recordable Other:

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ATTACHMENT A4

BARRICADE TAG





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ATTACHMENT A5

CONSTRUCTION WORKER'S PROTECTION ASSURANCE AUTHORIZATION

Date: _____

Operating Supervisor: _____

The following person(s) has authorization to receive W.P.A.: _____

Project Name: _____

Company Name: _____

Company Address: _____

Name	Title	Office	Cell	Home	E-Mail

	Beginning		Ending	
	Date	Time	Date	Time
Expected Duration:				

Training is Required for Automated WPA System.

_____
Plant Manager or Designee

(Designee: Admin. Supt., Operations Supt., Maintenance Supt., Planning/Scheduling, or Operations Supv. {Watch})

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ATTACHMENT A6

GRINDER SAFETY PLAN

Grinder Guard and Handle Removal PRE-PLAN

Date:	**Job #:**
Customer/Site:	**Location of Work/Unit:**
Description of Task:	**Equipment Identification:**

SCOPE OF WORK AND SCHEDULE (Please list complete description of task)

HAZARD ASSESSMENT TO DETERMINE ALTERNATE TOOL

procedures require a pre-plan whenever personnel remove the guard and handle on a grinder.

Reason:

- Grinding wheel cannot access point of work with guard and handle attached due to narrow gap for welding.

Alternate Methods to Removing Guard and/or Handle:

- Rotary file and die grinder?
- Conical grind stone and pole grinder?
- Other?

SAFETY PRECAUTIONS

- ☐ Cutting wheel CANNOT be used while guard and handle are detached.
- ☐ Grinder must be unplugged when removing guard and handle and when re-attaching.
- ☐ Guard and handle are only to be removed for this specific point of work. All other grinding in the work area must have safety devices attached.
- ☐ Pre-plan will only apply until the weld depth improves to allow for standard grinding operation, i.e. all safety devices attached.
- ☐ Wear face shield and sealed eyewear.
- ☐ Maintain control of grinder at all times, use two hands when operating the grinder.
- ☐ Keep hands/fingers clear of upper portion of the grinder near the wheel.
- ☐ Be aware of body positioning.

AFFECTED PERSONNEL INVOLVED IN WORK MUST READ AND SIGN THIS PRE-PLAN

PRE-PLAN REVIEW SIGN-IN

Employee Classification/Craft	Name (Print)	Signature	Date
1.			
2.			
3.			
4.			
Supervisor/Foreman			
Safety Representative			

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ATTACHMENT A7

CONTRACTOR REDUCTION IN FORCE REPORT

Contractor Name:	
Contractor Supervisor:	
Date Submitted:	
Time Submitted:	

Name of Employee (Please Print)	Badge #	Date of Reduction	Time of Reduction

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ATTACHMENT A8

POWER OPERATIONS HOT WORK CHECKLIST *(EXAMPLE)*

1. DESCRIPTION – JR#

Location _____ Elevation _____
Work to be done: Welding _____ Brazing _____ Open Flame Cutting / Heating _____
Equipment _____

NOTE: Before authorizing welding, cutting, heating, and brazing, this checklist must be completed.

2. PRE-WORK INSPECTION

Hot Work shall not be performed in the following situations:

a. In areas not authorized by Management.

b. In sprinklered buildings while such protection is impaired, unless authorized by Management.

c. In the presence of explosive atmospheres or explosive atmospheres that may develop inside unclean or improperly prepared tanks, pipes or equipment.

d. In areas near the storage of large quantities of exposed, readily ignitable materials.

Prior to welding, cutting heating, and brazing (W/C/H/B), you shall perform these basic precautions:

a. Move the object to be W/C/H/B to an area free of hazards.

b. If the object to be W/C/H/B cannot readily be moved, then you shall remove all movable fire hazards within the vicinity to a safe place.

c. If the object to be W/C/H/B cannot be moved and if all the fire hazards within 35 feet cannot be removed (including cable trays), then, immovable fire hazards shall be shielded and a fire watch provided.

IF THESE BASIC PRECAUTIONS ARE NOT FOLLOWED, WELDING, CUTTING HEATING AND BRAZING SHALL NOT BE PERFORMED. COMPLETE CHECK LIST.

3. ADDITIONAL FIRE WATCH PROVISIONS

N/A	YES	NO		
			a.	Can more than a minor fire develop?
			b.	Are combustible materials closer than 35-ft. to the point of operations?
			c.	Are combustible materials more than 35-ft. but easily ignitable by sparks?
			d.	Do wall or floor openings with a 35-ft. radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors?
			e.	Are combustible materials adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are they likely to be ignited by conduction or radiation?

NOTE: If you answered yes to any of the above, a fire watch is required. Complete checklist. All of the following conditions must be met, if applicable.

(continued on next page)

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4. PRECAUTIONS

N/A	YES	NO		
			a.	A fire watch will be provided during and for 30 minutes following welding, cutting, heating and brazing.
			b.	The fire watch shall be supplied with a proper portable fire extinguisher in addition to installed operable plant equipment.
			c.	Cutting and welding equipment is in good condition.
			d.	Combustible materials are protected with covers, guards, or metal shields, or material is removed prior to start of work.
			e.	Nearby workers are suitably protected against heat, sparks, slag and flash.
			f.	Wall or floor openings are covered or enclosures provided. For elevated work, covers are suspended beneath to collect sparks or area below is free of combustibles.
			g.	Enclosed equipment is cleaned of all combustible material and purged of flammable vapors.
			h.	Ducts and /or conveyors are suitably protected or shutdown.
			i.	For work near walls, partitions, ceiling or roofs, proper precautions have been taken to prevent ignition of combustibles inside the barrier of adjacent areas.
			j.	For work on pipes or other metal in contact with combustible walls, partitions, ceilings, or roofs, precautions have been taken to prevent ignition by conduction of heat.
			k.	Other

PRE-WORK INSPECTION

Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____

POST-WORK INSPECTION

Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____
Supervisors Initials _____ Date _____ Time _____

DEFINITIONS

1. Combustible Material: Any material that, if in the form and under the conditions used, could ignite and burn.

2. Minor Fire: A fire which, if no action is taken to extinguish it, will self-extinguish (burn out), will not propagate (spread to other materials through the continuity of combustibles), and will not damage any permanent plant equipment.

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ATTACHMENT A9

CONTRACTOR SAFETY & HEALTH DATA FORM

1. S&H PERFORMANCE HISTORY

A. Interstate or Intrastate Worker's Compensation Experience Modification Rate (EMR), as shown on Workers Compensation Insurance Policy for three most recent years.

Year	EMR	*WH/CL

*If self-insured, provide employee Work Hours per Claim. (WH/CL)

THE FOLLOWING DATA FOR LAST THREE (3) YEARS FROM CONTRACTOR'S OSHA LOG

		Year		
B-1.	Employee hours worked			
B-2.	Fatalities (Column G of OSHA 300 log). Attach explanation for any fatalities.			
B-3.	Cases involving days away from work (Column H of the OSHA 300 Log)			
B-4.	Job transfer or restricted duty cases (Column J of OSHA 300 log)			
B-5.	Cases defined as other recordable cases (Column J of OSHA 300 Log)			
B-6.	Total # of cases for B-2, 3, 4 & 5 above.			
B-7.	"OSHA Incidence Rate" – Formula: Total Recordable Cases x 200,000 / Total # of work hours.			
B-8.	Citations by OSHA and/or other S&H regulatory agencies in past 3 years (provide details of each)			
C-1.	Motor vehicle accidents.			
C-2	Miles driven per year, total fleet.			

(continued on next page)

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		Yes	No
2.	Do you have a written hazard communication program?	☐	☐
	Do you have a written S&H program?	☐	☐
	Do you have a written company substance abuse program?	☐	☐
	Do you have a written respiratory protection program?	☐	☐
3.	Do you have one or more full time:		
	A. Physicians	☐	☐
	B. S&H Professionals	☐	☐
	C. Industrial Hygienists	☐	☐
4.	Do you have a new employee orientation program?	☐	☐
	I it include the following?		
	A. Company S&H Policy	☐	☐
	B. Company S&H Rules	☐	☐
	C. S&H Meeting Attendance	☐	☐
	D. Company S&H Record	☐	☐
	E. Hazard Recognition	☐	☐
	F. Hazard Reporting	☐	☐
	G. Injury Reporting	☐	☐
	H. Personnel Protective Equipment	☐	☐
	I. Respiratory Protection	☐	☐
	J. Fire Protection	☐	☐
	K. Housekeeping	☐	☐
	L. Toxic Substances	☐	☐
	M. Electrical Safety	☐	☐
	N. Safety Harnesses and Lifelines	☐	☐
	O. First Aid	☐	☐
	P. Driving Safety	☐	☐
	Q. Lockout/Tagout	☐	☐
	R. Ladder/Stairway Safety	☐	☐
	S. Hearing Conservation	☐	☐
	T. Trenching and Excavation	☐	☐
	U. Asbestos Awareness	☐	☐
	V. Lead Awareness	☐	☐
5.	Do you have a training program for newly hired or promoted first line supervisors?	☐	☐
	I it include the following?		
	A. Hazard Recognition	☐	☐
	B. Safe Work Practices	☐	☐
	C. S&H Supervision	☐	☐
	D. New Employee Orientation	☐	☐
	E. Tailgate/Toolbox S&H Meetings	☐	☐
	F. First Aid Procedures	☐	☐
	G. Emergency Procedures	☐	☐
	H. Incident Reporting	☐	☐
	I. Accident Investigation	☐	☐

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6. How often do you hold periodic S&H meetings for your foremen/supervisors?

   A. Weekly ☐ C. Bi-Weekly ☐

   B. Monthly ☐ D. Less Often, As Needed ☐

7. Do you conduct field S&H inspection of work in progress? Yes ☐ No ☐

   A. If yes, who conducts the inspection? _____

   B. How often? _____

		Yes	No
8.	Are accident reports circulated to your management?	☐	☐
9.	Is S&H a (documented) weighted factor in evaluating the performance of:		
	A. Foreman	☐	☐
	B. Supervisor	☐	☐
	C. Management	☐	☐
10.	Does your firm hold "Toolbox S&H Meetings?	☐	☐

How often?

A. Weekly ☐

B. Bi-Weekly ☐

C. Monthly ☐

D. Less Often, As Needed ☐

11. List the most senior staff S&H professional at your company.

    Name: _____ Title: _____ Phone: _____

12. List the person to contact to discuss the details of the information contained in this document.

    Name: _____ Title: _____ Phone: _____

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ATTACHMENT A10

MONTHLY CONTRACTOR ACCIDENT STATISTICS REPORT

Month: _____ Project Name: _____

Contractor Name: _____

Work hours for the month: _____ Work hours year-to-date: _____

Number of First Aid only cases: _____

Number of injuries & illnesses that received treatment by a physician: _____

Total number of OSHA Recordable injuries & illnesses for the month: _____

Number of restricted duty cases: _____ Number of lost time (days away) cases: _____

Number of motor vehicle accidents: _____ Number of miles driven: _____

Please list injuries and illnesses, which have occurred to employees of your company on the above project this month. Include accident cause, injury/illness suffered and current disposition of injured/ill employee (i.e., returned to work, still off work, awaiting surgery, etc.):

_____

_____

_____

_____

_____

_____

_____

_____

_____

Person completing report: _____ Title: _____

Date: _____ Signature: _____

Please submit this report to the SPOC on above project by the second business day of each month, for the preceding month's work activities.

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ATTACHMENT A11

NOTICE OF SAFETY & HEALTH NON-COMPLIANCE

To: _____ Site Representative for: _____

Your company has been found to be in non-compliance with one or more Federal, State, or Ameren S&H requirements as specified below. This S&H con-compliance must be corrected immediately for your company to meet the requirements of your contract.

Item # Item of non-compliance

_____ _____

_____

_____

Applicable S&H Requirement _____

_____ _____

_____

_____

Applicable S&H Requirement _____

_____ _____

_____

_____

Applicable S&H Requirement _____

_____

Issued By: _____ _____
Signature of the SPOC Date

Received By: _____ _____
Signature of Representative Receiving Notice Date

cc: Superintendent-Construction Management Services
Safety Supervisor
Plant Outage Manager

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ATTACHMENT A12

WARNING LETTER OF SAFETY & HEALTH NON-COMPLIANCE

Project Name and Number _____

Your firm, _____, has been found to be in violation of your contract by non-compliance with applicable Federal, State, or Ameren S&H requirements.

On _____, in accordance with the Ameren S&H Adherence Policy, your representative, _____, was given a Notice of S&H Non-Compliance (copy attached). This notice specifies areas where your company does not comply with Federal, State, or Ameren S&H requirements, and requests that these items be corrected immediately. If they are not corrected, more stringent measures will be taken in accordance with Ameren S&H Adherence Policy.

Thank you for your prompt attention to this matter.

_____ Signature of the SPOC

_____ Date

cc: Superintendent-Construction Management Services
Safety Supervisor
Plant Outage Manager

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ATTACHMENT A13

WRITTEN NOTICE OF TEMPORARY JOB SUSPENSION

Your company, _____, while working on the _____ project, has been notified of S&H performance deficiencies in accordance with Ameren's S&H Policy. Despite these written notifications requesting that immediate corrective action be taken to improve your S&H performance, improvement has not occurred.

Therefore, in accordance with Action Level Two of the Ameren S&H Adherence Policy, we are hereby notifying you that after securing your equipment, job activities on the project named above are to cease. Activities on this project may be resumed only after your company meets requirements set forth in the Ameren Adherence Policy.

_____	_____	_____
Signature of the SPOC	Time	Date

cc: Superintendent-Construction Management Services
Safety Supervisor
Plant Outage Manager

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ATTACHMENT A14
AUTHORIZATION FOR CONTRACTOR TWO-WAY RADIOS

AUTHORIZATION FOR CONTRACTOR TWO-WAY RADIOS (SAMPLE)

All frequencies must NOT fall between the two ranges of frequencies:

463.5500 to 463.5700 MHz (Plant-Specific)

464.5500 to 464.5700 MHz (Plant-Specific)

- When reporting the frequency, you must include digits four places past the decimal point (e.g., 123.4567).
- If a repeater is being used, you must report both transmit and receive frequencies.
- If no repeater is being used, receive and transmit frequencies will be the same.
- You must submit all frequencies to be used.

CONTRACTOR	
CONTRACTOR REPRESENTATIVE	Print Name
RADIO MANUFACTURER OR MAKE	
HOW MANY CHANNELS BEING USED?	
FCC License "Call Sign" e.g. WPUP269	

CHANNEL		RECEIVE FREQ (MHz)	TRANSMIT FREQ (MHz)
1			
2			
3			
4			
5			
6			
7			
8			

Ameren SPOC: _____ Contractor Rep: _____

Date: _____ Date: _____

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ATTACHMENT A15
CONTRACTOR'S SUBSTANCE ABUSE POLICY

Policy No. AUE-POL-000001, Rev. 0

1.0 INTRODUCTION

1.1 In an effort to provide a drug- and alcohol-free workplace, Ameren establishes the following policy for Contractors:

2.0 SCOPE

2.1 Working on an Ameren work site and being under the influence of drugs or alcohol creates safety risks for all personnel who work on our work sites.

2.2 The term Contractor refers to all non-Ameren personnel hired to perform a service for Ameren who will be on Ameren property and includes all Contractors, their subcontractors and all other non-Ameren persons who are employed by them with active badges for site access. Visitors and delivery drivers are excluded from these requirements.

2.3 This Policy supersedes GP-06-01, Contractor Substance Abuse Policy.

3.0 IMPLEMENTATION

3.1 Contractors shall establish and maintain a confidential drug and alcohol testing program for each of their employees assigned to work on Ameren property, which shall meet the following minimum requirements.

3.1.1 All employees of a Contractor who are assigned to an Ameren site shall be subject to Contractor's drug and alcohol testing program. Contractor's program shall prohibit employees from buying, selling, consuming, or distributing alcohol or drugs while working for Ameren or while on Ameren property. The program shall also prohibit Contractor employees from reporting to an Ameren site or being on Ameren property while under the influence of alcohol or drugs.

3.1.1.1 Contractor's program shall provide for drug testing for substances listed in Section 3.1.4 of this Policy under the following circumstances: pre-assignment testing; random testing; testing for reasonable cause based on observations by Ameren or Contractor supervisor; and testing after any accident or incident that involves injury to personnel or damage to property.

3.1.2 Contractor shall require pre-assignment drug testing, or will assure that each person who will be assigned to an Ameren location has been tested for drug use within the 120-day period immediately prior to the start of work on Ameren premises. Contractor shall provide written documentation from the testing authority to Ameren Construction Project Lead or Plant Station Point of Contact that its employees are either compliant or non-compliant with this Policy. Contractor employees, who are not in compliance with this Policy, will be subject to Section 3.1.6 of this Policy. To maintain confidentiality, Ameren will not accept actual test results. A previous random drug test or drug test conducted for another reason is sufficient to satisfy the pre-assignment testing requirement if test was conducted during the 120-day period prior to working on Ameren premises, and otherwise satisfies the drug testing requirement in Section 3.1.4 of this Policy. Contractor employees who have taken a pre-assignment drug test will be allowed to work pending test results for no more than 5 working days. Testing may be waived pending Ameren management approval for Contractor employees who are working less than 40 hours annually providing site labor.

3.1.2.1 In lieu of pre-assignment testing, Contractor may accept a certificate signed by Department of Health and Human Services (DHHS), Substance Abuse Mental Health Service Administration (SAMHSA) DHHS/SAMHSA-certified drug testing laboratory indicating the results of drug test performed within the 120-day period immediately prior to working on Ameren premises. Identification cards, which indicate employee's name and date of his/her most recent drug test, may also be accepted if they are traceable to the certification from the DHHS/SAMHSA -certified drug-testing laboratory, which performed the test, and are attested to by Contractor management.

3.1.3 Contractor shall provide site specific random substance abuse testing for each of its employees and its subcontractors' employees assigned to be on Ameren premises. The random testing shall be conducted at a frequency such that a minimum of one test is performed for hours up to the first 2,000 man-hours worked and one additional test for every 2,000 man-hours worked by Contractor, or any of its subcontractors, on Ameren premises. Contractor shall establish a random selection process to ensure that each individual will have an equal chance of being selected and tested each time a

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random test is scheduled. The random testing pool will include all crafts under the direction of the prime Contractor, including subcontractors. Employees selected for random testing shall not be informed of test until immediately prior to test and shall be accompanied to testing site by a responsible Contractor supervisor as soon as practical on the same day selected. Contractor shall notify Construction Project Lead or Plant Station Point of Contact of random selection results and an Ameren representative may exercise the option of being present during the selection process.

3.1.4 Samples used to comply with this policy shall be analyzed by a NIDA-certified laboratory or quick cup and/or instant cup method. Tests must screen at a minimum for the following substances and levels, however some labor consortium testing programs will be accepted for initial site access only pending Ameren approval. A confirmed positive drug testing will be considered a violation of this policy.

Substance	Initial Level	Confirmed Level
Amphetamines	500 ng/ml	250 ng/ml
Barbiturates	300 ng/ml	200 ng/ml
Benzodiazepines	300 ng/ml	200 ng/ml
Cocaine	150 ng/ml	100 ng/ml
Marijuana	50 ng/ml	15 ng/ml
Methadone	300 ng/ml	200 ng/ml
Opiates	300 ng/ml	150 ng/ml
Oxycodone	100 ng/ml	100 ng/ml
Propoxyphene	300 ng/ml	200 ng/ml
Methamphetamine	500mg/dl	250mg/dl

3.1.5 Contractor's program shall provide for alcohol testing under the following circumstances: random testing; testing for reasonable cause based on observations by Ameren or Contractor supervisor; and testing after any accident or incident that involves injury to personnel or damage to property. Pre-assignment alcohol testing shall not be required. A test result of .04% blood alcohol concentration or greater as indicated by a breathalyzer or similar test will be considered a violation of this Policy.

3.1.6 Individuals who fail a test, refuse to test or otherwise violate this Policy will be denied site access from all Ameren premises. In addition, Contractor shall notify the applicable consortium to remove employee from the active pool. A Contractor employee who is determined to have violated this policy will be denied site access for a period of one year. After a period of one year, if the individual can demonstrate successful completion of a required treatment program based on Contractor's consortium policy, the individual will be given a last-chance opportunity. However, site access will not be permitted unless the individual has a satisfactory return-to-duty drug test. If at any time an individual is found to have a second violation of this Policy, the individual will be permanently denied site access to all Ameren premises. Contractor shall document all non-compliance on a reduction force report and forward the report to Construction Project Lead or Plant Station Point of Contact. The reduction force report shall include the person's name, craft and reason stated "Non-Compliance with Ameren Substance Abuse Policy."

3.1.7 Contractors shall require all of their subcontractors to comply with all provisions of this Substance Abuse Policy. Failure of Contractor or any of its subcontractors to comply with the requirements of this Policy shall be grounds for removal from consideration for any future work and/or termination of the current contract at the discretion of Ameren. Ameren reserves the right to audit Contractor's drug and alcohol testing program at any time to verify compliance with this policy.

3.1.8 Ameren will not be responsible for any expense or loss of wages due to non-compliance with this Policy.

3.1.9 Ameren retains the right to change or modify this Policy at any time. Ameren also retains the right to waive this Policy for any Contractor that is badged as a visitor.

3.1.10 Any documents relating to this Policy will be maintained in confidence and will not be released without written authorization unless otherwise required by law.

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ATTACHMENT A16

CRANE MAINTENANCE SAFETY CHECKLIST

DATE: _____ CRANE: _____

JOB NUMBER/ LOCATION: _____

TASK: _____

☐ Has a Total Hazard Analysis (THA) been completed today? YES ☐ NO ☐

Comments: _____

_____

☐ Is access to work area established? YES ☐ NO ☐

Comments: _____

_____

☐ Is all safety equipment on hand and functioning properly? YES ☐ NO ☐

Comments: _____

_____

☐ Have lines of communication between operator and affected employee(s) been established (visual &/or verbal)?

Comments: _____

_____

☐ When servicing the crane (including crane lubrication), the operator must lower all loads to the ground, and move all controls to OFF. The engine MUST be stopped before the crane is serviced. The operator is to attach a WARNING sign to the engine start control to warn personnel that crane is being serviced and must not be started.

Comments: _____

_____

☐ Do not operate crane until all safety guards and covers are securely reinstalled and all maintenance equipment is removed.

Comments: _____

_____

☐ Before operator enters cab of crane, the affected employee(s) must be at a minimum safe distance of two feet from any moving parts.

Comments: _____

_____

Additional Comments: _____

_____

CREW SIGNATURES:

_____ _____

_____ _____

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ATTACHMENT A17
CONTRACTOR AGREEMENT OF UNDERSTANDING
(Form CONMGT0)

All Contractors and Subcontractors will be required to sign and submit this form prior to entering and/or starting work on any Ameren property.

- I have been informed of all expectations regarding Ameren Safety / Work rules and ZERO TOLERANCE policies and will immediately investigate and enforce all such rule and policy violations when they are reported or observed.
- I will cooperate to the fullest extent with any Ameren management or security person in investigating ZERO TOLERANCE policy violations.
- I am aware that Ameren plants contain asbestos, lead and flyash. Where necessary, I will abide by all Ameren, OSHA, State and Local policies, procedures and ordinances in all abatement, containment, waste-disposal, employee protection and reporting activities.
- I will obtain and promptly submit all of the required permits to the Ameren-designated Station Point of Contact (SPOC) prior to starting work.
- I will promptly forward all of the required submittals to the Ameren SPOC.
- I will not allow any employee to enter and / or start work on Ameren property before first conducting a Safety / Work Rules orientation and ensuring they have all required personal protective equipment.
- I will report all violations / actions taken to the Ameren SPOC, on form CONMGT1, each Friday before 9:00 AM.
- I will inform the Ameren SPOC of any sub-contractors in my employ and ensure that they are aware of and meet the conditions of this agreement before they enter and / or start work on Ameren property and will have them complete this Contractor Agreement of Understanding Form.
- Any employee found to have violated a ZERO TOLERANCE policy may be removed and barred immediately from Ameren property and will not be allowed to return to any Ameren property in the future.
- I understand that repeated violation of the Work / Safety rules or ZERO TOLERANCE policies may result in my company's removal from Ameren property.

Contractor Company (Print) _____

Contractor Representative (Print) _____

Representative's Signature _____ Date _____

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ATTACHMENT A18
HOUSEKEEPING SCORECARD

PROJECT NAME: _____

CONTRACTOR NAME: _____

DATE: _____

HOUSEKEEPING SCORECARD						
CATEGORY	RATING POOR				EXCELLENT	COMMENTS
General Cleanup	1	2	3	4	5	
Cords & Hoses (are out of the way)	1	2	3	4	5	
Barricades & Caution Tape (used & taken down appropriately)	1	2	3	4	5	
Other (e.g., material stored/staged appropriately, no tools on running equipment, no hazardous conditions, etc.)	1	2	3	4	5	
Total Housekeeping Score:						
Total Points (Total Housekeeping Score x 4) :						

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ATTACHMENT A19
SAFETY SCORECARD

SAFETY SCORECARD			
Notwithstanding the provisions below, a "work-related fatality" will result in maximum KPI reduction to the contractor regardless of any other safety criteria.			
KPI payment will be based on criteria that are equally weighted as follows:	Section 1	OSHA recordable rate	33⅓ %
	Section 2	"Rules to Live By" infraction	33⅓ %
	Section 3	Safety observation program	33⅓ %

SECTION 1	OSHA RECORDABLES		
OSHA rate is calculated by the following:			
		2 or more =	0%
		less than 2 =	100% of Section 1
Note: Review based on specific job criteria (i.e., duration of project). Ameren POS safety supervisor has final call on OSHA recordable determination.			

SECTION 2	"RULES TO LIVE BY" OBSERVATIONS		
		1 or more =	$2,000 penalized assessment per Appendix A
		less than 1 =	(add)
Note: Observations that are self-reported by contractor do not apply to this. Only observations by Owner or Owner's representative apply.			

SECTION 3	COMPLETED CARDS		
An agreed-upon safety observation card program will be developed as part of site safety process. Observations are based on number of fully completed, meaningful cards generated by contractor's employees and submitted to Ameren designated representative. These observation cards may show positive coaching as well as corrective coaching. Observation cards completed by Ameren will not be utilized KPI of this section.		< 70 cards =	(deduction)
		70 - 90 cards =	$0
		> 90 cards =	(add)

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ATTACHMENT A20
GUIDELINE FOR ABANDONING PIPING AND DEMOLISHING ABANDONED PIPING

1.0 GENERAL GUIDELINE FOR PROPERLY ABANDONING AND/OR DEMOLISHING PIPING

The division of responsibility for the following actions to be decided at assignment of work:

1.1 A Competent Person shall pre-plan the job prior to the start of the work.

1.2 Determine pipe to be abandoned or demolished. Review P&ID's and piping isometrics to determine isolation points and material conveyed in piping.

1.3 If a JR is not already in EMPRV, Ameren Single Point of Contact (SPOC) shall create a JR in EMPRV.

1.4 Review WPA requirements with the Responsible Engineer listed on the JR. Ensure proper WPA is in place to isolate lines.

1.5 Conduct a pre-job briefing to discuss site specific safety plan and the following:

1.5.1 PPE required

- Chemical Protection
- Eye & Face Protection
- Foot Protection
- Hand Protection
- Head Protection
- Hearing Protection
- Respiratory Protection

1.5.2 Atmospheric conditions if working in enclosed spaces

1.5.3 WPA

1.6 Ensure proper WPA is in place to isolate lines. As part of WPA, drain lines and confirm all low spots have been drained.

1.7 Take special precautions to ensure environmental spills do not occur.

1.8 At extreme ends of pipe, remove at least a one foot section of pipe from equipment or process piping still in use to ensure complete isolation. Cap ends of process piping that will remain in service.

1.9 For piping that will be abandoned in place, permanently tag abandoned pipe in at least three locations (Steel or Brass tag wired to pipe). Tag shall indicate pipe to be "Abandoned in Place," applicable JR number, and material pipe conveyed.

1.10 For piping to be demolished, remove piping and dispose of properly.

1.11 Update P&ID's and piping isometrics as applicable.

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ATTACHMENT A21
SITE-SPECIFIC SAFETY PLAN (SSSP)

This plan shall be completed and reviewed with the Corporate Safety Department before work commences. Completed plans shall be maintained and kept on site with the project file.

Section 1: Company and Project Information	
Contractor Company:	
Contractor Address:	
Project Name:	
Project Address:	
Mobilization Date:	

Section 2: Contractor Info	Name	Phone	Email
Project Manager			
Superintendent			
Corporate Safety Representative			
General Foreman			
Site Safety Representative(s)			

Shifts working throughout project: 1st ☐ 2nd ☐ 3rd ☐	Maximum number of workers on site per shift: 1st 2nd 3rd	Number of safety representatives on site per shift: 1st 2nd 3rd

Job Responsibilities:	
Titles:	Description of Job Duties

Section 3: Site Emergency Information		
3.1	Identify the nearest medical facility (e.g., hospital, urgent care, occupational clinic etc.): Address: Phone # Note: Location and directions (including maps) to the nearest facility are required to be on this jobsite.	
3.2	List the local Fire & Rescue Squad Phone #	List the Police Phone #
3.3	Describe your emergency action plan for the project (e.g., response to fire, severe weather, etc.):	

Section 4: Company Safety Mission Statement

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Section 5: Scope of Work

Describe the activities your company will be performing while on this project. Ensure that all activities are referenced on the AHA of this plan, see Section 13.

Section 6: Subcontractor Information

Will subcontractor(s) be used on this project? ☐ Yes ☐ No

If yes, please provide the information below (add extra copies of this page as needed):

Note: All subcontractors are required to submit a Site Specific Safety Plan.

Subcontractor(s) Name:	Contact Person	Scope of Work	Phone	Email

Section 7: General Information

7.1	Describe how you will secure your jobsite, equipment, and materials to protect public safety and to prevent theft.
7.2	Will there be persons onsite trained in First Aid and CPR? ☐ Yes ☐ No
7.3	Will there be ANSI Z308.1 compliant First Aid Kit(s) and Bloodborne Pathogens Kit(s) located in strategic areas on this project: ☐ Yes ☐ No
7.4	Will restrooms and wash facilities be brought on site? ☐ Yes ☐ No
7.5	How will housekeeping be managed? Describe the control measures to be used and how often they will be performed.
7.6	Do you have a map of the worksite location that includes roads, waterways, railways, bridges, etc.? ☐ Yes ☐ No *Please provide a copy of the map when submitting this document*

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Sections 8: Project Safety Management	
Owner shall have the authority to immediately stop contractor's work indefinitely for operations which, in the opinion of owner, constitute a safety concern. It is the responsibility of the contractor to adequately satisfy owner of any remediation necessary to provide a safe and healthful workplace. Contractor must have qualified and competent supervision at the site at all times to direct and observe the work.	
8.1	Do you require your supervision to successfully complete the OSHA 30-Hour for Construction Training?
8.2	Do you require your employees to successfully complete the OSHA 10-Hour Construction Training?
8.3	Outline the initial employee orientation on the job site:
8.4	Describe the process that you will use to verify that training within your scope of work has successfully been completed. *Note: Employee training records do not have to be submitted. Ameren reserves the right to review training records which must be readily available upon request.*
8.5	Describe your procedures for Contractor Event Reporting (CER) to Ameren.
8.6	Describe your Job Observation Process in detail:
8.7	Describe your Job Briefing Process in detail:
8.8	Will you have a Hazard Communication Program with a chemical inventory list and Safety Data Sheets (SDS) for chemicals used onsite? ☐ Yes ☐ No NOTE: Chemical inventory list must be onsite at the beginning of the work and Safety Data Sheets (SDS) shall be kept on file at the site by the contractor. SDSs must be available for the contractor and subcontractor employees' review and for review by the owner upon request.

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Section 9: Rules To Live By Hazards and Controls	
9.1	Explain how you will communicate Ameren "Rules to Live By" to your employees on this project and describe the procedures you will follow when a violation occurs.
9.2	Explain your company's disciplinary action protocol as it relates to jobsite safety rules:

Section 10: Employee Engagement and Communication	
10.1	Identify steps your company is going to take to engage your workforce in safety:
10.2	Explain how your company is going to communicate safety information and expectations to your employees?

Section 11: Personal Protective Equipment (PPE)
List the minimum PPE required to access the job site:

Section 12: Safety and Health – Describe how hazards are controlled in the AHA for each 'Yes' answer (see Section 13):	
Will the work scope require any traffic or pedestrian disruptions?	☐ Yes ☐ No ☐ N/A
Will your work require you to penetrate into any surface at any depth?	☐ Yes ☐ No ☐ N/A
Will your work involve any excavations/trenches?	☐ Yes ☐ No ☐ N/A
Will the work scope require work at heights greater than 6 feet?	☐ Yes ☐ No ☐ N/A
Will wire rope guardrail systems be used on this project to protect workers from fall hazards and will an inspection program be implemented to verify safe installation/condition?	☐ Yes ☐ No ☐ N/A
Will the project involve electrical line construction, maintenance or repair activities?	☐ Yes ☐ No ☐ N/A
Will the project involve substation or switchyard construction, maintenance or repair activities?	☐ Yes ☐ No ☐ N/A
Will there be worksite obstructions that may create a hazard to workers such as railroads, bridges, power lines or waterways?	☐ Yes ☐ No ☐ N/A
Will the work scope involve the need to control hazardous energy sources?	☐ Yes ☐ No ☐ N/A
Will the project include work on pressurized vessels or pipes that may affect the integrity of the system such as welding, cutting, brazing, etc.?	☐ Yes ☐ No ☐ N/A
Will steel erection be part of the scope of this project?	☐ Yes ☐ No ☐ N/A

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Section 12: Safety and Health – Describe how hazards are controlled in the AHA for each 'Yes' answer (see Section 13):	
Will there be potential impalement hazards such as protruding reinforcing steel (rebar)?	☐ Yes ☐ No ☐ N/A
Will any roofing be performed on this project?	☐ Yes ☐ No ☐ N/A
Will earthmoving or drilling equipment be used on this project?	☐ Yes ☐ No ☐ N/A
Will cranes, derricks, or other equipment be used on this project?	☐ Yes ☐ No ☐ N/A
Will a helicopter be used on this project?	☐ Yes ☐ No ☐ N/A
Will the work scope require the need for a critical lift plan that will include the safe rigging practices and prohibit work under suspended loads?	☐ Yes ☐ No ☐ N/A
Will hoists, elevators or conveyors be used on this project?	☐ Yes ☐ No ☐ N/A
Will employees be involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold system?	☐ Yes ☐ No ☐ N/A
Will the work scope include diving?	☐ Yes ☐ No ☐ N/A
Will the work scope require you to work in a confined space?	☐ Yes ☐ No ☐ N/A
Will welding, cutting, or brazing be performed on this worksite?	☐ Yes ☐ No ☐ N/A
Will the work involve the use of chemicals such as paints, solvents, adhesives, epoxy coatings, corrosives, fuels or other hazardous materials?	☐ Yes ☐ No ☐ N/A
Will lead based materials be used or disturbed on this project?	☐ Yes ☐ No ☐ N/A
Will asbestos containing materials be disturbed on this project?	☐ Yes ☐ No ☐ N/A
Will you be working in or generating a hazardous atmosphere?	☐ Yes ☐ No ☐ N/A
Will appreciable levels of dust be generated that will require control measures?	☐ Yes ☐ No ☐ N/A
Will abrasive blasting be performed on this project?	☐ Yes ☐ No ☐ N/A
Will the work scope involve any environmental hazards that generate flying debris, excessive noise levels, or any other air contaminants not mentioned above?	☐ Yes ☐ No ☐ N/A
Do you have a heat stress prevention program in place?	☐ Yes ☐ No ☐ N/A
Will radioactive materials/sources be used on this project?	☐ Yes ☐ No ☐ N/A
Will hazardous waste (e.g., lead, asbestos, contaminated soils) be generated and properly disposed of on this project?	☐ Yes ☐ No ☐ N/A

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Section 13: Risk Management

ANTICIPATED HAZARD ANALYSIS (AHA)

Use this form to identify activities that will occur on this project. List all potential hazards associated with that activity. Use the Risk Assessment Code table to determine the risk level of the activity/hazards. Lastly, list all of the controls that will be implemented to control those hazards. When a Job Hazard Analysis is needed, it must be performed, documented, and communicated to workers prior to the start of that activity, see footnote 2.

Contractor Name:	Project Name/Number:		Project Location:
ACME Contractor			Anywhere, Missouri
	Date Prepared: 1/1/2014	Prepared By: ACME Manager	Reviewed By: John Doe

Risk Assessment Code (RAC) Color Ratings – *include color & numeric alpha characters for rating* Red =Extremely High Risk (Critical), e.g., Red IA Orange = High Risk (Serious), e.g., Orange 2B Yellow = Moderate Risk (Moderate), e.g., Yellow 3C Blue = Low Risk (Minor), e.g., Blue 3D Green = Extremely Low Risk (Negligible), e.g., Green 3E		PROBABILITY (how often the activity occurs)				
		Frequent (A) Occurs very often, known to happen regularly.	Likely (B) Occurs several times, a common occurrence.	Occasional (C) Occurs sporadically, but is not uncommon.	Seldom (D) Remotely possible, could occur at some time	Unlikely (E) Can assume it will not occur, but it is not impossible
Severity	Catastrophic (1) – Imminent and immediate danger of death or permanent disability to the public, employees or property.	Red (IA)	Red (IB)	Red (IC)	Orange (ID)	Yellow (IE)
	Critical (2) – Permanent partial disability, hospitalized injury, temporary total disability.	Red (2A)	Orange (2B)	Orange (2C)	Yellow (2D)	Blue (2E)
	Significant (3) – Reversible injury that would need ER care, reversible illness.	Orange (3A)	Yellow (3B)	Yellow (3C)	Blue (3D)	Green (3E)
	Negligible (4) – First aid or minor medical treatment	Yellow (4A)	Blue (4B)	Blue (4C)	Green (4D)	Green (4E)

Activity Category	Potential Hazards	RAC Rating [1]	JHA Required [2]	Controls
Cutting on steam pipe located 15 ft. above ground	Explosion, thermal burns, fire, fall from heights, lacerations, flying debris	1B	Yes	1) Lockout equipment, bleed/cool/drain line, blow air through line 2) Use aerial lift with anchor point, full body harness, laynard 3) Hot work permit, firewatch, fire extinguisher, no combustibles within 35 ft. 4) PPE (safety glasses, faceshield, leather gloves, hardhat)

1 RAC Rating – Risk Assessment Code Rating. Use the Risk Assessment Matrix to list the color and numeric alpha code

2 JHA required if red or orange RAC color (See sample JHA; JHA is not required to be submitted with this plan)

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JOB HAZARD ANALYSIS (JHA) FORM

JOB HAZARD ANALYSIS	COMPANY NAME:	JOB:	DATE
	JOB TITLE OF WORKERS WHO DO THIS JOB:		ANALYSIS BY:
LOCATION:		REQUIRED PERSONAL PROTECTIVE EQUIPMENT:	

Sequence of Basic Job Steps	Critical Task	Potential Accidents or Hazards	Recommended Safe Job Procedures
	☐		
	☐		
	☐		
	☐		
	☐		
	☐		
	☐		
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	☐		
	☐		

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FOR AMEREN USE ONLY	
SAFETY HAZARDS CONTROL REVIEW OF CHECKLIST:	
DATE SUBMITTED:	
REVIEW STATUS: ☐ UNSATISFACTORY, RESUBMITTAL REQUIRED ☐ SATISFACTORY	
This plan is considered satisfactory if there are no comments below.	
AMEREN CORPORATE SAFETY REVIEW COMMENTS:	
Sections	**Comments**
Section 1:	
Section 2:	
Section 3:	
Section 4:	
Section 5:	
Section 6:	
Section 7:	
Section 8:	
Section 9:	
Section 10:	
Section 11:	
Section 12:	

Review Date:	
Resubmit Date:	
Approved Date:	
Ameren Project Manager and Date:	

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ATTACHMENT A22
DIVERSE SUPPLIER BUSINESS PLAN

SUPPLIER / SUBCONTRACTOR BUSINESS PLAN

Note: Please list all diverse and non-diverse sub-contractors on supplier/sub-contractor business plan. Ameren will require bidders to track spend amounts when sub-contracts are awarded to Diverse Suppliers. If bidder is unable to award to Diverse Supplier indicate name of diverse supplier contacted and reason(s) why bidder was unable to award.

Please specify in the pull down below the % diverse supplier participation as part of the bid.

Enter % participation here					
Name of Sub-Contractor	Email	Business Classification of Diverse Sub-Contractor (Select from the Pull Down)	Type of Work/Services to be Provided by Sub-Contractor	Anticipated Value of Work ($) to be Performed	Reason(s) why unable to award to Diverse Sub-Contractor (Select from the Pull Down)

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ATTACHMENT A23
DIVERSE SUPPLIER 2ND TIER REPORT

2nd TIER PROGRAM - DIRECT EXPENDITURES

1st Tier Supplier: _____ **Report Period:** _____

In accordance with Ameren's Request for Proposal/Quotation, the definitions and codes contained herein and the resulting contract/purchase order between Ameren and the Supplier, Supplier shall complete columns 1 through 8, reporting its use of Minority Business Enterprises (MBEs) and (WBEs) in direct connection with goods and services provided under the terms and conditions of said contract/purchase order. Supplier shall also include the name of the Ameren business segment in which the work is being performed.

Use this report when MBE & WBE expenditures are directly attributable to fulfilling a specific contract. You must be able to trace the expenditure directly to the specified contract.

	(1)	(2)	(3)		(4)		(5)							(6)	(7)	(8)
	SUBCONTRACTOR	BUSINESS SEGMENT	CONTACT		WORK		2ND TIER SPEND									
	2nd Tier COMPANY NAME	AMEREN BUSINESS SEGMENT	NAME	PHONE	DESCRIPTION	MBE /NDIRECT	AFRICAN AMERICAN	ASIAN PAC & SUB	HISPANIC	NATIVE AMERICAN	WBE	VETERAN	LGBT	TOTAL 2ND TIER	MONTHLY PAID by AMEREN	% OF MONTHLY DIVERSE SPENDING
1														$ -	$0	#DIV/0!
2														$ -	$0	#DIV/0!
3														$ -	$0	#DIV/0!
4														$ -	$0	#DIV/0!
5														$ -	$0	#DIV/0!
6														$ -	$0	#DIV/0!
7														$ -	$0	#DIV/0!
8														$ -	$0	#DIV/0!
9														$ -	$0	#DIV/0!
10														$ -	$0	#DIV/0!
11														$ -	$0	#DIV/0!
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21														$ -	$0	#DIV/0!
22														$ -	$0	#DIV/0!
23														$ -	$0	#DIV/0!
24														$ -	$0	#DIV/0!
25														$ -	$0	#DIV/0!
	TOTAL AMOUNT:						$ -	$ -	$ -	$ -	$ -	$ -		$ -	$0	#DIV/0!

Name _____ Phone _____ Email _____ Date _____

END OF APPENDIX A

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APPENDIX B – JOB WORKING RULES AND CONTRACT WORK LIMITATIONS
CONTRACTOR REQUIREMENTS - POWER PLANTS

1.0 JOB WORKING RULES

1.1 Contractor must enforce the Ameren Job Working Rules, included in this specification here as Appendix B, as well as the Contractor's own work rules. If the rules conflict, the more restrictive rule applies.

2.0 PLANT ACCESS, PARKING AND SECURITY

2.1 Contractor employees must enter the plant ***only*** at the entrance where their company name is posted. Security cameras monitor entrances to inform supervisors of violations.

2.2 The speed limit is 10-MPH unless otherwise posted.

2.3 Contractor personnel may not ride in the back of a truck on company property or to/from/between job sites unless properly seated with a seat belt.

2.4 Contractor employee vehicles must park in Construction Parking lot or in areas designated for Contractor use.

2.5 Contractor employees must enter and leave through the designated Construction gate.

2.6 Contractor employees must check in and out of project with their immediate Foreman or General Foreman.

2.7 Security will issue an identification badge to Contractor employees after site orientation training. Badges must be visible at all times while on the site.

2.8 If the site has an electronic badge reader, a green LED light indicates that arrival/departure times have been recorded and the gate is unlocked.

2.8.1 If a badge reader is not available, employees must sign the gate register when arriving or departing.

2.9 Lunch boxes, toolboxes, coolers and other containers are subject to inspection when entering or leaving Ameren premises.

2.10 An Ameren Material Pass (Form 5532NS) signed by the Ameren Station Point of Contact (SPOC) and a Contractor supervisor must be presented to Security when tools or materials are taken off site.

2.11 The Security Guards can:

- De-activate / activate a badge when changing plant locations
- Replace a damaged badge or lost badge
- Update the employee name, Contractor company, or craft.

2.12 Cameras and video recording devices are prohibited unless specifically authorized by Ameren management.

3.0 GENERAL REQUIREMENTS

3.1 The more restrictive rule will govern in the event of any conflict between Ameren and Contractor work rules.

3.2 All Contractor/Subcontractor employees must not leave their work areas during assigned work periods. Any reasonable break periods will be established by the Contractor/Subcontractor.

3.3 Only drink water from drinking fountains or lavatories, other outlets may contain river water.

3.4 Certain plant locations, including cafeterias, locker rooms, and washrooms, may be posted as OFF LIMITS to construction or Contractor personnel.

3.5 Written permission is required before using Ameren equipment or tools, except for public pay phones.

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3.6 Radios or "boom boxes" are not allowed because they can disrupt communication and distract workers.

3.7 Ameren's Smoking Policy
In keeping with Ameren's corporate values, Ameren strives to provide a work environment that promotes and ensures the health and safety of all employees. Smoking presents known health risks to smokers and non-smokers alike. This policy applies to cigarette, pipe, and cigar smoke, as well as e-cigarettes.

3.7.1 Persons Affected
This policy applies to all Ameren employees, vendors, contractors, and visitors at any Ameren facility.

3.7.2 Policy
Smoking is prohibited in all Ameren buildings and any outside posted areas where hazards may exist. Smoking is prohibited within 25 feet from all entrances, exits, windows that open, and ventilation intakes that serve an enclosed area for all Ameren locations. Smoking is not permitted in a multi-occupant Company vehicle or while operating motorized equipment.

3.7.3 Enforcement
Any violation of this policy may result in the individual being removed or barred from Ameren property.

3.8 Daily cleanup of the work area is required. Ameren reserves the right to clean up Contractor's area if Contractor is not fulfilling their housekeeping requirements. Any and all costs associated with the cleanup will be deducted from Contractor's base contract.

4.0 EVACUATION

4.1 If there is an emergency, an evacuation announcement may be made over the plant's public address system. The evacuation assembly area shall be communicated during orientation training.

4.2 In the event of severe weather, an announcement to seek shelter may be made over the public address system. The location of the plant tornado shelter shall be communicated during orientation training.

4.3 To report an emergency, contact the Shift Supervisor immediately using the plant's public address system. Do not hang up. Wait for instructions.

5.0 WORKER'S PROTECTION ASSURANCE OR HOLD CARD PROCEDURE

WARNING: Violation of Workers Protection Assurance (WPA) procedures can cause serious equipment damage, personal injury or death.

When WPA is present, verify that equipment is actually de-energized or in the designated state. Always walk down the job, check voltages, temperatures, pressures, etc. to confirm status.

5.1 WPA is Ameren's procedure to tag equipment or systems that have been de-energized or put in a specified state, to allow for service or testing. The energy in a system may be electrical, mechanical, pneumatic, hydraulic, chemical, kinetic or nuclear.

5.2 All employees should receive site-specific WPA training including descriptions of the tags and their functions. Workers must sign on and off WPA protection as directed by their supervisor.

5.3 Contractor/Subcontractor employees shall observe all WPA rules and comply with WPA tags at all times. Never use an elevator that has a WPA card on the call button.

6.0 SUBSTANCE ABUSE

ATTENTION: Employees who refuse to take a drug test or have been found to be non-compliant will be escorted off-site immediately and may be subject to permanent barring from Ameren facilities.

6.1 Possession, and/or use of alcohol or drugs, is STRICTLY PROHIBITED.

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6.1.1 Drugs, stimulants, "pep pills," tranquilizers, and similar substances are allowed only if prescribed by a doctor.

6.2 Ameren's Contractor's Substance Abuse Policy requires pre-employment and random drug testing of Contractor employees.

7.0 HARASSMENT AND WORKPLACE VIOLENCE POLICIES

7.1 Ameren Corporation has a zero-tolerance policy for behavior that is prohibited under Ameren's EEO & Anti-Harassment Policy and Ameren's Workplace Violence Policy Statement. These policies apply to Ameren employees and Contractor/Subcontractor employees.

7.2 Ameren intends that employees, contractors, customers, vendors, and visitors, never feel threatened, intimidated, harassed, offended or demeaned by any individual's actions, presence, conduct, or communication while they are on Ameren property.

7.3 The following behaviors and actions are **STRICTLY PROHIBITED** anywhere on Company property and may result in permanent barring from all Ameren facilities:

- Willful violation of safety rules or safe working practices
- Possession of unauthorized firearms, weapons or explosives and/or materials/components that could be used to make explosive devices
- Damaging, mutilating, or willful abuse of supplies, equipment & tools, vandalism of company property, or property of others
- Gambling or stealing
- Urinating in an undesignated area
- Harassment by anyone and in any form
    - Harassment includes, but is not limited to, unwelcome or unsolicited conduct or hostility based on or directed at a person or group because of race, color, religion, sex, national origin, ethnicity, age, disability, veteran status, pregnancy, marital status, sexual orientation or any other protected factor.
    - Conduct that may be considered offensive, hostile, demeaning, or derogatory, regardless of whether it is physical, verbal, or graphic in nature and whether it is done in person, or delivered via phone, fax, e-mail, text message, over a PA system, company mail, or by any other means.
    - Examples of Prohibited Physical Conduct:
        - → Bullying, wrestling, fighting, horseplay, or spitting on an individual,
        - → Sexual conduct such as rape, sexual battery, molestation, stalking, or attempts to commit such assaults, unwelcome touching, hugging, massaging, etc.
    - Examples of Prohibited Verbal Conduct:
        - → Threatening/intimidating someone (both explicit and implied),
        - → Verbal abuse, jokes, derogatory comments, references, or derogatory slurs of a sexual, racial, ethnic, or religious nature.
    - Examples of Prohibited Non-Verbal Conduct:
        - → Wearing of offensive clothing, hats, patches, etc.
        - → Displaying stickers, drawings, or posters that depict nooses, confederate "Rebel" flags, KKK paraphernalia, swastikas, or magazines, books, pictures or videotapes with sexual content.
        - → Drawing/displaying graffiti, specifically graffiti that is sexual, racial, or otherwise offensive, hostile, demeaning or derogatory to any individual/group or known to incite anger/violence.
        - → Using gestures that are obscene, or known to incite anger/violence.

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7.4 Other behaviors and actions, not specifically set forth in this list, may violate Ameren zero tolerance policies.

8.0 WORKPLACE HAZARDS

8.1 Work near coal dust, fly ash, lime, or ferric/lead paint removal projects can create airborne contaminates. Do not use compressed air to clean surfaces or clothing. Use properly equipped vacuum, wet methods or other approved methods for cleaning.

8.2 All plants have asbestos-containing insulation and building materials (ACM). Treat all suspect materials as if they are asbestos.

8.3 Asbestos abatement projects may be in progress. Barricades will restrict access to areas with abatement projects. Only trained personnel using Personal Protection Equipment (PPE) may handle asbestos.

8.4 Personnel who are medically required to use syringes shall take them home, properly packaged for disposal. Only trained employees using PPE shall handle items contaminated with blood or other body fluids. Report any bloodborne related issues to the SPOC.

9.0 FOREIGN MATERIAL EXCLUSION (FME)

9.1 Foreign Material Exclusion protects critical plant components and systems, from contamination or damage. Systems such as feed water, condensate, steam, oil, and electrical controls and motors may suffer significant damage from foreign materials. See Foreign Material Exclusion Requirements (Appendix X) for additional requirements and details.

9.2 Foreign material contamination can come from sources such as:

- Welding and gas cutting debris,
- Metal chips, shavings and filings,
- Corrosion that produces flakes of metallic substances,
- Cleaning materials, such as shot from blasting, rags & lint,
- Forgotten tools or any material that falls out of worker's pockets,
- Water leaks/spills, cutting fluids, solvents, etc.

9.3 To prevent damage from foreign objects follow these work practices:

- Clean dirt, oil and fly ash from around covers, caps and other devices before opening.
- Remove welding electrodes, stubs and broken flux coating material from internal work areas in closed systems.
- Cover openings on turbines, generators, pumps, pipes, tubes, electrical cabinets/motors and other critical components during maintenance activities.
- Track tools, parts and materials allowed in an FME work area.
- Allow only materials necessary for the task into the work area; do not allow personal items such as jewelry or change.
- Secure all tools, safety glasses, badges, gloves and other loose items with lanyards, tape or other means.
- Catch clippings from cable ties, stripped wires, etc.
- Vacuum or wipe out electrical cabinets after repairs/modifications to remove moisture, metal chips, knockouts, clippings, etc.

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I, the undersigned, have read the Job Working Rules. I have completed site orientation training and I understand:

- The Job Working Rules
- Site-specific instructions, including Worker's Protection Assurance procedures
- Safety requirements

I acknowledge that a violation of any of these provisions will be grounds for immediate removal from Ameren property and I may be subject to permanent barring from all Ameren facilities.

Date _____

Employee Name (Print) _____

Employee Signature _____

Contractor _____

END OF APPENDIX B

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APPENDIX C
DESIGN FOR SAFETY GUIDE

OBJECTIVE

Develop and maintain design guidelines to ensure engineering designs reduce safety risks for construction, operations, and maintenance of equipment and facilities.

These Guidelines reflect Ameren's commitment to incorporate safety into all designs. The designer of record is ultimately responsible for adherence to all governing Federal, State, and Local code requirements.

While attempts will be made to follow the recommendations in this guideline during the engineering phase there will be occasions where conditions and physical constraints may render some recommendations impractical or unattainable.

Several of the Design for Safety recommendations are subjective and can vary from plant to plant (i.e. serviceable access for equipment, pipe labeling, & color coding). Ameren Engineering and contracted consultants must engage plant stakeholders during the design phase to accommodate plant specific safety and operating requirements.

GENERAL FACILITY SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	General Arrangement layouts shall provide for adequate serviceable access for operation, maintenance, and replacement; i.e. personnel access, tool access, cart access, vertical lift access, fork truck access.
☐	☐	☐	Stairs shall not be used as access platforms. No valves, controls, equipment, etc., shall be positioned / designed to be accessed by personnel standing on stairs.
☐	☐	☐	Permanent, well identified and load rated fall protection tie-offs, shall be incorporated into the building structure at removable handrails and access hatchways.
☐	☐	☐	Self-closing swing gates are to be used instead of chains and clips at all personnel access openings for fall protection guarding where the elevated surface is used as a work platform or walkway.
☐	☐	☐	Non-slip "Mebac" ladder rung covers should be used on all fixed access ladders.

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YES	NO	N/A	
☐	☐	☐	All new handrails shall be fabricated utilizing 1 ½" diameter standard pipe rails and posts. Posts shall be spaced a maximum 6'-0 on centers. Rails shall include one (1) top rail (top of top rail shall be 42 inches above walking surface); **two (2) mid rails** *equally spaced to provide increased fall protection*; and a standard 4" high toeboard.
☐	☐	☐	OSHA required clearance to handrails on stairs (3") must be maintained. Structural bracing, electric conduit, or mechanical piping is not located within the required clearance space.
☐	☐	☐	No more than a 3" open gap is maintained between a walking surface and the side of a piece of equipment penetrating the walking surface.
☐	☐	☐	When practical, valves shall be located to allow for ergonomically correct operation.
☐	☐	☐	When practical, provide stairs rather than ladders to equipment, valves, etc. that requires routine access for operations and/or maintenance.
☐	☐	☐	Provide chain wheel operators for valves that cannot be accessed from a permanently installed ladder or platform.
☐	☐	☐	When possible, design stairs with lower angle of stairway rise (6½" R, 11" T). Stair landings are provided every 10 to 12 treads.
☐	☐	☐	When possible, no low mounted equipment, piping, ducting, conduit, etc. in travels paths. No "duck-unders". Use a minimum design head clearance of 7'-0".

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YES	NO	N/A	
☐	☐	☐	All 90 degree corners of structural steel members and plate trimmed / clipped where close to personnel access areas.
☐	☐	☐	Maintenance and replacement access considered when locating lighting fixtures (especially on stairways, over tops of equipment and high overhead locations).
☐	☐	☐	Underground utilities shall be designed and installed with warning and location indicators for future excavations in the areas of buried utilities.
☐	☐	☐	Underground utilities shall be designed and installed at shallowest depth possible (while maintaining freeze protection and surface surcharge loads) to minimize deep trenching hazards.
☐	☐	☐	Thermal protection guarding incorporated into design where required.
☐	☐	☐	Utilize above ground liquid containments or rigid structural underground containment. Avoid below grade lined pits.
☐	☐	☐	Incorporate seismic shut-off valves for gas service lines entering buildings and at meter locations. (Application mostly at non-power plant, off-site buildings / facilities).
☐	☐	☐	Walkways shall be clear of protruding obstructions and bump hazards. No valves, valve stems, valve handles, controls, equipment, etc. shall be positioned / designed within the normal walking path within personnel walkways. If not possible, paint or otherwise safeguard.

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YES	NO	N/A	
☐	☐	☐	Utilize yellow warning striping along edges of personnel walkways to guide / warn walking personnel of potential obstructions, ramps, bump hazards, grade / slope changes.
☐	☐	☐	Provide personnel access to all roofs for inspection and maintenance purposes.
☐	☐	☐	Provide permanent fall protection tie-offs that are well identified, load rated, and incorporated into the building structure on roofs where there are no parapets or guard railing. (Review the need for fall protection tie-offs on specific roof areas on a case-by-case basis).
☐	☐	☐	To eliminate the need for fall protection tie-offs, when practical building roof parapets should be designed high enough to meet OSHA fall protection guarding requirements.
☐	☐	☐	Where possible, roof mounted equipment shall not be designed and installed closer than 15' to open, unguarded edge of roof.
☐	☐	☐	Provide fall protection guarding at edge of roof (without parapet) where roof mounted equipment is installed closer than 15' to open edge of roof.
☐	☐	☐	Provide fall protection guarding on both sides of a fixed roof access ladder onto roofs with no parapet or guard railing.
☐	☐	☐	Provide fall protection guarding or tie-off point at all personnel access roof hatches.

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YES	NO	N/A	
☐	☐	☐	Provide fall protection guarding at roof mounted sky lights (many commercial skylights are available with security grills that will act as fall protection guarding).
☐	☐	☐	Design roof mounted equipment, ducting, and piping with adequate clearance for roof maintenance and replacement. Design clearances shall meet the NRCA recommendations for equipment to roof clearances.
☐	☐	☐	Provide service power for roof mounted equipment.
☐	☐	☐	Eliminate tripping hazards on roofs / floors. No low to roof / floor mounted electric conduits and drain pipes.
☐	☐	☐	Utilize safety balls on lightning protection air terminals. Eliminate impalement hazard of pointed air terminals on roofs.
☐	☐	☐	"Roof slippery when wet" signs shall be installed at all personnel access points onto roofs.
☐	☐	☐	Provide lighting on roofs in areas of personnel access for maintenance of equipment.
☐	☐	☐	Design mechanical / electrical equipment and components to be water tight for wash down cleaning.

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YES	NO	N/A	
☐	☐	☐	Provide the proper quantity and type of fire extinguishers and hose stations.
☐	☐	☐	Provide proper washdown facilities (hose reels, supply pipes, drains) to allow facility cleaning.
☐	☐	☐	Assure proper safety signage is in place (chemicals, hearing protection, etc.).
☐	☐	☐	Assure roof drains are not placed where water will freeze and become a slipping hazard.
☐	☐	☐	Provide ice dams on sloped roofs above doorways and walkways to prevent and/or break up sliding ice.

COMMENTS TO GENERAL FACILITY SAFETY DESIGN:

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ELECTRICAL SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	Walk down conduit and cable tray routes before installation to identify hazards such as tripping, head, thermal, chemical, etc.
☐	☐	☐	The location, cable tray material, and conduit shall be designed for the identified hazards for that specific location.
☐	☐	☐	Place electrical equipment in accessible locations.
☐	☐	☐	Electrical Room Egress: Provide at least two exit paths even if Code allows one exit for "un-occupied space". These spaces frequently become temporary Control Centers during construction, commissioning, and start-up.
☐	☐	☐	Cabinet/enclosures shall be designed to allow sufficient space for maintenance if maintenance to be performed inside the cabinet/enclosure.
☐	☐	☐	Provide sufficient space to allow for cabinet / enclosure access doors to fully open.
☐	☐	☐	Provide sufficient space for electrical equipment as defined by NEC in walkways, area between cabinets, etc. for forklifts, routine maintenance, etc.
☐	☐	☐	All control switches shall be accessible from outside of the cabinet.

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YES	NO	N/A	
☐	☐	☐	Provide the manufacturer's recommended spacing for equipment cooling.
☐	☐	☐	Obtain arc flash incident energy level and labels for any equipment rated 480V and higher or greater than 125KVA at 120VAC & above per NFPA 70E.
☐	☐	☐	Consider extra guarding of high voltages (Plexiglas) in electrical cabinets to reduce PPE requirements.
☐	☐	☐	Switchgear shall be specified to provide "Lock Out" capability.
☐	☐	☐	Equipment shall be designed for the ratings for which it will be subject to (i.e., maximum voltage, short circuit current, continuous current, ambient temperature, etc.).
☐	☐	☐	Equipment, cable, conduit, tray, etc. shall be labeled with the voltage level.
☐	☐	☐	Equipment shall be labeled with normal power feed and backup power feed (if applicable).
☐	☐	☐	Consider backup power feed for systems where failure of normal power feed would result in a hazardous event.

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YES	NO	N/A	
☐	☐	☐	Label all equipment with appropriate equipment description (if applicable).
☐	☐	☐	When possible, critical conduits shall be installed in a duct bank rather than direct buried.
☐	☐	☐	Control cabinets and wiring termination cabinets shall be accessible from platforms or at grade level. Ladders shall be avoided.
☐	☐	☐	Provide fall protection tie-off points at tops of transformers.

COMMENTS TO ELECTRICAL SAFETY DESIGN:

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MECHANICAL SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	Walking or climbing surfaces are sheltered or maintained in a manner to avoid slippery surfaces from rain or ice. (Review on a case-by-case basis).
☐	☐	☐	Emergency drainage systems are provided to direct flammable liquid leakage to a safe location.
☐	☐	☐	Provide eye wash stations at locations where liquids are sampled or "open fluids" are otherwise handled.
☐	☐	☐	Stairs, ladders, or ramps are provided at all locations where equipment design or maintenance actions require personnel to abruptly change elevation by more than 12 inches.
☐	☐	☐	Fixed ladders designed with a slope of 75 degrees or more where practical.
☐	☐	☐	Whenever practical, provide adequate access for maintenance personnel to all mechanical components, small-bore piping, ducts, valves, thermowells, flow meters and other appropriate instrumentation on piping runs and equipment units which require inspecting, testing, servicing, adjusting, greasing, removal, replacement, or repair.
☐	☐	☐	When practical, locate instruments, sample points, valves, etc. that require frequent readings, calibration, operation, etc. to allow for walk-up access.

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YES	NO	N/A	
☐	☐	☐	Specify equipment to include handling features that will aid in grasping, removing, and carrying equipment.
☐	☐	☐	Labeling and coding is provided for service and adjustment points to clearly identify the key aspects of the maintenance activity.
☐	☐	☐	Equipment and components shall be labeled with weights for lifting and removing for later maintenance or replacement. When modifying existing equipment, determine the weight of the existing equipment plus modifications and label or revise the existing labels accordingly. When possible, the label shall include references to the calculation, project, and/or drawing number.
☐	☐	☐	Provide lifting devices (lifting lugs, beams, monorail, etc.) for maintenance and replacement of equipment. Lifting devices shall be labeled with the rated lifting capacity.
☐	☐	☐	Provide Indicators for convenient and reliable determination of fluid levels.
☐	☐	☐	Drain fittings are provided to support fluid removal readily and safely.
☐	☐	☐	Ensure design basis application for failure modes on all positioned equipment. Example, loss of air, loss of DC, etc.
☐	☐	☐	Standardize parts, maintenance and adjustment points as much as possible. For example, use the same size and type of bolts to eliminate special wrenches/tools. Utilize common rigging points to minimize types of rigging connections, etc. If standardization is not possible, clearly differentiate specialized items with signs, markings, etc.

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YES	NO	N/A	
☐	☐	☐	Minimize steam hazards, heat hazards, sharp corners, edges, and projections on equipment.
☐	☐	☐	Equipment should be placed on concrete housekeeping pads, especially where standing water might accumulate.
☐	☐	☐	Add equipment protection features to guard against hazards that cannot be removed or designed out of the system.
☐	☐	☐	Specify that equipment vendor technical manuals deal with one specific equipment model rather than with many different equipment models.
☐	☐	☐	Valves shall be provided with "Lock Out" devices.
☐	☐	☐	Provide adequate isolation valving and venting for WPA, maintenance, etc. on piping systems and equipment. Follow applicable code/standard section requirements.

COMMENTS TO MECHANICAL SAFETY DESIGN:

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CHEMICAL SAFETY DESIGN

YES	NO	N/A	
☐	☐	☐	Insure that bulk chemical tanks have separate containment areas. Containment areas shall be washable and have the ability to be drained.
☐	☐	☐	All materials used to construct storage tanks, containment, piping, etc. must be verified to be compatible for use with the chemicals used in each specific application.
☐	☐	☐	Lengths of chemical piping runs should be minimized. Chemical supply tanks and pumps should be designed to be as close to injection points as possible. Overhead chemical piping runs should be minimized. When used, labels shall be affixed to the floor beneath the piping with proper hazard communication. Chemical lines must be labeled a minimum of every 10 feet. All PVC/CPVC chemical piping must be protected from foot traffic.
☐	☐	☐	Chemical day tanks shall be properly sized to minimize the number of drums in the work area.
☐	☐	☐	Designate storage areas for each type of chemical, taking into account compatibility of each.
☐	☐	☐	Provide sufficient room for servicing instruments around bulk chemical storage tanks.
☐	☐	☐	Drains to sump shall be located around all chemical feed equipment. Local wash down water must be provided in chemical feed area. Include hose and hose reels for local wash down water.

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YES	NO	N/A	
☐	☐	☐	All laboratory areas must contain proper first-aid kit(s).
☐	☐	☐	Material for chemical spill control (pigs, pads, soda ash, etc.) shall be located in a designated area close to chemicals.
☐	☐	☐	Personal protective equipment shall be located in a designated area close to chemicals.
☐	☐	☐	Chemicals shall be transferred to equipment (mixing tanks or day tanks) in a way to minimize chances of contacting personnel and avoid manual dumping of bottles and drums.
☐	☐	☐	Chemical containers must be labeled with chemical names and HAZCOM placards.
☐	☐	☐	All safety showers shall be supplied with tepid water. Safety showers located outside shall also be covered and protected from the wind. Safety shower activation shall signal an alarm in the control room.
☐	☐	☐	All concrete and equipment exposed to chemicals shall be coated with an appropriate chemical-resistant coating.
☐	☐	☐	PA shall be located convenient to all chemical use areas, but beyond the area that could be engulfed by a chemical spill.

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YES	NO	N/A	
☐	☐	☐	Operating and Maintenance personnel shall be isolated from all chemical pumps and feed systems by plastic screens or curtains.

COMMENTS TO CHEMICAL SAFETY DESIGN:

END OF APPENDIX C

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APPENDIX D
STANDARD CONTRACTOR SCHEDULING REQUIREMENTS

1.0 PRE-BID/AWARD REQUIREMENTS

1.1 Contractor bids shall be rejected if they are not accompanied by a schedule. The scheduling tool shall be Primavera Enterprise (P6) unless otherwise authorized by Ameren Construction managing supervisor in writing.

1.2 Contractor's bid schedule shall reflect sufficient level of detail that effectively communicates the methodology of work/execution plan. The bid schedule shall be defined in compliance with the milestones, project constraints and deliverables required by Ameren.

1.3 Contractor shall indicate the calendar of their work schedule (days/week, shifts/day, hours/day) that is the basis for their schedule.

1.4 Contractor shall identify projected manpower required to execute project and shall also provide an assessment of labor availability based on prevailing market conditions.

1.5 Contractor shall identify the hierarchy of their project management team, including an organization chart of how they report to the Project Manager and how they report into the project management system.

1.6 The individual responsible for updating the Contractor's schedule shall be identified in the bid along with a personal resume.

1.7 Contractor's bid shall list any exceptions to the standard schedule requirements.

2.0 PRE-OUTAGE REQUIREMENTS AFTER AWARD

2.1 Contractor's point of contact for schedule submittals/updates will be the Ameren Project Scheduler. All schedule iterations and revisions shall be coordinated and approved through the Project Scheduler.

2.2 Contractor shall be required to organize the schedule according to requirements specified by Ameren's Project Scheduler, and shall include a work breakdown structure (WBS) that follows the provided sample schedule to facilitate schedule review and reporting.

2.2.1 Contractor shall develop their resource loaded schedule using Ameren's outage planning milestones within two weeks following contract award date. During this time frame, the Contractor and Project Scheduler will collaborate to develop a mutually acceptable schedule. Contractor's schedule will then be installed in the Ameren network to be used as the working schedule during pre-outage, outage execution and post outage.

2.2.2 Contractor is required to provide an onsite scheduler to provide updates to Ameren Project Scheduler for scheduling progress once installed in Ameren network.

2.2.3 Ameren will provide onsite network access to Contractor for scheduling review.

2.2.4 Ameren will make milestone to milestone ties, and other appropriate relationship ties between Contractor schedule and Ameren integrated outage schedule.

2.3 Contractor baseline shall be established after both Contractor and Project Scheduler mutually agree on schedule. This will be completed before the start of the outage. In accordance with outage planning milestones, the baseline schedule shall be compared to the actual schedule during the course of the outage.

3.0 OUTAGE EXECUTION/SUPPORT REQUIREMENTS

3.1 Contractor shall provide an onsite scheduler, unless otherwise authorized by Ameren, to provide updates to the Project Scheduler. Contractor scheduler will provide the following update information:

3.1.1 Activities worked on

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3.1.2 Actual durations and resources used

3.1.3 Remaining durations

3.1.4 Percent complete

3.1.5 Expected finish dates

3.2 Contractor shall update/analyze the schedule daily. The schedule shall provide accurate reflection of progress throughout the outage. Schedule analysis should include risk management strategies to assure that outage milestones are achieved.

3.3 Contractor shall provide updates to Project Scheduler daily by 8:00 a.m. Several iterations of schedule edits/updates may be required before the Contractor's schedule may be scheduled with the integrated outage schedule. Ameren's Project Scheduler will analyze all schedules together with the integrated outage schedule and will post the updated integrated outage schedule to outage home page by 1:30 p.m.

3.4 Contractor will supply and develop activities, resources and associated project logic for added EWO work within one day of award of contract. Ameren will update Contractor with EWO work.

3.5 Ameren Project scheduler will inform the Contractor scheduler or single point of contact, Ameren engineering and responsible plant personnel of any high-risk activities that may impact the outage schedule and milestones on the Integrated Outage Schedule as required.

3.6 If Contractor progress is not meeting or will not meet the outage milestones, Ameren will require Contractor to participate in a re-evaluation of remaining work to ensure that milestone dates will be met for outage.

4.0 POST-OUTAGE SCHEDULE REQUIREMENTS

4.1 Contractor shall attend post-outage critique meetings that include a review of schedule performance.

END OF APPENDIX D

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APPENDIX E
SAFETY DATA SHEETS
CONTRACTOR AFFIDAVIT PURCHASE ORDER NO.

As the responsible party for the firm of _____, I do here state that I have requested, received, read, understand, and will abide by and enforce the guidelines and conditions set forth in the Safety Data Sheets (SDS) provided by the product manufacturer for each hazardous chemical product delivered to and/or used in connection with the work specified in _____. I further state that I have the most current copy of the SDS for each hazardous chemical my firm has brought on site.

I further state that I am aware of, understand, and will fully implement the requirements of the OSHA Hazard Communication Standard (CFR 29, Part 1910.1200) and other workers' right-to-know laws.

I further state that I understand that Ameren maintains copies of SDS's on chemical substances at this facility. If any question arises regarding any chemicals to which employees may come into contact, an SDS on that chemical shall be reviewed. A copy of the SDS's is available from the Ameren SPOC.

I further state that I will maintain copies of the required SDS for each hazardous chemical used while on Ameren property; and will insure that the Safety Data Sheets are readily accessible during each work shift to employees when they are in their work areas.

I further state that the information contained within the SDS has been disseminated to all parties who have a right or need to know; and that all workers and other effected parties have received adequate and appropriate training in the hazards, handling, and use of hazardous chemicals.

_____ _____
Contractor's Representative/Title Date

_____
Notary Public Signature & Seal

END OF APPENDIX E

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APPENDIX F
LEADED PAINT DISTURBANCE

NOT USED FOR THIS PROJECT

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APPENDIX G
ASBESTOS REMOVAL

NOT USED FOR THIS PROJECT

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APPENDIX H
FEDERAL ENERGY REGULATORY COMMISSION (FERC) STANDARDS OF CONDUCT

NOT USED FOR THIS PROJECT

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APPENDIX I
CHEMICAL OF INTEREST REPORTING

NOT USED FOR THIS PROJECT

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APPENDIX J
VENDOR DRAWING TRANSMITTAL/CAD REQUIREMENTS

NOT USED FOR THIS PROJECT

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APPENDIX K
PLANT ACCESS, PARKING & SECURITY

1.0 Plant Access, Parking and Security

1.1 Contractor employees, visitors and vendors must enter the plant *only* at the entrance where their company name is posted. Security cameras monitor entrances to inform supervisors of violations.

1.2 Security will direct contractor employees to work rules training the first time employees report to the site.

1.3 Employees must document their completion of site specific work rules training before they are allowed unescorted access to the site.

1.3.1 Computer Based Training (CBT) is typically used for work rules orientation and to document training.

1.3.2 Contractor employees must read and sign a hard-copy of the Job Working Rules if an orientation video or oral presentation is used for training.

1.3.3 If alternative training has been used due to a temporary CBT malfunction, then employees must take the CBT training when the system is restored.

1.4 Contractor's Employee Identification

1.4.1 Ameren Contractor ID badges containing the Contractor employee's name and Contractor ID number are issued when work rules training is completed.

1.4.2 Security will re-activate an existing badge if the employee has completed the site work rules orientation within the last 12 months.

1.4.3 Security will de-activate badges at the end of each job.

1.4.3.1 Contractor shall inform the Single Point of Contact (SPOC) when employees will complete their work on the site using the Reduction in Force Report (Attachment A7).

1.4.4 Daily gate logs will be used to validate invoices and may be provided to the Contractor upon request. If the plant has electronic badge readers, employee arrival and departure times are automatically recorded.

1.4.5 Contractor shall provide employees with hard hats of the same color. The hard hats must have Contractor's name or company logo on either the sides or the front of the hard hat.

1.4.6 Security will apply labels with the employee's first and last names to the front and back of each hard hat.

1.4.7 Contractor may provide a hard hat storage container at the Construction gate. PPE is required to access the site.

1.5 Contractor Access

1.5.1 Business agents, vendor/sales representatives, contractor executives and other contractor visitors shall park in the construction parking lot and be escorted on-site.

1.5.2 Consultant badge holders may park in either the construction parking lot or the Ameren employee parking lot visitor space, depending on the purpose of the visit.

1.5.3 A contractor employee who has completed CBT/Work Rules training may escort visitors and ensure Ameren work rules are followed.

1.5.4 Contractor visitors are issued a Visitor's badge and are required to wear a hard hat and safety glasses.

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1.6 Vehicles Beyond the Security Gate

1.6.1 Only contractor work vehicles with an Ameren mirror tag are permitted beyond the security gate. Contractor can request a mirror tag for vehicles necessary to complete the Work by submitting an Authorization for Site Vehicle Pass form.

1.6.1.1 Vehicles must have Contractor name or Logo on each side and must have an insurance certificate verifying $1,000,000.00 minimum liability coverage.

1.6.1.2 Contractor work vehicles, commercial vehicles, or contract carrier vehicles without a mirror tag will be held at the gate until cleared by the SPOC.

1.6.2 Vehicle drivers and all passengers must swipe/sign-in at the construction gate.

1.6.3 Contractor vehicles leaving the plant will be inspected by Security.

1.6.3.1 Tools and materials being removed on Contractor vehicles must have an Ameren Material Pass (Form 5532NS) signed by the SPOC and a Contractor supervisor for Security to retain.

1.7 Use of Plant Facilities

Note: The policies are on Scholar, the Ameren intranet. Go to *Employee Center, Corporate Policies, Policies by Topic, Technology*.

1.7.1 Contractors who have Ameren computers, phones and fax machines are "Privileged Users" and must comply with the following policies.

- Electronic Mail Policy
- Facsimile Machine Usage Policy
- Information Resources Acceptable Use Policy
- Internet/Intranet Usage Policy
- System Access Control Policy
- Wireless Communication Policy

1.7.2 Work areas must be restored to a condition that is approved by the SPOC.

END OF APPENDIX K

Ameren MISSOURI

APPENDIX L
CYBER SECURITY

NOT USED FOR THIS PROJECT

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APPENDIX M
HAULING HEAVY EQUIPMENT

NOT USED FOR THIS PROJECT

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APPENDIX N
PIPE AND FITTINGS: APPROVED MANUFACTURER LIST

NOT USED FOR THIS PROJECT

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APPENDIX Q
QUALITY MANAGEMENT OVERSIGHT APPLICATION AID

NOT USED FOR THIS PROJECT

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APPENDIX R
RADIOGRAPHY SAFETY REQUIREMENTS

NOT USED FOR THIS PROJECT

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APPENDIX W
WELDING AND NDE

NOT USED FOR THIS PROJECT

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APPENDIX X
FOREIGN MATERIAL EXCLUSION REQUIREMENTS

NOT USED FOR THIS PROJECT

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APPENDIX Z
CONFINED SPACE LOCATIONS

NOT USED FOR THIS PROJECT

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APPENDIX AA

BID FORM

MEREDOSIA ASH POND CLOSURES

AT

MEREDOSIA ENERGY CENTER
MORGAN COUNTY, ILLINOIS

FOR

AMEREN ENERGY MEDINA VALLEY COGEN, LLC
800 South Washington Street
Meredosia, IL 62665

DATE _____, 2016

BIDDER

FIRM _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE NO (with AREA CODE) _____

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BASE BID

The scope of **BASE BID** shall include all work included in the Plans and Specification as outlined on this bid form.

Having examined all Bidding Documents, including the Request for Quotation, and Plans and Specification prepared by Geotechnology, Inc. and CDG Engineers, Inc. for the project entitled above dated 04-29-2016 and having visited the site and examined all conditions affecting work, the undersigned proposes to furnish all labor, materials, equipment, and appliances required by said work for a Stipulated Sum of:

BASE BID:

_____ DOLLARS (_____)

For purposes of progress payment submittals only, this base bid can be divided as follows:

Ash Pond Closure	Quantity	Unit	Total Cost
Mobilization/Demobilization	1.0	LS	$
Erosion and Sediment Control Measures	1.0	LS	$
Surface Water Management	1.0	LS	$
Clearing and Grubbing	1.0	LS	$
Removal of Improvements	1.0	LS	$
Earthwork (Ash)	427,216	CY	$
Earthwork (Borrow)	167,076	CY	$
Earthwork Misc. Grading (Ditches, Swales, etc)	5,943	CY	$
ClosureTurf™	42.8	AC	$
HydroTurf™	3.4	AC	$
Energy Dissipators	317.0	CY	$
Remove and Re-use Existing Rock Blanket	3,386.0	CY	$
Rock Blanket	1,145.0	CY	$
Dewatering	1.0	LS	$
Aggregate Access Road (6" thick)	156	CY	$
Aggregate Access Road (24" thick)	2873	CY	$
Seeding and Mulching	33.0	AC	$
Chain Link Fence	995.0	LF	$
30' Wide Gate	1.0	EA	$
Other / Misc.	1.0	LS	$
Utility Allowance (Local Utility)	1.0	AL	$ 60,000
		TOTAL	$

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SUBCONTRACTOR INFORMATION

The Contractor shall list all Subcontractors that he proposes to use.

SUBCONTRACTOR: _____

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

WORK: _____

SUBCONTRACT AMOUNT: $_____

SUBCONTRACTOR: _____

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

WORK: _____

SUBCONTRACT AMOUNT: $_____

SUBCONTRACTOR: _____

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

WORK: _____

SUBCONTRACT AMOUNT: $_____

LABOR AND EQUIPMENT RATES FOR TIME AND MATERIAL WORK

Provide on the following pages labor and equipment rates for miscellaneous work on Ameren Energy Medina Valley Cogen, LLC property at the Meredosia Energy Center as directed by the Owner.

Use of equipment included on the Small Tools Reference List shall be considered incidental to the labor and equipment rates provided.

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TIME AND MATERIAL LABOR RATES

EXPIRE _____

	S.T.	T.H.	D.T.
Carpenter/Millwright			
Apprentice			
Journeyman			
Foreman			
General Foreman			
Laborer			
Apprentice			
Journeyman			
Foreman			
General Foreman			
Cement Mason			
Apprentice			
Journeyman			
Foreman			
General Foreman			
Ironworker (Rebar)			
Apprentice			
Journeyman			
Foreman			
General Foreman			
Operator			
Apprentice			
Journeyman			
Foreman			
General Foreman			
Ironworker (Structural)			
Apprentice			
Journeyman			
Foreman			
General Foreman			

Material Mark-up _____
Subcontractor Mark-up _____
Equipment Mark-up _____

Ameren MISSOURI

BARE EQUIPMENT RATES

EXPIRE _____

	Daily	Weekly	Monthly
Compactors/Tampers			
Compactor (Plate Tamper)			
Compactor (Jumping Jack)			
Concrete Breaking & Drilling			
Jack Hammer (60-90#)			
Chipping Hammer			
Hel Dog			
Rock Drills (45# & Over)			
1 - 1/2" Hammer Drill			
Concrete Placing Equipment			
Concrete Bucket (1CY)			
Concrete Bucket (2CY)			
Concrete Buggy (Power)			
Concrete Power Trowel (36")			
Concrete Vibrator			
Concrete Vibrator High Cycle			
Concrete Vibrators Air			
Concrete Saws			
Concrete Chain Saw			
Hand Held Cut-Off-Saw			
K40 Hand Held Air Saw			
K50 Walk Behind Air Saw			
14" Walk Behind			
36" Walk Behind			
Drills - Electric			
Core Drill			
Magnetic Drill			
Engineering and Alignment Equipment			
Engineers Level (Including Rod)			
EL-1 Electronic Level (Rotating)			
Level (Self Leveling)			
Transit			
Laser Alignment			
Generators			
Electric Generator Up To 3500 Watts			
Hi-Cycle 3500 Watt Generator			

Ameren MISSOURI

	Daily	Weekly	Monthly
Heavy Equipment			
Bobcat			
Gehl GX35 Hoe or equivalent			
John Deere 650G Dozer or equivalent			
Cat 426 Backhoe (4WD)(416B) or equivalent			
Ford 655A Backhoe or equivalent			
Long-Arm Crawler Excavator			
Backhoe Mounted Hydraulic Breaker			
Backhoe Mounted Auger			
Backhoe Mounted Compactor			
Track Skid Steer			
Gradall/Lull/Lift			
Trackhoe			
Flatbed Truck			
Pick-up			
Hoists			
Air Tugger			
Electric Chain Hoist			
3 Ton Chain Hoist			
Miscellaneous Equipment			
Light Plant			
Gang Box (Security Box)			
Port-a-Power			
Radio			
Radio Repeater			
Pumps			
Pump with 20' suction & 50' discharge			
3" Gas			
4" Gas			
6" Gas			
Pump Only			
3" Gas			
4" Gas			
6" Gas			
2" Submersible			
3" Submersible			
4" Submersible			
Safety			
Breathing Air Equipment			
Tripod Safety Hoist			

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	Daily	Weekly	Monthly
Shoring			
Shoring 11' -6 x 8" Panel (Krings)			
Shoring 14" Beams (Each)			
Trailers			
Large (Office)			
Small (Office)			
Work or Change Trailer			
Welders			
110 Wire Feed Welders			
Gas Welder			
Electric Welder			
Additional Equipment Required to Complete the Work			

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FIRM: _____

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

TELEPHONE NO. (with AREA CODE) _____

AUTHORIZED SIGNATURE: _____

TITLE: _____

DATE: _____

ATTACHMENT G

SEE LARGE FORMAT MAP OR PLAN SHEET

DOCUMENT DESCRIPTION:

Tie #:	Batch #W006012
Document ID #:	2833912
Site #:	W137030 0005
Site Name:	Ameren Energy - Meredosia
Cat #:	06L
Document Date:	08/15/2016
Permit #:	
Log #:	
Keyword:	
Comment:	

	Type or Description of Plan/Drawing	SEE COLOR	Date of Plan	Figure/Diagram
1.	Plant Vicinity Map	Y	8/12/16	T-002
2.	Title Sheet	Y	8/12/16	T-001
3.	Site Index Map	Y	8/12/16	C-101
4.	General Notes	N	8/12/16	T-003
5.	Site Plan	Y	8/12/16	C-102
6.	Site Plan	Y	8/12/16	C-103
7.	Site Plan	Y	8/12/16	C-104
8.	Site Plan	Y	8/12/16	C-105
9.				

IL 532-2702
LPC 602 5/2008

SEE LARGE FORMAT MAP OR PLAN SHEET

DOCUMENT DESCRIPTION:

Tie #:	Batch #W006012
Document ID #:	2833912
Site #:	W1370300005
Site Name:	Ameren Energy - Meredosia
Cat #:	06L
Document Date:	8/15/16
Permit #:	
Log #:	
Keyword:	
Comment:	

	Type or Description of Plan/Drawing	SEE COLOR	Date of Plan	Figure/Diagram
1.	Site Plan	Y	08/12/16	C-106
2.	Site Plan	Y	8/12/16	C-107
3.	Site Profile	N	8/12/16	C-110
4.	Profiles	N	8/12/16	C-111
5.	Details	Y	8/12/16	C-301
6.	Details	Y	8/12/16	C-302
7.	Details	Y	8/12/16	C-303
8.	Details	Y	8/12/16	C-304
9.				

IL 532-2702
LPC 602 5/2008

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SEE LARGE FORMAT MAP OR PLAN SHEET

DOCUMENT DESCRIPTION:

Tie #:	Batch #W006012
Document ID #:	2833912
Site #:	W1370300005
Site Name:	Ameren Energy - Meredosia
Cat #:	06L
Document Date:	8/15/16
Permit #:	
Log #:	
Keyword:	
Comment:	

	Type or Description of Plan/Drawing	SEE COLOR	Date of Plan	Figure/Diagram
1.	Details	N	8/12/16	C-305
2.	Drainage Area Map	Y	8/12/16	C-601
3.	SWPPP Plan	Y	8/12/16	C-602
4.	SWPPP Details	N	8/12/16	C-603
5.				
6.				
7.				
8.				
9.				

IL 532-2702
LPC 602 5/2008

Exhibit 6

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W1370300005
06L

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
BRUCE RAUNER, GOVERNOR ALEC MESSINA, DIRECTOR

March 8, 2017

Mr. Mike Bollinger, Principal Environmental Scientist
Ameren Services
1901 Chouteau Avenue
P.O. Box 66149, MC 602
St. Louis, Missouri 63166-6149

IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

APR 24 2017

REVIEWER: JMR

Dear Mr. Bollinger;

This transmittal responds to the AmerenEnergy Medina Valley Cogen, LLC (Ameren) supplemental data and responses received at the Illinois Environmental Protection Agency ("Agency") headquarters, dated February 6, 2017, which amends the "Closure Plan: Fly Ash Pond and Bottom Ash Pond, Meredosia Power Station". The Agency has reviewed the additional data and responses Ameren provided, and finds that the document adequately addresses the Agency's comments dated November 1, 2016.

The Agency notes that Ameren has committed to submitting a signed groundwater management zone ("GMZ") application upon the Agency's approval of the Meredosia Station Closure Plan which includes the initial plan dated August 15, 2016 as modified by the supplemental information dated February 6, 2017. The Agency hereby approves the Closure Plan for the Meredosia Station. The Agency will acknowledge approval of the signed GMZ application under separate cover.

Thank you for your attention to these matters. If you have any questions or concerns, please contact Lynn Dunaway of my staff or me at the letterhead address or 217/785-4787.

Sincerely,

William E. Buscher

William E. Buscher, P.G.
Supervisor, Hydogeology and Compliance Unit
Groundwater Section
Division of Public Water Supplies
Bureau of Water

CC: Lynn Dunaway
Darin LeCrone
Records

Exhibit 7

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W1191050002
06L

SMARTER SOLUTIONS

EXCEPTIONAL SERVICE

VALUE

CLOSURE PLAN
VENICE POWER PLANT ASH PONDS 2 & 3

Venice Power Plant
Venice, Illinois

Project No: 1949

February 4, 2011

NATURAL RESOURCE TECHNOLOGY

ENVIRONMENTAL CONSULTANTS

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NATURAL RESOURCE TECHNOLOGY
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CLOSURE PLAN, VENICE POWER PLANT ASH PONDS 2 & 3

VENICE POWER PLANT
VENICE, ILLINOIS

Project No. 1949

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1 INTRODUCTION

1.1 Overview

Union Electric Company d/b/a Ameren Missouri (hereafter referred to as Ameren) operated two on-site coal ash impoundments (Ponds 2 and 3) south of the Venice Power Plant in Venice, Illinois. Coal ash from the power plant was sluiced to the ponds from the 1950's until the late 1970's, when the last of the coal-burning units at the plant was converted to burn oil. Oil ash, process wastewater, and storm water continued to be pumped to the ponds from 1977 until 1999, and storm water and process wastewater were routed through the ponds until 2005. The ponds have not been used since 2005, when a new storm water and process wastewater treatment system was constructed immediately north of the ash ponds.

Ameren is proposing to close the Venice ponds in place, following an approach that will generally conform to regulatory provisions adopted by the Illinois Pollution Control Board concerning the closure of a coal ash impoundment in Hutsonville, Illinois (35 IAC 840 et seq.). Sections 1 through 4 of this closure plan follow the structure for a closure plan listed in those rules. Table 1-1 lists specific closure plan elements prescribed in 35 IAC 840.130 and sections within this closure plan where those elements are addressed.

This closure plan also includes elements from 35 IAC 840 that would not otherwise be included in the closure plan, in order to document Ameren's intent to close the Venice ponds consistent with the rule. Therefore, Section 5 of this closure plan describes post-closure maintenance of the cover system following an approach similar to 35 IAC 840.136, the elements required for a post-closure care plan (840.138 and 840.140), and descriptions of the elements that will be incorporated into the final cover construction and closure report (840.134), post-closure report (840.142).

A schedule for implementation and completion of these activities is provided in Section 6.

1.2 Site Map

The Venice ash impoundments (hereafter referred to as the Venice ponds) are located in St. Clair County (the power plant property straddles the border between Madison and St. Clair counties), Township 2 North, Range 10 West, Section 2 (Figure 1-1). The ash ponds are bounded to the north by the Venice power plant, to the east by property owned by Norfolk Southern Rail, to the south by property owned by Terminal Rail Road Association, and to the west by the Metro East Sanitary District's flood control levee for the Mississippi River. The property on which the levee exists and the adjacent Mississippi River bank are owned by Ameren. A map of the site layout is provided as Figure 1-2. This map identifies all

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pertinent features (e.g., the Mississippi River and levee), buildings, the ash impoundments, and all existing wells.

1.3 Site Description

Materials managed in the Venice ponds included coal fly and bottom ash, oil fly ash, and low-volume wastes associated with generation of electric power. All materials managed in the ponds were generated at the Venice Power Plant.

The ponds occupy a combined area of approximately 58 acres with each being roughly the same size. The estimated volume of material in the ponds is 1,425,000 cubic yards with an average depth of 30 feet in Pond 2 and 26 feet in Pond 3. Both ponds are unlined, consistent with industry practice of the time of their construction in the 1950's.

As part of closure planning, the structural integrity of the ponds was evaluated. This evaluation included the proposed final cover and related grading plan. The results of this evaluation demonstrate that the proposed topographic configuration of the ponds and final cover meet or exceed the relevant stability criteria specified in 35 IAC 811.304. Further details regarding this evaluation are provided in Section 4.2.

1.4 Description of Closure Activities

1.4.1 Final Cover

The Venice ponds are dewatered. They have been cleared of vegetation and re-graded in accordance with the proposed storm water management plan (Section 4.3). A geosynthetic cover will be placed over the re-graded ash, consisting of (from bottom up) a 40-mil polyvinyl chloride (PVC) geomembrane; a geocomposite drainage layer, consisting of a high-density polyethylene geonet with geotextile adhered to the top and bottom of the net, to drain infiltrated surface water; and a 3 foot thick protective soil layer. The protective layer will have 2.5 feet of rooting zone soil and 6 inches of topsoil to support the establishment of vegetation to minimize erosion and exposure of the geosynthetics. This cover design meets the requirements of 35 IAC 811.314, and provides a barrier to infiltration and subsequent generation and release of leachate. The cover system will extend to the levee on the west, with the exact extent subject to approval by the US Army Corps of Engineers, and will extend across the north berm. The cover system will extend to, but not cross, the east and south berms. The Illinois Department of Transportation (IDOT) is constructing an access road along the east side of the Venice ponds to their Mississippi River Bridge (I-70) project located just to the south of the ash ponds. The cover will be terminated along side of this access road, rather than crossing it, since it will be constructed after IDOT's

access road is completed and while they are using the road to access the bridge project. The south berm will be left intact to prevent runoff of storm water off site to the south and avoid contributions to potential flooding within this area, which is a closed depression.

1.4.2 Storm Water Management

The south and east berms are located immediately adjacent to the property boundary, and there is no property outside of the ash ponds to the east and south for managing storm water runoff from the cover. Due to insufficient grade and concerns for erosion of the levee, Ameren is unable to direct storm water runoff from the cover to the west. Managing storm water runoff from the cover north of the ash ponds would result in an unacceptable impact to Ameren's operations. As a result, there is no feasible option for draining storm water off the cover. Therefore, storm water derived from precipitation falling onto the cover will be routed toward two low areas designed into the north and south ends of the cover and pumped from these locations over the levee to the Mississippi River. The cover will be graded such that there is no off-site contribution, or run-on, of storm water from areas outside of the ash ponds.

1.5 Description of Groundwater Management Zone

In March 2010, Ameren presented to IEPA for approval the establishment of a groundwater management zone (GMZ). Subsequent to the March 2010 presentation, Ameren attempted to negotiate an access agreement with the property owner to the south; however, the terms requested by the property owner were not practical for a long-term monitoring and compliance program. In February 2010, Ameren notified IEPA that an impasse had been reached and IEPA agreed that a GMZ confined to the property boundary could be an alternative approach. The revised GMZ is illustrated on Figure 1-3, and mapped in detail in Appendix L. The legal description for the GMZ is as follows:

> A tract of land situated partly in the County of Madison and party in the County of St. Clair, State of Illinois, located in Southwest Quarter (SW¼) of Section 36, Township 3 North Range 10 West and Section 1, Township 2 North Range 10 West of the Third Principal Meridian, more particularly described as follows: Starting at a point which is marked by an Old Iron Pin in the Northwest corner of U.S Survey 623 which has Illinois State Plane coordinates of N 52868.31 E 55930.60, is the Point of Beginning;
>
> Thence 1,342.7 ft. S 26°58'50"E to a point that is on the line between U.S. Survey 623 and 764, thence 1,980.7 ft. S 23°02'58"E to a point , thence 84.5 ft. S48°09'30"W to a point which is the intersection of the east line of Lot 100, as shown and described on a plat prepared by Julius Pitzman, City Surveyor of St. Louis, Missouri, and filed for record in Plat Book "H", Page 31 , of the records of St. Clair County, Illinois, and U.S. Survey 764, said point having an Illinois State Plane coordinate of N 49792.782 E 57252.320,, thence 290.84 ft. S48°24'34"W to a point which is the

southwest corner of US Survey 764, thence 1,634.28 ft. S 77°11'49"W to the east shore line of the Mississippi River, thence following the east shore line of the Mississippi River in a northerly direction to a point that is 3,556.4 ft. N07°5'19"W of the last described point and 934.1 ft. S 83°45'07"W from the Northwest corner of U.S Survey 623 (point of beginning); thence 840.8 ft. N 68°00'47"E to a point, thence 259.98 ft. S 34°55'54"E back to the point of the Point of Beginning. Said parcel containing approximately 104 +/- acres at normal river stage.

Groundwater within the GMZ discharges to the Mississippi River. Ameren understands that none of the groundwater impairments associated with the Venice ponds significantly impact water quality within the Mississippi River as discussed below in Section 2.4.2.

2 HYDROGEOLOGIC INVESTIGATION

2.1 Background

Hanson Engineers performed a hydrogeological assessment of Venice ponds 2 and 3 in 2000 (Appendix A). Activities included installation of groundwater monitoring wells, characterization of hydrogeology, and characterization of groundwater quality near the ponds. That assessment was performed while the ponds were active for storm water management at the power plant. The ponds were removed from service in 2005 and have received only precipitation since that time.

In 2009 a supplemental hydrogeologic assessment was performed by Natural Resource Technology, Inc. (NRT) to supplement the work of the Hanson report and to characterize groundwater quality near the ash ponds. Activities included collection of groundwater grab samples beyond the limits of the existing monitoring well network to define the vertical and horizontal extent of groundwater impacts associated with the ash ponds, a potable well survey, and fate and transport modeling. The results of the NRT investigations were presented in a series of Technical Memorandums:

- Technical Memorandum No.1 "Potable Well Survey, Hydrogeologic Assessment, and Modifications to the Groundwater Monitoring Program, Venice Ash Impoundment" (Appendix B);
- Technical Memorandum No.2 "Supplemental Hydrogeological Assessment, Venice Ash Ponds" (Appendix C);
- Technical Memorandum No.3 "Boron Loading to the Mississippi River from Venice Ponds 2 and 3" (Appendix D);
- Technical Memorandum No.4 "Evaluation of Closure Alternatives, Venice Ash Ponds" (Appendix E);
- Technical Memorandum No.5 "Predicted Change in Percolation, Venice Ash Impoundment" (Appendix F); and,
- Technical Memorandum No.6 "Groundwater Modeling of Venice Former Ash Ponds" (Appendix G).

The supplemental investigation performed by NRT conformed with the hydrogeological interpretations made in the Hanson, 2000 report. The text in the subsections below summarizes results of both hydrogeologic investigations with references to the attached reports as appropriate.

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2.2 Site Description

2.2.1 Geology

The site is located in the Mississippi River valley floodplain, in an area referred to as the American Bottoms. Approximately 80 feet of alluvial deposits associated with the Mississippi River underlie the site. Those alluvial deposits are underlain by Mississippian-aged limestone bedrock. The natural undisturbed soil profile generally consists of clayey silt overlying sand and gravel. The upper 20 to 30 feet of the alluvial deposits contain alternating layers of silt, sand, and clay; while the lower 60 to 50 feet primarily consist of sand and gravel. During supplemental investigation activities, undisturbed soils were observed at ground surface in the floodplain west of the Mississippi River levee and in the field south of the ash ponds east of the levee.

Fill material greater than 10 feet thick, which contained coal ash, was observed in the berm that surrounds the ash ponds, the former coal pile storage area north of the ponds, and within the ash ponds themselves (Figure 2-1). Fill material less than 10 feet thick, and which did not contain coal ash, was observed east of the ash ponds.

2.2.2 Mississippi River Characterization

The nearest United States Army Corps of Engineers (USACE) gauging station is located approximately 2.5 river miles upstream of the site, in Granite City, Illinois (Lock and Dam 27 lower). From 1965 through 2008, the mean annual elevation of the Mississippi River was 393.55 feet MSL (mean sea level) at Lock and Dam 27.

Using the monthly mean elevation data provided by the USACE, it was determined that the Mississippi River stage regularly exceeds the mean annual stage during the months of March, April, May, and June (Table 2-1), and occasionally exceeds mean annual stage at other times of the year. During these periods, groundwater at the site may be flowing away from the river in an east or southeasterly direction (flow reversal). During the majority of the year, groundwater flows toward the river.

2.2.3 Groundwater Flow

Groundwater flow contours for four consecutive quarterly monitoring events are illustrated in Figures 2-2 through 2-5. Groundwater is typically encountered at a depth of 20 to 30 feet at the site. Groundwater flow in the region is controlled by the Mississippi River, and water levels within the monitoring wells rise and fall with river stage. The predominant groundwater flow direction is northeast to southwest (toward

the Mississippi River) during most of the year. During periods of high river stage, usually the spring or early summer months, groundwater flow direction is northwest to southeast (away from the river).

Hydraulic gradients and groundwater velocity were calculated for the periods shown on Figures 2-2 through 2-5 (Table 2-2). Hydraulic gradients during these events ranged from 0.001 to 0.008 toward the river and 0.004 to 0.006 away from the river. The geometric mean hydraulic conductivity of the uppermost aquifer is 2.89×10^{-3} cm/s (Table 2-3). Assuming an effective porosity of 0.25, groundwater flow velocities ranged from 13 ft/yr to 90 ft/yr.

Using river elevation data collected near the Venice ponds during quarterly sampling events, the following generalizations can be made:

- Flow reversals are commonly observed on site when the Mississippi River elevation is above 400 feet MSL;
- The water table is nearly flat or exhibits variable flow patterns (normal and/or reversed) on site when the Mississippi River elevation is between 390 and 400 feet MSL; and,
- Normal flows are commonly observed on site when the Mississippi River elevation is below 390 feet MSL.

The direction of groundwater flow across the site is dependant both on Mississippi River level and the duration of such elevated river stage. Short periods of elevated river stage may cause flow reversals in the western monitoring wells near the riverbank. Sustained periods of elevated river stage are typically required to change the direction of groundwater flow across the entire site.

Elevated river stage may also have an impact on groundwater quality by raising groundwater levels across the site and saturating fly ash at the base of the former ponds. Subsurface profile B-B' (Figure 2-1) indicates the base of ash is approximately 400 feet MSL. In monitoring wells located near the central portions of the former ponds (MW-4 and MW-6) groundwater levels have been observed above 400 feet approximately 15% of the time (see Figure 9 in Tech Memo 2, Appendix C).

Groundwater elevations in excess of 400 feet have been coincident with the June quarterly sampling event. However, it is noteworthy that groundwater in these wells occurs episodically as the river level does not rise above 400 feet every year (there is a three year period from 2005 through 2007 where observed groundwater levels were below 400 feet in both wells). Review of USACE daily mean elevation data indicate that river elevations during 2005 and 2006 also rarely exceeded 400 feet. This suggests that to the extent groundwater comes into contact with ash, such communication occurs during the spring or early summer on an episodic and non-annual basis.

2.3 Monitoring Well Network

Construction details for the existing monitoring well network are summarized in Table 2-4.

2.3.1 Existing Perched Groundwater Monitoring Wells

The existing monitoring well network consists of nine separate sampling locations surrounding the former ponds (Figure 1-2). Some locations include a well to monitor perched groundwater (those wells have a "P" following the name, e.g. MW-2P). Since 2000, the perched zone wells have been typically dry. Boron concentrations in the perched zone wells are consistently lower than its Class I standard (Tech Memo 2, Appendix C), including wells MW-5P and MW-7P. The only exception was observed at MW-2P where two boron samples obtained prior to dewatering of the pond (one in 1999 and one in 2001) had concentrations higher than 2 mg/L. More recent observations (2008 and 2009) at MW-2P were below the Class I standard. The lack of apparent impacts at MW-5P and MW-7P demonstrates that the perched zone is not a migration pathway. The migration pathway is the saturated zone as indicated by elevated concentrations of boron, an indicator constituent for coal ash leachate, at wells MW-5 and MW-7.

The perched zone wells are screened in a sand and gravel lens that only contains significant amounts of water during extremely wet periods. Accordingly, sampling at these locations can occur only during periods of flood events. For example, the last time samples were collected from MW-8P and MW-9P was in June of 2008, during a period of record rainfall and flooding in portions of Iowa, Illinois, and Wisconsin that resulted in widespread flooding along the Mississippi River.

The lack of boron exceedances in the perched zone monitoring wells, combined with the observation that these wells are often dry, indicates that migration is not currently occurring via the perched zone. Rather, the perched zone reflects recharge during rainy periods. Because the perched wells do not monitor the contaminant migration pathway, they were not included in the groundwater quality discussions that follow. It is further recommended that these wells be removed from the proposed monitoring well network and permanently abandoned.

2.3.2 Existing Zone of Saturation Monitoring Wells

The existing monitoring well network consists of nine separate locations around the former ponds (Figure 1-2). The zone of saturation monitoring wells are typically screened between elevations 395 and 385 feet MSL with the exception MW-8 and MW-9 which are screened approximately 10 feet deeper. The monitoring wells are all 2-inch diameter wells with 10-foot screens, and were constructed between April 1996 and July 1999 (in this report, references to screen elevation describe the elevation of the bottom of the screen and/or sample interval). The September 2009 round of analytical data collected

from the well network was used for comparison to groundwater grab samples to depict groundwater flow and quality as of 2009.

Given that flow is usually toward the river, monitoring wells MW-8 and MW-9 are sufficiently far from the site that water quality in these wells will not be affected during flow reversals. This observation is confirmed by the low concentrations of the primary ash indicator constituent, boron, observed in these wells (as described below). The remainder of this document therefore refers to MW-8 and MW-9 as upgradient wells.

2.3.3 Proposed Monitoring Well Network

Based on a review of the analytical data collected from the monitoring wells and direct-push samples, additional monitoring well locations are proposed to monitor compliance with site groundwater quality standards as defined in Section 3.3 and 3.4, while some existing wells are proposed for abandonment.

As discussed above, the perched zone monitoring wells do not provide useful information relative to the extent of the boron plume; therefore, it is recommended that the perched wells be removed from the monitoring well network and permanently abandoned.

The proposed monitoring well network will be used to monitor compliance in all directions from the Venice ponds. Monitoring wells MW-10 and MW-11 will monitor compliance to the north; MW-5 will monitor compliance to the east; MW-6 will monitor compliance to the south; and MW-2, MW-3, and MW-11 will monitor compliance to the west (Figure 2-6). Deep piezometers will be nested with the water table monitoring wells at MW-2, MW-3, MW-6, and MW-11.

All new monitoring wells will be constructed consistent with monitoring well construction standards described in Section 3.1. Proposed well construction details are summarized in Table 3-1. The final screen intervals for new monitoring wells will be determined in the field during installation.

Groundwater monitoring at MW-7 cannot continue because this well is off-site and the access agreement with the property owner has ended. Ameren intends to properly abandon MW-7. MW-4 was abandoned on July 23, 2010 to make way for an access roadway associated with construction of the new I-70 bridge. Documentation of MW-4 abandonment will be included with other construction documentation in the Final Cover Construction and Closure Report as outlined in Section 5.1. Both MW-1 and MW-4 were drilled through coal ash. Review of monitoring results from these wells indicates that coal ash indicator (boron) concentrations in these wells are similar to those in the leachate wells (Tech Memo 2, Appendix C). This observation suggests that coal ash may have been dragged down to the screened interval of the monitoring wells during installation. Therefore, it is recommended that MW-1 also be permanently abandoned. Replacement wells are not needed because groundwater is monitored upgradient of these

locations at MW-8 and MW-9, and downgradient of these locations at the MW-2 and proposed MW-11 well nests. Furthermore, construction of a replacement well for MW-4 is not feasible due to usage of the east berm for I-70 bridge construction traffic, and replacement of MW-1 is not recommended because that area will be capped and a replacement well would result in a penetration through the synthetic cap material, potentially enabling seepage into the coal ash.

2.4 Groundwater Quality as of 2009

Groundwater quality was evaluated in 2009 as part of the supplemental investigation (Tech Memo 2, Appendix C); results of that investigation are summarized below:

- The boron plume has been defined through existing monitoring wells and groundwater grab samples, and extends approximately 500 feet south of the property line (Figure 2-7).

- Arsenic is present inside and outside of the boron plume at concentrations in excess of the Class I groundwater quality standard (Figure 2-8). The Venice ponds, however, are not a significant source of arsenic to groundwater. This conclusion is based upon the following: 1) arsenic concentrations in field leachate samples taken from the ash ponds were lower than the maximum concentrations observed in groundwater (Table 2-5), whereas higher concentrations would be expected in leachate if the Venice ponds were the source; 2) there is a weak inverse correlation between arsenic and boron concentrations in groundwater (Figure 2-9), rather than a positive correlation that should exist if the Venice ponds were the source; and 3) arsenic concentrations higher than the Class I standard were observed in a background sampling location (GP002) (Figure 2-8), Accordingly, arsenic concentrations higher than Class I groundwater quality standards emanate from a different source than the Venice ponds.

- Iron is present inside and outside of the plume in excess of the Class I standard. Similar to arsenic, the data suggest that the source of iron is not the ash ponds.

- Manganese is present inside and outside of the boron plume in excess of the Class I standard. The presence of manganese in upgradient wells outside of the plume indicates that there is another source in the area, in this case that source may be natural rather than anthropogenic. Unlike iron and arsenic, the data suggest that the ash ponds may contribute to elevated manganese concentrations in groundwater; although the mechanism of this impact is geochemical rather than as a direct contribution source, because manganese concentrations in the leachate were usually lower than detection limits. Furthermore, manganese is more reactive and less mobile in groundwater than boron, and the extent of manganese contributed to groundwater from the ash ponds will not be greater than the extent of boron. Therefore, boron is the primary indicator for coal ash impacts.

- Total dissolved solids concentrations reflect dissolved concentrations of major ions in groundwater that are not necessarily associated with coal ash leachate from the ash ponds.

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2.4.1 Other Known and Potential Sources

Past land use was evaluated using Sanborn maps from 1907, 1950, and 1962 (Appendix A). A corn refining operation and a plaster mill were in the vicinity in 1907. Creosoting operations were reported in the northern vicinity of the site as of 1950. The Sanborn maps indicated the presence of numerous oil tanks and storage areas for treated and untreated railroad ties. The creosoting operations were active as of 1962. All of these facilities were upgradient of the Venice power plant site.

As the Sanborn maps indicate, this area has been used for industrial purposes for at least 100 years, supporting the conclusion that multiple potential sources of contamination are present. For example, the petroleum impacted material encountered at GP001 (described Appendix C) is an example of the type of industrial by-products that may affect groundwater quality in the area. The creosote operation is a potentially significant potential source in the context of the Venice ash pond groundwater monitoring program because it was a wood treatment facility, and arsenic compounds were also used to treat wood at many such facilities.

2.4.2 Boron Loading to the Mississippi River

Boron loading to the Mississippi River from the inactive and dewatered Venice ponds was calculated to estimate the effect that this loading has on concentrations in the river (Appendix D). The estimated low flow of the Mississippi River at the Site is 46,500 cubic feet per second (cfs) and is four million times greater than the estimated groundwater flow into that receiving body.

Boron was chosen because it is readily available and is a very mobile indicator constituent of coal ash leachate. NRT used conservative assumptions for hydraulic conductivity, water flow conditions, and the highest observed concentration value (of 41 mg/L boron at MW-4) to calculate an estimate of the resulting incremental increase in boron in the Mississippi River due to discharge from the Venice ash ponds. The result was 0.0019 mg/L boron and this highly conservative concentration is approximately an order of magnitude lower than typical detection limits for boron as listed by USEPA. This result can be applied to other constituents that may have been released to groundwater from the Venice ash ponds. However, because boron almost always has higher concentration in coal ash leachate than any other trace or minor element (i.e., excluding the major ions Ca, Mg, K, Na, Cl, HCO_3, and SO_4), it can be assumed that these constituents will have concentrations even lower than the 0.0019 mg/L conservatively calculated for boron. Accordingly, the loading calculations indicate that boron released from the Venice ponds, and by extension all other coal ash leachate constituents, are negligible and have no perceptible impact on water quality within the Mississippi River.

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2.5 Fate and Transport Modeling

Groundwater fate and transport modeling was performed to assess the groundwater impacts associated with the Venice ponds, assist with the remedial alternative analysis, and assist with development of the groundwater monitoring system. Technical Memorandums 5 & 6 (Appendices F & G) describe the modeling in detail, and the following subsections summarize those memos. A disk containing model files is attached in Appendix K.

2.5.1 Conceptual Model

Groundwater in the vicinity of the Venice ponds originates as recharge from precipitation, flow from the east, and recharge from the Mississippi River when at high stage. The ultimate discharge point for groundwater is the Mississippi River since there are no known active water supply wells near the ash ponds (Appendix B). Groundwater elevation fluctuates in response to changes in river stage. Flow direction reversals are also common, resulting in a highly variable up and down, back and forth flow pathway.

The only source considered for this modeling is the Venice ponds. While other sources of contamination are present in the area, the Venice ponds are the only known significant source of boron, the primary ash indicator constituent. Boron mass enters groundwater via two mechanisms: year-round leaching as precipitation and snow melt water percolates vertically through the ash, and occasional leaching when groundwater elevation rises to a level higher than the base of ash and flows horizontally through the material. The groundwater that seeps into the ash when water table is high likely drains vertically for an unspecified period of time after the water table returns to normal elevation.

2.5.2 Model Approach

A three-dimensional transient groundwater flow and transport model was calibrated to represent the conceptual flow system described above. Modeling begins in the year 2000, and mass that entered the aquifer prior to 2000 was simulated by specifying initial concentrations in groundwater. The model was calibrated to match groundwater elevation fluctuations and concentration trends observed between 2000 and 2009 (Run 19). Prediction simulations were then performed to evaluate the effect of the cap, which was assumed to be present beginning in 2011. The following scenarios were simulated:

- No Action (Run 19pna): The calibrated model was extended 27 years into the future without simulating placement of the cap;
- Base Case (Run 19pbc): The calibrated model was extended to July 2011 (estimate of when the geomembrane portion of the cap will be constructed). Starting in August 2011 the cap was simulated 25 years into the future. The cap covers the former ponds and berms.

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- Case 1 (Run 19pc1): Similar to the base case, the calibrated model was extended to July 2011, then the cap was simulated another 25 years in the future. This scenario differs from the base case in that the cap covers the former ponds but leaves the eastern and southern berms uncapped.

Transport of boron was modeled because it is an indicator parameter for coal ash leachate, it is mobile in groundwater, and its concentration in downgradient monitoring wells is higher than its Class I groundwater quality standard.

This model was complicated by the need to simulate the fluctuations in elevation, flow direction, and leachate generation caused by changes in Mississippi River stage. To accommodate these fluctuations, four stress periods were used for each calendar year in the model from the first year of calibration (2000) to the final year of prediction (2035), for a total of 144 stress periods. These four stress periods simulate the average long-term transient fluctuations of the Mississippi River and its effects on groundwater flow near the site.

Three model codes were used to simulate groundwater flow and contaminant transport:

- Leachate percolation from the ponds and aquifer recharge south of the ponds was modeled using the Hydrologic Evaluation of Landfill Performance (HELP) model;
- Groundwater flow was modeled in three dimensions using MODFLOW; and
- Contaminant transport was modeled in three dimensions using MT3DMS.

2.5.3 Percolation and Recharge Modeling Using HELP

The Hydrologic Evaluation of Landfill Performance (HELP) code was developed by the U.S. Environmental Protection Agency and is used extensively in waste facility assessments. HELP predicts one-dimensional vertical percolation from a landfill or soil column based on precipitation, evapotranspiration, runoff, and the geometry and hydrogeologic properties of a layered soil and waste profile.

HELP (Version 3.07; Schroeder et. al, 1994) was used to estimate percolation through the former ash ponds after construction of the synthetic cap. HELP was also used to estimate aquifer recharge in the field south of the former ash ponds. This field lies in a closed depression ringed by soil berms that form the levee, railroad tracks, and the south berm of the former ash ponds.

HELP input and output files are included on a CD included as Appendix K.

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2.5.3.1 Help Model Approach

Three rounds of HELP modeling were completed in support of closure:

1. HELP was used to model current conditions and assist with selection of the type of cap for closure (Tech Memo 5, Appendix F).

2. Once the cap was selected, HELP was used to estimate recharge through the cap for transport modeling. Three configurations of synthetic cap placement were simulated based on the texture of the protective soil layer (Silty, Sandy, and Clayey). HELP was also used to model infiltration south of the ponds, a large field that is a closed depression bounded by the south berm of the ash ponds, the levee, and railroad embankments.

3. HELP was also used to evaluate the effect of changes to the final grade of the synthetic cap after the transport model was completed.

2.5.3.2 HELP Input Data

Refer to Table 2-6 and Technical Memorandum No 5 (Appendix F) for detailed descriptions of model setup and input values for the first round of HELP modeling. The second and third rounds of HELP modeling are modifications of the first round. Second and third round inputs that vary from the first round are discussed below. All scenarios were modeled for a period of 20 years. Since the ponds are already dewatered, that mitigation scenario was not considered.

The second round inputs are summarized in Table 2-7. As discussed above, three configurations of the protective soil layer were tested during this round. The protective soil texture parameter was the only input varied from the first round of modeling (Table 2-6). Infiltration and recharge in the field south of the former ash ponds were also simulated with HELP for a period of 20 years at this time (Table 2-6).

The third round of inputs are summarized in Table 2-8. The 58 acre ponds were divided into two areas. The larger area was 43.5 acres with a slope of 1% over 520 feet. The smaller area was 14.5 acres with a slope of 2% over 330 feet. All other inputs were left unchanged from the previous HELP model runs (Table 2-6).

2.5.3.3 Help Model Results

The first round of HELP modeling resulted in the selection of a synthetic cap rather than soil or compacted clay caps.

The second round of HELP modeling resulted in a maximum percolation rate of 0.0024 in/yr (5.48×10^{-7} ft/day). To be environmentally conservative, that infiltration rate was rounded up to 6.00×10^{-7} ft/day for input to the transport model to represent the recharge component of seepage from the Venice ponds.

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The third round of HELP modeling resulted in a weighted average infiltration rate of 0.0019 in/yr (4.34×10^{-7} ft/day). This result was less than the recharge rate of 6.00×10^{-7} ft/day used in the transport model; therefore, the new slope changes would result in slightly less percolation (source) through the capped impoundments. The small reduction in percolation through the cap meant that the transport modeling would still be environmentally conservative and running an updated transport model would be unnecessary.

2.5.4 Flow and Transport Modeling

2.5.4.1 Model Descriptions

MODFLOW uses a finite difference approximation to solve a three-dimensional head distribution in a transient, multi-layer, heterogeneous, anisotropic, variable-gradient, variable-thickness, confined or unconfined flow system—given user-supplied inputs of hydraulic conductivity, aquifer/layer thickness, recharge, wells, and boundary conditions. The program also calculates water balance at wells, rivers, and drains. MT3DMS (Zheng and Wang, 1998) is an update of MT3D. It calculates concentration distribution for a single dissolved solute as a function of time and space. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. Refer to Appendix G for more detailed descriptions of the flow and transport models.

2.5.4.2 Model Sequence

MODFLOW was calibrated to approximate groundwater elevation data collected between March 2000 and February 2009 (nine years). This timeframe was chosen because it represents current conditions and there were adequate data for calibration of this transient groundwater flow system. Next, MT3DMS was run, and model-predicted concentrations were calibrated to observed boron concentration values at the monitoring wells. Multiple iterations of MODFLOW and MT3DMS calibration were performed to achieve an acceptable match to observed data.

Once calibrated, additional simulations were performed to evaluate the prediction scenarios. With the exception of the No Action scenario (which has no cap) the percolation rate and concentration value assigned to the cap was the same for all prediction scenarios (25 mg/L), only the distribution of the cap was varied between the Base Case and Case 1.

2.5.4.3 Flow and Transport Model Setup and Inputs

Refer to Appendix G for detailed descriptions of model setup and input values. A CD containing input files is attached in Appendix K.

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2.5.4.4 Input Data Assumptions

Simplifying assumptions were made while developing this model, including:

- The cap has an instantaneous effect on percolation rate;
- Leachate is assumed to instantaneously reach groundwater (e.g., migrate through the unsaturated zone);
- The Mississippi River is assumed to behave in a consistent annual pattern;
- The general head boundary and natural recharge are assumed constant over time; and
- Leachate concentrations are assumed to remain constant over time.

2.5.5 Modeling Results

Results of the MODFLOW/MT3DMS modeling are presented below. A CD containing output files is attached in Appendix K.

2.5.5.1 Calibration

The model was calibrated to observed conditions from 2000 through 2009. The model was first calibrated to approximate observed groundwater elevation (head) data, and then to observed concentration data. MW-1 and MW-4 were not used for concentration calibration because those wells were installed through ash and groundwater quality results are anomalous.

Head calibration results show that the model successfully reproduces the range of observed seasonal fluctuations (Figure 2-10).[1] MW-2 and MW-7 represented downgradient calibration; MW-1 and MW-5 represented on-site calibration; and MW-8 and MW-9 represented upgradient calibration. In all three areas, modeled and observed heads were in good agreement considering that the stress periods used in the model represent river stage in concept, rather than a historical depiction.

Concentration calibration accurately simulated observed trends at most monitoring wells (Figure 2-11). MW-2, MW-3, MW-7, and GP-6 represented downgradient concentrations. GP-6 is a monitoring point placed in the model to compare to a groundwater grab sample collected in the fall of 2009. The largest

[1] Qualitative head matching (e.g., calculation of the sum of squared residuals) was not performed for this model because the average fluctuations in river stage modeled did not necessarily correlate with actual fluctuations, and given the large range in observed and modeled heads, calculations of head differential would not be meaningful. Instead, calibration was deemed successful when head fluctuations covered a similar range as observed groundwater levels, and—most importantly—when modeled long-term concentration trends closely matched observed trends.

discrepancy between modeled and observed concentrations was at MW-3, where observed concentrations appear to be anomalously low given its proximity to the site in the downgradient flow path.[2] The model also predicted a future concentration increase at MW-6 that would not be interpreted from the relatively flat trend in the observed data. Since one purpose of the model is to predict the amount of time needed for groundwater to recover to Class I standards, the higher than observed modeled concentrations at MW-3 and MW-6 are conservative because it increases predicted recovery time.

2.5.5.2 Prediction

The No Action scenario (Figure 2-12) reflects that concentrations in wells MW-2 and MW-3 (downgradient, on-site between the levee and the ponds) will stabilize around 4 to 5 mg/L boron, approximately twice the Class I standard. Concentrations in GP-6 (downgradient, off-site about 500 feet south of ponds) will stabilize just below the Class I standard of 2 mg/L. Concentrations in well MW-7 (downgradient, off-site about 100 feet south of the ponds) will stabilize around 3 mg/L, above the Class I standard. On-site concentrations at MW-6 will stabilize around 6 mg/L, while on-site concentrations at MW-5 will stabilize just below the Class I standard. This scenario was modeled for comparison with the two scenarios described next, and does not represent a closure alternative considered by Ameren.

The Base Case scenario, with a cap that covers the ponds and all berms, (Figure 2-13) suggests that concentrations in all monitoring wells will stabilize below the Class I standard within 13 to 20 years, with the exception of on-site well MW-6. Concentrations modeled at MW-6 were slowly decreasing at the end of the model period and a linear interpolation of the trend suggests that concentrations will be lower than the Class I standard 28 years after the cap is constructed. However, it is important to remember that the model conservatively predicts an increase in concentration in MW-6 that is not supported by observed data, and as a result this recovery period may also be conservatively long.

The sensitivity of the Base Case scenario to saturated ash extent was tested by increasing the area of saturated ash to include the entire footprint of the former ash ponds (Figure 2-14). The results are similar with the following exception: Concentrations in MW-2 and MW-3 (downgradient, between the levee and ponds) stabilize around 4 to 5 mg/L. This suggests that if ash extent is greater than that assumed for the base case, Class I exceedances may persist west of the ash ponds, but not to the south.

The Case 1 scenario, which most closely approximates the final closure plan because it assumes that the eastern and southern berms are not capped, reflects that concentration distribution will be similar to the

[2] The proposed monitoring program includes a deep well at this location to determine if concentrations are higher at depth in the aquifer.

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Base Case scenario (Figure 2-15), with concentrations at most monitoring wells stabilizing at levels below the Class I standard within 14 to 20 years. The most notable difference is that the recovery period at on-site monitoring well MW-6 is 57 years, although, as stated above, the model appears to be over-predicting concentration in this well.

3 GROUNDWATER MONITORING PLAN

3.1 Groundwater Monitoring System

A groundwater monitoring system is proposed for the Venice ponds to monitor groundwater, evaluate post-closure groundwater quality and trends, and to demonstrate compliance with the groundwater quality standards as described in Section 3.3.

Standards for monitoring well design and construction include:

- All monitoring wells will be cased in a manner that maintains the integrity of the bore holes.
- Wells will be screened to allow sampling only at the specified interval.
- All wells will be covered with vented caps, unless located in flood-prone areas, and equipped with devices to protect against tampering and damage.

The proposed groundwater monitoring system will consist of 2 upgradient and 10 downgradient of wells, installed at the water table and at depth in the uppermost aquifer underlying the Venice ponds. These wells will yield groundwater samples that represent the quality of background water that has not been affected by contamination from the Venice ponds and represent the quality of downgradient groundwater at the property boundary and within the GMZ (Figure 3-1). Monitoring well depths and construction details are listed in Table 3-1.

3.2 Groundwater Monitoring Program

A groundwater monitoring program is proposed to monitor groundwater and evaluate post-closure groundwater quality within the GMZ. The groundwater monitoring program will begin upon approval of this closure plan by IEPA, and completion of the installation of the groundwater monitoring system.

3.2.1 Monitoring Parameters

Groundwater quality data will be monitored for constituents listed in 35 IAC 620.410(a) and (d) except radium-226 and radium-228. Any constituent that is not detectable at the reporting level or PQL in the downgradient wells for four consecutive quarters or has a concentration that does not differ to a statistically significant degree from the concentration detected in the upgradient wells for four consecutive quarters may be removed from the monitoring program in both the upgradient and downgradient wells with the exception of:

- boron,
- iron,
- manganese,
- field parameters including pH,
- sulfate, and
- TDS.

Field parameters will include pH, specific conductance, temperature, groundwater elevation, and monitoring well depth. Table 3-2 lists constituents to be monitored at the Venice ash ponds.

3.2.2 Sampling Schedule

Groundwater sampling will be performed according to the schedule provided in Table 3-3. Quarterly sampling will initially be performed. Five years after approval of the closure plan, a request may be made to modify the post-closure care plan to reduce the frequency of groundwater monitoring to semi-annual sampling by demonstrating all of the following:

- That monitoring effectiveness will not be compromised by the reduced frequency of monitoring;
- That sufficient data has been collected to characterize groundwater; and
- That concentrations of constituents monitored at the downgradient boundaries of the GMZ show no statistically significant increasing trends that can be attributed to the Venice ponds.

If concentrations of constituents at the downgradient boundaries of the GMZ show no statistically significant increasing trends that can be attributed to the Venice ash ponds for the five years after reducing the monitoring frequency to semi-annual, a request may be made to modify the post-closure care plan to reduce monitoring frequency to annual sampling by demonstrating the same items above as for the reduction to semi-annual monitoring.

Groundwater monitoring may be discontinued upon Agency approval of a certified post-closure care report. Specifically, when no statistically significant increase is detected in the concentration of any constituent above that measured and recorded during the immediately preceding scheduled sampling for three consecutive years after changing to an annual monitoring frequency; or, contaminated leachate is no longer generated by the Venice ash ponds.

3.2.3 Groundwater Sample Collection

Groundwater samples will be collected according to the draft standard operating procedure attached in Appendix H. The procedure is summarized below.

All groundwater elevations will be measured on a single day, in conjunction with sampling of the wells. River elevations as measured at the Venice plant will also be recorded at this time.

Monitoring wells will be sampled using a submersible pump. The well will be purged until specific conductance has stabilized within ±10 percent. Once stabilized, field parameters will be recorded in the log book. A 0.45 um filter will be attached to the discharge tube and the sample will be collected in pre-cleaned HDPE bottles. Samples for metals analysis will be preserved in the field using nitric acid (HNO_3). All samples will be placed in a cooler with ice to maintain a temperature of less than 4° Celsius during transport to the analytical laboratory.

In addition to groundwater well samples, quality assurance samples will be collected as listed in Section 3.2.5.

3.2.4 Laboratory Analysis

Laboratory analysis will be performed by Ameren's state-certified laboratory using the methods listed in Table 3-2. If alternative methods are used, they will be comparable to or better than the methods listed in Table 3-2. Concentrations lower than the reporting limit (RL) or practical quantitation limit (PQL) will be reported as less than the RL or less than the PQL.

3.2.5 Quality Assurance Program

One blind replicate and one equipment blank sample will be collected and analyzed for each day of sampling. In addition, one field blank sample will be analyzed for each sample trip.

Laboratory QA/QC programs may vary, but most laboratories use similar approaches, which include:

- Regular generation of instrument calibration curves to assure instrument reliability.
- Laboratory control samples and/or quality control check standards that have been spiked, and analyses to monitor the performance of the analytical method.
- Matrix spike/matrix spike duplicate analyses to determine percent recoveries and relative percent differences for each of the analytes detected.

- Analysis of replicate samples to check the precision of the instrumentation and/or methodology employed for all analytical methods.
- Analysis of daily or batch method blanks to assure that the system is free of contamination.

3.2.6 Groundwater Monitoring System Maintenance Plan

Monitoring wells will be inspected annually, and maintenance will be performed as needed to assure that the monitoring wells provide representative groundwater samples. Monitoring well inspections will consist of the following:

- Visual inspection, clearing of vegetation, replacement of markers, and painting of protective casings as needed to assure that monitoring wells are clearly marked and accessible.
- Visual inspection and repair or replacement of well aprons as needed to assure that they are intact, drain water away from the well, and have not heaved.
- Visual inspection and repair or replacement of protective casings as needed to assure that they are undamaged, and that locks are present and functional.
- Checks to assure that well caps are intact and vented, unless in flood-prone areas in which case caps will not be vented.
- Annual measurement of monitoring well depths to determine the degree of siltation within the wells. Wells will be redeveloped as needed to remove siltation from the screened interval if it impedes flow of water into the well.
- Checks that wells are clear of internal obstructions, and flow freely.

If maintenance of a monitoring well cannot address a deficiency, then a replacement well will be installed that meets the criteria outlined in Section 3.1.

3.2.7 Data Reporting

Sampling and analysis data from groundwater monitoring, and decisions to remove any constituent from the monitoring program, will be reported to the Agency no later than 30 days after the sampling and analysis have been completed.

3.3 Groundwater Quality Standards

3.3.1 On-Site Applicable Groundwater Quality Standards

On site, prior to the completion of the post-closure care period, the applicable groundwater quality standards at the Venice ponds are the concentrations as determined by groundwater monitoring, if such

concentrations exceed the numeric standards for Class I: Potable Resource Groundwater set forth in 35 IAC 620.410.

After completion of the post-closure care period, the on-site concentrations of contaminants from the Venice ponds as determined by groundwater monitoring, if such concentrations exceed the numeric standards for Class I Potable Resource Groundwater set forth in 35 IAC 620.410, are the applicable groundwater standards if:

- To the extent practicable, the exceedance has been minimized and beneficial use, as appropriate for the class of groundwater, has been returned on-site;
- Any threat to public health or the environment on-site has been minimized; and
- An institutional control prohibiting potable uses of groundwater is placed on the Venice site in accordance with the Uniform Environmental Covenants Act (765 ILCS 122) or an alternative instrument authorized for environmental uses under Illinois law and approved by the Agency. Existing potable uses of groundwater may be preserved as long as such uses remain fit for human consumption in accordance with accepted water supply principles.

3.3.2 Off-Site Applicable Groundwater Quality Standards

Off-site applicable groundwater quality standards are not proposed and the Groundwater Management Zone (GMZ) will terminate at Ameren's southern property boundary. Groundwater modeling predictions suggest that concentrations will return to levels lower than Class I groundwater quality standards and approach background concentrations within 25 years (Section 2.5). Monitoring well nest 6 is located near the property boundary and is reflective of off-site impacts. Furthermore:

- To the extent practicable, the activities described in this closure plan are designed to minimize exceedances of groundwater quality standards; and
- Any threat to public health or the environment has been minimized. There are no groundwater receptors in this area (Appendix B), and in recognition of the industrial nature of the area and historical waste practices, the cities of Venice, East Saint Louis, Wood River, Granite City and the Villages of Brooklyn and Sauget – located in St. Clair and Madison counties – have all enacted groundwater use restriction ordinances.

3.4 Demonstration of Compliance

3.4.1 Compliance with On-Site Applicable Groundwater Quality Standards

Compliance with on-site groundwater quality standards will be achieved when no statistically significant increasing trend that can be attributed to the Venice ponds is detected in the concentrations of all constituents monitored at the downgradient boundaries of the Venice site for four consecutive years after

changing to an annual monitoring frequency pursuant to Section 3.2. Monitoring wells to be used in this analysis are designated in Table 3-1 and Figure 3-1.

3.4.2 Demonstration of Compliance

An annual trend analysis will be performed for each compliance monitoring well designated in Table 3-1 and Figure 3-1 for all constituents monitored in accordance with Section 3.2 and listed in Table 3-2, based on a minimum of four consecutive samples, by applying Sen's Estimate of Slope. Compliance during closure and post-closure care periods will be demonstrated as described in Sections 3.4.1 and 3.4.2.

- If the results of sampling and analysis show an increasing trend at any compliance monitoring well located at the downgradient boundaries of the Venice site GMZ as specified in Table 3-1, a Mann-Kendall analysis will be performed at 95 percent confidence to determine whether or not the increasing trend is statistically significant. Ameren will investigate the cause of a statistically significant increasing trend as described below. If the statistically significant increasing trend occurs during post-closure care, the investigation will include more frequent inspection of the surface of the cover system and evaluation of background concentrations.
    - If the investigation attributes a statistically significant increasing trend to a superseding cause, Ameren will notify the Agency in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.
    - If there is no superseding cause for the statistically significant increasing trend and sampling frequency has been reduced pursuant to semi-annual or annual sampling, a quarterly sampling schedule will be reestablished. After four consecutive quarterly samples show no statistically significant increasing trend, the frequency of groundwater monitoring will return to either semi-annual or annual, whichever frequency was utilized prior to the return to quarterly sampling.
    - Notifications concerning statistically significant increasing trends and revisions of the sampling frequency will be reported to the Agency in writing within 30 days after making the determinations.
- If a statistically significant increasing trend is observed to continue over a period of two or more consecutive years and there are no superseding causes for the trend, then Ameren will perform the following:
    - A hydrogeologic investigation; and
    - Additional site investigation, if necessary.

Based on the outcome of the investigation above, Ameren may take action to mitigate statistically significant increasing trends. Such actions will be proposed as a modification to the post-closure care plan within 180 days after completion of the investigation activities described above.

3.5 Proposed Mitigation Actions

If a statistically significant increasing trend is observed to continue over a period of two or more years, and a subsequent hydrogeologic and site investigation demonstrates that such exceedances are due to a release from the Venice Ash Ponds and corrective actions are appropriate to mitigate such releases, then Ameren will propose a corrective action plan as a modification to the post-closure care plan within 180 days after completion of the investigation activities. This plan will propose corrective actions to be undertaken to mitigate the groundwater quality exceedances.

4 FINAL COVER DESIGN

4.1 Overview

4.1.1 Profile

The final cover system proposed for the Venice ponds consists of the following profile (from bottom up), as depicted in Detail 3 on the enclosed Drawing 7824-Y-502164 entitled "Final Cover Sections and Details";

- 40-mil polyvinyl chloride (PVC) geomembrane infiltration barrier installed over a coal ash subgrade that will be prepared to be free of sharp objects or protrusions that may cause damage to the geomembrane when the overlying materials are placed;
- Geocomposite drainage layer, consisting of a high-density polyethylene geonet with geotextile adhered to the top and bottom of the geonet to provide a filter for the soils above the geocomposite and cushioning between the edges of the geonet and the geomembrane beneath; and
- 3-foot thick protective soil layer completely covering the geosynthetic layers with 2.5 feet of rooting zone soils and 6 inches of topsoil to support the establishment of vegetation on the cover system.

This cover design meets the requirements of 35 IAC 811.314, and provides a barrier to infiltration and subsequent generation and release of leachate.

PVC was selected for the geomembrane because of its greater flexibility relative to other types of geomembranes, making it better able to accommodate long-term settlement of ash within the ponds without compromising the infiltration barrier. PVC geomembrane is also available in larger panel sizes than that available for other types of geomembranes, which minimizes the amount of seams completed in the field. PVC is chemically compatible with the coal ash contained within the ponds. Vertical "boots" comprised of PVC geomembrane will be provided for penetrations in the cover for existing transmission tower foundations and poles for overhead electrical power distribution (Detail 4 on the enclosed Drawing 7824-Y-502164 entitled "Final Cover Sections and Details").

The geocomposite is provided to drain surface water that infiltrates the protective soil layer.

Vegetation will be established on the cover system to minimize erosion and exposure of the geosynthetics. Proposed seed mixes and related application rates are provided in Table 4-4.

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4.1.2 Areal Extent

The approximate extent of the cover system is depicted on the enclosed Drawing 7824-Y-502161 entitled "Geomembrane Subgrade Grading Plan" and described herein.

The cover will extend to the Metro East Sanitary District's (MESD's) levee to the west, with the exact extent subject to approval by the US Army Corps of Engineers (USACE) and MESD. Details of the final cover system germane to USACE's / MESD's regulatory authority over the project, such as the proximity of the geosynthetics to the levee, were jointly submitted to MESD and the St. Louis District of USACE for review and approval around the same time as submittal of this closure plan to IEPA.

The cover system will extend across the north containment berm of Pond 2.

The east and south containment berm of Pond 3 will be left intact in accordance with the storm water management plan for the cover, which is described in Section 4.3 below.

The cover system will extend to, but not cross, the east containment berms of both ponds and south containment berm of Pond 3. The Illinois Department of Transportation (IDOT) has constructed an access road along the east side of the ponds to their Mississippi River Bridge (I-70) project located just to the south of the ponds. The anchor trench for the geosynthetics will be excavated along the west side of this access road since the cover system will be constructed after IDOT's access road is completed and while they are using the road to access the bridge project. Ameren learned through discussions with IDOT during planning of this access road in early 2010 that extending the cover across the access road would result in an impediment to construction of the bridge by limiting access to and use of the access road by IDOT and their contractor(s).

4.2 Final Slope and Global Stability

The Venice ponds will be graded to promote drainage of storm water runoff (Drawing 7824-Y-502162 entitled "Final Cover Grading and Storm Water Management Plan) prior to installation of the geosynthetics. Stability analyses were conducted on the proposed final slopes to verify and demonstrate compliance with relevant portions of 35 IAC 840.124, which cross-references 35 IAC 811.304 for foundation and mass stability requirements. Specifically, the following analyses were performed:

- Global stability under static and seismic conditions with consideration of a rapid decline or drawdown in the elevation of the adjacent Mississippi River;
- Surface deformation and liquefaction potential under seismic conditions; and
- Veneer stability of the geosynthetic cover under static and seismic conditions.

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Two cross-sections representing the maximum slope from the crown in the middle of the cover to both the eastern berm and western levee were evaluated under static conditions at several different river and corresponding groundwater elevations. The cross-section exhibiting deep rotational failure under static conditions at the highest river and corresponding groundwater elevation (west slope) was carried forward for evaluation of static global stability under rapid drawdown conditions, seismic deformation, and global stability under pseudo-static (seismic) conditions. Liquefaction potential was also evaluated. Further details regarding the scope of these analyses and related assumptions / input parameters are summarized briefly below and in detail in Appendix I.

The proposed slopes exceed the minimum stability requirements in 35 IAC 811.304. Results are summarized below and in Table 4-1.

Computed Stability Safety Factors for Final Slope

Analysis	Static SF	Seismic SF
Global Stability	4.9	1.3
Rapid Drawdown	5.0	1.3
Veneer Stability	24.8	1.6
Required Minimum	1.5	1.3

Global stability was analyzed using the SLOPE/W computer software. A conceptual model of subsurface conditions at the site was constructed using data from historic site investigations. Geotechnical strength parameters for subsurface materials were conservatively estimated from literature sources due to a lack of site-specific data. The static analysis was performed for six river stages ranging from base conditions up to the approximate elevation of the top of the levee. Safety factors ranged from 4.86 to 6.50 under static conditions for the various river stages evaluated,

An additional static stability analysis was performed to evaluate the effects of a rapid drawdown condition where the river stage drops faster than the saturated slope material can drain. The analysis was performed for a rapid 8-ft drop in river stage resulting in a safety factor of 4.98. All static global stability analyses exceed the minimum safety factor of 1.5 required by 35 IAC 811.304.

The seismic stability analysis incorporated peak ground acceleration (PGA) of 0.23 for a 2% occurrence probability over 50 years based on a US Geologic Survey chart of seismic activity for the eastern US. The

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resulting factor of safety was 1.3 for a reasonable worst-case scenario with a river stage of 418 ft. An additional analysis evaluated the unlikely occurrence of simultaneous rapid drawdown and seismic events. The resulting safety factor was also 1.3. All seismic global stability analyses meet the minimum safety factor of 1.3 required by 35 IAC 811.304.

Due to the potential for earthquake-induced liquefaction, surface deformation and liquefaction analyses were conducted to satisfy the requirements of 35 IAC 811.304(f). Calculations were performed for NRT by Geo Engineering Consulting, LLC following methods published by the Tennessee Division of Solid Waste because the State of Illinois does not have specific technical guidance. The effects of both potential liquefaction and overall surface deformation on the final cover from seismic activity were determined to be negligible.

Lastly, the proposed geosynthetic cover was analyzed for veneer stability against sliding under static and seismic conditions (Appendix J). The critical interface was assumed to be between the geocomposite drainage layer and the PVC geomembrane. Material interface properties were conservatively estimated from published data for typical materials anticipated to be used in construction. The computed factor of safety against sliding was 24.78 and 1.56 for static and seismic conditions, respectively, which exceeds the corresponding minimum stability requirements of 1.5 and 1.3 in 35 IAC 811.304.

4.3 Storm Water Management Plan

Site constraints will not allow for the management of storm water outside of the limits of the final cover. The south and east containment berms of the ponds are located immediately adjacent to the property boundary, thus not providing any property outside of the ponds to the east and south for managing storm water runoff from the cover. The property to the south of the ponds is a closed depression to which the property east of the ponds already drains, and Ameren desires to avoid contributing to the potential for flooding within this area. Due to insufficient grade and concerns for erosion of the levee, Ameren is unable to direct storm water runoff from the cover to the west. Managing storm water runoff from the cover in the area north of the ponds would result in an unacceptable impact to Ameren's operations.

Consequently, storm water derived from precipitation falling onto and running off of the cover will be managed on the cover itself. The cover will be graded such that there is no off-site contribution, or run-on, of storm water from areas outside of the ponds, thus minimizing the amount of storm water that is managed on the cover. The cover grading plan was designed to collect storm water runoff in two topographically low areas located on the north and south ends of the cover (Drawing 7824-Y-502162, entitled "Final Cover Grading and Storm Water Management Plan"). Two low areas were necessary to minimize the amount of ash relocation / disturbance prior to installation of the cover. Storm water runoff collected in the low areas will be pumped from these locations over the levee to the Mississippi River.

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The rate of inflow to the pump stations will be more variable than can be reasonably pumped to prevent ponding of storm water on the cover (most pumps operate at a static flow rate); therefore, the pump stations will be designed to minimize such ponding to the extent practical. A preliminary analysis of anticipated runoff and pumping rates suggests that ponding will be limited to approximately 0 to 3 feet in depth and 0.5 to 10 hours in duration depending upon the storm event. Recurrence intervals of 100% (1-yr), 50% (2-yr), 10% (10-yr), 4% (25-yr), 2% (50-yr), and 1% (100-yr), corresponding to the rainfall depths identified in Table 4-2, were evaluated. Runoff was quantified by the unit hydrograph method described in the Soil Conservation Service's (now referred to as the Natural Resource Conservation Service) Technical Release 55 (SCS, 1986). The shorter durations and lower depths of ponding were associated with the higher recurrence events (Table 4-3), while the longer durations and higher depths were associated with the lower recurrence events, indicating that the greatest extent of ponding anticipated will occur at a relatively low frequency.

Consequently, the cover design itself includes features to minimize infiltration while accommodating the management of storm water runoff on the cover. The geocomposite drainage layer component of the cover will drain directly into the pump stations so that infiltrated surface water is removed (Detail 1 of Drawing 7824-Y-502168, entitled "Storm Water Pump Station Sections and Details"). The geomembrane component of the cover will be placed beneath the subsurface wet wells associated with the pump stations. An additional flap of geomembrane will be placed directly beneath the geocomposite immediately surrounding the pump stations to minimize the infiltration of surface water into the topographically low spot in the main geomembrane layer. This flap will be fused to the main geomembrane layer and attached to the pump stations. A perforated pipe penetrating the geomembrane flap will be provided to facilitate monitoring for the presence of water within the topographically low spot in the main geomembrane layer and removal of this water via pumping. These details are depicted on Drawing 7824-Y-502168 entitled "Storm Water Pump Station Sections and Details".

During construction of the cover, coal ash contact water will be contained within the work area by the existing ash pond berms. Following installation of the geomembrane and construction of the storm water pump stations, accumulated storm water in the work area will be managed with the pump stations utilizing best management practices (BMPs), such as sediment traps and check dams, to minimize the amount of sediment discharged from the pump stations until vegetation is established on the cover.

4.4 Construction Quality Assurance Program

Construction of the proposed final cover system and storm water pumping stations will be subject to a quality assurance program similar to that required in 35 IAC 840.146. This program will be lead and supervised by a licensed professional engineer (PE) in the State of Illinois. Construction Quality Assurance (CQA) officers will execute the program on site through inspection and testing as described

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below. The CQA officers will communicate associated observations and testing results to the supervising PE, construction contractor (including relevant subcontractors), design engineer, and Ameren on a day-to-day basis, and prepare and maintain daily reports documenting construction activities and relevant CQA observations and/or test results. Observed construction quality deficiencies will be rectified by the contractor to the satisfaction of the CQA officers, supervising PE, design engineer, and Ameren.

4.4.1 Geosynthetics Installation

CQA officers will review quality control certificates issued by the geosynthetics manufacturers for each specific product used in the final cover prior to installation to verify that the products conform to relevant technical specifications. For geomembrane, this includes factory seam testing results to verify that the panels delivered to the site were fabricated in accordance with the relevant technical specifications. Nonconforming products will be rejected for use in the final cover.

The subgrade surface on which geosynthetics will be deployed / installed will be inspected and approved by the CQA officers and geosynthetics installer on a daily basis. This includes inspection of completed underlying geomembrane in the case of the geocomposite drainage layer. Additional inspections shall be performed if weather, vehicular traffic, or other factors may have changed the condition of the subgrade surface following approval. The following items shall be completed during subgrade inspections:

- Verification that the subgrade surface, including the anchor trench, has been prepared in accordance with the technical specifications and drawings;
- Visual inspection of the subgrade surface to verify that it is smooth and free of ruts, erosion rills, rocks or other protrusions which are greater in size than that allowed by the technical specifications; and
- Documentation of acceptance of the subgrade surface by the CQA officer and geosynthetics installer, including signatures by authorized representatives of each party.

If any portion of the subgrade surface is determined to be unacceptable, it will be repaired and subject to re-inspection and acceptance prior to deployment of geosynthetics.

The CQA officers will verify the following during deployment of geosynthetics:

- Geosynthetics panels are installed at the locations and positions indicated on the approved panel layout plan;
- Geosynthetics are deployed reasonably flat to minimize wrinkles and subsequent folds during placement of the protective soil layer above the geosynthetics;
- Removal or cut out and repair of wrinkles in the geosynthetics that are higher than wide;
- Sufficient slack is provided in the deployed geosynthetics to account for anticipated temperature fluctuations (excessive slack should be avoided);

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- Deployed geosynthetics have not pulled away from the subgrade surface or anchor trench after a significant drop in temperature;
- Tensile stresses in the deployed geosynthetics are minimized to the extent practical;
- Stones or excessive dust that could damage the geomembrane or clog the geocomposite are not entrapped between layers of geosynthetics;
- Adequate ballast, such as sandbags, is provided to prevent uplift of the geosynthetics by wind and prevent damage of geosynthetics during temporary anchoring; and
- Geosynthetics are inspected for damage after placement any necessary repairs are made.

Seaming operations for all geosynthetics will be monitored by the CQA officers to verify that they are conducted in accordance with the relevant technical specifications and the geosynthetics installer's quality control program. For geomembrane, this includes both trial and production seams, and related non-destructive and destructive testing of each. Any seams that fail non-destructive testing will be repaired and re-tested by the geosynthetics installer. For seams that fail destructive tests, the installer will collect and test additional samples from the length of the affected seam as indicated in the relevant technical specifications until samples are obtained that yield satisfactory destructive testing results. For geocomposite, this includes verification that the composition of the geonet ties and geotextile seams meet the requirements of the relevant technical specifications, as well as the tie spacing and geonet / geotextile overlap. Geonet ties or geotextile seams that do not comply with the material specifications will be rejected from use in the final cover. Inadequate tie spacing and/or geotextile overlap will be corrected by the geosynthetic installer and subject to re-inspection and approval by the CQA officers.

4.4.2 Protective Soil Layer

The CQA officers will observe placement of the protective soil layer above the geosynthetics to verify that the installed geosynthetics are not damaged. The thickness of the first lift will be at least 12 inches and this material will be placed onto the geocomposite by a bulldozer that exerts a ground pressure of 5 pounds per square inch (psi) or less. Fill material will be free of sticks, rocks, roots or other debris that may puncture the geomembrane. If damage to geosynthetics is observed during fill placement, the filling operations will be suspended and not resumed in the damaged area until repairs to the geosynthetics can be made by the geosynthetics installer. The CQA officers will document any damage to the geosynthetics in their daily report as well as associated repairs and testing.

The fill material will be randomly sampled by the CQA officers. These samples will be analyzed by a geotechnical laboratory for documentation purposes.

The thickness of the completed protective soil layer will be verified through field survey and comparison of the geomembrane subgrade elevations and final elevations.

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4.4.3 Storm Water Pump Stations

The CQA officers will inspect components of the storm water pump stations prior to installation to verify that they are in conformance with the relevant technical specifications. Surveying will be conducted during construction where appropriate to verify that these items are set at the elevations specified on the construction drawings. The CQA officers will observe construction of any piping and manhole connections and related backfill activities to verify that the materials and methods utilized conform to the relevant technical specifications and drawings for these items, and that leak testing is conducted where specified and that the results meet or exceed the requirements of the relevant technical specifications.

The CQA officers will observe nuclear density testing of structural backfill used in pump station foundations to verify compaction in accordance with the relevant technical specifications. CQA officers will also collect concrete delivery tickets and observe related quality control testing (e.g., slump, air entrainment, etc.) by the contractor to verify conformance with the relevant technical specifications. CQA officers will have authority to reject a load of concrete based upon the results of quality control testing. Cylindrical control samples of ready-mix concrete will be prepared by the contractor and tested for compressive strength to verify that cured compressive strengths meet or exceed the requirements of the relevant technical specifications. Compressive strength test results will be submitted to the CQA officers for review and approval prior to acceptance of the work.

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5 CLOSURE AND POST-CLOSURE ACTIVITIES

5.1 Final Cover Construction and Closure Report

Ameren will prepare a final cover construction and closure report (closure report). This document will be submitted to IEPA within 90 days of completion of all closure activities described in Sections 3 and 4 of this closure plan. The closure report will include certification by a professional engineer that the Venice ponds have been closed in accordance with this closure plan, and will also contain supporting documentation including, but not limited to:

- Engineering and hydrogeology reports including, but not limited to, monitoring well completion reports and boring logs, monitoring well abandonment forms, all CQA reports, certifications, and designations of CQA officers-in-absentia;
- Photographs of the final cover system and any other photographs relied upon to document construction activities;
- A written summary of closure requirements and activities as set forth in the closure plan;
- Any other information relied upon by the professional engineer in making the closure certification; and
- The signature and seal of the professional engineer supervising the implementation of the closure plan, the preparation of the closure report, and making the certification of completion of closure.

5.2 Post-Closure Maintenance of Cover System

After closure and until completion of the post-closure report, Ameren will perform inspections of the cover system at the same time and frequency as the groundwater monitoring sampling schedule established in Table 3-3 and will take actions to mitigate the following conditions:

- Rills, gullies, and crevices six inches or deeper will be filled. Areas identified as particularly susceptible to erosion will be recontoured.
- Eroded and scoured drainage channels will be repaired, and lining material will be replaced if necessary.
- Holes and depressions created by settling will be filled and recontoured to prevent standing water.
- Areas in excess of 100 square feet, cumulative, with failed or eroded vegetation will be revegetated.

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- Tears, rips, punctures, and other damage to the geosynthetic membrane will be repaired.
- Any woody species that take root on the protective cover will be removed.

5.3 Post-Closure Care Plan

A post-closure care plan will be submitted to IEPA within 90 days of completion of the cover.[3] The post closure care plan will include the following elements:

- Description of the post-closure care activities as listed in Section 5.2 of this closure plan;
- Description of the groundwater monitoring system as described in Section 3.1 of this closure plan, and a description of the maintenance plan for the groundwater monitoring system;
- Description of the groundwater monitoring program as described in Section 3.2 of this closure plan;
- Identification of the location of the monitoring wells used for trend analyses as listed in Section 3.4 of this closure plan;
- Description of the groundwater trend analysis methods as listed in Section 3.4 of this closure plan;
- A proposal for a groundwater management zone as listed in Section 1.5 of this closure plan;
- Description of actions proposed to mitigate statistically significant increasing trends in accordance with Section 3.4 of this closure plan, and the operation and maintenance of any structures or devices as listed in Section 3.5 of this closure plan; and
- The signature and seal of the professional engineer supervising the preparation of the post-closure care plan.

5.4 Annual Reporting

A report will be provided to IEPA annually during the post closure care period. The annual report will include the following items:

- Groundwater monitoring data;
- Annual trend analysis results per Section 3.4 of this Closure Plan, including a preliminary assessment of any statistically significant increasing trends;

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[3] In 35 IAC 840, the post-closure care plan is due 180 days after enactment of the rule. In this case, all of the elements of the post-closure care plan are included in this closure plan; however some items such as monitoring wells, are planned at this point in time. Therefore, we propose to submit the post-closure care plan after completion of the cover. This will allow inclusion of as-built details such as monitoring well construction.

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- Groundwater monitoring system maintenance inspection forms, including a description of any maintenance or replacement activities performed; and
- Cover inspection reports and a description of any maintenance activities performed on the cover.

The annual report will be provided to IEPA by March 31 of the following year.

5.5 Post-Closure Report and Certification of Completion of Post-Closure Care Plan

Post-closure care will continue until a demonstration of compliance with the groundwater quality standards as set forth in Section 3.3 has been approved by the Agency. Ameren will prepare and submit to IEPA for review and approval a post-closure report within 60 days after satisfying the requirements of the approved post-closure care plan and achieving the applicable groundwater quality standards as set forth in the plan and Sections 3.3 and 3.4 of this closure plan. The post-closure report will include a certification(s) by a professional engineer that the objectives of this closure plan and post-closure care plan have been met. A professional geologist may supervise post-closure care activities as appropriate under the Professional Geologist Licensing Act (225 ILCS 745). The report will also contain supporting documentation including, but not limited to:

- Engineering and hydrogeology reports including, but not limited to, documentation of compliance with the groundwater quality standards of Section 3.3;
- Photographs of the final cover system and any other photographs relied upon to document construction activities ;
- A written summary of post-closure care requirements and activities as set forth in the post-closure care plan and their completion;
- Any other information relied upon by the professional engineer or professional geologist, as appropriate for the activity, in making the post-closure care certification(s); and
- The signature and seal of the professional engineer or professional geologist (if utilized) supervising the implementation of the post-closure care plan, and the signature and seal of the professional engineer supervising preparation of the post-closure report and making the certification of completion of the post-closure care plan.

6 SCHEDULE

Closure and post closure activities will be completed according to the schedule below. IEPA will be notified of any changes in schedule. Such notifications will include the reason(s) for the change and a new schedule.

- Installation of groundwater monitoring system: within 90 days of IEPA approval of this closure plan.
- Implementation of groundwater monitoring plan: the quarter immediately following installation of the groundwater monitoring system.
- Application for new, or modification of existing, storm water discharge permits: within 180 days of IEPA approval of this closure plan or US Army Corps of Engineers approval the levee alteration and 404 permitting for the outfalls, whichever is later.
- Construction of the cover: within 18 months of IEPA approval of this closure plan or US Army Corps of Engineers approval the levee alteration and 404 permitting for the outfalls, whichever is later.
- Submittal of closure report: 90 days after completion of closure activities as outlined in Section 4 of this closure plan.
- Submittal of post-closure care plan: 90 days after completion of closure activities as outlined in Section 4 of this closure plan.
- Post-closure report: 60 days after satisfying the requirements of the approved post-closure care plan and achieving the applicable groundwater quality standards as set forth in the plan and Sections 3.3 and 3.4 of this closure plan. Specifically, when no statistically significant increase is detected in the concentration of any constituent above that measured and recorded during the immediately preceding scheduled sampling for three consecutive years after changing to an annual monitoring frequency; or, when contaminated leachate is no longer generated by the Venice ash ponds.

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7 REFERENCES

Schroeder, P.R., T.S. Dozier, P.A. Zappi, B.M. McEnroe, J.W. Sjostrom, and R.L. Peyton, 1994, *The Hydrologic Evaluation of Landfill Performance (HELP) Model: Engineering Documentation for Version 3*, EPA/600/R-94/168b, U.S. Environmental Protection Agency Office of Research and Development, Washington, D.C.

Soil Conservation Service, 1986, *Urban hydrology for Small Watersheds*. Technical Release 55.

Zheng, Z., and P.P. Wang, 1998, *MT3DMS, A Modular Three-Dimensional Multispecies Transport Model*, Model documentation and user's guide prepared by the University of Alabama Hydrogeology Group for the US Army Corps of Engineers.

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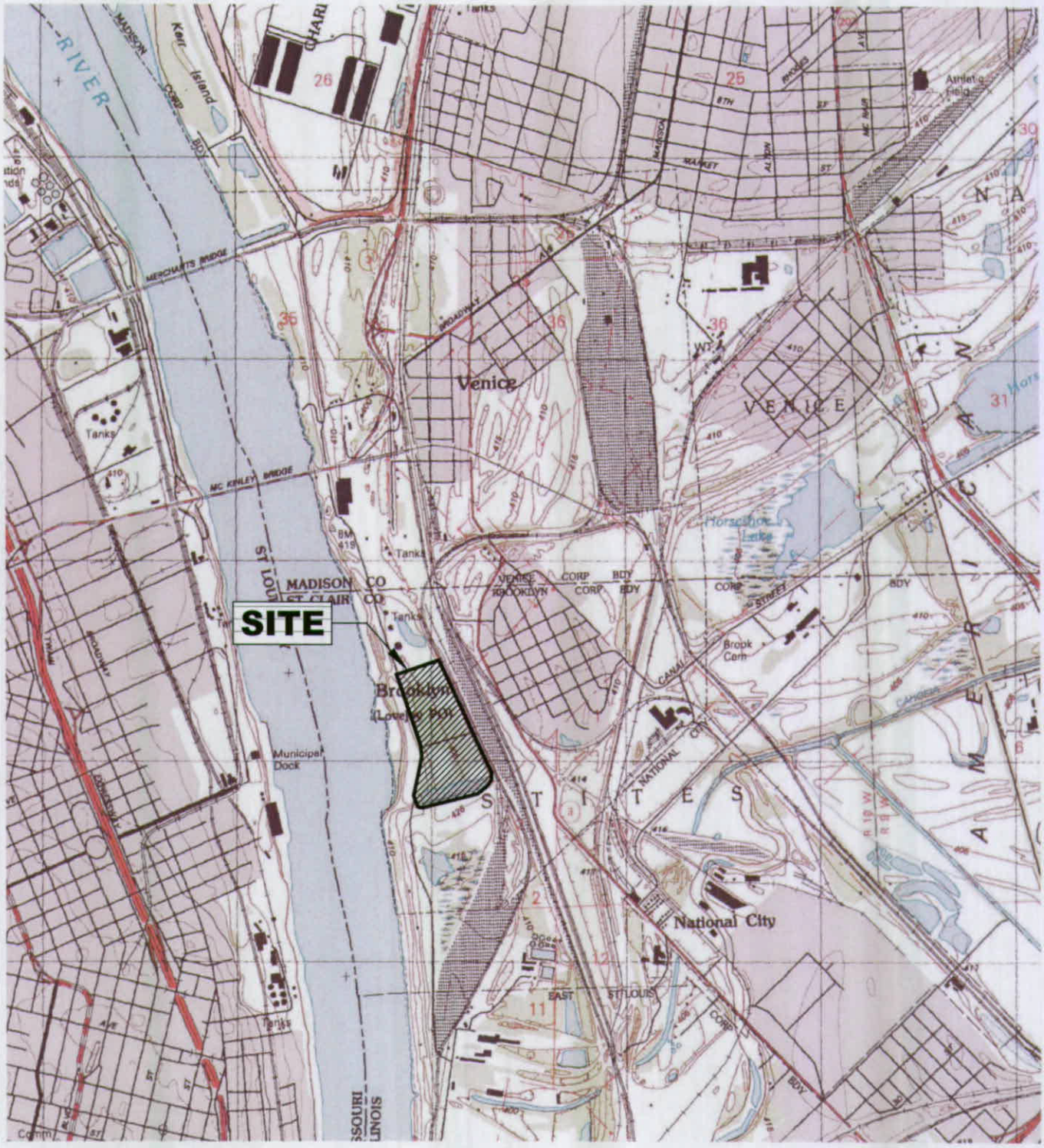
FIGURES



SOURCE:
HTTP://STORE.USGS.GOV
USGS 7.5 MINUTE QUADRANGLE,
GRANITE CITY, IL–MO. DATED 1998.

SITE LOCATION MAP

AMEREN
VENICE POWER STATION
VENICE, ILLINOIS

NATURAL RESOURCE TECHNOLOGY

DRAWN BY: RLH 11/22/10 APP'D BY: BRH DATE: 11/22/10

PROJECT NO. 1949

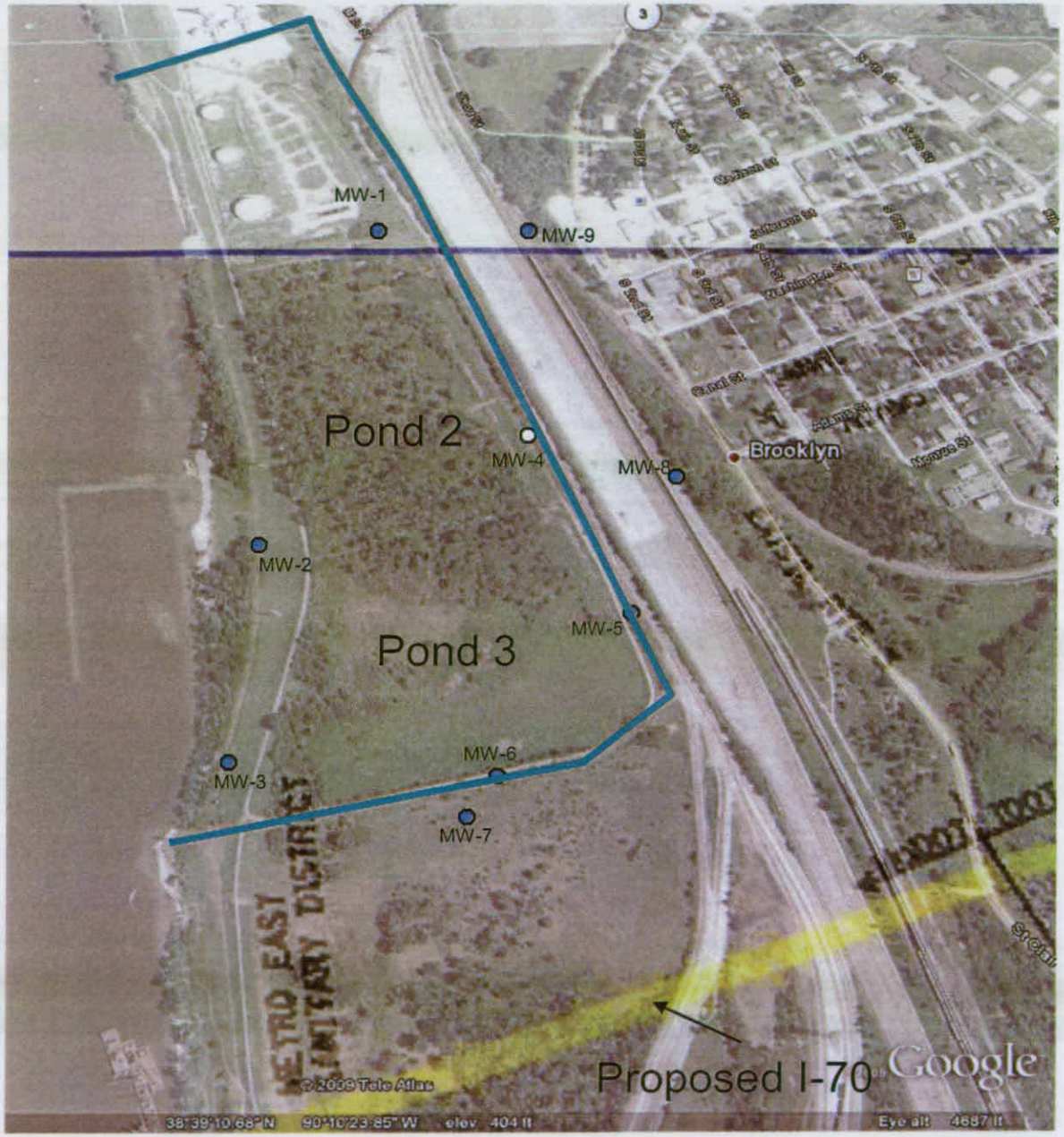
DRAWING NO. 1949–A01C

FIGURE NO. 1–1

Figure 1-3 Approximate Extent of Groundwater Management Zone

- Existing MW Location
- Abandoned MW Location
- Proposed Groundwater Management Zone (approximate), see Appendix L for exact location

The dark blue line across the top of the page is an artifact of the I-70 overlay on the aerial photo



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NATURAL RESOURCE TECHNOLOGY

Received Clerk's Office 09/28/2020
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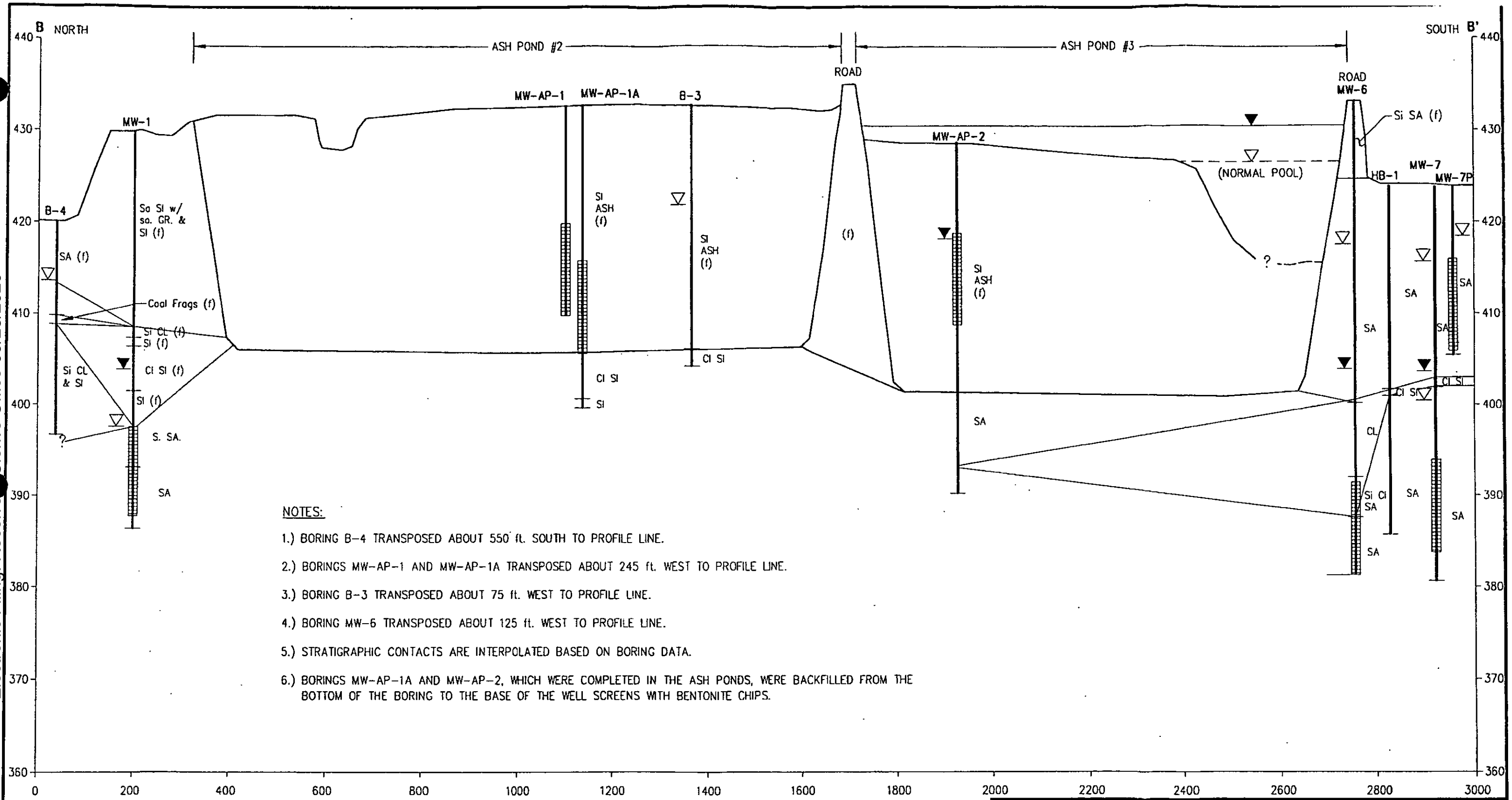

NOTES:

1.) BORING B-4 TRANSPOSED ABOUT 550 ft. SOUTH TO PROFILE LINE.

2.) BORINGS MW-AP-1 AND MW-AP-1A TRANSPOSED ABOUT 245 ft. WEST TO PROFILE LINE.

3.) BORING B-3 TRANSPOSED ABOUT 75 ft. WEST TO PROFILE LINE.

4.) BORING MW-6 TRANSPOSED ABOUT 125 ft. WEST TO PROFILE LINE.

5.) STRATIGRAPHIC CONTACTS ARE INTERPOLATED BASED ON BORING DATA.

6.) BORINGS MW-AP-1A AND MW-AP-2, WHICH WERE COMPLETED IN THE ASH PONDS, WERE BACKFILLED FROM THE BOTTOM OF THE BORING TO THE BASE OF THE WELL SCREENS WITH BENTONITE CHIPS.

LEGEND

CL = CLAY (f) = FILL
SI = SILT ▽ = WATER LEVEL DURING DRILLING
SA = SAND ▼ = WATER LEVEL ON JULY 8, 1999
GR = GRAVEL

SCALE

VERTICAL - 1 INCH = 10 FEET
HORIZONTAL - 1 INCH = 200 FEET

HANSON ENGINEERS INCORPORATED

SUBSURFACE PROFILE B-B"

HYDROGEOLOGICAL INVESTIGATION
VENICE POWER PLANT
AMEREN SERVICES
VENICE, ILLINOIS

JOB NO. 95S3085B Figure 2-1



LEGEND

410 — WATER TABLE ELEVATION CONTOUR, FT. (NGVD)

GROUNDWATER FLOW DIRECTION

MW-1 400.50 — MONITORING WELL AND WATER TABLE ELEVATION, FT. (NGVD)

NM — NOT MEASURED

SOURCE:
2005 DIGITAL ORTHOPHOTO FROM ILLINOIS NATURAL RESOURCES GEOSPATIAL DATA CLEARINGHOUSE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY SOURCE WATER ASSESSMENT PROGRAM (SWAP) ArcIMS MAPPING TOOL (http://maps.epa.state.il.us/website/swap/intro.htm).

ILLINOIS STATE GEOLOGOICAL SURVEY, DIGITAL WATER WELL RECORDS INTERACTIVE MAP (http://www.isgs.illinois.edu/maps-data-pub/wwdb/wwdb.shtml).

HANSON ENGINEERS, INC., UNDATED FIGURE "SITE PLAN, HYDROGEOLOGICAL INVESTIGATION, VENICE POWER PLANT", JOB NO. 95530858.

N

0 200 400
SCALE IN FEET

FIGURE NO. 2-2

PROJECT NO. 1949/2.2

NATURAL RESOURCE TECHNOLOGY

GROUNDWATER ELEVATION
JUNE 26, 2008
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

DRAWN BY: KNW/RLH	DATE: 02/04/11
CHECKED BY: BRH	DATE: 02/04/11
APPROVED BY: BRH	DATE: 02/04/11

DRAWING NO:1949-22-B05C
REFERENCE:38090f23.sid



LEGEND

400 — WATER TABLE ELEVATION CONTOUR, FT. (NGVD)

GROUNDWATER FLOW DIRECTION

MW-1 ⊕ 400.50 — MONITORING WELL AND WATER TABLE ELEVATION, FT. (NGVD) ELEVATIONS IN PARANTHESIS NOT USED FOR CONTOURING

SOURCE:
2005 DIGITAL ORTHOPHOTO FROM ILLINOIS NATURAL RESOURCES GEOSPATIAL DATA CLEARINGHOUSE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY SOURCE WATER ASSESSMENT PROGRAM (SWAP) ArcIMS MAPPING TOOL (http://maps.epa.state.il.us/website/swap/intro.htm).

ILLINOIS STATE GEOLOGOICAL SURVEY, DIGITAL WATER WELL RECORDS INTERACTIVE MAP (http://www.isgs.illinois.edu/maps-data-pub/wwdb/wwdb.shtml).

HANSON ENGINEERS, INC., UNDATED FIGURE "SITE PLAN, HYDROGEOLOGICAL INVESTIGATION, VENICE POWER PLANT", JOB NO. 9553085B.

N

0 200 400
SCALE IN FEET

NATURAL RESOURCE TECHNOLOGY

GROUNDWATER ELEVATION SEPTEMBER 26, 2008

ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

DRAWN BY: KNW/RLH	DATE: 02/04/11
CHECKED BY: BRH	DATE: 02/04/11
APPROVED BY: BRH	DATE: 02/04/11
DRAWING NO: 1949-22-B04C	
REFERENCE: 38090f23.sid	

PROJECT NO. 1949/2.2

FIGURE NO. 2-3



LEGEND

- 388 — WATER TABLE ELEVATION CONTOUR, FT. (NGVD)
- GROUNDWATER FLOW DIRECTION
- MW-1 # 386.70 — MONITORING WELL AND WATER TABLE ELEVATION, FT. (NGVD) ELEVATIONS IN PARANTHESIS NOT USED FOR CONTOURING

SOURCE:
2005 DIGITAL ORTHOPHOTO FROM ILLINOIS NATURAL RESOURCES GEOSPATIAL DATA CLEARINGHOUSE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY SOURCE WATER ASSESSMENT PROGRAM (SWAP) ArcIMS MAPPING TOOL (http://maps.epa.state.il.us/website/swap/intro.htm).

ILLINOIS STATE GEOLOGOICAL SURVEY, DIGITAL WATER WELL RECORDS INTERACTIVE MAP (http://www.isgs.illinois.edu/maps-data-pub/wwdb/wwdb.shtml).

HANSON ENGINEERS, INC., UNDATED FIGURE "SITE PLAN, HYDROGEOLOGICAL INVESTIGATION, VENICE POWER PLANT", JOB NO. 95530858.

N

0 200 400
SCALE IN FEET

FIGURE NO. 2-4

PROJECT NO. 1949/2.2

NATURAL RESOURCE TECHNOLOGY

GROUNDWATER ELEVATION DECEMBER 2, 2008

ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

DRAWN BY: KNW/RLH	DATE: 02/04/11
CHECKED BY: BRH	DATE: 02/04/11
APPROVED BY: BRH	DATE: 02/04/11
DRAWING NO: 1949-22-B02C	
REFERENCE: 38090f23.sid	



LEGEND

400 — WATER TABLE ELEVATION CONTOUR, FT. (NGVD)

GROUNDWATER FLOW DIRECTION

MW-1 ⊕ 398.50 — MONITORING WELL AND WATER TABLE ELEVATION, FT. (NGVD) ELEVATIONS IN PARANTHESIS NOT USED FOR CONTOURING

SOURCE:
2005 DIGITAL ORTHOPHOTO FROM ILLINOIS NATURAL RESOURCES GEOSPATIAL DATA CLEARINGHOUSE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY SOURCE WATER ASSESSMENT PROGRAM (SWAP) ArcIMS MAPPING TOOL (http://maps.epa.state.il.us/website/swap/intro.htm).

ILLINOIS STATE GEOLOGOICAL SURVEY, DIGITAL WATER WELL RECORDS INTERACTIVE MAP (http://www.isgs.illinois.edu/maps-data-pub/wwdb/wwdb.shtml).

HANSON ENGINEERS, INC., UNDATED FIGURE "SITE PLAN, HYDROGEOLOGICAL INVESTIGATION, VENICE POWER PLANT", JOB NO. 95530858.

N

0 200 400
SCALE IN FEET

FIGURE NO. 2-5

PROJECT NO. 1949/2.2

NATURAL RESOURCE TECHNOLOGY

GROUNDWATER ELEVATION MARCH 14, 2009

ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

DRAWN BY KNW/RLH	DATE: 02/04/11
CHECKED BY: BRH	DATE: 02/04/11
APPROVED BY: BRH	DATE: 02/04/11
DRAWING NO:1949-22-B03C REFERENCE:38090f23.sid	

Figure 2-6 Adjustments to Monitoring Well Network

- Existing MW Location
- Abandoned MW Location
- Proposed Deep Well
- Proposed Water Table Well
- Existing MW Location Proposed for Abandonment
- Proposed Groundwater Management Zone (approximate), see Appendix L for exact location

The dark blue line across the top of the page is an artifact of the I-70 overlay on the aerial photo

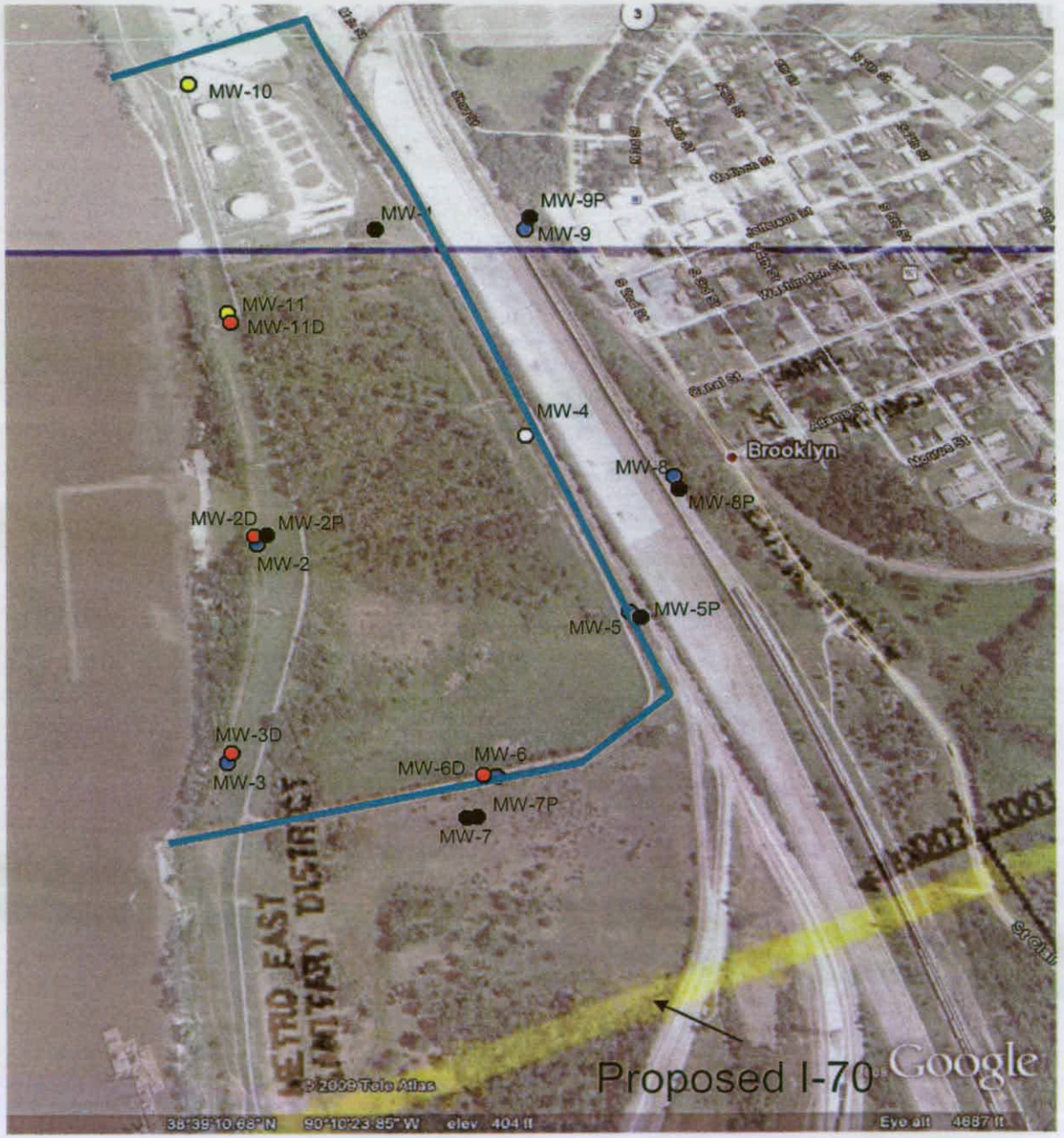

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Figure 2-7 Observed Boron Concentrations in 2009

- Existing MW Location
- Abandoned MW Location
- Geoprobe Locations

Geoprobe data (October 2009)

MW data (June 2009)

1.6 Dissolved Boron concentration (mg/L)

Boron 2.0 mg/L concentration contour (Class I standard)

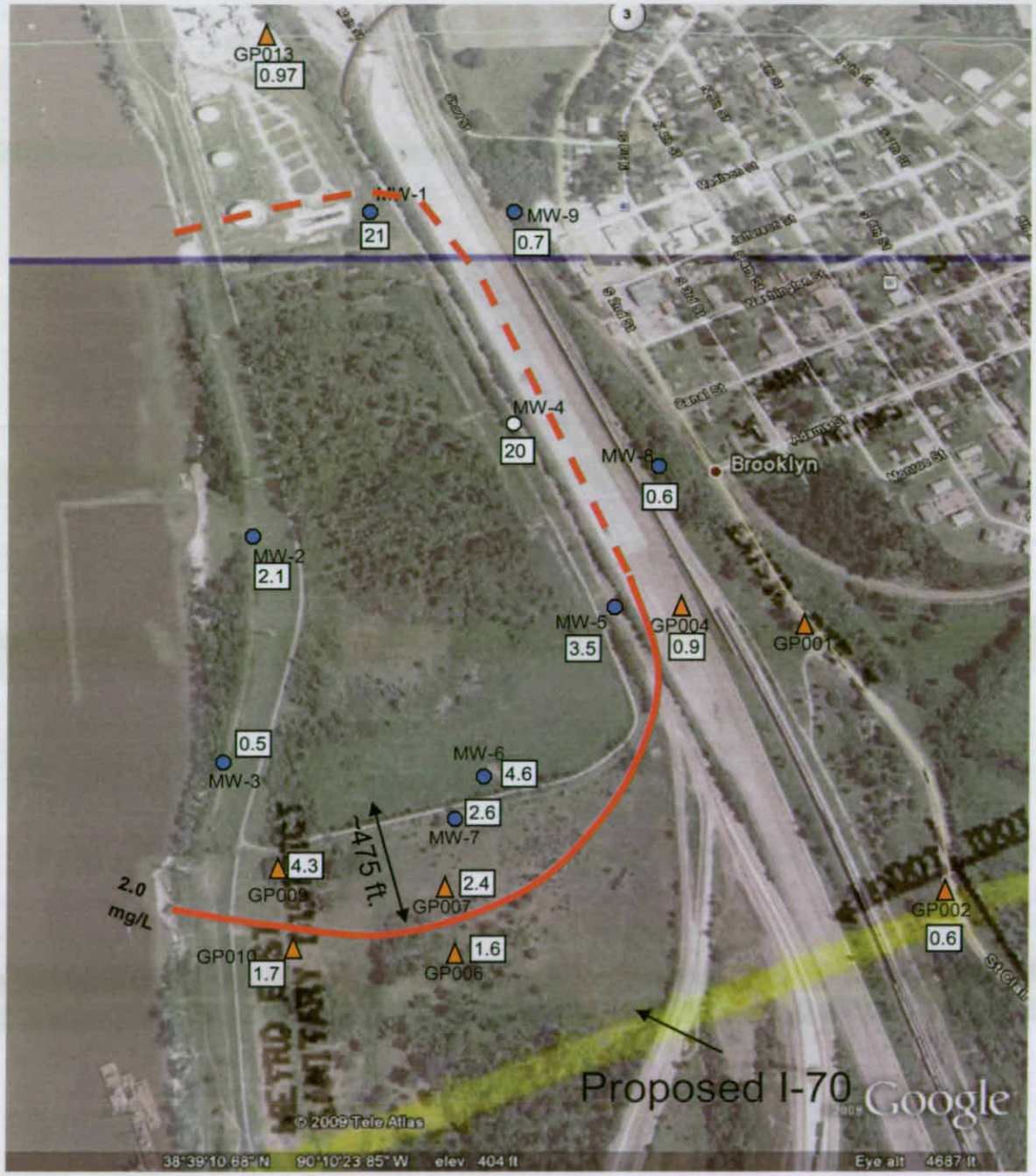

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Figure 2-8 Boron and Arsenic Concentrations in 2009

- Existing MW Location
- Abandoned MW Location
- Geoprobe Locations

Geoprobe data (October 2009)

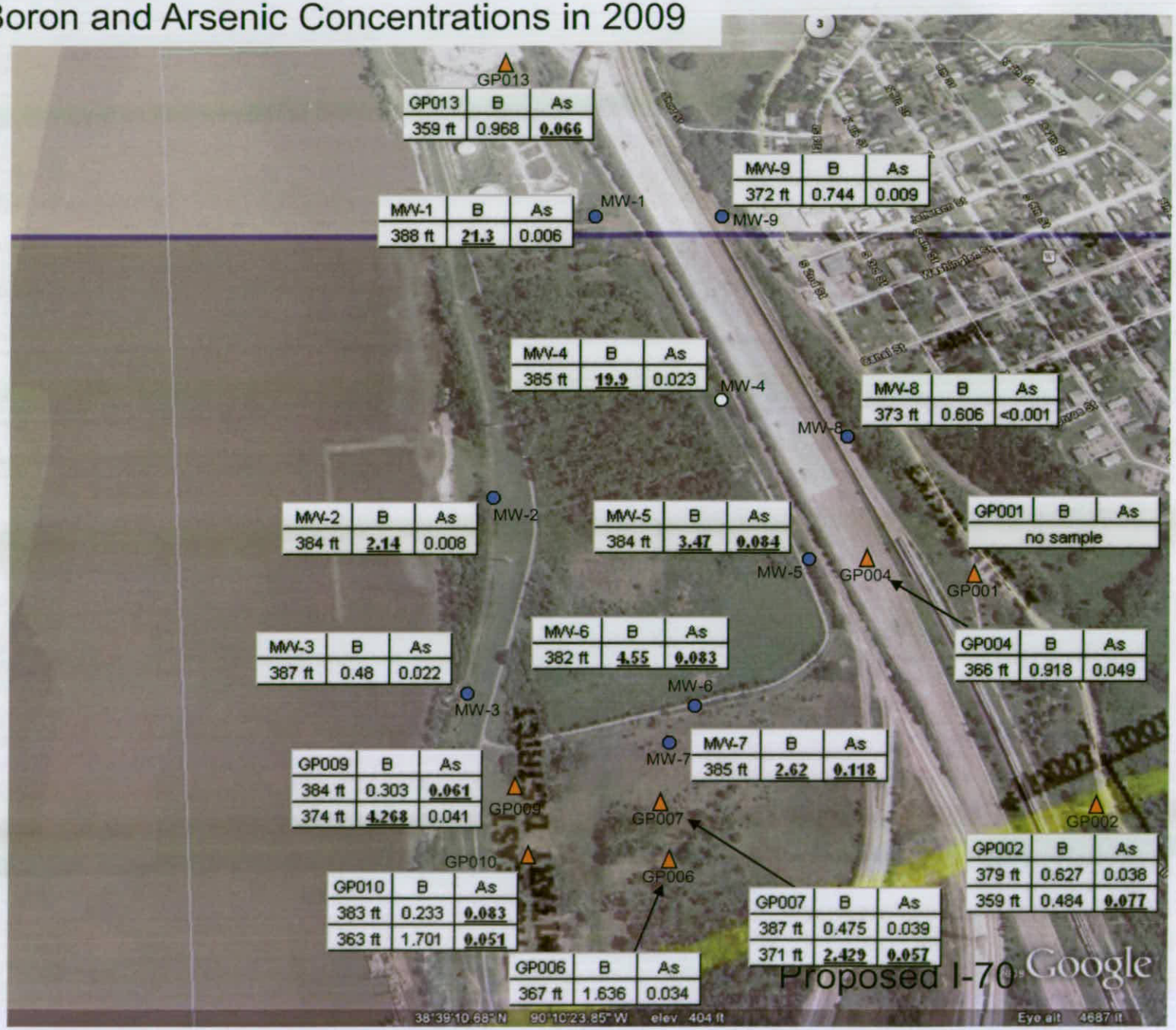
MW 3 data (March 2009)

Other MW data (June 2009)

Sample depths are elevations, in feet

Bold and Underline indicate dissolved concentrations in excess of standard:

Stnd.	B	As
Class I	**2.0**	**0.05**



NATURAL RESOURCE TECHNOLOGY

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Figure 2-9 Scatter Plot Comparing Boron and Arsenic Concentrations in Groundwater Samples Collected in 2009

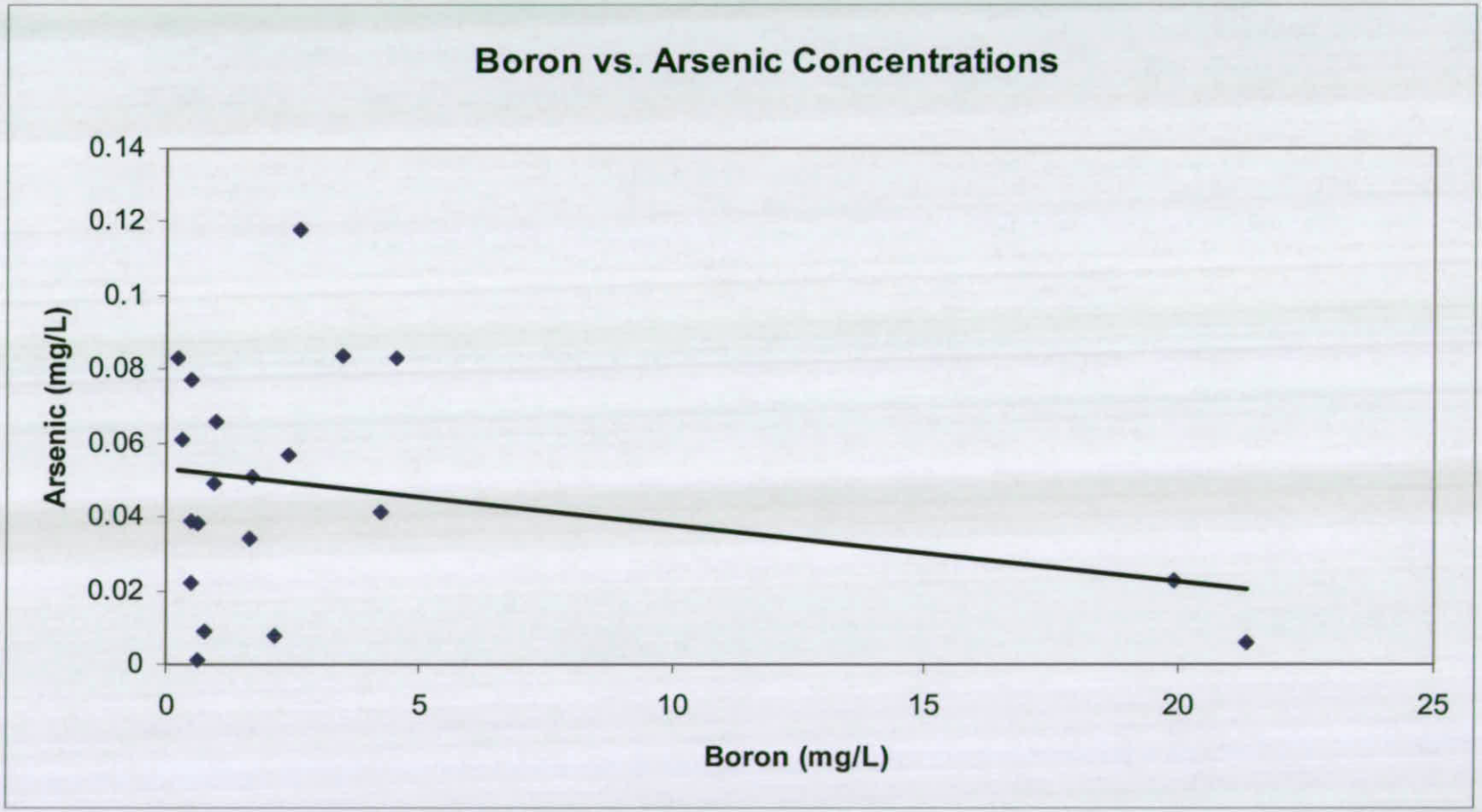

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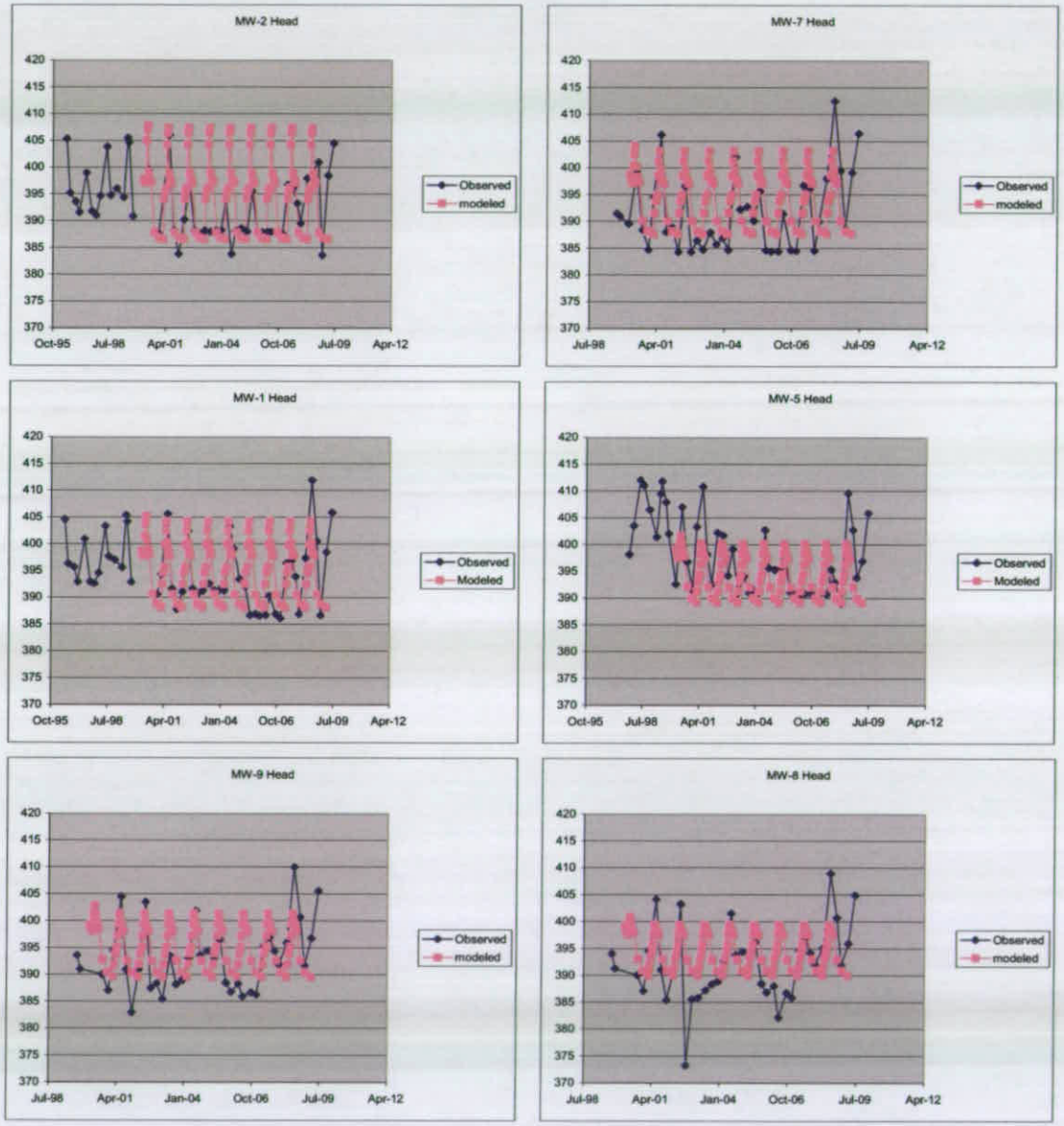
Figure 2-10 Flow Model Calibration Results



Head calibration graphs [Run 19]. MW-2 and MW-7 represented downgradient calibration; MW-1 and MW-5 represented on-site calibration; and MW-8 and MW-9 represented upgradient calibration.

NATURAL RESOURCE TECHNOLOGY

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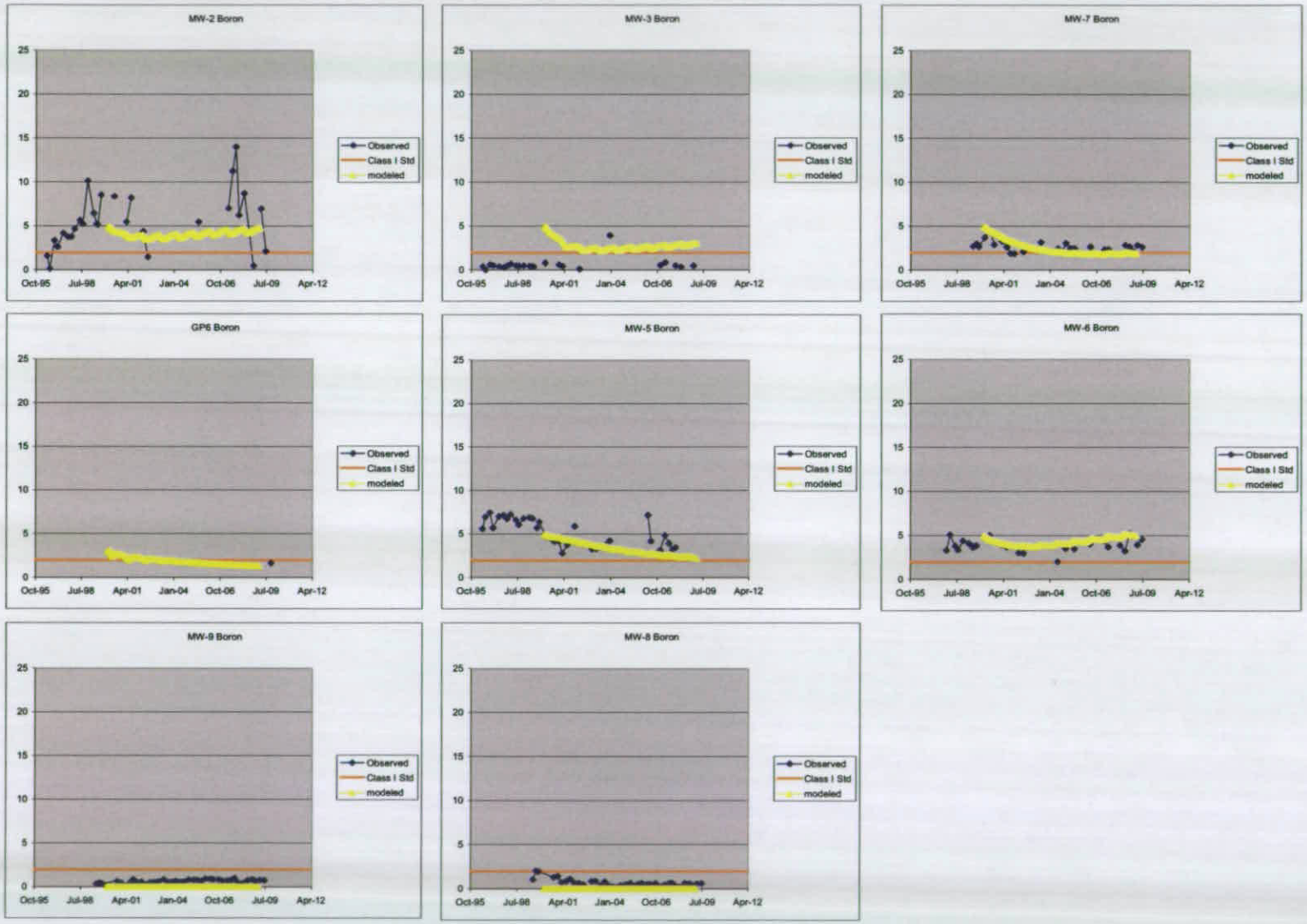
Figure 2-11 Transport Model Calibration Results



Concentration calibration graphs [Run 19]. MW-2, MW-3, MW-7, and GP-6 represented downgradient concentrations. GP-6 is a monitoring point placed in the model to compare to a groundwater grab sample collected in the fall of 2009. MW-5 and MW-6 represented on-site conditions; and MW-8 and MW-9 represented upgradient conditions.

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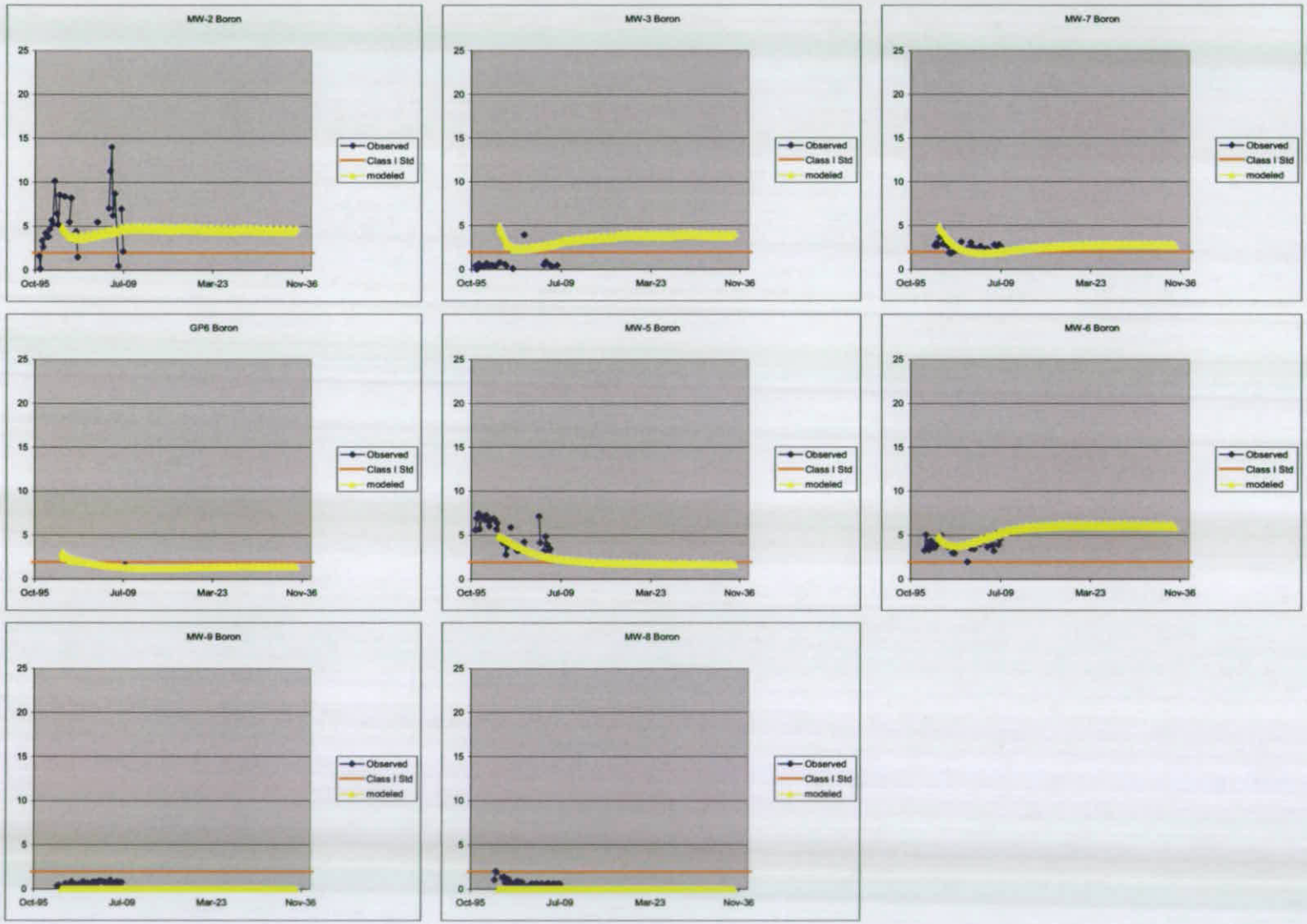
Figure 2-12 Prediction Model Results (No Action Scenario)



No Action Prediction Scenario [Run 19pna]. MW-2, MW-3, MW-7, and GP-6 represented downgradient concentrations. GP-6 is a monitoring point placed in the model to compare to a groundwater grab sample collected in the fall of 2009. MW-5 and MW-6 represented on-site conditions; and MW-8 and MW-9 represented upgradient conditions.

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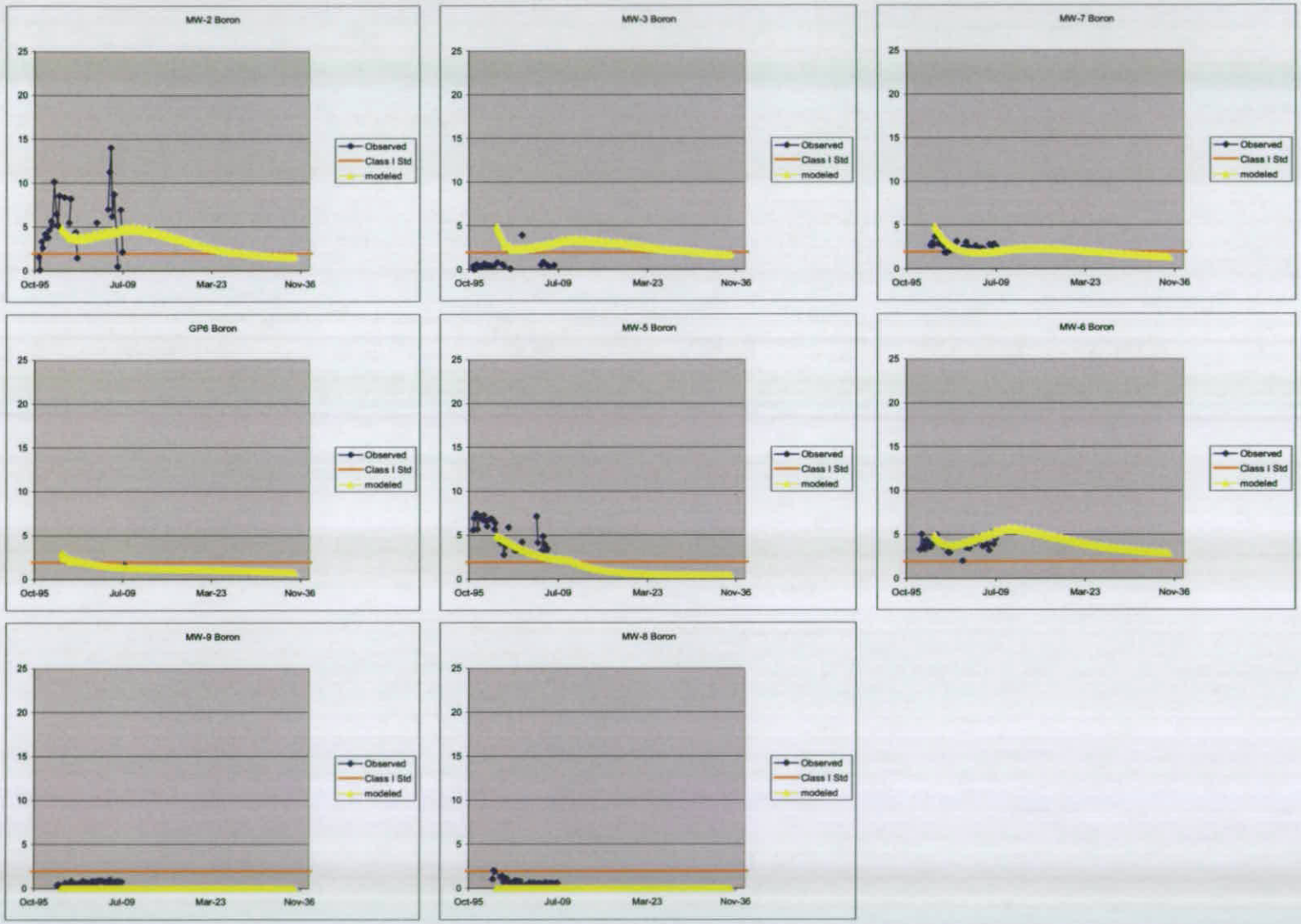
Figure 2-13 Prediction Model Results (Base Case Scenario)



Base Case Prediction Scenario [Run 19pbc]. MW-2, MW-3, MW-7, and GP-6 represented downgradient concentrations. GP-6 is a monitoring point placed in the model to compare to a groundwater grab sample collected in the fall of 2009. MW-5 and MW-6 represented on-site conditions; and MW-8 and MW-9 represented upgradient conditions.

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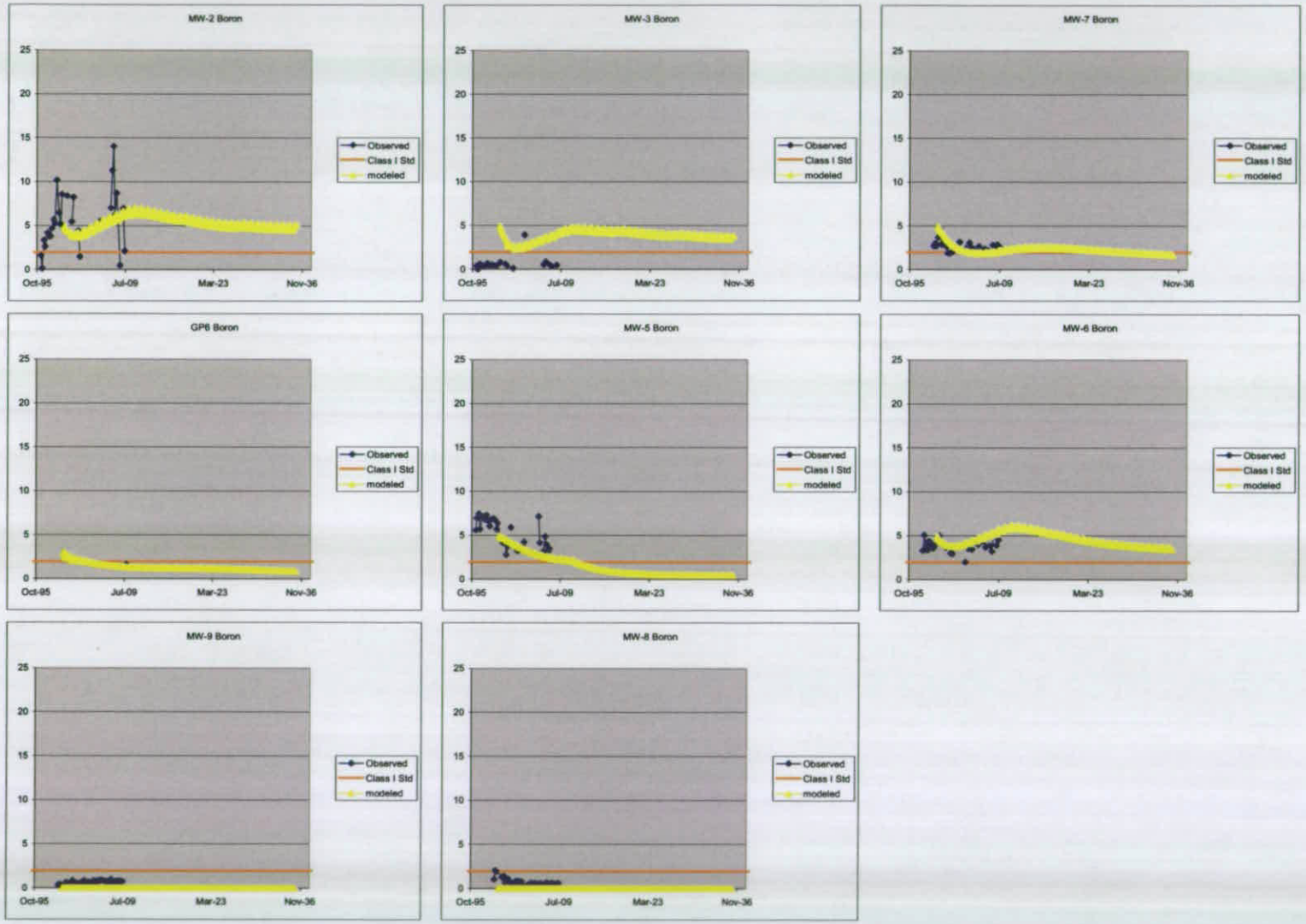
Figure 2-14 Prediction Model Results (Base Case Sensitivity)



Base Case Prediction with entire footprint of saturated ash [Run 18pbc]. Compared to Figure 16, note that the results are similar with the following exception: Concentrations in MW-2 and MW-3 (downgradient, between the levee and ponds) stabilize around 4 to 5 mg/L, twice the Class I standard.

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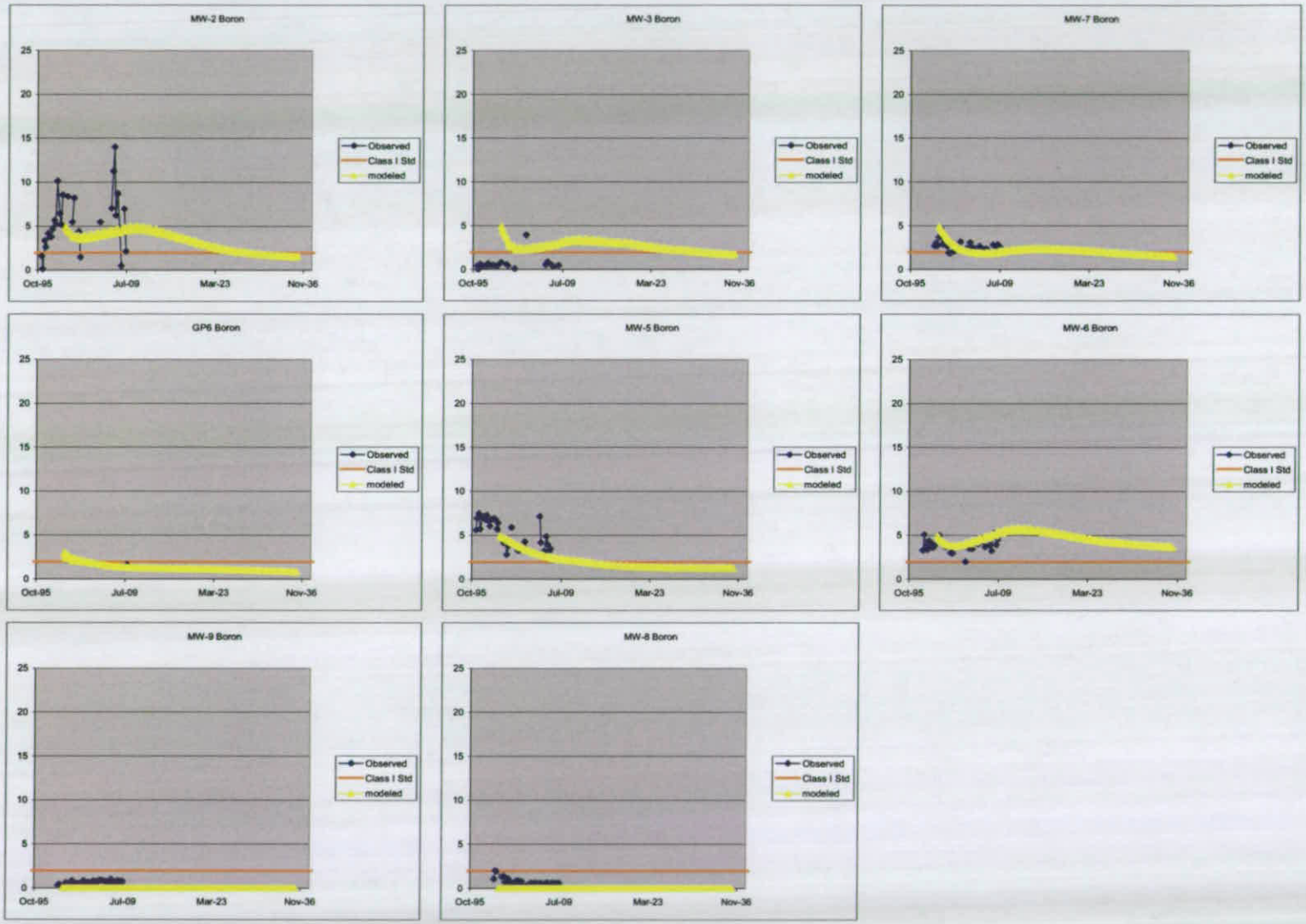
Figure 2-15 Prediction Model Results (Case 1 Scenario)



Case 1 Prediction Scenario [Run 19pc1]. Concentration trends were similar to the Base Case scenario, with all off-site wells below the Class I standard. The most notable exception is that MW-5 concentrations appear to stabilize closer to the Class I standard than in the Base Case.

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Figure 3-1 Groundwater Monitoring Program Well Locations

- Monitoring Well
- On-Site Compliance Well
- Proposed Groundwater Management Zone (approximate), see Appendix L for exact location

The dark blue line across the top of the page is an artifact of the I-70 overlay on the aerial photo



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TABLES

Table 1-1
Comparison to 35 IAC Section 840.130 Closure Plan Contents
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Section	Description	Location in this Document
840.130(a)	Site Map	Section 1.2
840.130(b)	Description of [Facility]	Section 1.3
840.130(c)	Description of Closure Activities to be Performed	Section 1.4
840.130(d)	Description and Results of the Hydrogeologic Site Investigation	Section 2
840.130(e)	Description of Groundwater Trend Analysis Methods	Section 3.4
840.130(f)	[Plans] for the Groundwater Monitoring System	Section 3.1
840.130(g)	Description of the Groundwater Monitoring Program	Section 3.2
840.130(h)	Identification and Location of the Monitoring Wells	Section 3.1
840.130(i)	[Plans] for the Groundwater Collection Trench	not applicable
840.130(j)	[Plans] for the Final Slope Design...Compliance with Stability Criteria	Section 4.2
840.130(k)	[Plans] for the Final Cover System	Section 4.3
840.130(l)	Estimates of the Amount of Time to Complete Closure	Section 6
840.130(m)	[Description of] Groundwater Management Zone	Section 1.5
840.130(n)	Description of Construction Quality Assurance Program	Section 4.4
840.130(o)	Description of Actions Proposed to Mitigate Statistically Significant Increasing Trends	Section 3.5
840.130(p)	Signature and Seal of Professional Engineer	Title Page

[ ] indicates paraphrasing

Table 2-1
Mississippi River Mean Monthly Stage
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Mississippi - 27 TW (MI7T) - Mean Monthly River Stage												
	January	February	March	April	May	June	July	August	September	October	November	December
2004	384.73	382.84	**396.43**	**394.39**	**396.07**	**407.11**	**396.88**	389.29	388.31	385.46	391.71	392.36
2005	**398.31**	**397.03**	388.52	**395.58**	393.08	**396.47**	387.57	383.08	383.2	386.53	381	380.89
2006	383.04	382.54	386.03	**395.79**	**395.66**	388.02	382.66	381.89	383.45	381.9	380.44	386.48
2007	388.73	385.49	**399.02**	**404.65**	**405.51**	**397.75**	391.65	390.75	391.28	393.05	387.91	385.99
2008	390.1	**394.22**	**403.82**	**409.83**	**410.25**	**415.92**	**409.98**	392.98	**399.24**	390.56	387.68	386.44

Mean river stage (1965 - 2008): 393.55 ft

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Bold and shaded numbers indicate monthly mean river stage in excess of mean river stage

Data obtained from USACE web archive (http://mvs-wc.mvs.usace.army.mil/archive/mi/mi7t/)

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Table 2-2
Hydraulic Gradients and Groundwater Velocity
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Date	Flow Direction	Hydraulic Gradient	Groundwater Velocity (ft/year)
6/26/2008	Away from River	0.004	45
9/26/2008	Toward River	0.001	13
12/2/2008	Toward River	0.008	90
3/14/2009	Away from River	0.006	75

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Table 2-3
Hydraulic Conductivity Values
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

	Date	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity Geomean (cm/sec)	Hydraulic Conductivity Geomean (ft/year)
MW-1	Apr-96	2.40E-03	2.40E-03	2.48E+03
MW-2	Apr-96	3.73E-03	3.63E-03	3.76E+03
	Apr-96	3.53E-03		
MW-3	Apr-96	2.30E-03	2.30E-03	2.38E+03
MW-7	Jul-99	4.53E-03	3.50E-03	3.63E+03
	Jul-99	2.71E-03		
Site Geomean			2.89E-03	3.00E+03

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Source: Hanson, 2000, Table 5.

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Table 2-4
Existing Monitoring Well Network Summary
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Monitoring Well	Date Drilled	Depth Below Grade (ft.)	Surface Elevation (ft.)	Top of Well Casing Elevation (ft.)	Top of Screen Elevation (ft.)	Bottom of Screen Elevation (ft.)	Include in Monitoring Network[1]
MW-1	4/16/96	43.5	429.8	429.4	397.8	387.8	No
MW-2P	6/30/99	18	412.7	412.41	405.2	395.2	No
MW-2	4/15/96	29	412.8	412.57	393.8	393.8	Yes
MW-3	4/15/96	29	411.6	411.21	396.6	396.6	Yes
MW-4	10/13/97	50	434.6	434.49	394.6	384.6	No
MW-5P	7/1/99	18.5	433.5	433.2	425.5	415.5	No
MW-5	10/14/97	50	433.5	433.22	393.5	383.5	Yes
MW-6	10/15/97	52	433.8	433.31	391.8	381.8	Yes
MW-7P	6/30/99	18.5	424.5	424.29	416.5	406.5	No
MW-7	6/29/99	43.5	424.5	424.42	394.5	384.5	No
MW-8P	7/2/99	16	416.5	416.35	405.5	400.5	No
MW-8	7/2/99	43.5	416.4	416.25	383.4	373.4	Yes
MW-9P	7/2/99	16	413.9	413.85	407.9	397.9	No
MW-9	7/2/99	43.5	413.8	413.69	381.8	371.8	Yes

Note:

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1: Wells not included in the proposed monitoring network have been or will be permanently abandoned.

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Table 2-5
Arsenic Concentrations in Leachate Wells and Upgradient Groundwater
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Location	Date	As, diss (mg/L)
Leachate Samples		
AP-1A	9/16/1999	0.018
AP-2	7/8/1999	0.026
AP-2	9/16/1999	0.029
AP-2	6/26/2001	0.015
AP-2	6/20/2002	0.010
Upgradient Samples		
MW-9	6/20/2009	0.009
MW-8	6/20/2009	<0.001
GP002	10/27/2009	0.038
	10/27/2009	0.077
GP004	10/27/2009	0.049

RMN/BGH 11/10

Table 2-6
HELP Model Input/Output Parameters (Cap Alternative Evaluation)
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

	Current	Synthetic	Clay	Earthen	
Input Parameter		**Existing Footprint**			**Notes**
Climate-General					
City	see note	see note	see note	see note	East St. Louis, IL
Latitude	38.65	38.65	38.65	38.65	Plant
Evap Zone	14	21	21	21	poor (14), fair (21)
Leaf Index	1	2	2	2	poor (1), fair (2)
All Others	see note	see note	see note	see note	Defaults for East St. Louis
Climate-precip/temp/ET					
All	see note	see note	see note	see note	Synthetically generated using St. Louis (precipitation) or East St. Louis (ET and solar radiation) defaults
Soils-General					
Area (acres)	58	58	58	58	
% where runoff possible	0	100	100	100	
Specify Initial MC	No	No	No	No	Model calculated
Surface Water/Snow	Calc	Calc	Calc	Calc	Model calculated
Soils-Layers					
1	ash	native	native	native	
2	ash	drainage	clay	ash	
3	ash	synthetic	ash	ash	
4		ash	ash	ash	
5		ash	ash		
		ash			
Soil Parameters--native					
Type	n/a	1	1	1	vertical percolation layer
Thickness (in)	n/a	36	36	18	
Texture	n/a	9	9	9	silt loam, defaults used
Soil Parameters--clay					
Type	n/a	n/a	1	n/a	vertical percolation layer
Thickness (in)	n/a	n/a	36	n/a	
Texture	n/a	n/a	16	n/a	barrier soil, defaults used
Soil Parameters--drainage					
Type	n/a	2	n/a	n/a	drainage layer
Thickness (in)	n/a	0.2	n/a	n/a	
Texture	n/a	20	n/a	n/a	drainage net(pipes@300ft)
Soil Parameters--synthetic					
Type	n/a	4	n/a	n/a	geomembrane
Thickness (in)	n/a	0.03	n/a	n/a	
Texture	n/a	37	n/a	n/a	PVC, defaults used
Pinhole density	n/a	1	n/a	n/a	
Installation Defects	n/a	4	n/a	n/a	
Placement Quality	n/a	3	n/a	n/a	good placement quality
Soil Parameters--ash layers					
Type	1	1	1	1	vertical percolation layer
Thickness (in)	60	60	60	60	
Texture	30	30	30	30	coal fly ash, defaults used
Soils--Runoff					
Equation	n/a	HELP CN	HELP CN	HELP CN	HELP-calculated
Slope	n/a	1.0%	1.0%	1.0%	
Length (ft)	n/a	1000	1000	1000	
Texture	n/a	9	9	9	
Vegetation	n/a	fair	fair	fair	
Execution Parameters					
Years	20	20	20	20	
Report Daily	n	n	n	n	
Report Monthly	n	n	n	n	
Report Annual	y	y	y	y	
Percolation Rate (In/yr)	5.3	0.0012	1.3	3.2	rounded to 2 digits
Percolation Volume (ft^3/yr)	1,100,000	250	280,000	680,000	rounded to 2 digits

Table 2-7
HELP Model Input/Output Parameters (Protective Soil Evaluation)
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

	Current	Silty	Sandy	Clayey	Field	
Input Parameter		**Existing Footprint**			**(south of ponds)**	**Notes**
Climate-General						
City	see note	see note	see note	see note	see note	East St. Louis, IL
Latitude	38.65	38.65	38.65	38.65	38.65	Plant
Evap Zone	14	21	21	21	21	poor (14), fair (21)
Leaf Index	1	2	2	2	2	poor (1), fair (2)
All Others	see note	see note	see note	see note	see note	Defaults for East St. Louis
Climate-precip/temp/ET						
All	see note	see note	see note	see note	see note	Synthetically generated using St. Louis (precipitation) or East St. Louis (ET and solar radiation) defaults
Soils-General						
Area (acres)	58	58	58	58	5	
% where runoff possible	0	100	100	100	0	
Specify Initial MC	No	No	No	No	No	Model calculated
Surface Water/Snow	Calc	Calc	Calc	Calc	Calc	Model calculated
Soils-Layers						
1	ash	native	native (sandy)	native (clayey)	native	
2	ash	drainage	drainage	drainage		
3	ash	synthetic	synthetic	synthetic		
4		ash	ash	ash		
5		ash	ash	ash		
		ash	ash	ash		
Soil Parameters--native						
Type	n/a	1	1	1	1	vertical percolation layer
Thickness (in)	n/a	36	36	36	36	
Texture	n/a	9	6	11	4	
Description	n/a	silt loam	sand loam	clay	silty sand	
Soil Parameters--clay						
Type	n/a	n/a	n/a	n/a		vertical percolation layer
Thickness (in)	n/a	n/a	n/a	n/a		
Texture	n/a	n/a	n/a	n/a		barrier soil, defaults used
Soil Parameters--drainage						
Type	n/a	2	2	2	n/a	drainage layer
Thickness (in)	n/a	0.2	0.2	0.2	n/a	
Texture	n/a	20	20	20	n/a	drainage net (pipes@300ft)
Soil Parameters--synthetic						
Type	n/a	3	3	3	n/a	geomembrane
Thickness (in)	n/a	0.03	0.03	0.03	n/a	
Texture	n/a	37	37	37	n/a	PVC, defaults used
Pinhole density	n/a	1	1	1	n/a	
Installation Defects	n/a	4	4	4	n/a	
Placement Quality	n/a	3	3	3	n/a	good placement quality
Soil Parameters--ash layers						
Type	1	1	1	1	n/a	vertical percolation layer
Thickness (in)	60	60	60	60	n/a	
Texture	30	30	30	30	n/a	coal fly ash, defaults used
Soils--Runoff						
Equation	n/a	HELP CN	HELP CN	HELP CN	n/a	HELP-calculated
Slope	n/a	1.0%	1.0%	1.0%	n/a	
Length (ft)	n/a	1000	1000	1000	n/a	
Texture	n/a	9	9	9	n/a	
Vegetation	n/a	fair	fair	fair	n/a	
Execution Parameters						
Years	20	20	20	20	20	
Report Daily	n	n	n	n	n	
Report Monthly	n	n	n	n	n	
Report Annual	y	y	y	y	y	
Percolation Rate (in/yr)	5.3	0.00122	0.0024	0.00171	7.58	
Percolation Volume (ft^3/yr)	1,121,171	257	505	360	n/a	

Table 2-8
HELP Model Input/Output Parameters (Final Grade Evaluation)
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Input Parameter	Current	Synthetic 1 Drainage Net		Notes
Climate-General				
City	see note	see note	see note	East St. Louis, IL
Latitude	38.65	38.65	38.65	Plant
Evap Zone	14	21	21	poor (14), fair (21)
Leaf Index	1	2	2	poor (1), fair (2)
All Others	see note	see note	see note	Defaults for East St. Louis
Climate-precip/temp/ET				
All	see note	see note	see note	Synthetically generated using St. Louis (precipitation) or East St. Louis (ET and solar radiation) defaults
Soils-General				
Area (acres)	58	43.5	14.5	
% where runoff possible	0	100	100	
Specify Initial MC	No	No	No	Model calculated
Surface Water/Snow	Calc	Calc	Calc	Model calculated
Soils-Layers				
1	ash	native	native	
2	ash	drainage	drainage	
3	ash	synthetic	synthetic	
4		ash	ash	
5		ash	ash	
		ash	ash	
Soil Parameters--native				
Type	n/a	1	1	vertical percolation layer
Thickness (in)	n/a	36	36	
Texture	n/a	9	9	
Description	n/a	silt loam	silt loam	
Soil Parameters--clay				
Type	n/a	n/a	n/a	vertical percolation layer
Thickness (in)	n/a	n/a	n/a	
Texture	n/a	n/a	n/a	barrier soil, defaults used
Soil Parameters--drainage				
Type	n/a	2	2	drainage layer
Thickness (in)	n/a	0.2	0.2	
K	n/a	10	10	
Drainage Length	n/a	520	330	
Drainage Slope	n/a	1	2	
Texture	n/a	20	20	
Soil Parameters--synthetic				
Type	n/a	4	4	geomembrane
Thickness (in)	n/a	0.03	0.03	
Texture	n/a	37	37	PVC, defaults used
Pinhole density	n/a	1	1	
Installation Defects	n/a	4	4	
Placement Quality	n/a	3	3	good placement quality
Soil Parameters--ash layers				
Type	1	1	1	vertical percolation layer
Thickness (in)	60	60	60	
Texture	30	30	30	coal fly ash, defaults used
Soils--Runoff				
Equation	n/a	HELP CN	HELP CN	HELP-calculated
Slope	n/a	1.0%	2.0%	
Length (ft)	n/a	520	330	
Texture	n/a	9	9	
Vegetation	n/a	fair	fair	
Execution Parameters				
Years	20	20	20	
Report Daily	n	n	n	
Report Monthly	n	n	n	
Report Annual	y	y	y	
Percolation Rate (in/yr)	5.3	0.00239	0.00053	
Percolation Volume (ft^3/yr)	1,121,171	377	28	
Weighted Average (in/yr)		0.0019		

RMN/BGH 11/10

Table 3-1
Groundwater Monitoring System Monitoring Wells and Construction Details
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Monitoring Well	Date Drilled	Depth Below Grade (ft.)	Surface Elevation (ft.)	Top of Well Casing Elevation (ft.)	Top of Screen Elevation (ft.)	Bottom of Screen Elevation (ft.)	Objective**
Existing Wells							
MW-2	4/15/96	29	412.8	412.57	393.8	393.8	Compliance
MW-3	4/15/96	29	411.6	411.21	396.6	396.6	Compliance
MW-5	10/14/97	50	433.5	433.22	393.5	383.5	Compliance
MW-6	10/15/97	52	433.8	433.31	391.8	381.8	Compliance
MW-8	7/2/99	43.5	416.4	416.25	383.4	373.4	Background
MW-9	7/2/99	43.5	413.8	413.69	381.8	371.8	Background
Proposed Wells*							
MW-2D	TBD	48	413	TBD	370	365	Compliance
MW-3D	TBD	47	412	TBD	370	365	Compliance
MW-6D	TBD	64	434	TBD	370	365	Compliance
MW-10	TBD	27	411	TBD	394	384	Compliance
MW-11	TBD	26	410	TBD	394	384	Compliance
MW-11D	TBD	46	410	TBD	374	364	Compliance

Note:

KJB/BGH 11/10

* All depths and elevations for proposed wells are estimates.

** Background = monitoring well used to establish background concentration

Compliance = monitoring well used to evaluate compliance with on-site applicable groundwater quality standards

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Natural Resource Technology

Table 3-2
Groundwater Monitoring Program Parameters and Laboratory Analysis Methods
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Field Parameters	Method
pH	Field
Electrical conductance	Field
Temperature	Field
Water level	Field
Well depth	Field
Laboratory Parameters	**Method**
Antimony	SW-846 #3015 and #6020
Arsenic	SW-846 #3015 and #6020
Barium	EPA 200.7
Beryllium	EPA 200.7
Boron	EPA 200.7
Cadmium	SW-846 #3015 and #6020
Chloride	ASTM D4327
Chromium	EPA 200.7
Cobalt	EPA 200.7
Copper	EPA 200.7
Cyanide	Std. Meth. 4500-CN
Fluoride	Std. Meth. 4500-F
Iron	EPA 200.7
Lead	SW-846 #3015 and #6020
Manganese	EPA 200.7
Mercury	SW-846 #3015 and #6020
Nickel	EPA 200.7
Nitrate as N	ASTM D4327
Selenium	SW-846 #3015 and #6020
Silver	EPA 200.7
Sulfate	ASTM D4327
Thallium	SW-846 #3015 and #6020
Total Dissolved Solids	EPA 160.1
Zinc	EPA 200.7

Table 3-3
Groundwater Monitoring Program Schedule
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Frequency	Duration
Quarterly	Begins: upon approval of this plan.
	Ends: 5 years after completion of cap and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Venice ash ponds.
Semiannual	Begins: after IEPA approves that quarterly monitoring requirements have been satisfied.
	Ends: 5 years after initiation of semiannual monitoring and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Venice ash ponds.
Annual	Begins: after IEPA approves that semiannual monitoring requirements have been satisfied.
	Ends: upon IEPA approval of a certified post-closure care report.

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Table 4-1
Computed Stability Safety Factors for Final Slope Design
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren Services

	Static SF	Seismic SF
Global Stability	4.9	1.3
Rapid Drawdown	5	1.3
Veneer Stability	24.8	1.6
Required Minimum	1.5	1.3

Table 4-2
Rainfall Depths Corresponding to Storm Event Recurrence Intervals
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren Services

Storm Event Recurrence Intervals	Corresponding Rainfall Depth (inches)
100% (1-yr)	2.64
50% (2-yr)	3.16
10% (10-yr)	4.56
4% (25-yr)	5.60
2% (50-yr)	6.54
1% (100-yr)	7.66

Table 4-3
Anticipated Duration of Ponding and Maximum Depth by Storm Event Recurrence Interval
Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren Services

Recurrence Intervals	North Station		South Station	
	Anticipated Duration (hrs)	Maximum Ponding Depth (ft)	Anticipated Duration (hrs)	Maximum Ponding Depth (ft)
100% (1-yr)	0.2	<0.1	0.4	0.3
50% (2-yr)	0.7	0.4	1.1	0.7
10% (10-yr)	2.3	1.2	3.2	1.5
4% (25-yr)	4.0	1.6	5.2	1.8
2% (50-yr)	5.3	1.8	7.2	2.1
1% (100-yr)	7.0	2.1	9.6	2.4

Table 4-4
Proposed Seed Mixes and Application Rates for Final Cover Closure Plan, Venice Power Plant Ash Ponds 2 & 3
Ameren

Common Name	Genus, Species	PLS Application Rate (lbs/acre)
Big Blue Stem	Andropogon, Gerardi	4
Little Blue Stem	Andropogon, Scoparius	5
Side-Oats Grama	Bouteloua, Curtipendula	5
Canada Wild Rye	Elymus, Canadensis	1
Switch Grass	Panicum, Virgatum	1
Indian Grass	Sorghastrum, Nutans	2
Annual Ryegrass		25
Spring Oats		25
Perennial Ryegrass		15

Notes:
PLS = Pure Live Seed
The mix above corresponds to the Illinois Department of Transportation's Class 4 - Native Grass.

Appendix

A

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APPENDIX A

HYDROGEOLOGICAL INVESTIGATION, FORMER ASH DISPOSAL POND SYSTEM, AMERENUE VENICE POWER PLANT, VENICE ILLINOIS (HANSON, 2000)

[ON CD]

B

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APPENDIX B

TECHNICAL MEMORANDUM NO.1 POTABLE WELL SURVEY, HYDROGEOLOGIC ASSESSMENT, AND MODIFICATIONS TO THE GROUNDWATER MONITORING PROGRAM, VENICE ASH IMPOUNDMENT

[ON CD]

C

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APPENDIX C

TECHNICAL MEMORANDUM NO.2
SUPPLEMENTAL HYDROGEOLOGICAL ASSESSMENT, VENICE ASH PONDS

[ON CD]

D

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APPENDIX D

TECHNICAL MEMORANDUM NO.3
BORON LOADING TO THE MISSISSIPPI RIVER FROM VENICE PONDS 2 AND 3

[ON CD]

E

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APPENDIX E

TECHNICAL MEMORANDUM NO.4 EVALUATION OF CLOSURE ALTERNATIVES, VENICE ASH PONDS

[ON CD]

F

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APPENDIX F

TECHNICAL MEMORANDUM NO.5
PREDICTED CHANGE IN PERCOLATION, VENICE ASH IMPOUNDMENT

[ON CD]

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APPENDIX G

TECHNICAL MEMORANDUM NO.6
GROUNDWATER MODELING OF VENICE FORMER ASH PONDS

[ON CD]

H

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APPENDIX H

GROUNDWATER SAMPLING STANDARD OPERATING PROCEDURE

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GROUNDWATER SAMPLING PROCEDURE

Updates of this procedure should be sent to:

Section A Supervisor
Copies for sampling kit
Venice Chemical Engineer
M. F. Bollinger

A. Preparation

Before samplings are to be performed, review this procedure thoroughly. Check the electric well pump and battery to ensure the pump starts, check the conductivity meter to ensure it is calibrated and the battery is not dead, and check the depth gauge to ensure the battery is not dead.

Section A Lab Supervisor:

1. At the beginning of the middle month of each quarter, establish target sampling date when no precipitation is expected and when the wells will be accessible.

2. Ask Venice Plant Superintendent for weeds to be cleared and verify that there is safe access to the wells.

3. Schedule two Section A Section Chemical Testers for sampling, by overtime canvass.

Section A Chemical Tester:

1. Reserve the Lab Services van for the scheduled sampling day(s) and also the day before (to allow packing equipment). Verify that all items listed in Attachment A are on hand.

2. Prepare the containers (label and add preservatives) as described in Attachment B. Add the acid no more than 1 day in advance of sampling.

3. Prepare and label 1 set of containers per A-2, and fill with demineralized water for the field blank sample.

Instrument Technician:

1. Check the electric well pump and battery to make sure that they are functioning properly.

2. Check the conductivity meter and battery.

3. Check the pH meter (with temperature probe) and battery.

4. Check the depth gauge and battery.

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B. Mobilization and Opening Wells

Important Note: A 4-wheel drive vehicle is needed for access to wells west of the levee and south of the ash ponds. Use Venice Plant Gator or truck.

1. Place ice in coolers for the bottles. Put all supplies into the van.

2. Drive to well. Remove well cover with well head tool. Unlock and remove well cap.

3. Repeat Step B-2 for each of the wells, in the expected order of sampling. All wells must be opened before sampling so that water levels in wells have time to equalize.

C. Water Level Measurement and Sampling

1. Return to the first well that was opened.

2. Turn on power and adjust volume up. Test sound.

3. Insert gauge probe into large open hole.

4. Lower probe until sound is heard. Adjust height until sound is just heard.

5. Read and record depth to 0.01 ft. on the Venice Groundwater Monitoring Data Sheet (Attachment C). Measure to the top of the PVC casing at the mark noted for depth measurement. If no water level is detected, mark "dry" on the data sheet. **All depth to water readings must be taken on the same day. If sampling will take more than one day, then repeat steps C-1 through C-5 as needed to assure that all depth to water measurements are obtained on the first day of sampling.**

6. Make sure that the wiring and tubing are secure on the electric well pump. Begin lowering the pump into the well and start the pump. When water begins to flow, flush the well for 10 minutes. Record the temperature and conductivity as indicated on the Data Sheet. Purge 5 more minutes and record the temperature and conductivity. If the conductivity has changed more than 10%, continue purging in 5 minute increments to steady-state conductivity (± 10%). Record the temperature, conductivity, and pH. Ensure that the temperature probe makes good connection with the pH meter and is responding. (Use the glass thermometer, if needed.)

7. Apply 0.45µ filter to tubing discharge. (Use large filter only if very high turbidity is seen.) Collect 1 liter dissolved metals sample in bottle labeled "filtered and acidified with HNO_3." Collect 1 liter sample in the bottle labeled "filtered." Collect 1 liter cyanide sample in bottle labeled "filtered and NaOH added." Collect ½-gallon sample in bottle labeled "filtered and acidified with H2SO4."

8. Restore site and equipment.

9. Repeat steps C-1 through C-8 above for the remaining wells. At one of the wells, take a set of duplicate samples. (Generally, duplicate well #1 in first quarter, well #2 in second quarter, well #3 in third quarter and well #4 in fourth quarter.) Collect one duplicate sample for each day of sampling.

10. Prior to sample collection at one well, remove the pre-filled field blank sample bottles from the cooler with empty bottles and remove the caps. After collecting the groundwater sample, replace the caps on the field blank sample bottles and place the bottles in the cooler with the collected samples. There is one field blank sample per sample trip.

11. Using a 5-gallon carboy of demineralized water, take a set of field equipment blank samples. Lower the pump into the carboy, then flush, check conductivity and take samples as in steps C-6 and C-7. Collect one equipment blank sample per day of sampling—use a fresh carboy for each equipment blank sample.

12. **VERY IMPORTANT! BEFORE LEAVING PLANT – ENTER THE RIVER LEVEL AT THE TIME OF THE DEPTH TO GROUNDWATER MEASUREMENTS (FROM VENICE PLANT CONTROL ROOM) ON THE DATA SHEET.**

13. Pack all samples in coolers with ice and take back to Lab Services.

D. Lab Services Follow Up

1. Complete the Request for Analysis (Attachment D) and submit to the Chemical Tester Leader along with the Venice Groundwater Monitoring Data Sheet and the samples.

2. Using a large tub or other reservoir, flush the tubing and pump by pumping soapy water and then thoroughly rinse by pumping demineralized water. Store the groundwater sampling kit, including electric pump and tubing. Return pH and conductivity meters to proper storage area.

3. The Section A Laboratory Supervisor will issue the Chemical Analysis Report of the results, with the completed Data Sheet attached, to Environmental Services and File: VEN 16-15-0.

E. Groundwater Monitoring System Inspection and Maintenance

During each sample event:

1. Assure that locks are present and functional.

2. Assure that well caps are intact and vented, unless in flood-prone areas in which case caps should not be vented.

3. Check that wells are clear of internal obstructions.

Perform at least annually during the first or second quarter sample:

1. Complete the Monitoring System Inspection form (Attachment E).

2. Inspect and repair or replace protective casings as needed to assure that they are undamaged, and that locks are present and functional.

3. Check to assure that well caps are intact and vented, unless in flood-prone areas in which case caps should not be vented.

4. Check that wells are clear of internal obstructions and flow freely.

5. Clear vegetation, repair or replace markers as needed, and paint protective casings if needed to assure that monitoring wells are clearly marked and accessible.

6. Inspect and repair or replace well aprons as needed to assure that they are intact, drain water away from the well, and have not heaved.

7. Measure monitoring well depths to determine the degree of siltation within the wells. Redevelop as needed to remove siltation from the screened interval if it impedes flow of water into the well.

ATTACHMENT A

GROUNDWATER MONITORING EQUIPMENT

SAMPLING EQUIPMENT

Electric Well Pump (Proactive Twister-Tempest)
Jug of drinking water (optional)
Two large equipment chests:
- keys to well cap locks
- well-head tools
- depth gauge (Sample Pro, model 6000)
- 12 well-specific sample tubes and 1 spare
- water filters: 24 small (QED Co. #FF8100)
- water filters: 24 large (QED Co. #FF8200)
- conductivity meter, battery-powered (Hach Instruments C0150)
- pH meter (with temperature probe), battery powered (Hach Instruments EC10)
- instructions and manuals
- thermometer (backup)
- marker (indelible)
- first aid kit
- insect repellent
- 1 trash bag (small)
- paper towels
- 2 channel-lock pliers
- 3 plastic beakers
- demineralized water, approx. 10 gallon (for equipment blanks)

Sample coolers containing:

54 each 1 L bottles, "EPA pre-cleaned," with labels and preservatives (as appropriate). (I-Chem #313-1000, HDPE, Hayward, California at 1-800-443-1689)

36 each ½-gallon or 2-liter bottles, HDPE

Water Filters: Martek "Sample Pro" 0.45µ, Std. capacity filters: Model FF8100
High capacity filters: Model FF8200 (also polyethylene tubing, tube fittings, and filter adaptors QED #8810)

Available from QED Co., Ann Arbor, Michigan at 1-800-624-2026
or VanDevanter Engineering Co., St. Louis, at 343-8880

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ATTACHMENT B

VENICE GROUNDWATER SAMPLES

SAMPLE #	WELL #	DESCRIPTION	PRESERVATION
1	Each Well + Duplicate(s)	TDS, Fluoride, Chloride, Nitrate, Sulfate, Alkalinity	Filtered, Chill
2	" "	Dissolved Metals	Filtered + 5 mL HNO_3
3	" "	Cyanide	Filtered + NaOH to pH>12, Chill
4	" "	Ammonia, COD, Phosphorus, Phenols, TOC	Filtered + H2SO4 to pH<2, Chill
1	Field and Eqpt Blank – Demin Water	TDS, Fluoride, Chloride, Nitrate, Sulfate, Alkalinity	Filtered, Chill
2	" "	Dissolved Metals	Filtered + 5 mL HNO_3
3	" "	Cyanide	Filtered + NaOH to pH>12, Chill
4	" "	Ammonia, COD, Phosphorus, Phenols, TOC	Filtered + H2SO4 to pH<2, Chill

ATTACHMENT C

Venice Groundwater Monitoring Data Sheet

Sample Date: ____/____/____

River Level: _____ **feet**

	Well #___	Well #___	Well #___	Well #___	Well #___	Well #___
Water Level (±0.01 feet) (From top of casing mark)						
Time purging began (24-hour clock)	___:___	___:___	___:___	___:___	___:___	___:___
Conductivity after 10 minutes µS/cm						
Temperature °C						
Conductivity after 15 minutes µS/cm						
Temperature °C						
*Conductivity after 20 minutes µS/cm						
Temperature °C						
pH (on site) (±0.01)						

* If conductivity changes more than 10% in 5 minutes, then continue purging. Otherwise sample after 15 minutes of purging.

Attach this form to the Chemical Analysis Request for inclusion in the final report.

Signature _____

 ATTACHMENT D

REQUEST FOR CHEMICAL ANALYSIS

AmerenUE - Laboratory Services Department

Requester/Contact Person: Nancy Morgan **Request Date:** / /

Department: Environmental Services (MC 602) **Phone:** 44581

Additional Reports To: Carol Zale (MC 613) **Required Date:** / /

Michael Smallwood (MC 602) **Report Desired:**

File: VEN 16-15-0 (MC 613) ☐ Paper COLLTIM3.cef

( ) ☐ Phone

☐ Fax

General Description of Sample(s): Venice Plant Groundwater Samples - Filtered

Analysis Desired: (Routine Analysis Method Number on Back of Form IF APPLICABLE): #U3505MODIF, #U3505ADDL on HNO3 acidified samples, #U3505NOPRESV on unacidified, #U3505H2SO4 on H2SO4 acidified samples, U3021HACH on pH >12 samples

Remarks:

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RECEIPT DATE: / / **LOG IN RECORD FILE:** **ASSIGNED TO:** CAZ

SAMPLE DESCRIPTION CODE: 072

SAMPLE LIST

Lab Sample ID.	Sample Point Code	Requester's Sample ID.	Sample Date	Sample Time (24 Hour)	Sample Collector	Sample Point Description
UU	UVPMSC02	With HNO_3	/ /	:		VEN #2 Groundwater Mon. Well
UU	UVPMSC02	No Acid	/ /	:		VEN #2 Groundwater Mon. Well
UU	UVPMSC02	With NaOH	/ /	:		VEN #2 Groundwater Mon. Well
UU	UVPMSC02	With H_2SO_4	/ /	:		VEN #2 Groundwater Mon. Well
UU	UVPMSC02D	With HNO_3	/ /	:		VEN #2D Groundwater Mon. Well^{++}
UU	UVPMSC02D	No Acid	/ /	:		VEN #2D Groundwater Mon. Well^{++}
UU	UVPMSC02D	With NaOH	/ /	:		VEN #2D Groundwater Mon. Well^{++}
UU	UVPMSC02D	With H_2SO_4	/ /	:		VEN #2D Groundwater Mon. Well^{++}
UU	UVPMSC03	With HNO_3	/ /	:		VEN #3 Groundwater Mon. Well
UU	UVPMSC03	No Acid	/ /	:		VEN #3 Groundwater Mon. Well
UU	UVPMSC03	With NaOH	/ /	:		VEN #3 Groundwater Mon. Well
UU	UVPMSC03	With H_2SO_4	/ /	:		VEN #3 Groundwater Mon. Well
UU	UVPMSC03D	With HNO_3	/ /	:		VEN #3D Groundwater Mon. Well^{++}
UU	UVPMSC03D	No Acid	/ /	:		VEN #3D Groundwater Mon. Well^{++}
UU	UVPMSC03D	With NaOH	/ /	:		VEN #3D Groundwater Mon. Well^{++}
UU	UVPMSC03D	With H_2SO_4	/ /	:		VEN #3D Groundwater Mon. Well^{++}

ATTACHMENT D

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RECEIPT DATE: ____/____/____ LOG IN RECORD FILE: _____ Page 2 of 4

SAMPLE LIST						
Lab Sample ID.	Sample Point Code	Requester's Sample ID.	Sample Date	Sample Time (24 Hour)	Sample Collector	Sample Point Description
UU	UVPMSC05	With HNO_3	/ /	:		VEN #5 Groundwater Mon. Well
UU	UVPMSC05	No Acid	/ /	:		VEN #5 Groundwater Mon. Well
UU	UVPMSC05	With NaOH	/ /	:		VEN #5 Groundwater Mon. Well
UU	UVPMSC05	With H_2SO_4	/ /	:		VEN #5 Groundwater Mon. Well
UU	UVPMSC06	With HNO_3	/ /	:		VEN #6 Groundwater Mon. Well
UU	UVPMSC06	No Acid	/ /	:		VEN #6 Groundwater Mon. Well
UU	UVPMSC06	With NaOH	/ /	:		VEN #6 Groundwater Mon. Well
UU	UVPMSC06	With H_2SO_4	/ /	:		VEN #6 Groundwater Mon. Well
UU	UVPMSC06D	With HNO_3	/ /	:		VEN #6D Groundwater Mon. Well
UU	UVPMSC06D	No Acid	/ /	:		VEN #6D Groundwater Mon. Well
UU	UVPMSC06D	With NaOH	/ /	:		VEN #6D Groundwater Mon. Well
UU	UVPMSC06D	With H_2SO_4	/ /	:		VEN #6D Groundwater Mon. Well
UU	UVPMSC07	With HNO_3	/ /	:		VEN #7 Groundwater Mon. Well
UU	UVPMSC07	No Acid	/ /	:		VEN #7 Groundwater Mon. Well
UU	UVPMSC07	With NaOH	/ /	:		VEN #7 Groundwater Mon. Well
UU	UVPMSC07	With H_2SO_4	/ /	:		VEN #7 Groundwater Mon. Well
UU	UVPMSC08	With HNO_3	/ /	:		VEN #8 Groundwater Mon. Well
UU	UVPMSC08	No Acid	/ /	:		VEN #8 Groundwater Mon. Well
UU	UVPMSC08	With NaOH	/ /	:		VEN #8 Groundwater Mon. Well
UU	UVPMSC08	With H_2SO_4	/ /	:		VEN #8 Groundwater Mon. Well
UU	UVPMSC09	With HNO_3	/ /	:		VEN #9 Groundwater Mon. Well
UU	UVPMSC09	No Acid	/ /	:		VEN #9 Groundwater Mon. Well
UU	UVPMSC09	With NaOH	/ /	:		VEN #9 Groundwater Mon. Well
UU	UVPMSC09	With H_2SO_4	/ /	:		VEN #9 Groundwater Mon. Well
UU	UVPMSC10	With HNO_3	/ /	:		VEN #10 Groundwater Mon. Well^{++}
UU	UVPMSC10	No Acid	/ /	:		VEN #10 Groundwater Mon. Well^{++}
UU	UVPMSC10	With NaOH	/ /	:		VEN #10 Groundwater Mon. Well^{++}
UU	UVPMSC10	With H_2SO_4	/ /	:		VEN #10 Groundwater Mon. Well^{++}

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SAMPLE LIST

Lab Sample ID.	Sample Point Code	Requester's Sample ID.	Sample Date	Sample Time (24 Hour)	Sample Collector	Sample Point Description
UU	UVPMSC11	With HNO_3	/ /	:		VEN #11 Groundwater Mon. Well++
UU	UVPMSC11	No Acid	/ /	:		VEN #11 Groundwater Mon. Well++
UU	UVPMSC11	With NaOH	/ /	:		VEN #11 Groundwater Mon. Well++
UU	UVPMSC11	With H_2SO_4	/ /	:		VEN #11 Groundwater Mon. Well++
UU	UVPMSC11D	With HNO_3	/ /	:		VEN #11D Groundwater Mon. Well++
UU	UVPMSC11D	No Acid	/ /	:		VEN #11D Groundwater Mon. Well++
UU	UVPMSC11D	With NaOH	/ /	:		VEN #11D Groundwater Mon. Well++
UU	UVPMSC11D	With H_2SO_4	/ /	:		VEN #11D Groundwater Mon. Well++
UU	UVPMSBLK	With HNO_3	/ /	:		VEN Groundwater Field Blank
UU	UVPMSBLK	No Acid	/ /	:		VEN Groundwater Field Blank
UU	UVPMSBLK	With NaOH	/ /	:		VEN Groundwater Field Blank
UU	UVPMSBLK	With H_2SO_4	/ /	:		VEN Groundwater Field Blank
UU	UVPMSC0__	With HNO_3	/ /	:		VEN #____ Groundwater Duplicate 1
UU	UVPMSC0__	No Acid	/ /	:		VEN #____ Groundwater Duplicate 1
UU	UVPMSC0__	With NaOH	/ /	:		VEN #____ Groundwater Duplicate 1
UU	UVPMSC0__	With H_2SO_4	/ /	:		VEN #____ Groundwater Duplicate 1
UU	UVPMSEB	With HNO_3	/ /	:		VEN Equipment Blank 1
UU	UVPMSEB	No Acid	/ /	:		VEN Equipment Blank 1
UU	UVPMSEB	With NaOH	/ /	:		VEN Equipment Blank 1
UU	UVPMSEB	With H_2SO_4	/ /	:		VEN Equipment Blank 1

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RECEIPT DATE: ____/____/____ **LOG IN RECORD FILE:** _____

SAMPLE LIST

Lab Sample ID.	Sample Point Code	Requester's Sample ID.	Sample Date	Sample Time (24 Hour)	Sample Collector	Sample Point Description
UU	UVPMSC0__	With HNO_3	/ /	:		VEN #____ Groundwater Duplicate 2*
UU	UVPMSC0__	No Acid	/ /	:		VEN #____ Groundwater Duplicate 2*
UU	UVPMSC0__	With NaOH	/ /	:		VEN #____ Groundwater Duplicate 2*
UU	UVPMSC0__	With H_2SO_4	/ /	:		VEN #____ Groundwater Duplicate 2*
UU	UVPMSEB	With HNO_3	/ /	:		VEN Equipment Blank 2*
UU	UVPMSEB	No Acid	/ /	:		VEN Equipment Blank 2*
UU	UVPMSEB	With NaOH	/ /	:		VEN Equipment Blank 2*
UU	UVPMSEB	With H_2SO_4	/ /	:		VEN Equipment Blank 2*

* Collect duplicate 2 and equipment blank 2 if sampling event occurs over two days.

↔ indicates proposed wells that have not yet been installed

 ATTACHMENT E1

Venice Monitoring Well Inspection Form

Inspector: _____ **Date:** ____/____/____

Monitoring Well: _____ **Original Total Depth (to Well Bottom):** _____ **feet (see Attachment E2)**

1. **Condition of protective casing:** ☐ Good ☐ Damaged or Bent (complete next two lines)

   Maintenance actions required: _____

   Maintenance actions completed: ____/____/____ By: _____

2. **Lock:** ☐ Present ☐ Replaced

3. **Well cap:** ☐ Present ☐ Replaced

   Cap vented ☐ Yes ☐ No ☐ No, Flood Prone Area

5. **Well obstructed?** ☐ No ☐ Yes (complete next two lines)

   Maintenance actions required: _____

   Maintenance actions completed: ____/____/____ By: _____

6. **Well flows freely?** ☐ Yes ☐ No (complete next two lines)

   Maintenance actions required: _____

   Maintenance actions completed: ____/____/____ By: _____

7. **Well is clearly visible?** ☐ Yes ☐ No (complete next two lines)

   Well is clearly marked? ☐ Yes ☐ No (complete next two lines)

   Maintenance actions required: _____

   Maintenance actions completed: ____/____/____ By: _____

8. **Well apron is intact, drains water away from the well, and has not heaved?**

   ☐ Yes ☐ No (complete next two lines)

   Maintenance actions required: _____

   Maintenance actions completed: ____/____/____ By: _____

9. **Measured well depth:** _____ **feet from top of casing.**

   Sediment depth in well: _____ **feet (original depth to well bottom – measured well depth = sediment depth)**

   Maintenance actions required: _____

   Maintenance actions completed: ____/____/____ By: _____

10. **Other observations:** _____

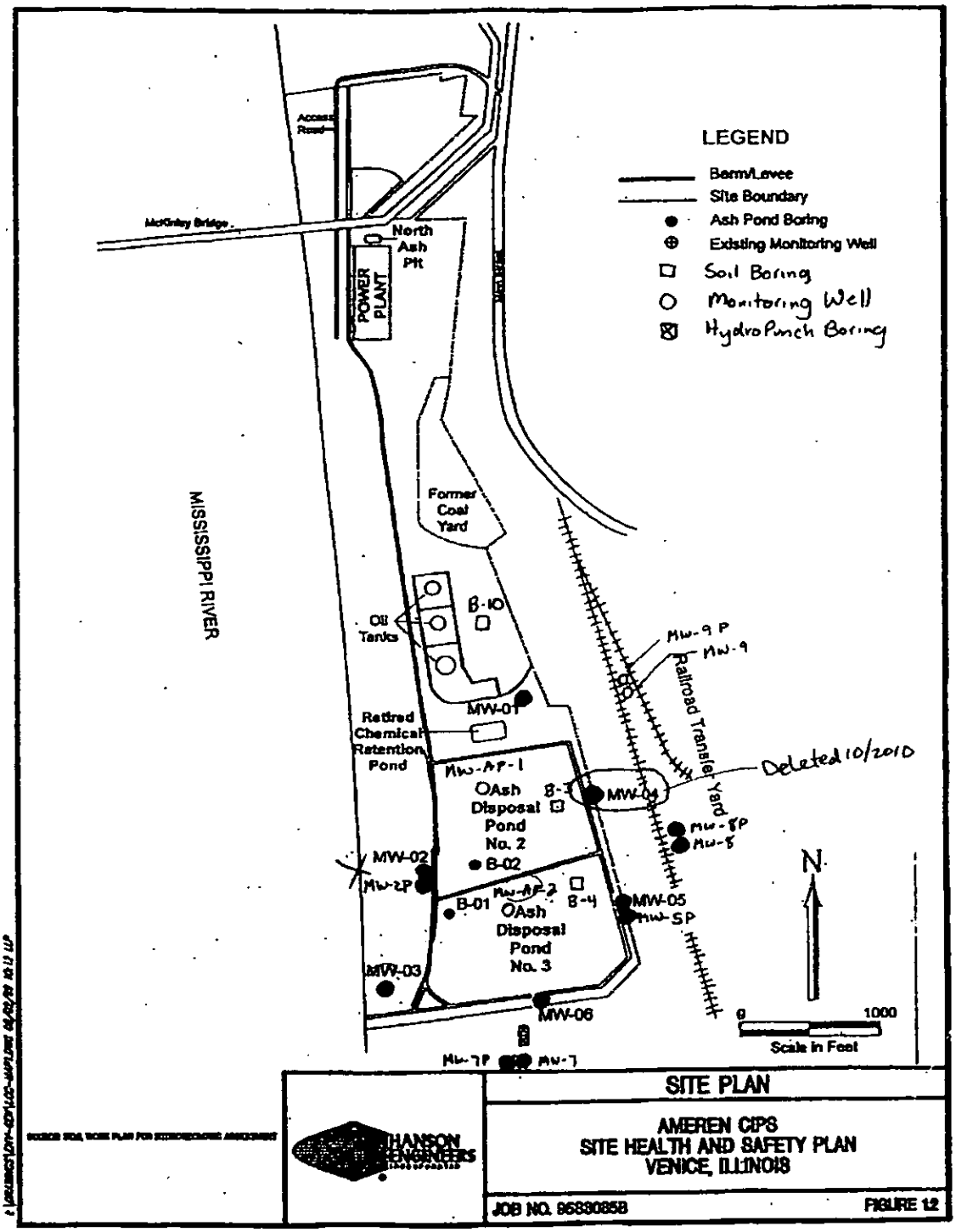
Venice Monitoring Well Inspection Form
Monitoring Well Depths & Screened Intervals

Monitoring Well	Depth to Screen Top (ft)	Depth to Screen Bottom (ft)	Total Depth (ft)
MW-2	18.8	28.8	28.8
MW-2D*			
MW-3	14.6	24.6	28.6
MW-3D*			
MW-5**	(39.7)	(49.7)	(49.7)
MW-6	41.5	51.5	51.5
MW-7	29.9	39.9	43.4
MW-8	32.9	42.9	43.4
MW-9	31.9	41.9	43.4
MW-10*			
MW-11*			
MW-11D*			
MW-12*			
MW-12D*			
MW-13*			
MW-13D*			

All depths in feet from top of casing

* Proposed well, complete table after well is completed.

** Protective casing for MW-5 was reconstructed; table may require adjustment if casing was cut or extended.


LEGEND
Berm/Levee
Site Boundary
Ash Pond Boring
Existing Monitoring Well
Soil Boring
Monitoring Well
HydroPunch Boring
Access Road
McKinley Bridge
North Ash Pit
POWER PLANT
MISSISSIPPI RIVER
Former Coal Yard
Oil Tanks
B-10
MW-9P
MW-9
Railroad Transfer Yard
MW-01
Retired Chemical Retention Pond
MW-AP-1
OAsh Disposal Pond No. 2
B-3
MW-04
Deleted 10/2010
MW-5P
MW-5
MW-02
MW-2P
B-02
MW-AP-2
B-01
B-4
OAsh Disposal Pond No. 3
MW-05
MW-5P
MW-03
MW-06
MW-7P
MW-7
N
0
1000
Scale in Feet
SITE PLAN
AMEREN CIPS
SITE HEALTH AND SAFETY PLAN
VENICE, ILLINOIS
HANSON ENGINEERS
JOB NO. 96330858
FIGURE 12

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APPENDIX I

GLOBAL SLOPE STABILITY EVALUATION – ASH POND CLOSURES AT AMEREN MISSOURI'S VENICE, ILLINOIS POWER PLANT

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NATURAL RESOURCE TECHNOLOGY

TECHNICAL MEMORANDUM

www.naturalrt.com

Date: November 12, 2010

Subject: Global Slope Stability Evaluation
Ash Pond Closures at Ameren Missouri's Venice, Illinois Plant

From: Richard H. Weber, PE
Principal Engineer

Objective and Summary of Results

This technical memorandum describes the evaluation of global slope stability related to planned construction activities to regrade and cap Ash Pond Nos. 2 and 3 at the Ameren Missouri electric power generating station in Venice, Illinois. These planned closure activities must be reviewed and approved by both the Illinois Environmental Protection Agency (IEPA), as well as by the Metro East Sanitary District (MESD) and U.S. Army Corps of Engineers with respect to MESD's flood control levee, which forms the west side of the ash ponds.

Based on the evaluation described within this memorandum, the global stability of the closed ash impoundments, specifically along the east and west perimeter berms and corresponding interior ash materials, satisfies the requirements of 35 IAC 811.304(d) for foundation and mass stability with a minimum factor of safety of at least 1.5 and 1.3 for static and pseudo-static (i.e., seismic) conditions, respectively.

Deformation and liquefaction analyses of the ash pond system under reasonably expected seismic conditions is contained in separate companion technical memorandums prepared by Geo Engineering Consulting, LLC, a subconsultant to NRT. Further, analysis of interface stability of the composite geosynthetic cap is contained in another NRT technical memorandum.

Geo Engineering Consulting acted in an advisory role to NRT on this project and also peer reviewed our analysis results and this technical memorandum.

Historical Operation of Ash Pond System

From approximately 1942 until the mid-1970s, Ameren operated the Venice station as a coal-fired electric generating facility (Ameren Services, 2010). In the 1970s, Ameren converted the plant generators to burn oil. Prior to fuel conversion, Ameren managed coal combustion byproducts (CCBs) in a series of ponds

referred to as Ash Pond Nos. 2 and 3 (collectively the ash pond system) along with waste waters from the boilers and water treatment plant, various other process waters, and storm water runoff. Process waste water and storm water runoff continued to be managed in the ash pond system until 2005, when a separate treatment system for these streams was constructed. The ash pond system was constructed in the 1950s in conjunction with construction of MESD's current flood control levee system on the banks of the adjacent Mississippi River. The ash pond system is unlined, consistent with engineering and design practices of that time. The ash pond berms were constructed from indigenous earthen materials. Coal ash has not been disposed of in the system since 1977.

Coal ash, a CCB, was removed from the boilers and wet sluiced to the impoundment system via pipelines. Supernatant was discharged to the Mississippi River and water within the ponds eventually dissipated after the ash pond system was decommissioned. There is an estimated 1,425,500 cy of CCBs located within the ash pond system with a depth of approximately 27 feet. Borings advanced by Hanson Engineers through the CCBs indicate the base of ash is at an elevation of approximately 400 ft above mean sea level (MSL) (Hanson Engineers, 2000). Based on a review of groundwater monitoring data by both Hanson Engineers and NRT, groundwater flow in the vicinity is controlled by the adjacent Mississippi River. During periods of normal river stage groundwater flows towards, and discharges into, the river. During relatively short periods of high river stage, groundwater flow is reversed, with the river recharging the aquifer.

Geometry

Attachment A is Figure 5, Subsurface Profile A-A', from the Hanson Engineers Hydrogeological Investigation Report (Hanson Engineers, 2000). This figure is in an east-west orientation, and was used to develop a typical soil profile through the ash pond system. Planned construction by the Illinois Department of Transportation (IDOT) of a roadway on top of the ash pond system's east berm was also considered. This roadway was completed in Fall 2010 and serves heavy earthwork and truck vehicles during ongoing construction of a new bridge over the Mississippi River just south of the Ameren facility. Based on the Geotechnical Report by Kaskaskia Engineering Group for IDOT (Kaskaskia Engineering Group, 2010), and later confirmed during construction of the roadway, modifications of the east berm were limited to minor surficial regrading followed by installation of geomembrane/geotextile/geogrid products and a crushed aggregate traffic surface.

Closure design activities by NRT have, among other things, evaluated various grading plans to retain storm water runoff inside the existing perimeter berms, while at the same time attempting to balance cuts and fills and limiting the overall volume of materials to be moved before capping. An early grading plan contemplated a final slope of approximately 2% upward from the top of the perimeter berms (at approximately elevation 435) to a peak elevation of approximately 445-447 at the center of Ash Pond No. 2, while an existing low area at the southwest corner of Ash Pond No. 3 would be retained to collect a

majority of storm water runoff (see Attachment B, Draft Grading Plan, April 2010). Accordingly, an east-west cross-section through the approximate center of Ash Pond No. 2, along with the Subsurface Profile A-A', was used as the geometric basis for global stability analysis of the ash pond system. The simplified east berm and west berm/levee profiles are shown hereafter in Figures 1 and 2, respectively. The subsurface horizons can be grouped as follows:

- Existing ***undisturbed ash*** and ***re-graded ash*** to re-shape the ash ponds before capping.
- ***Fill*** material of perimeter berms.
- Upper and lower native ***granular*** strata.
- Native ***clay-silt*** stratum.

Subsequently, during an August 2010 planning meeting, the U.S. Army Corps of Engineers (USACE) requested that the storm water collection area in the southwest corner of Ash Pond No. 3 be relocated eastward as far as possible to satisfy USACE concerns for seepage into this low area during potential river flood levels at or near the top elevation of the west berm/levee. Grading plan revisions thereafter changed the locations of storm water collection areas to near the north-central portion of Ash Pond No. 2 and the central portion of Ash Pond No. 3. The revisions also lowered the maximum final peak elevation to approximately elevation 440 (see Attachment C, Draft Grading Plan, October 2010). These changes were not considered appreciable with respect to the slope stability analysis. On the contrary, the lower peak elevations would result in higher safety factors than those represented herein. Therefore, a re-run of the computer model analyses to incorporate these geometric modifications was considered unnecessary.

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Figure 1 – East Berm

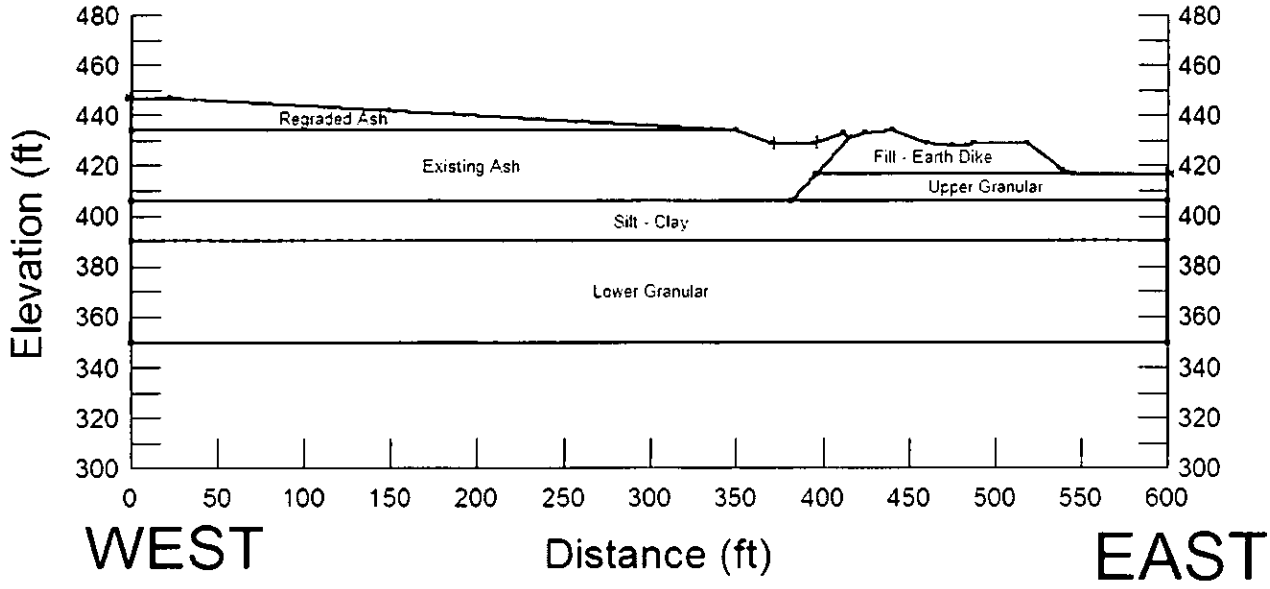
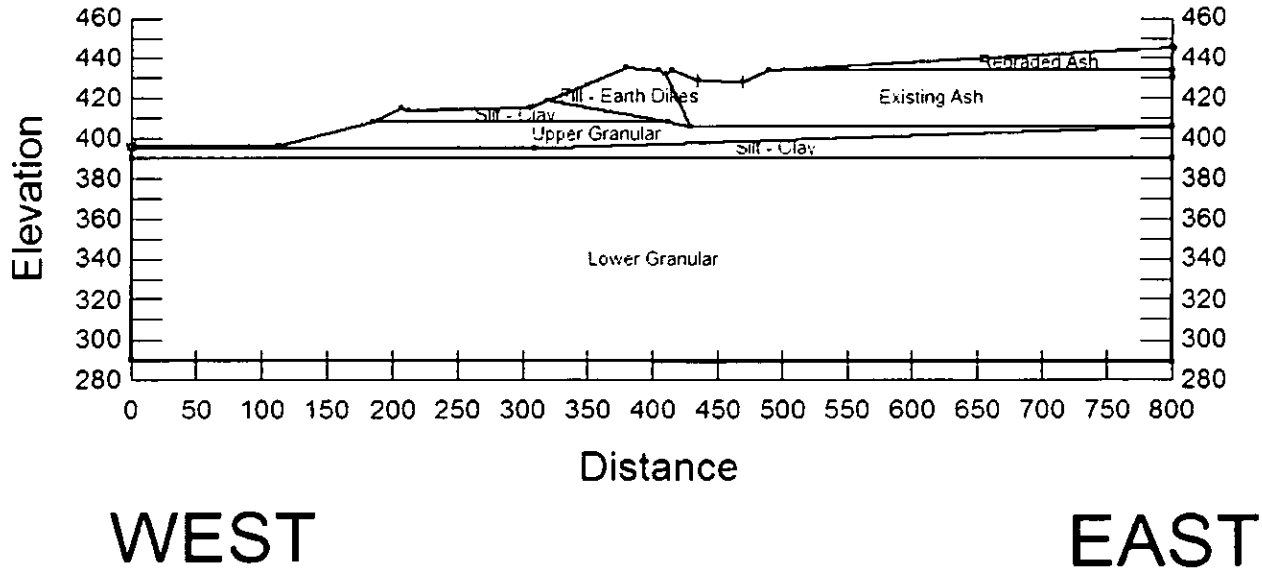


Figure 2 – West Berm/Levee



Input Parameters and Computer Model for Global Slope Stability Analysis

Soil and Ash Properties

The Hanson Engineers (2000) and Kaskaskia Engineering Group (2010) reports were reviewed for geotechnical index and strength parameters for subsurface soil and coal combustion ash, but contained limited geotechnical information. Several borings by Hanson Engineers in close proximity to the perimeter berms, and through the interior ash materials, contained no standard penetration test (SPT) N-values or undisturbed sampling/testing from which to assess relative strength and density. Although borings by Kaskaskia Engineering Group through the east berm did contain SPT N-values, the borings were relatively shallow, on the order of 25-30 feet, thus only generally evaluating the blended earthen fill and ash materials of the berm and not the underlying native soils. The Hanson report focused on hydrogeologic conditions and groundwater chemistry, and thus contained no geotechnical laboratory results. The Kaskaskia report contained limited index testing results (moisture content, grain size, density, Atterberg limits) and no strength testing results.

Given the limited site specific information that exists, soil and ash properties were estimated generally on the low end of available ranges using various references, in combination with engineering judgment and experience. Long-term or drained, versus short-term or undrained, soil parameters are appropriate for this project given that long-term global stability of existing perimeter berms is being evaluated, in combination with interior ash materials that will be minimally re-graded before capping.

Ash: Given the period of operation of the ash pond system, from the 1950s to the 1970s, it is likely the ash spans a wide spectrum of grain sizes and contains little, if any, fly ash from advanced air pollution control equipment. Fly ash typically has grain size similar to silty soil whereas bottom ash has grain size similar to granular soils. According to Ramme (2004), fly ash typically has an angle of internal friction (ϕ) in the range of 26°–42°, whereas bottom ash has an angle of internal friction in the range of 38°–42°. Cohesion (c) for granular soils would normally be 0 pounds per square foot (psf). Kaskaskia (2010) had difficulty retrieving ash samples in an undisturbed state, which is representative of a degree of cementation. Therefore, a low value of cohesion is warranted for undisturbed ash. Ramme (2004) also indicates fly ash typically has a maximum ***dry*** density in the range of 60–110 pounds per cubic foot (pcf). According to Zand (2007) for a Class F fly ash at a site in Ohio, in situ moist densities were measured in the range of 100 to 105 pcf. Therefore, the following ash parameters were assigned:

Layer	Moist Density (pcf)	Friction Angle (degrees)	Cohesion (psf)
Re-graded ash	90	26	0
Undisturbed ash	100	28	50

Fill Materials: As noted previously, the perimeter berms of the ash pond system, including the west berm/levee, were constructed of indigenous (from the area) earthen materials. Kaskaskia borings through the east berm indicated the fill was predominantly a blend of coal combustion byproducts, including ash and cinders. Following the August 2010 meeting with the USACE referenced earlier, NRT was provided a link to their Limited Reevaluation Report (LRR), which assessed flood through-seepage and under-seepage in the MESD levee system (USACE, 2010). As part of this USACE project, they drilled a series of borings at approximately 330-ft spacing along the interior or exterior of the MESD levee system. The borings generally extended to a depth of 30 ft below the prevailing ground surface at the levee toe. None of these borings were drilled through the west berm of the ash pond system, nor were any borings by Hanson Engineers drilled through the berms during its hydrogeologic investigation of the ash pond system.

Consequently, no information exists to our knowledge on the make-up of the west berm/levee, and our assumption is that it consists of a mixture of native near-surface soils, which according to the Hanson report consist of both fine-grained clays and silts and coarse-grained granular soils (i.e., sands). Further, because these berms were constructed many decades ago, the fill materials are likely relatively dense/compact, if none other than from consolidation/settlement under self-weight over time. Therefore, the following fill parameters were assigned for this project:

Layer	Wet Density (pcf)	Friction Angle (degrees)	Cohesion (psf)
Fill (berms)	115	30	0

Granular Strata: According to the Hanson report, there is an upper and lower granular layer separated by a stratum of clay-silt. ***Rounded*** granular soils typically have an internal friction angle in the range of 30°–35° for medium dense conditions and 35°–38° for dense conditions (Das, 2005). ***Angular*** granular soils have higher friction angles, on the order of 35°–40° for medium dense conditions and 40°–45° for dense conditions. Because the Hanson boring logs contain no SPT N-values, there is no indication of the relative density of these granular soils. Cohesion for granular soils, especially without substantive fines, is generally 0 psf. Given this information (or lack thereof), the following soil properties were assigned for the granular strata:

Layer	Wet Density (pcf)	Friction Angle (degrees)	Cohesion (psf)
Upper granular	125	30	0
Lower granular	130	32	0

Clay-Silt: The clay-silt stratum has variable thickness and depth as shown on Figures 1 and 2. Again, no site-specific information exists for this material. The clay-silt was assumed to have low plasticity with a plasticity index (PI) less than 20. According to Bowles (1979), the undisturbed, drained friction angle for

low plasticity clays would typically be in the range of 32°–36°. A reasonable assumption would also be to use 0 psf for cohesion. Therefore, the assigned parameters for clay-silt strata are as follows:

Layer	Wet Density (pcf)	Friction Angle (degrees)	Cohesion (psf)
Clay-silt	120	32	0

Groundwater and River Conditions

Subsequent to the Hanson Engineers hydrogeologic investigation (2000), NRT has performed on behalf of Ameren detailed assessments of closure alternatives as well as chemical fate and transport related to the ash pond system, including development of a groundwater model to support a modified groundwater monitoring program and application for a groundwater management zone (GMZ) at the site. To date, six technical memorandums have been issued, the first (No. 1) dated September 17, 2009, and the last (No. 6) dated March 12, 2010. In Technical Memorandum No. 6, river stage data obtained from the USACE from 1999 to 2010 were reviewed and an elevation of 390 feet above MSL is a reasonable breakeven point between base-stage flow and high-stage flow. This USACE river stage data is plotted on the enclosed Attachment D. For this reason, river elevation 390 was used as the lowest river level in our global slope stability analysis, although lower river levels are normal.

Six river flood conditions were also evaluated in our stability analysis, the first two in successive 10 ft increments above the base-stage flow, equating to elevation 400 and 410 (it is our understanding that river elevation 410 is "flood stage" in the St. Louis area). The next flood condition evaluated was elevation 418, the approximate highest elevation recorded by the USACE in the period of 1999 to 2010 at St. Louis (see Attachment D). Then based on the Kaskaskia Geotechnical Report (2010), which evaluated slope stability of the east berm in relation to IDOT roadway construction, we used a river flood elevation of 426 in our stability analysis, because Kaskaskia determined a river/groundwater elevation of 423-426 was needed to result in the lowest acceptable factor of safety of 1.5 for their analysis of the east berm. Lastly, based on the USACE Limited Reevaluation Report (2010) referenced earlier, we used river flood elevations of 430 and 436 in our stability analysis, which the USACE indicated represent 100-year and 500-year events. River flood elevation 436 is at or slightly above the top of the west berm/levee.

As indicated earlier, during periods of normal river stage, groundwater flow is towards and discharges into the river. During relatively short periods of high river stage, groundwater flow is reversed, with the river recharging the aquifer, away from the river. NRT used quarterly monitoring data from monitoring well MW-6, located at the toe of the south berm of Ash Pond No. 3, to assess the relationship between groundwater levels and water levels in the adjacent Mississippi River (see Attachment D) during the period of 1996–2009. A regression analysis was performed on this data, and the best fit line is shown on Attachment E. Based on this regression analysis, the river levels and corresponding groundwater levels tabulated below were used in our global slope stability analysis.

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River Elevation (MSL, ft)	Groundwater Elevation (MSL, ft)
390	390
400	400
410	404
418	410
426	415
430	418
436	422

Although the regression analysis calculated a slightly different groundwater level for river elevation 390 (i.e., groundwater 391) and river 400 (i.e., groundwater 398), a groundwater elevation equal to the river elevation was used for simplicity in these two scenarios. For higher river levels and stability analysis of the west berm/levee, a uniformly sloping phreatic surface was assumed through the berm, connecting the higher river level outside the berm to the lower groundwater level within the ash impoundment. For the east berm, the river is sufficiently far from the berm, so that only a constant groundwater elevation within the soil profile was used.

Rapid Drawdown Condition

To evaluate the potential effects of "rapid drawdown" (i.e., a relatively sudden drop in river flood level over a period of hours instead of over several days or weeks, thus causing groundwater seepage from the west slope/levee back toward the river), we chose river flood elevation 418, the highest river stage recorded by the USACE in the period of 1996–2010, and corresponding groundwater elevation 410, as a reasonable worst case scenario. We kept the water level within the west berm/levee and ash impoundment the same as the non-rapid drawdown scenario, but lowered the corresponding water level on the river side of the west berm/levee to follow the ground surface until the water level intersected river elevation 410, the same as the groundwater elevation within the ash impoundment.

Seismic (Earthquake) Condition

Based on the U.S. Geological Survey chart of seismic activity for the eastern United States (Attachment F), the peak horizontal ground acceleration (PGA) with a 2% probability of occurrence in 50 years is in the range of 0.20-0.26 for the St. Louis vicinity. For purposes of this project, we chose an average PGA value of 0.23 to analyze the pseudo-static (seismic) factor of safety of the west slope/levee. We also chose river flood elevation 418, the highest river stage recorded by the USACE in the period of 1996–2010, and corresponding groundwater elevation 410, as a reasonable worst case scenario for seismic analysis.

Computer Model

Commercially available SLOPE/W software was used by NRT in our static and pseudo-static slope stability analysis. The equilibrium limit, Morgenstern Price method of analysis was used.

Results of Static Global Slope Stability Analysis

Results of the static global stability analysis are summarized below for the conditions evaluated for the east slope and west slope/levee. Our subconsultant, Geo Engineering Consulting, independently checked our critical profile with a separate computer program (WinSTABL) and method of analysis (Bishop's), and determined the factor of safety to be consistent.

River Elevation (ft, MSL)	Groundwater Elevation (ft, MSL)	East Slope Factor of Safety	West Slope Factor of Safety
390	390	5.67	6.16
400	400	5.53	5.53
410	404	5.53	5.79
418	410	5.65	6.06
426	415	5.72	6.50
430	418	5.61	5.79
436	422	5.61	4.86

SLOPE/W graphical output images from each scenario are contained in Attachment G, which show the critical failure surface at the lowest computed factor of safety. These images show the critical failure surfaces for the east slope are confined to the ash pond limits as shallow slides at the inside perimeter storm water ditch, which would be easy to repair if they occurred. Further, the grading plan revisions subsequent to the August 2010 meeting with USACE significantly reduced the depth of these ditches, which would result in higher safety factors than those referenced above and an associated decrease in the probability of these shallow slides. For the west berm/levee, the output files show the critical failure surfaces are deep rotational failures up to and including the scenario of river elevation 418, whereas at higher river elevations, the critical failure surfaces are smaller, shallower, and confined to the inside perimeter storm water ditch, similar to the critical failure surfaces for the east slope. Also, as noted above, grading plan revisions subsequent to the August 2010 meeting with USACE significantly reduced the depth of these storm water ditches, which would result in higher safety factors than those referenced above for these shallow slides. In all scenarios, the computed factors of safety are well above the minimum acceptable safety factor of 1.5.

For the rapid drawdown analysis of the west slope/levee, as described earlier, the factor of safety dropped from 6.06 without rapid drawdown (see scenario of river elevation 418 and groundwater elevation 410) to a factor of safety of 4.98 with rapid drawdown. Again, this is still well above the minimum acceptable safety factor of 1.5. The SLOPE/W graphical output image for the critical failure surface from this scenario is also contained in Attachment G.

Results of Pseudo-Static Global Stability Analysis

The results of pseudo-static (seismic) global stability analysis of the west slope/levee are summarized below in comparison to the corresponding static analysis:

River Elevation	Groundwater Elevation	Factor of Safety		Rapid Drawdown Scenario
		Static (g = 0.0)	Pseudo-Static (g = 0.23)	
418	410	6.06	1.32	No
418/410	410	4.98	1.26	Yes

The SLOPE/W graphical outputs of the critical failure surface from these analyses are also contained in Attachment G. The pseudo-static factor of safety (not considering the rapid drawdown scenario) is 1.32, slightly above the minimum safety factor of 1.3 specified in 35 IAC 811.304(d).

In the unlikely scenario of a high intensity earthquake (2% in 50 years, g=0.23) during rapid drawdown from a river flood elevation 418 to 410, without adequate time for groundwater elevations in the west slope/levee and ash impoundment to equalize to the river level, the pseudo-static factor of safety was computed to be 1.26, which rounds to the minimum specified safety factor of 1.3. This same rapid drawdown condition was used in the computer software to progressively increase the seismic factor from 0.23 to 0.31, where the factor of safety dropped to just under 1.0, or theoretical failure of the soil profile. This yield acceleration of 0.31 was used by Geo Engineering Consulting in their seismic deformation analysis for the rapid drawdown condition.

Seismic Deformation and Liquefaction Analyses

Geo Engineering Consulting performed seismic deformation and liquefaction analyses for this project as a subconsultant to NRT. The deformation analysis, contained in Attachment H, was performed to estimate the permanent seismic deformation of the earthen embankment and ash fill as a result of a potential earth quake. The calculated deformation was extremely low, much less than one-tenth of an inch.

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The liquefaction analysis, contained in Attachment I, was used to evaluate the susceptibility of saturated ash within the impoundment to liquefy during a potential earth quake. The conclusion of this analysis was that a thin layer of saturated ash at the bottom of the site is potentially liquefiable, but no surface damage is predicted.

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Enclosures

Attachment A: Figure 5 – Subsurface Profile A-A' (from Hanson Engineers, 2000)

Attachment B: Draft Grading Plan, April 2010

Attachment C: Draft Grading Plan, October 2010

Attachment D: Mississippi River at St. Louis

Attachment E: Monitoring Well MW-6 Water Levels in Relation to River Levels, 1996-2009

Attachment F: USGS Seismic Chart

Attachment G: SLOPE/W Output Images

Attachment H: Seismic Deformation Analysis

Attachment I: Liquefaction Analysis

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ATTACHMENT A

FIGURE 5 – SUBSURFACE PROFILE A-A'
(FROM HANSON ENGINEERS, 2000)

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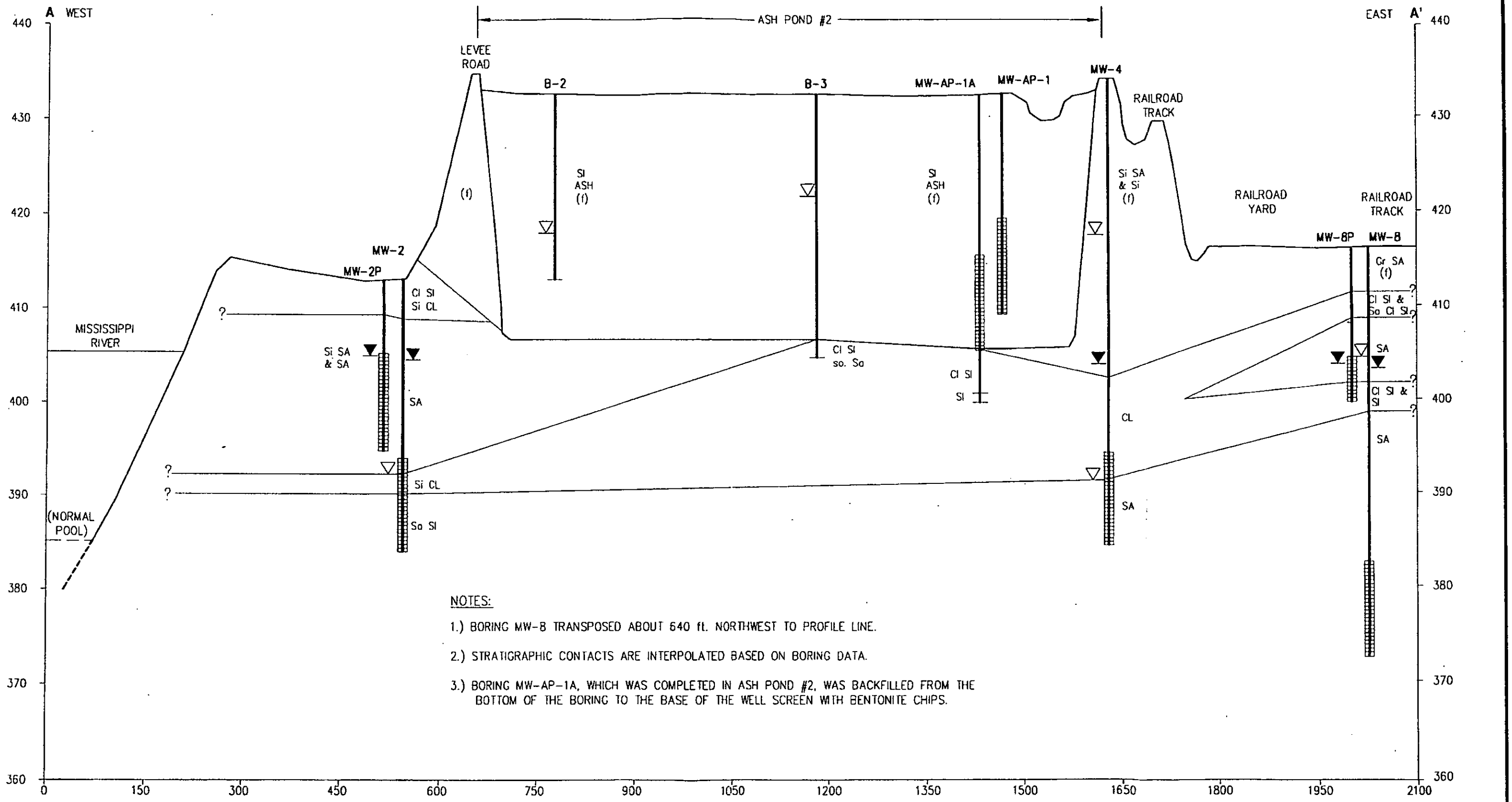

NOTES:

1.) BORING MW-8 TRANSPOSED ABOUT 640 ft. NORTHWEST TO PROFILE LINE.

2.) STRATIGRAPHIC CONTACTS ARE INTERPOLATED BASED ON BORING DATA.

3.) BORING MW-AP-1A, WHICH WAS COMPLETED IN ASH POND #2, WAS BACKFILLED FROM THE BOTTOM OF THE BORING TO THE BASE OF THE WELL SCREEN WITH BENTONITE CHIPS.

LEGEND

CL = CLAY (f) = FILL
SI = SILT ▽ = WATER LEVEL DURING DRILLING
SA = SAND ▼ = WATER LEVEL ON JULY 8, 1999
GR = GRAVEL

SCALE

VERTICAL - 1 INCH = 10 FEET
HORIZONTAL - 1 INCH = 150 FEET

HANSON ENGINEERS

SUBSURFACE PROFILE A-A'

HYDROGEOLOGICAL INVESTIGATION
VENICE POWER PLANT
AMEREN SERVICES
VENICE, ILLINOIS

JOB NO. 95S3085B FIGURE 5

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ATTACHMENT B

DRAFT GRADING PLAN, APRIL 2010

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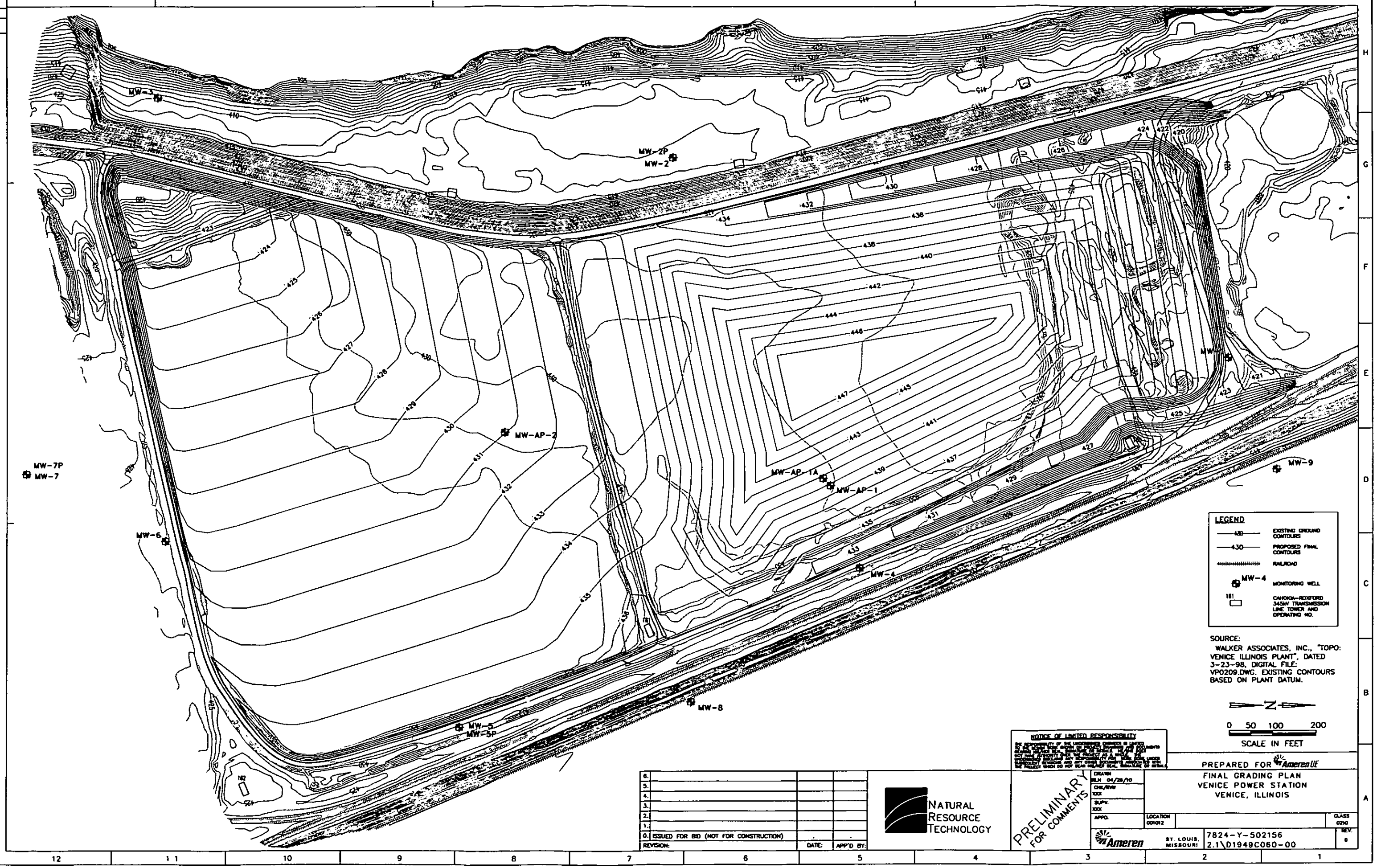
PRINT DIST.

REVISIONS

REV.	W.O.



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ATTACHMENT C

DRAFT GRADING PLAN, OCTOBER 2010

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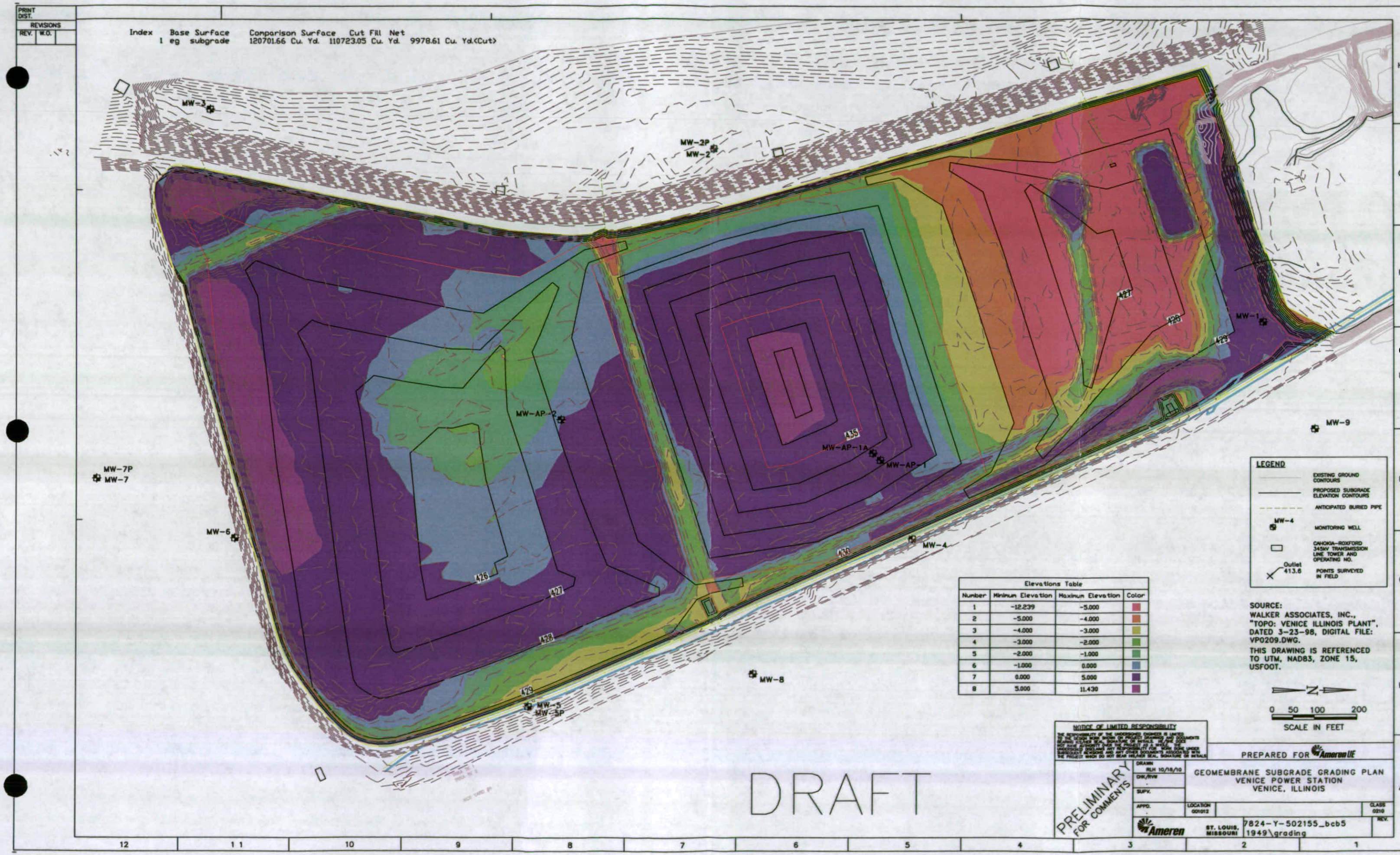

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-12.239	-5.000	
2	-5.000	-4.000	
3	-4.000	-3.000	
4	-3.000	-2.000	
5	-2.000	-1.000	
6	-1.000	0.000	
7	0.000	5.000	
8	5.000	11.430	

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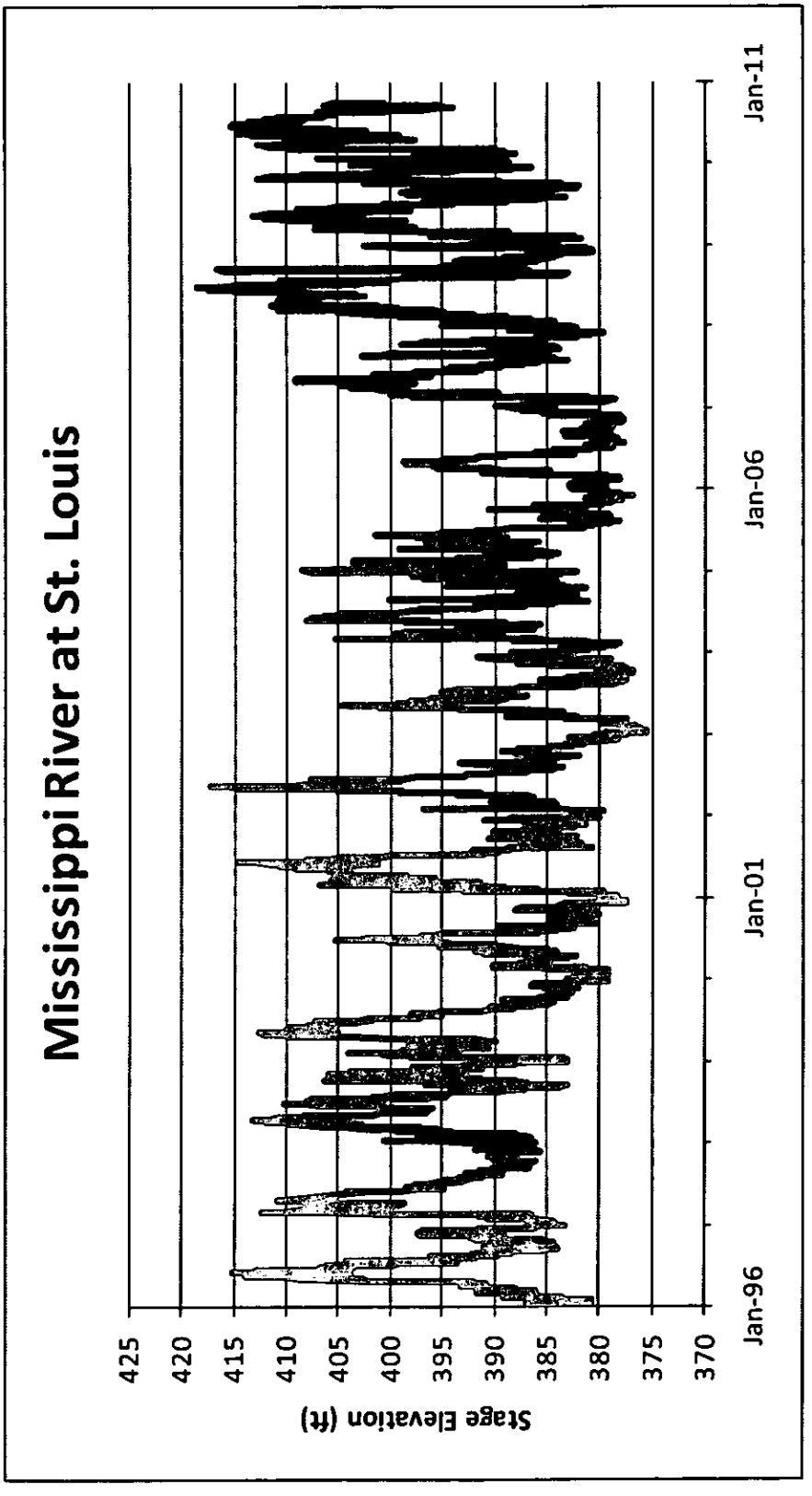
ATTACHMENT D

MISSISSIPPI RIVER AT ST. LOUIS


Mississippi River at St. Louis
Stage Elevation (ft)
425
420
415
410
405
400
395
390
385
380
375
370
Jan-96
Jan-01
Jan-06
Jan-11

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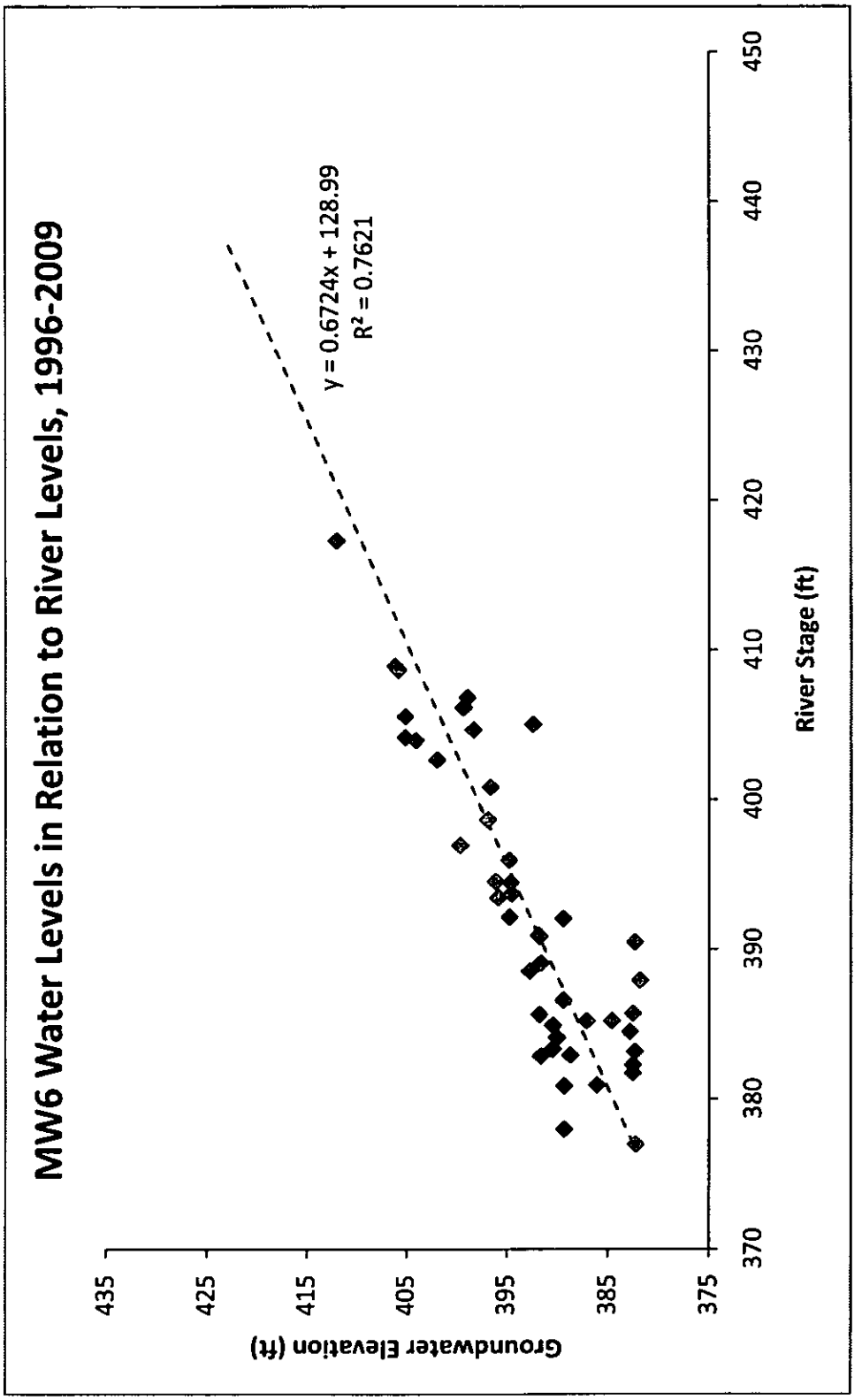
ATTACHMENT E

MONITORING WELL MW-6 WATER LEVELS IN RELATION TO RIVER LEVELS, 1996-2009


MW6 Water Levels in Relation to River Levels, 1996-2009
y = 0.6724x + 128.99
R² = 0.7621
Groundwater Elevation (ft)
River Stage (ft)
435
425
415
405
395
385
375
370
380
390
400
410
420
430
440
450

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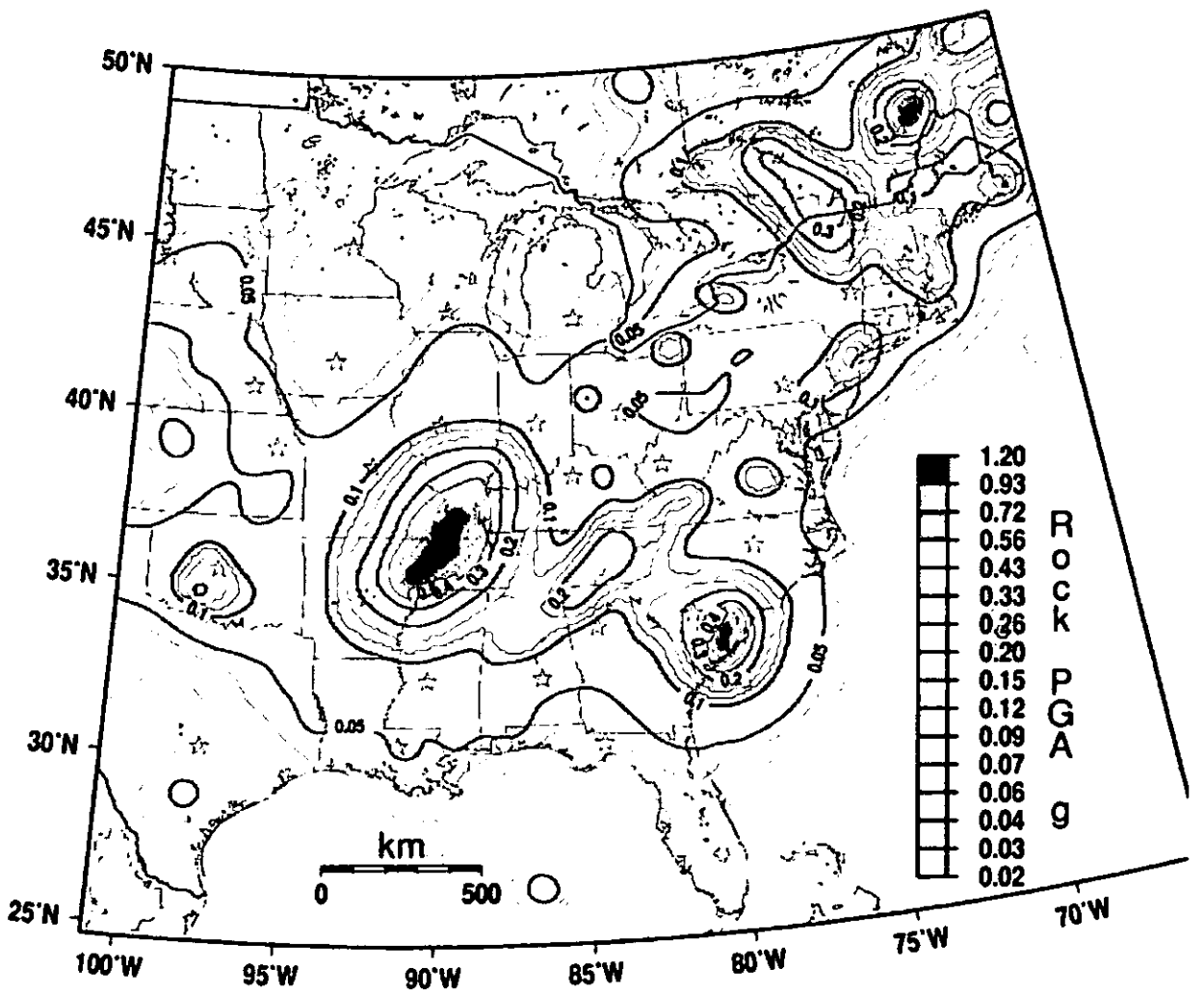
ATTACHMENT F

USGS SEISMIC CHART

PGA with 2%/50 yr PE, 2008



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ATTACHMENT G

SLOPE/W OUTPUT IMAGES

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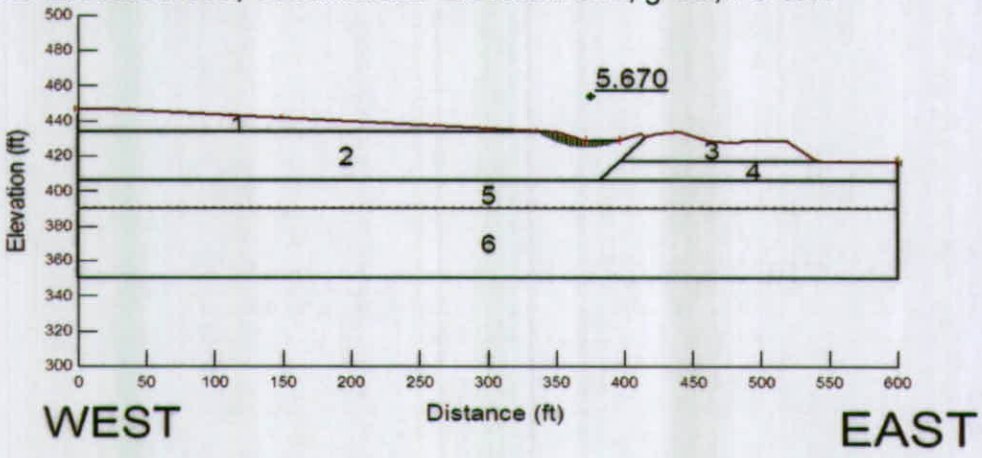
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

EAST SLOPE

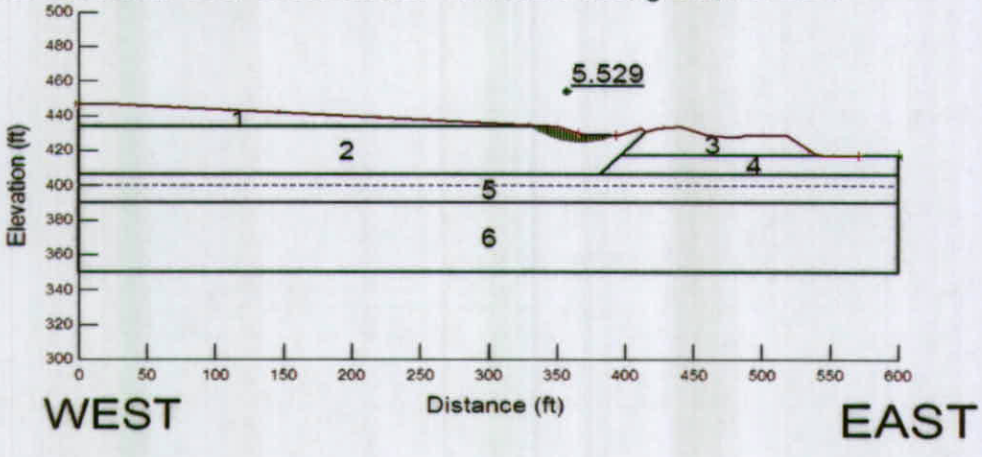
East Slope Soil Horizons and Input Parameters:

Region	Soil Type	Unit Weight (pcf)	Cohesion (pcf)	ϕ (deg)
1	Regraded Ash	90	0	26
2	Existing Ash	100	50	28
3	Fill	115	0	30
4	Upper Granular	125	0	33
5	Silt – Clay	120	0	32
6	Lower Granular	130	0	34

River Elevation 390; Groundwater Elevation 390; g 0.0; FS 5.67



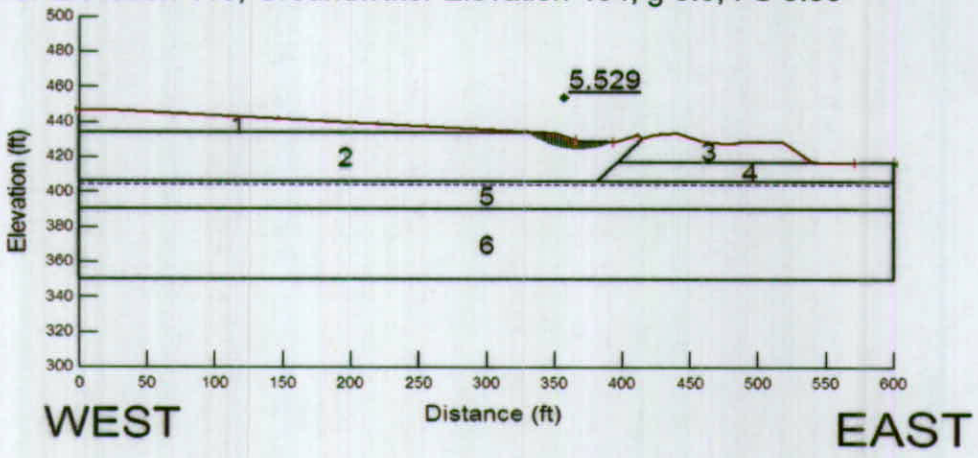
River Elevation 400; Groundwater Elevation 400; g 0.0; FS 5.53



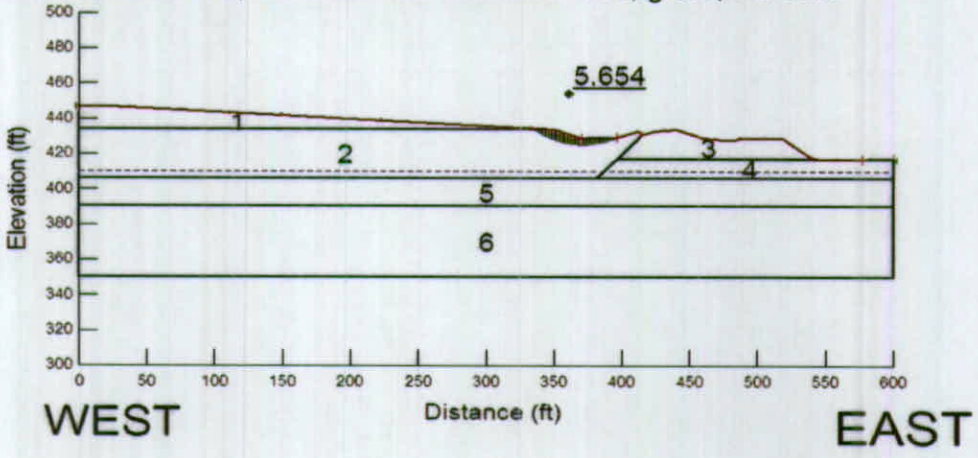
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

EAST SLOPE

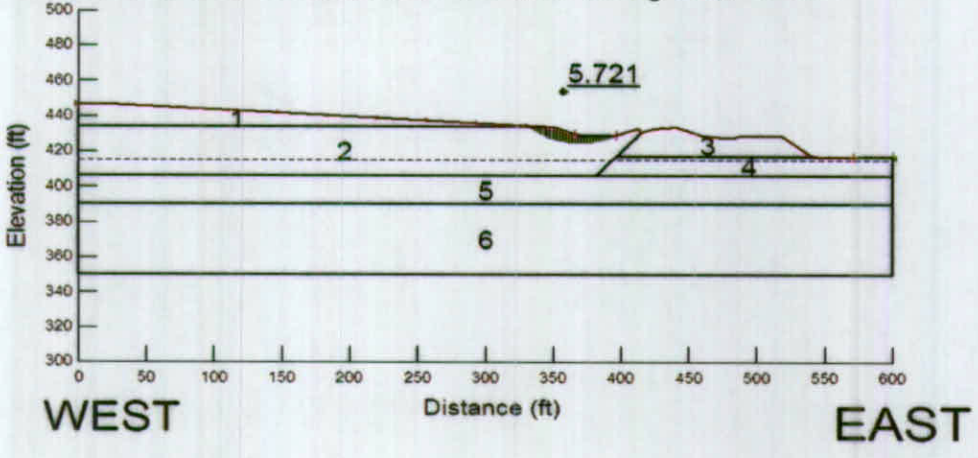
River Elevation 410; Groundwater Elevation 404; g 0.0; FS 5.53



River Elevation 418; Groundwater Elevation 410; g 0.0; FS 5.65



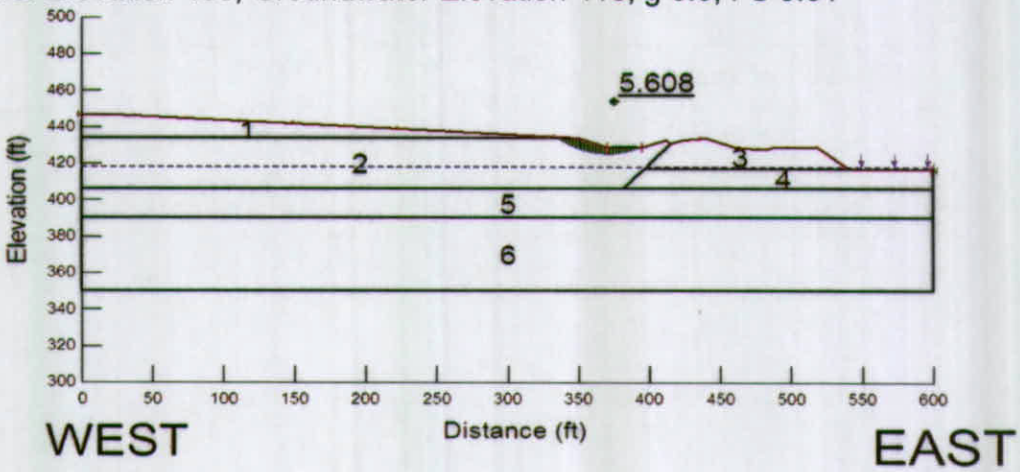
River Elevation 426; Groundwater Elevation 415; g 0.0; FS 5.72



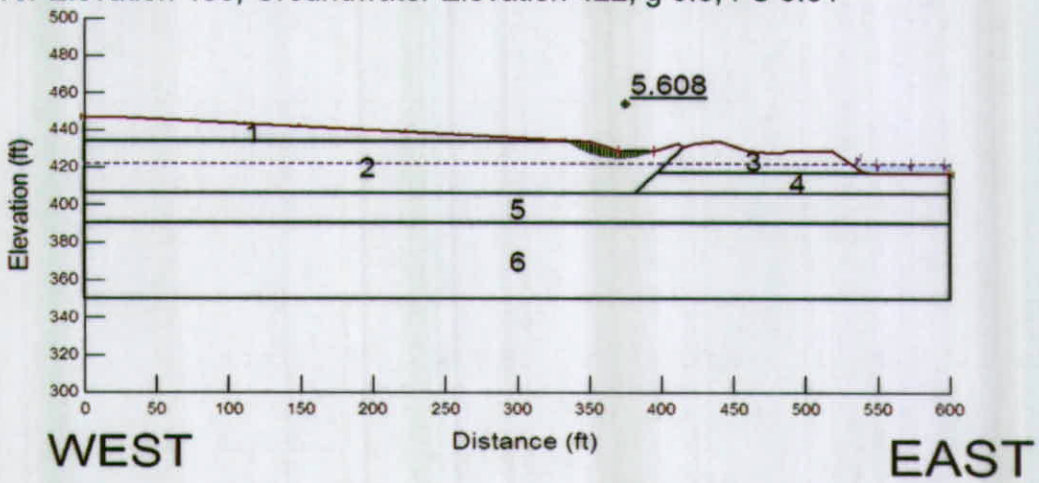
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

EAST SLOPE

River Elevation 430; Groundwater Elevation 418; g 0.0; FS 5.61



River Elevation 436; Groundwater Elevation 422; g 0.0; FS 5.61



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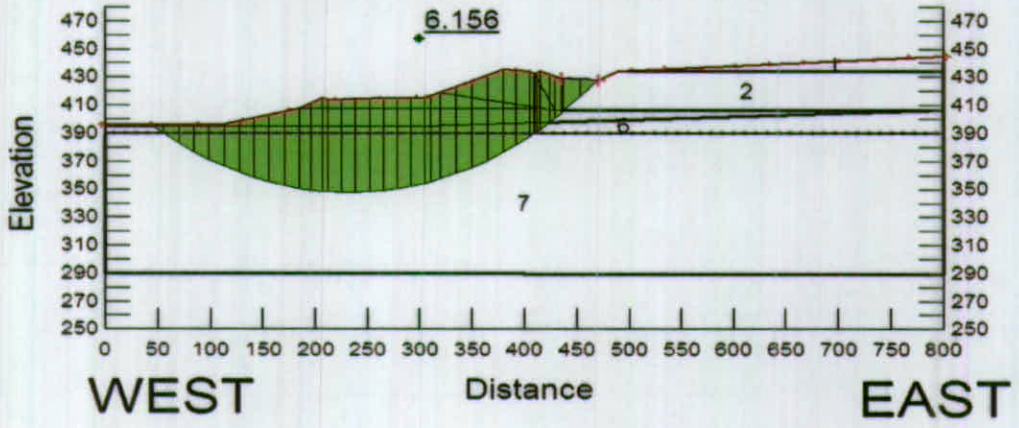
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

WEST SLOPE/LEVEE

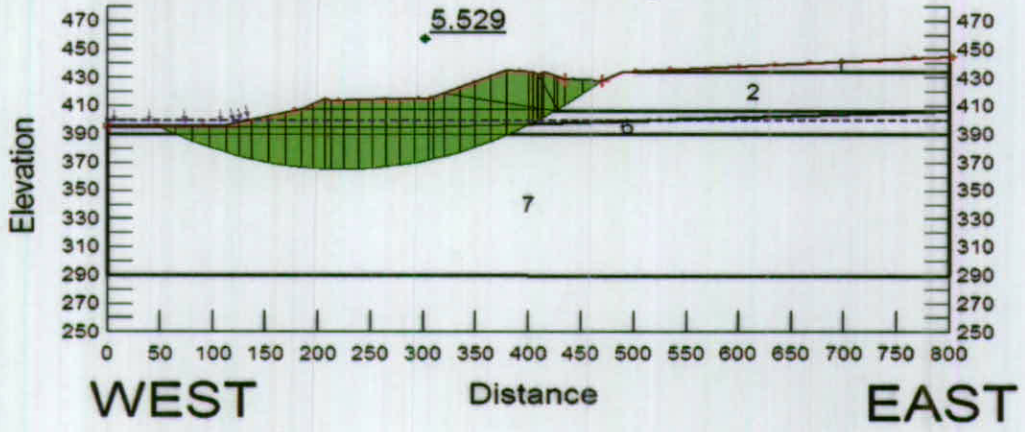
West Slope Soil Horizons and Input Parameters:

Region	Soil Type	Unit Weight (pcf)	Cohesion (pcf)	ϕ (deg)
1	Regraded Ash	90	0	26
2	Existing Ash	100	50	28
3	Fill	115	0	30
4 and 6	Silt–Clay	120	0	32
5	Upper Granular	125	0	33
7	Lower Granular	130	0	34

River Elevation 390; Groundwater Elevation 390; g 0.0; FS 6.16



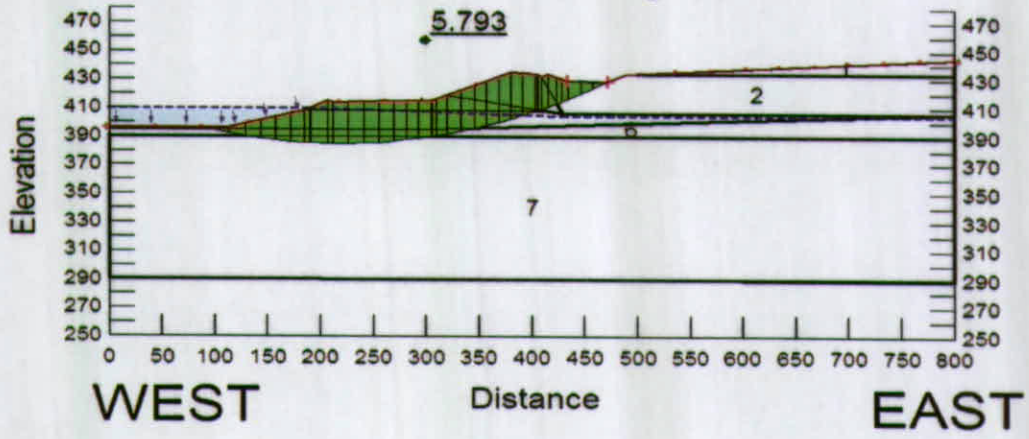
River Elevation 400; Groundwater Elevation 400; g 0.0; FS 5.53



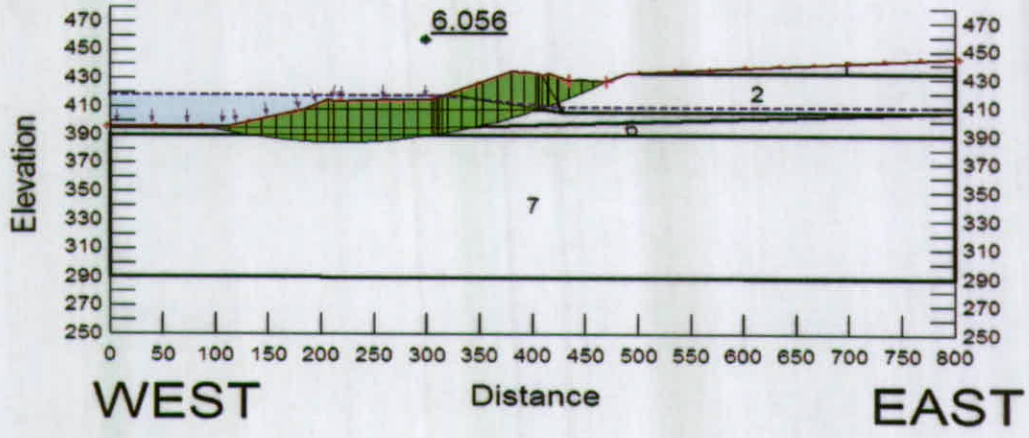
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

WEST SLOPE/LEVEE

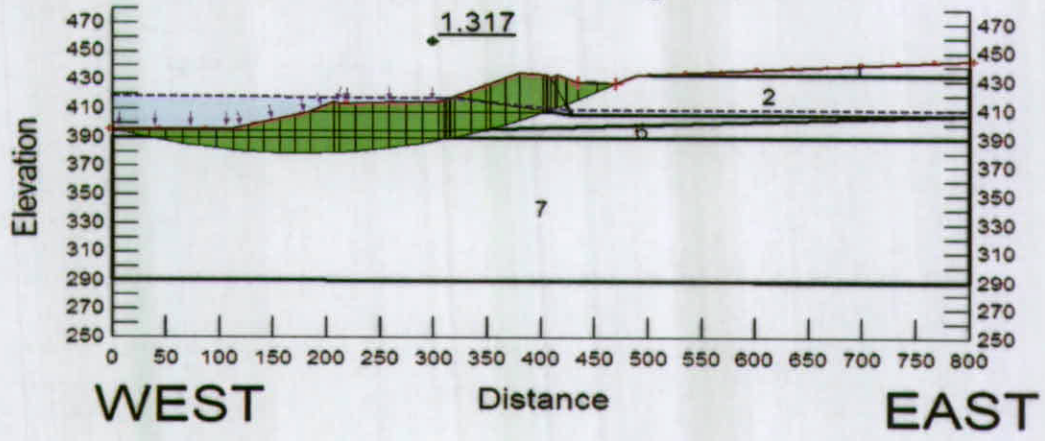
River Elevation 410; Groundwater Elevation 404; g 0.0; FS 5.79



River Elevation 418; Groundwater Elevation 410; g 0.0; FS 6.06



River Elevation 418; Groundwater Elevation 410; g 0.23; FS 1.32



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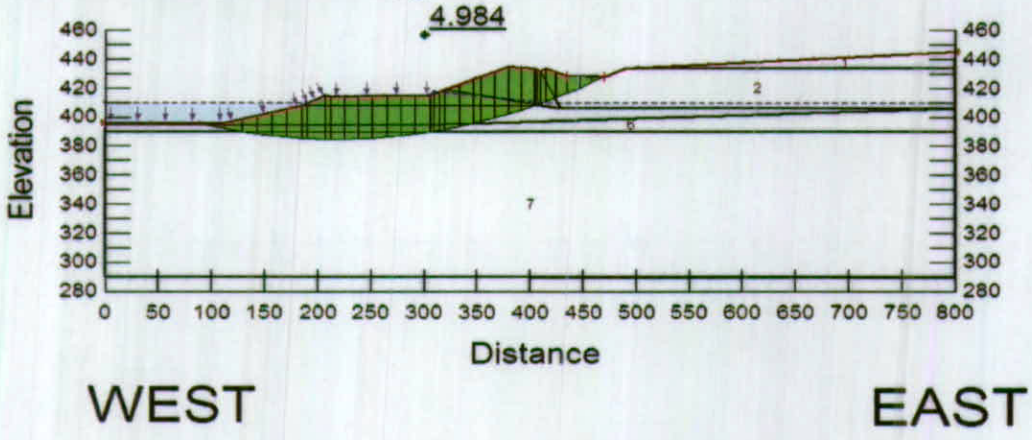
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

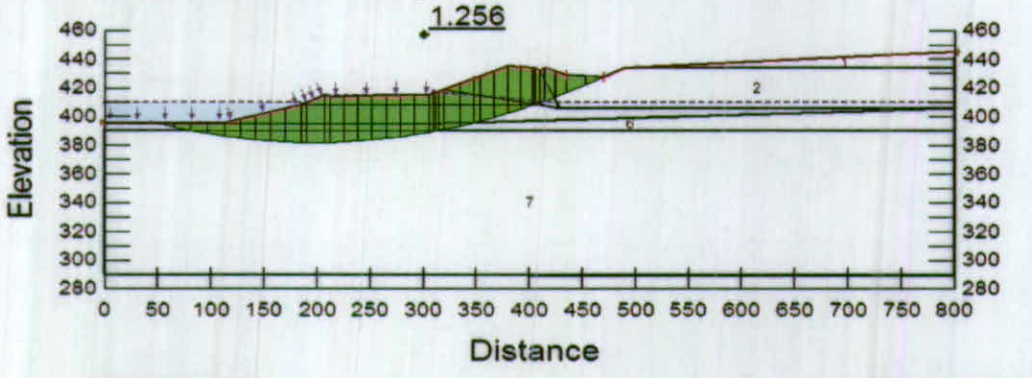
WEST SLOPE/LEVEE

River Elevation was 418 followed by rapid drawdown to Elevation 410;
Groundwater Elevation still 410; g 0.0; FS 4.98



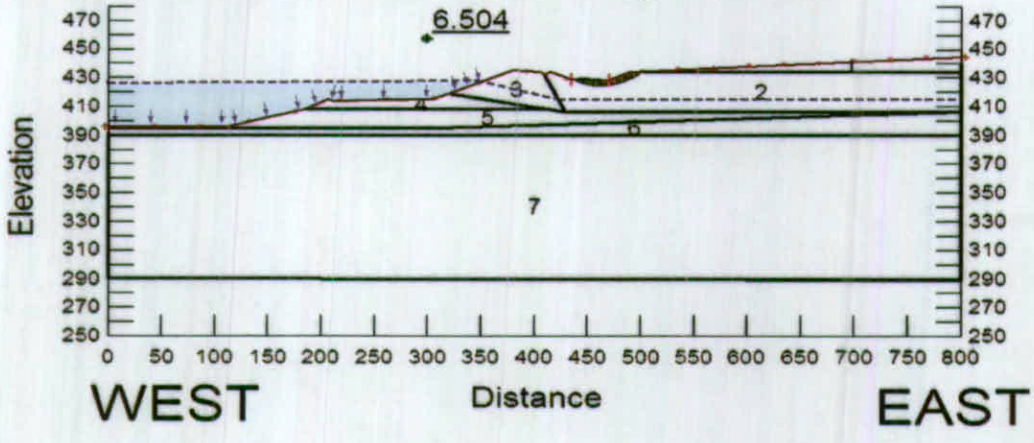
WEST EAST

River Elevation was 418 followed by rapid drawdown to Elevation 410;
Groundwater Elevation still 410; g 0.23; FS 1.26



WEST EAST

River Elevation 426; Groundwater Elevation 415; g 0.0; FS 6.50



WEST EAST

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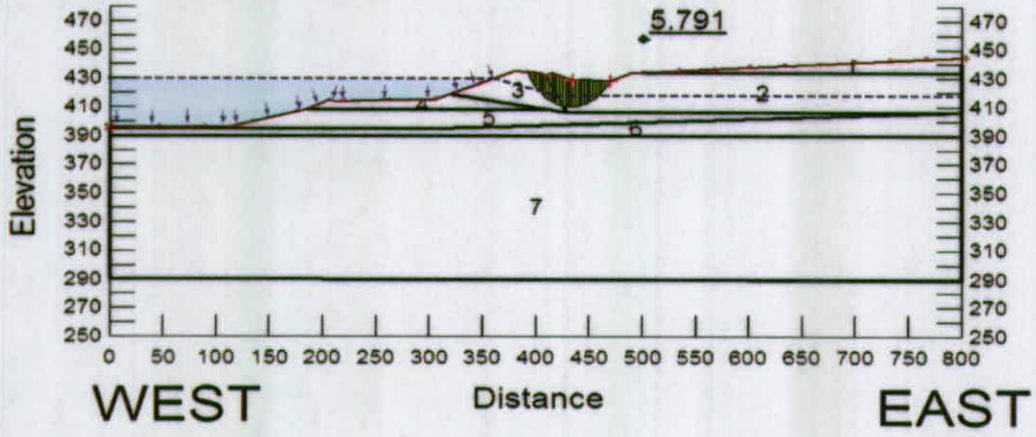
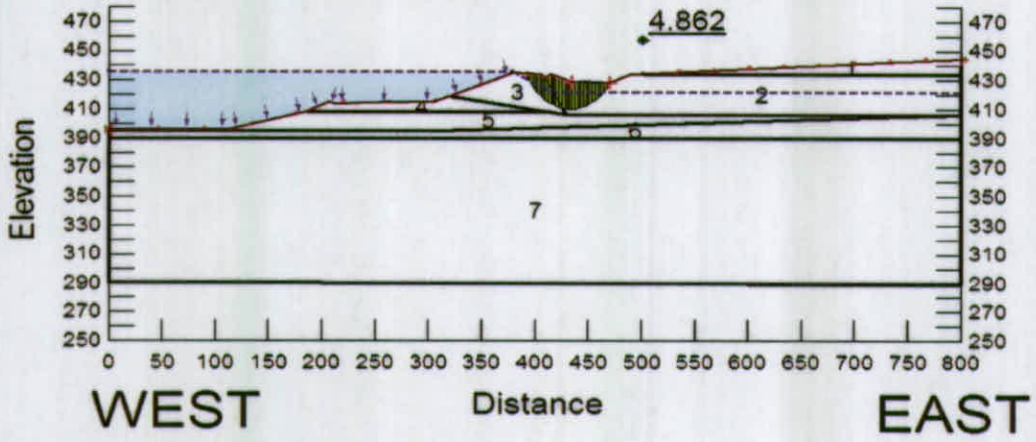
AmerenUE-Venice: Ash Pond 2–Slope Stability (1949) 10/25/2010
Equilibrium Limit, Morgenstern-Price Method of Analyses

WEST SLOPE/LEVEE

River Elevation 430; Groundwater Elevation 418; g 0.0; FS 5.79



River Elevation 436; Groundwater Elevation 422; g 0.0; FS 4.86



[P://1949/slope stability/slope stability output_101025]

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ATTACHMENT H

SEISMIC DEFORMATION ANALYSIS

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GEO ENGINEERING CONSULTING, LLC

3100 Lake Mendota Drive, #503 Madison, WI 53705 (608) 233-5794

COMPUTATION SHEET

PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

OBJECTIVE

Estimate the amount of permanent seismic deformation of the earthen embankment and flyash fill at the Ameren-Venice flyash disposal pond closure system using procedures developed by Newmark (1965) and later refined by Makdisi and Seed (1977).

BACKGROUND

A. Site Background

- Site is located on the east bank of the Mississippi River in Venice, Illinois
- Flyash impoundments in question consist of two 'pond' systems - No. 2 (northern, approximately 30 acres) and No. 3 (southern, 30 acres), with a river flood control levee embankment to the west
- Plant began operating in 1942 as a coal-combustion power plant, but turbines were converted to oil/gas in 1972 and 1979, respectively; thus, sluicing operations to the ash ponds were suspended at that time
- The ash ponds were used for plant storm water management through 2005
- Site is in planning for long-term closure

B. Subsurface Soil Investigation Data Available

Hanson Engineers Inc. 2000. "Hydrogeological Investigation, Former Ash Disposal Pond System, AmerenUE Venice Power Plant."

- 14 soil borings in June/July 1999 using 5-ft-long CME split-barrel sampler
- 11 converted to monitoring wells
- Site geology is generally clayey silt overlying sand
- Levees classified as "fill" material

Kaskaskia Engineering Group LLC. 2010. "MRB IDOT Access Road 1."

- 5 borings using SPT at 2.5-ft intervals advanced in February of 2010
- Focus on the haul road berm on the east side of the impoundment
- Water content (14 to 88) higher than expected for given N values, likely due to cementation

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- For the silty flyash material, ϕ' of 26° and c' = 50psf used

C. Slope Stability Analysis

Natural Resource Technology Inc. 2010. "Global Slope Stability Evaluation: Ash Pond Closures at Ameren Missouri's Venice, Illinois Plant."

Soil Horizons and Input Parameters:

Region	Soil Type	Unit Weight (pcf)	Cohesion (psf)	ϕ (deg)
1	Regraded Ash	90	0	26
2	Existing Ash	100	50	28
3	Fill	115	0	30
4	Upper Granular	125	0	30
5	Silt – Clay	120	0	32
6	Lower Granular	130	0	32

APPROACH - PERMANENT SEISMIC DEFORMATION ANALYSIS

The procedure developed by Newmark (1965) and later refined by Makdisi and Seed (1977) to determine the amount of deformation an earthen embankment may undergo as a result of seismic forces will be followed. Although Illinois does not have specific technical guidance for seismic analyses of landfill closures, nearby State guidance (Tennessee and Missouri) for similar situations advocates this procedure. Global type failures are the main focus of these guidance policies because these failures are generally of a catastrophic nature. The following assumptions are inherent in the Newmark analysis (Missouri Department of Natural Resources and Stark, 1997):

- The slide mass is a rigid-plastic body (i.e., does not deform internally)
- There is no displacement at accelerations below the yield acceleration (i.e., yield coefficient, K_y, multiplied by g, the acceleration of gravity)
- The sliding mass deforms plastically along a discrete basal shear surface when the yield acceleration is exceeded.
- Static and dynamic shearing resistances are identical.
- The effect of dynamic pore-water pressures are neglected. In other words, the materials do not lose strength during shaking (note, the extreme loss of strength case would be liquefaction).

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PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

- The yield acceleration is not strain dependent and thus remains constant throughout the anaysis.

For this analysis, the "Simplified Deformation Analysis" is followed because permanent deformation caused by a seismic event would have minimal impact (i.e., there are no liner systems or leachate collection systems involved in the system). The revised Newmark procedure for the landfill stability analysis of waste slopes is thus as follows:

A. Develop a model of the landfill slope configurations to be used for pseudo-static analysis.

B. Perform pseudo-static analyses on the landfill model substituting different values of the horizontal acceleration so as to determine which acceleration results in a factor of safety of one. The horizontal acceleration that yields a factor of safety of one shall be referred to as the yield acceleration (k_y).

C. Determine the maximum crest acceleration (u_{max}) induced in the embankment and the natural period (T_o) of the embankment. This can be accomplished by several different methods, but the Makdisi and Seed procedure (1977) will be used.

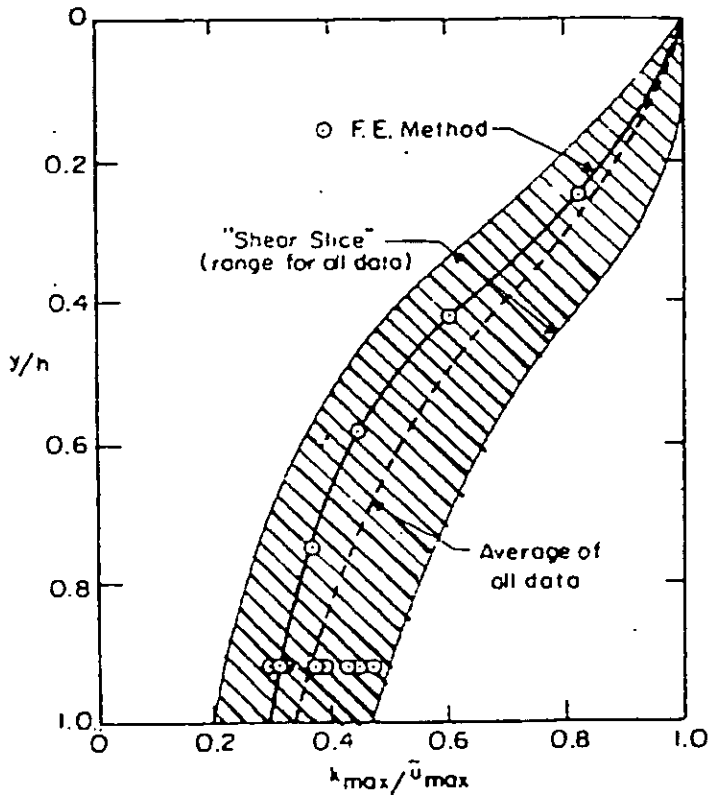
D. Determine the maximum value of average acceleration (k_{max}) for any level within the embankment using the maximum crest acceleration (u_{max}) determined in Step C and using the "maximum acceleration ratio" plot shown below:

GEO ENGINEERING CONSULTING, LLC **COMPUTATION SHEET**

SHEET 4 OF 8

3100 Lake Mendota Drive, #503 Madison, WI 53705 (608) 233-5794

PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.



E. Determine the permanent displacements (U) for the yield acceleration (k_y) by using the following figure and the appropriate values of k_{max} and T_o:

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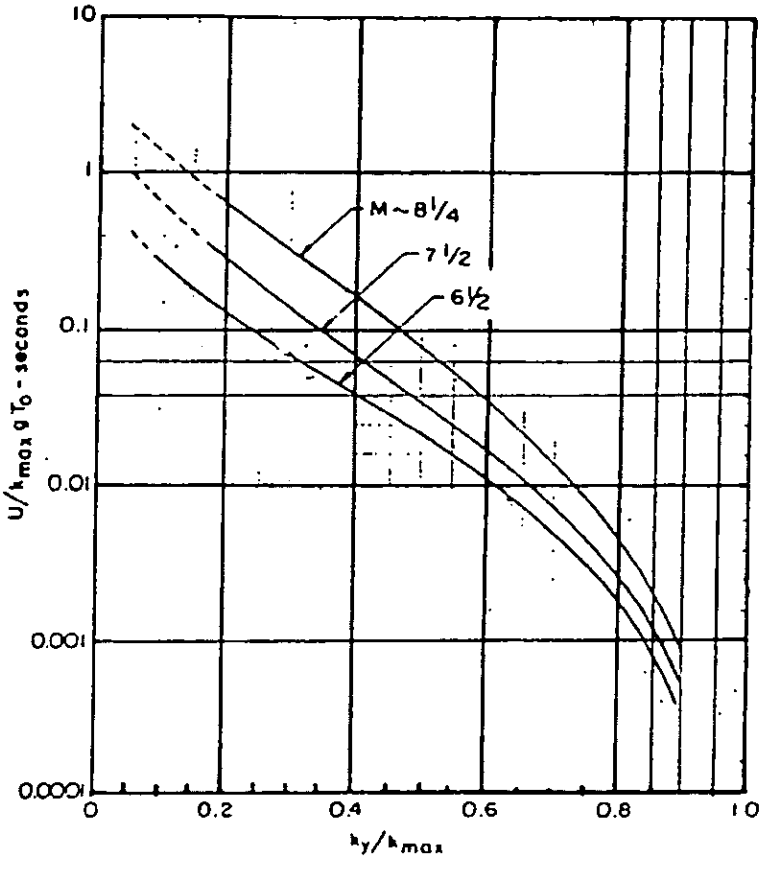
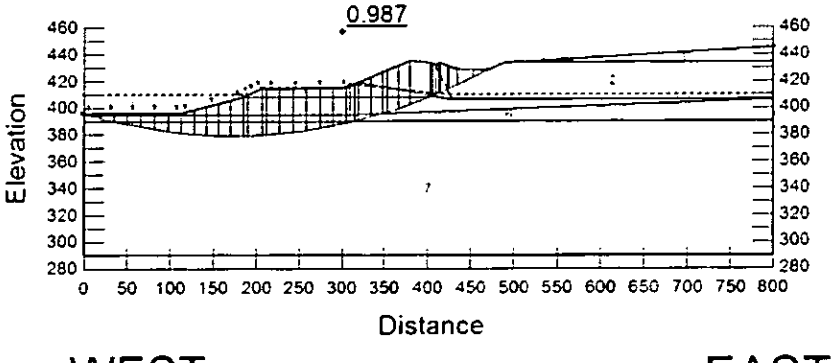
PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.



ANALYSIS

A. Model of Landfill Slope Configuration:

Representative Failure Surface (Circular Failure; River Elevation 418; GW EL 410):



WEST EAST

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PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

Note, Layers 1 and 2 are flyash fill, so the yield acceleration failure surface shown above is a conservative representation for the Newmark calculation set.

B. Perform Pseudo-Static Analysis:

K_y, the yield acceleration, was determined to be 0.31 for the critical section show in Part A above.

C. Maximum Crest Acceleration and Natural Period

See Attachment A for the hand calculations and iteration for determination of u_{max} and T_o.

D. Maximum Acceleration Ratio

See Attached Figure 3 for the Maximum Acceleration Ratio with depth of sliding mass.

E. Maximum Permanent Displacement

See Attached Figure 4 for the calculated Permanent Displacement.

CONCLUSIONS:

An extremely low deformation value (4.5E-06 ft) is calculated via the Newmark Method as simplified by the Makdisi and Seed procedure. This is expected because of the limited slope height of flyash (conservative at 30 ft because part of this depth is below outside grade), the minimal final slope, and the estimated flyash properties. Furthermore, since there is not a liner or associated leachate collection (lateral) system, any calculated deformation would have limited impact.

REFERENCES:

Hanson Engineers Inc., 2000. Hydrogeological Investigation, Former Ash Disposal Pond System, Ameren Venice Power Plant, Venice, Illinois, January 2000.

Kaskaskia Engineering Group, 2010. Geotechnical Report, MRB IDOT Access Road 1 (Ameren Site), Section 82-1B-2, St. Clair County, Illinois, Contract 76D61, March 2010.

Makdisi, F.I. and Seed, H.B. 1977. "A Simplified Procedure for Estimating Earthquake-Induced Deformation in Dams and Embankments."

Natural Resource Technology, Inc. 2010. Global Slope Stability Evaluation, Ash Pond Closures at Ameren Missouri's Venice, Illinois Plant. Technical Memorandum Dated November 2010.

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PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

Missouri Department of Natural Resources and Stark, T.D. 1997. "Draft Technical Guidance Document on Static and Seimic Slope Stability for Solid Waste Containment Facilities." Dated Oct. 14, 1997. 91 pp.

Newmark, N.M. 1965. "Effects of Earthquakes on Dams and Embankments." *Geotechnique.* 5(2).

Tinjum, J.M. 2010. "Site Characterisation, Design, and Construction Considerations." In *WindEnergy Systems: Optimising Design and Construction for Safe and Reliable Operation.* Eds. J.D. Sørensen and J.N. Sørensen. Woodhead Pub. Cambridge, UK.

Zand, B., Wei, T., Amaya, P.J., Wolfe, W.E., Butalia, T. 2007. Evaluation of Liquefaction Potential of Impounded Fly Ash. *World of Coal Ash.* May 7-10, Northern Kentucky, USA.

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PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Newmark Embankment Deformation	By: JMT	Date: 11/01/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

Maximum Crest Acceleration and Natural Period Calculation and Iteration

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THE UNIVERSITY of WISCONSIN MADISON

GEOLOGICAL ENGINEERING

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ATTACHMENT A

SUBJECT: AMEREN VENICE DEFORMATION ANALYSIS

DATE: 11/01/10 PREPARED BY: JM TINJUM PAGE 1 OF 5

CRITICAL PROFILE

- PER NRT (2000), "WESTERN SLOPE/LEVEE" AT DRAWDOWN YIELDS A "YIELD ACCELERATION" OF 0.31
  (See Attached A-1)

PARAMETERS AND GEOMETRY

- YIELD ACCELERATION, k_y, = 0.31
- HEIGHT OF FLYASH AVAILABLE FOR SLOPE DEFORMATION
  - CRITICAL SECTION SHOWS SLOPE FAILURE FROM APPROXIMATE TOP EL = 435 THROUGH LOWER LIMIT OF EL = 405
  - EMBANKMENT HEIGHT, h, = 435-405 = 30 FT
  - UNIT WEIGHT OF UNDISTURBED FLYASH, γ = 100 pcf
- MAXIMUM HORIZONTAL ACCELERATION, a_{max} = 0.23
  - SEE NRT (2000)
  - USGS 50-YR RETURN WITH 2% PROBABILITY
- MAXIMUM SHEAR WAVE VELOCITY, V_{max}
  - NO IN SITE GEOPHYSICAL MEASUREMENTS AVAILABLE
  - FROM KASKASKIA (2010), $N_{avg(flyash)}$ = 12
    - CORRECTED TO $N \simeq 10$ WITH OVERBURDEN CORRECTION
    - PER SOWERS (1979), THIS IS 'LOOSE' TO 'MEDIUM' DENSE
  - FROM TINJUM AND CHRISTENSEN (2010), SATURATED LOOSE 'SAND' HAS V_s = 100-300 m/s
    - ASSUMING THAT THE FLYASH, WHICH IS NON-PLASTIC, BEHAVES AS A 'SAND'
  - FROM TABLE 4 OF ZAND ET AL. (2007)
    $V_{s(flyash)}$ = 170 to 240 m/s
    - USE $V_{max(flyash)}$ = 170 m/s = 560 ft/s

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THE UNIVERSITY of WISCONSIN MADISON

GEOLOGICAL ENGINEERING

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OBJECTIVE

DETERMINE

(1) MAXIMUM CREST ACCELERATION, a_{max}

(2) NATURAL PERIOD, T_o

(3) PERMANENT DISPLACEMENT OF WASTE FILL, U

USING THE MODIFIED NEWMARK METHOD

FIRST ITERATION

STEP 1 DETERMINE G/G_{max}, SHEAR STRAIN, AND DAMPING

ASSUME $V_s = 400$ FT/S

$V_s/V_{max} = $ ~~500/750~~ $400/560 = 0.71$

$G/G_{max} = (V_s/V_{max})^2 = 0.51$

FOR $G/G_{max} = 0.51$, SHEAR STRAIN (γ) = 0.033 AND DAMPING (λ) = 10.5 % (SEE ATTACHED FIGURE 1)

STEP 2 CALCULATE NATURAL FREQUENCIES AND PERIOD

~~USE a_{max} WITH λ (STEP 1) AND~~

$\omega_1 = 2.4(V_s/h) = 2.4(400/30) = 32$ rad/s

$T_1 = 2\pi/\omega_1 = 2\pi/32 = 0.196$ s

$\omega_2 = 5.52(400/30) = 74$ rad/s

$T_2 = 2\pi/74 = 0.085$ s

$\omega_3 = 8.65(400/30) = 115$ rad/s

$T_3 = 2\pi/115 = 0.054$ s

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STEP 3 DETERMINE THE SPECTRAL ACCELERATIONS FOR THE THREE FREQUENCIES

USE a_{max} WITH λ (STEP 1) AND T (STEP 2) TO DETERMINE SPECTRAL ACCELERATIONS FROM FIG. 7

$S_1/a_{max} = 1.4 \Rightarrow S_1 = 1.4(0.23) = 0.322$

$S_2/a_{max} = 1.1 \Rightarrow S_2 = 1.1(0.23) = 0.253$

$S_3/a_{max} = 1.0 \Rightarrow S_3 = 1.0(0.23) = 0.230$

STEP 4 DETERMINE MAXIMUM CREST ACCELERATIONS FOR EACH NATURAL FREQUENCY

ϕ = MODE PARTICIPATION FACTOR

$\phi_1 = 1.6$, $\phi_2 = 1.06$, $\phi_3 = 0.86$

$u_{1(max)} = \phi_1 (S_1) = 1.6(0.322) = 0.515\ g$

$u_{2(max)} = \phi_2 (S_2) = 1.06(0.253) = 0.268\ g$

$u_{3(max)} = \phi_3 (S_3) = 0.86(0.230) = 0.198\ g$

STEP 5 DETERMINE MAXIMUM CREST ACCELERATION

$$u_{max} = [(u_{1max})^2 + (u_{2max})^2 + (u_{3max})^2]^{1/2}$$

$$u_{max} = [0.515^2 + 0.268^2 + 0.198^2]^{1/2} = 0.61\ g$$

STEP 6 CALCULATE THE AVERAGE EQUIVALENT SHEAR STRAIN, $(\gamma_{avg})_{eq}$

$$(\gamma_{avg})_{eq} = 0.65 \times 0.3 \times h/V_s^2 \times (S_1)$$

$$(\gamma_{avg})_{eq} = 0.65 \times 0.3 \times 30ft/(400\ ft/s)^2 \times 0.322(32.2\ ft/s^2)$$

$$(\gamma_{avg})_{eq} = 0.038\% \neq 0.033\%$$

$\therefore$ SECOND ITERATION REQUIRED

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SECOND ITERATION

STEP 1 FROM FIG. 1 (ITERATION 2), WITH $\gamma = 0.038\%$

$G/G_{max} = 0.50$; $\lambda = 10.8\%$

$G/G_{max} = (V_s/V_{max})^2 \Rightarrow V_s/V_{max} = (0.50)^{1/2} = 0.71$

$V_s = 0.71(560) = 398$ ft/s

STEP 2

$\omega_1 = 2.4(398/30) = 32$ rad/s ; $T_1 = 2\pi/32 = 0.20$ s

$\omega_2 = 5.52(398/30) = 73$ rad/s ; $T_2 = 2\pi/73 = 0.086$ s

$\omega_3 = 8.65(398/30) = 115$ rad/s ; $T_3 = 2\pi/115 = 0.055$ s

STEP 3 SEE ATTACHED FIG. 2 (ITERATION 2)

$S_1/a_{max} = 1.5 \Rightarrow S_1 = 1.5(0.23) = 0.345$

$S_2/a_{max} = 1.2 \Rightarrow S_2 = 1.2(0.23) = 0.276$

$S_3/a_{max} = 1.0 \Rightarrow S_3 = 1.0(0.23) = 0.230$

STEP 4

$u_{1max} = 1.6 \times 0.345 = 0.552$ g

$u_{2max} = 1.06 \times \frac{0.253}{0.276} = 0.268$ g ~~0.293 g~~

$u_{3max} = 0.86 \times 0.230 = 0.198$ g

$u_{max} = [0.552^2 + 0.293^2 + 0.198^2]^{1/2} = 0.66$ g

STEP 6

$(\gamma_{avg})_{eq} = 0.66 \times 0.3 \times 30\text{ft}/(398\text{ft/s})^2 \times 0.345(32.2\text{ft/s}^2) = 0.041\%$

$0.038\% \approx 0.041\%$; STOP ITERATION PROCESS

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ITERATION RESULT SUMMARY

$u_{max} = 0.66\,g$

$\gamma_{avg} = 0.04\%$ ⇒ SEE FIG. 1 (FINAL ITERATION)

$T_0 = 0.20\,s$ $\quad G/G_{max} = 0.45$

$\gamma = 11\%$

DETERMINE MAXIMUM VALUE OF AVERAGE ACCELERATION, k_{max}

PER FAILURE SURFACE, FLYASH FROM EL 435 TO EL 405 PARTICIPATES; THUS,

$y = h$ AND $y/h = 1.0$

⇒ SEE ATTACHED FIG. 3

$k_{max}/u_{max} = 0.34$

$k_{max} = 0.34(0.66\,g) = 0.224\,g$

DETERMINE PERMANENT DISPLACEMENT, U

$k_y/k_{max} = 0.3/0.224 = 1.38$

SEE ATTACHED FIG. 4, $U/k_{max}(T_0) \leq 0.0001$

$U = 0.0001(0.224)(0.20) = 4.5 \times 10^{-6}$ ft

∴ AN EXTREMELY LOW DEFORMATION VALUE IS CALCULATED BY THE NEWMARK PROCEDURE. FURTHERMORE, SINCE THE SITE DOES NOT HAVE A LINER SYSTEM OR ASSOCIATED COLLECTION (LATERAL) SYSTEM, ANY CALCULATED DEFORMATION WOULD NOT BE IMPACTFUL. A COROLLARY SEISMIC LIQUEFACTION ANALYSIS SHOULD BE CONDUCTED.

FIGURES

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ITERATION 1

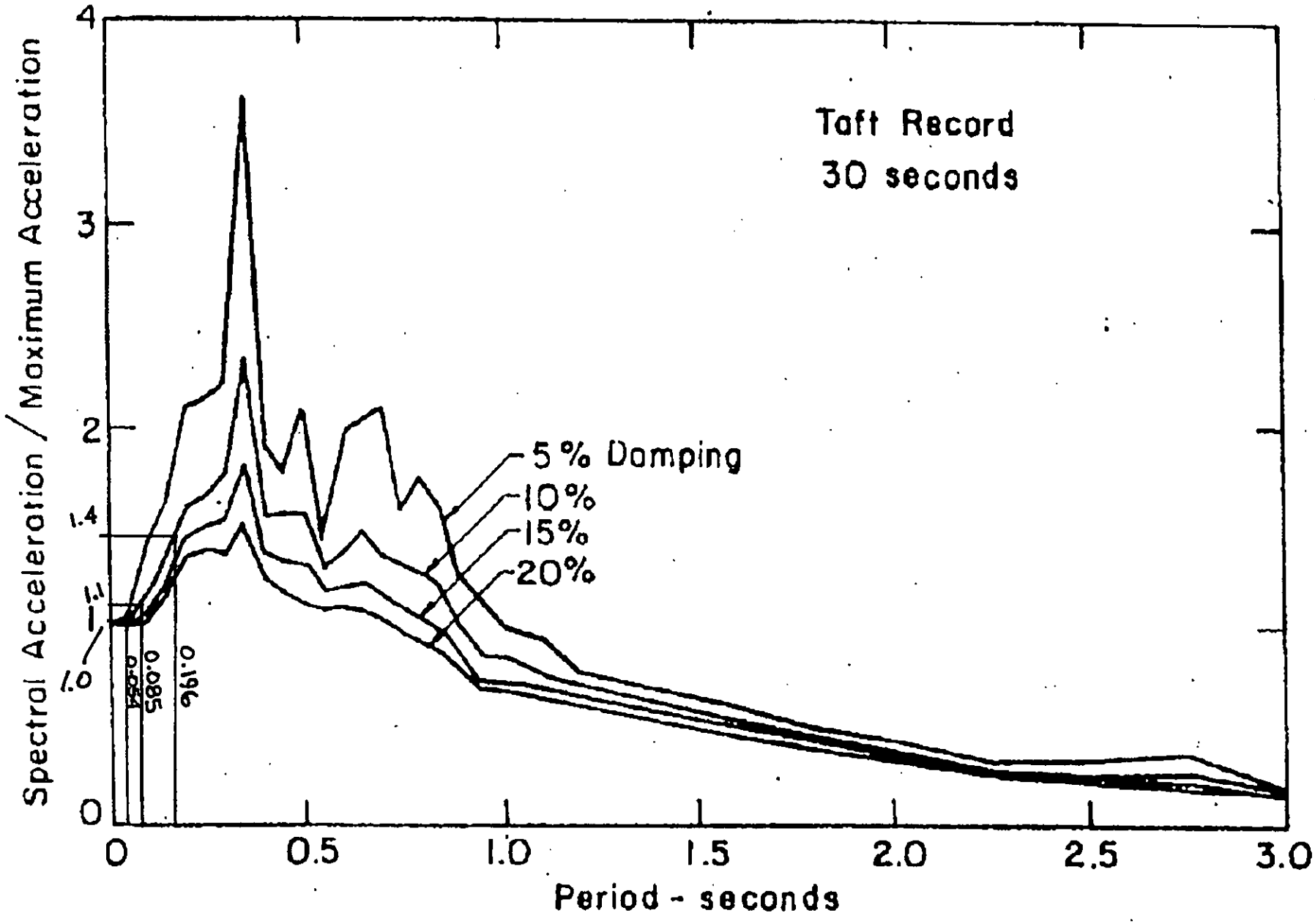

FIGURE 2: NORMALIZED ACCELERATION RESPONSE SPECTRA - TAFT RECORD
(NORTH - SOUTH COMPONENT)

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ITERATION 2

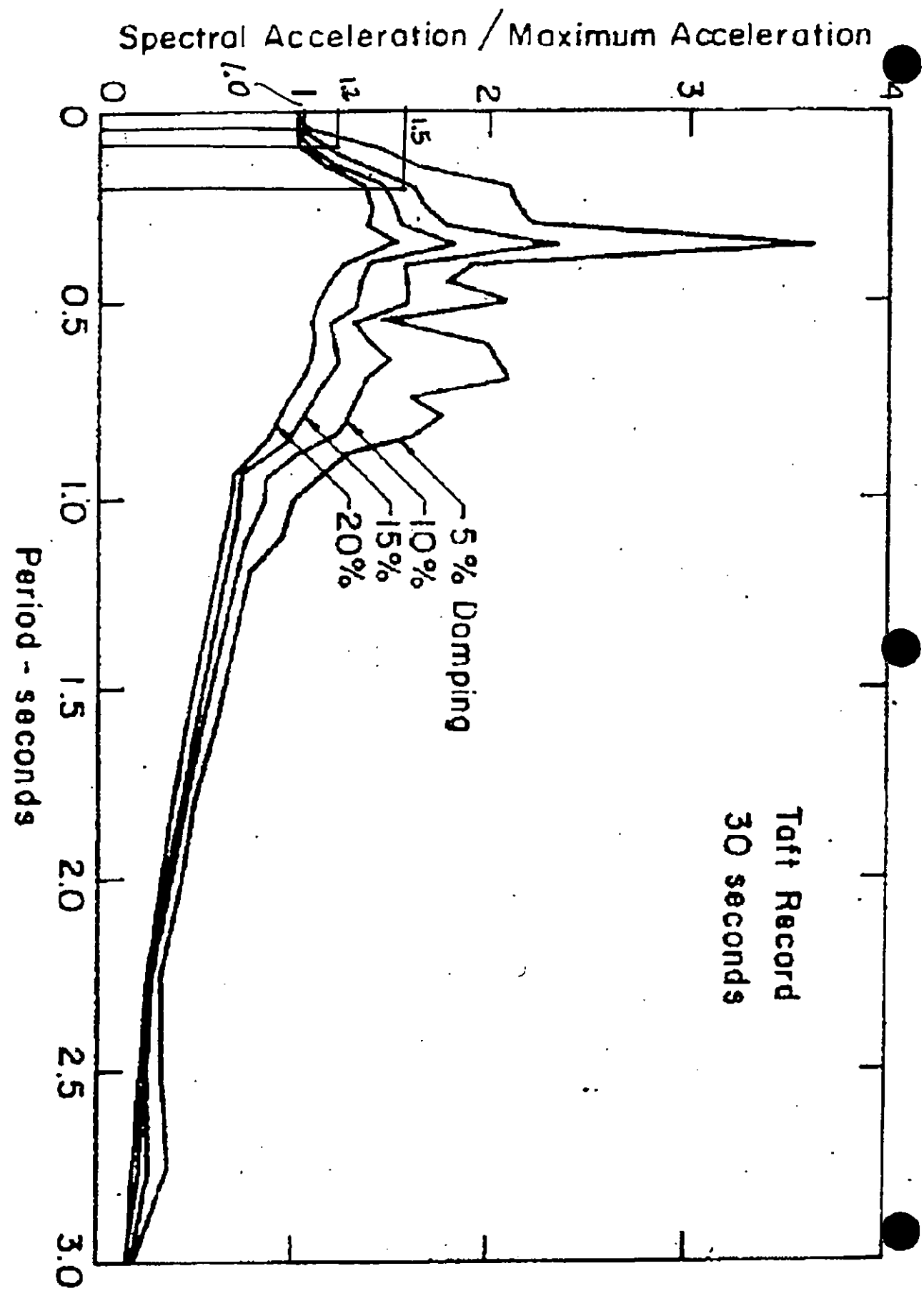

FIGURE 2: NORMALIZED ACCELERATION RESPONSE SPECTRA - TAFT RECORD
(NORTH - SOUTH COMPONENT)

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ITERATION 1

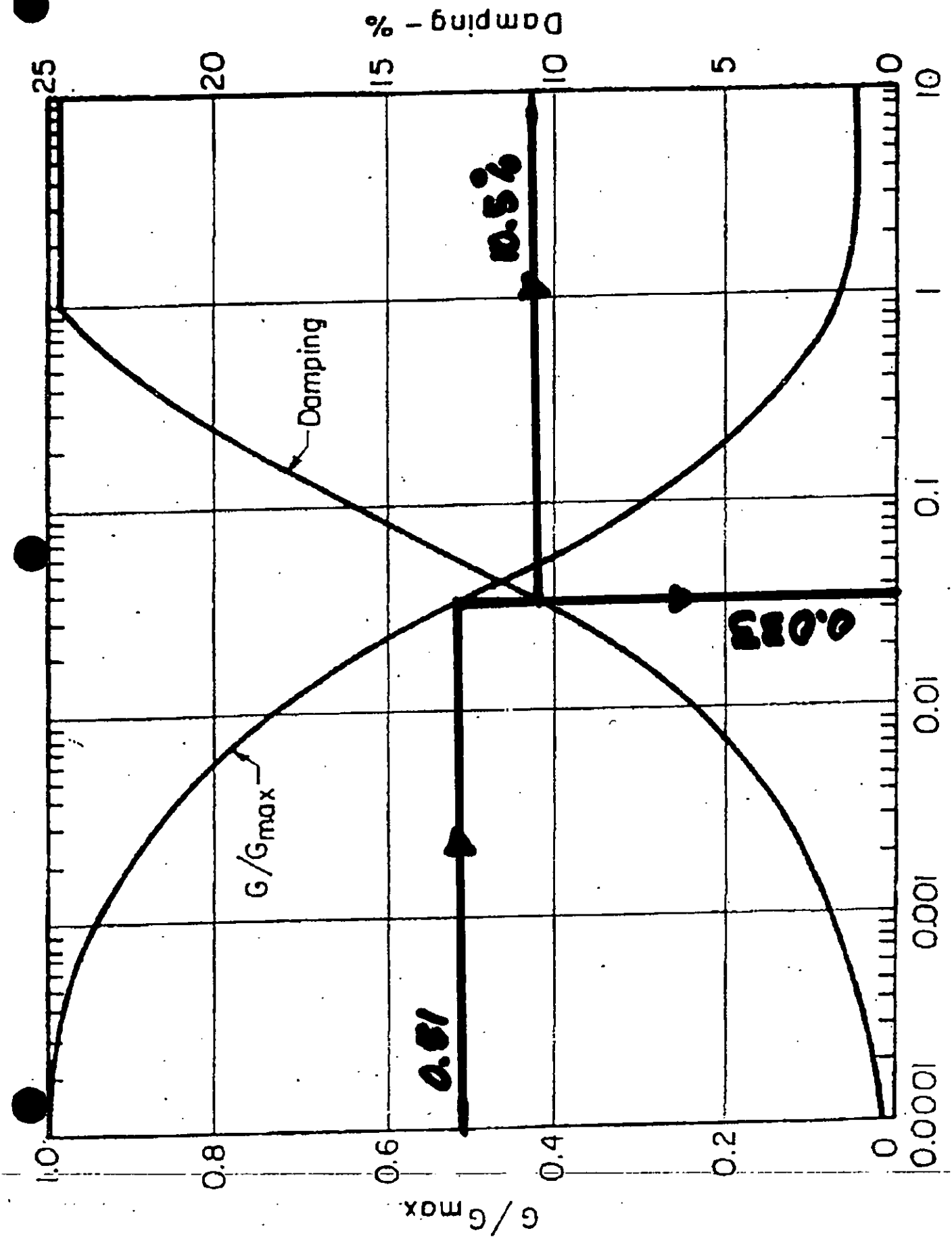

FIGURE 1: SHEAR MODULUS AND DAMPING CHARACTERISTICS USED IN RESPONSE CALCULATIONS

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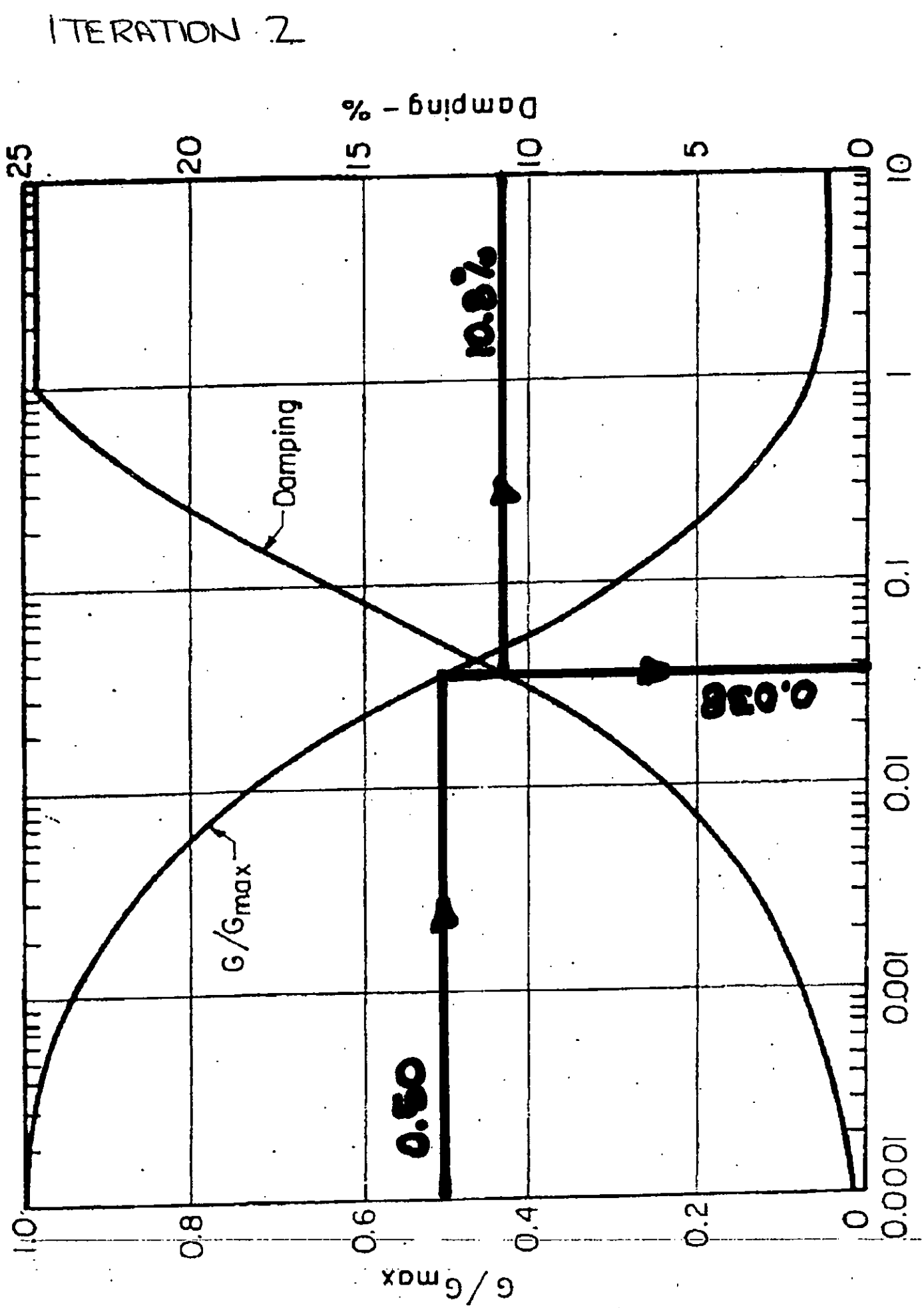

FIGURE 1: SHEAR MODULUS AND DAMPING CHARACTERISTICS USED IN RESPONSE CALCULATIONS

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FINAL ITERATION

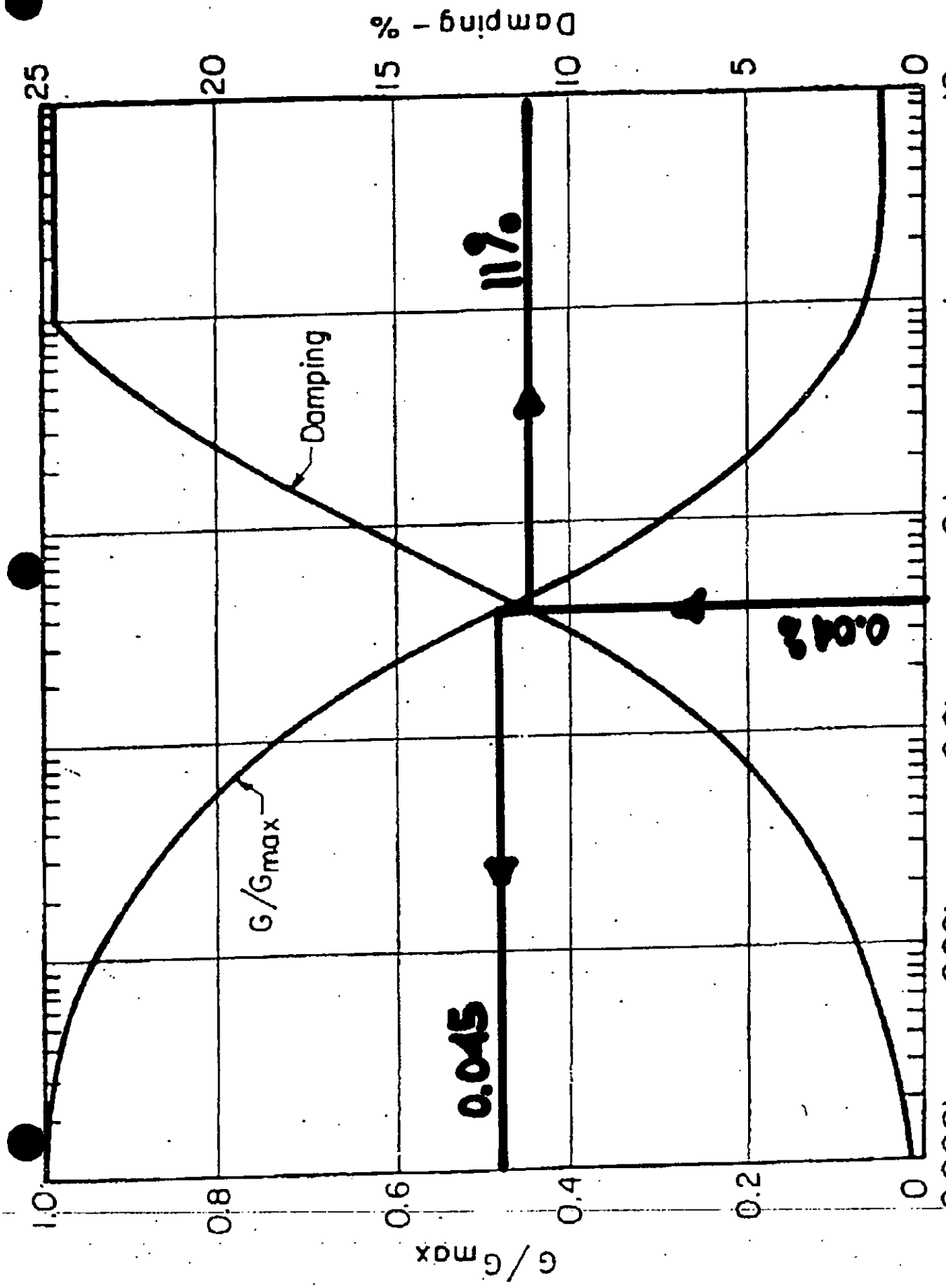

FIGURE 1: SHEAR MODULUS AND DAMPING CHARACTERISTICS USED IN RESPONSE CALCULATIONS

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FIG. 3

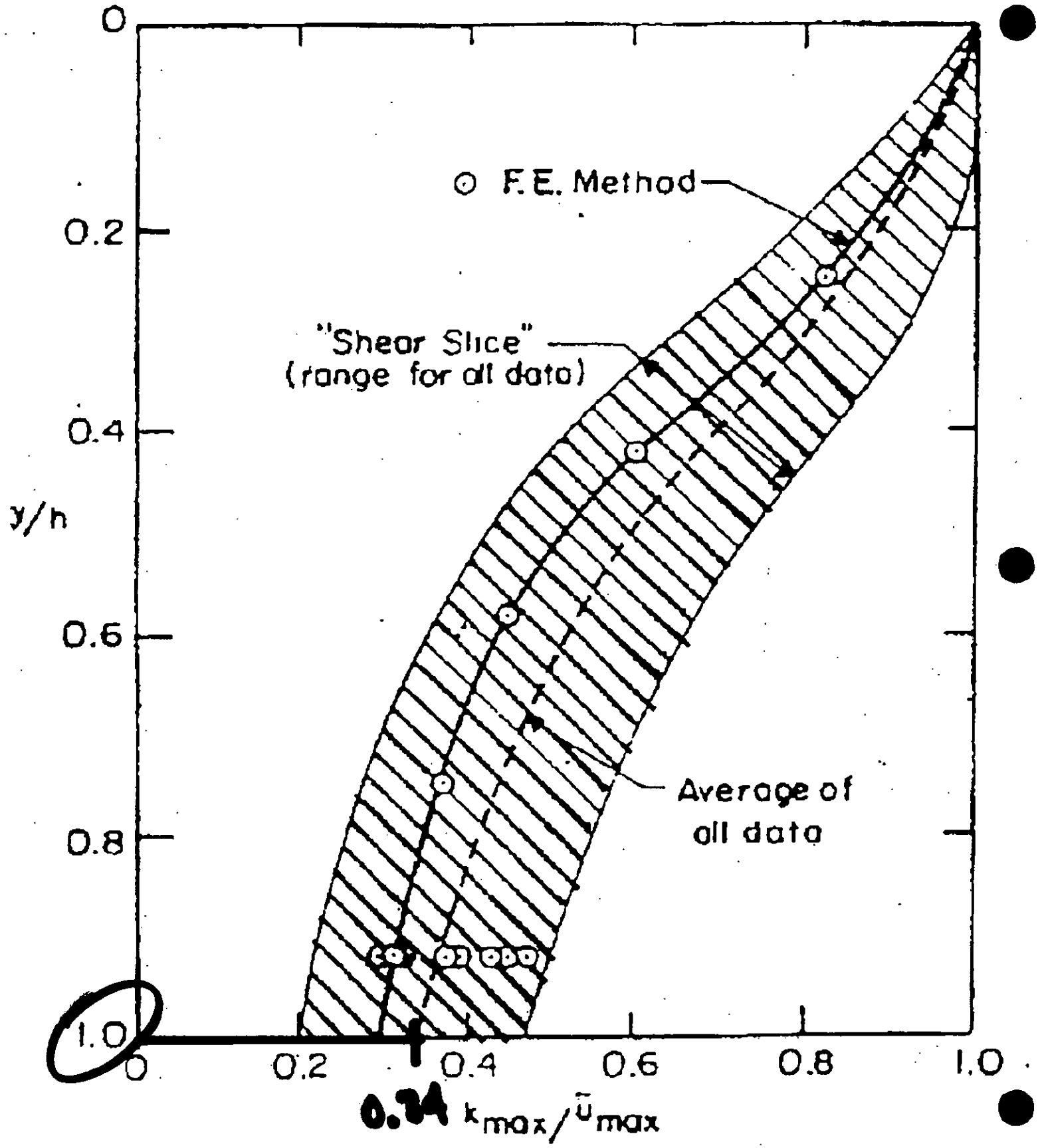

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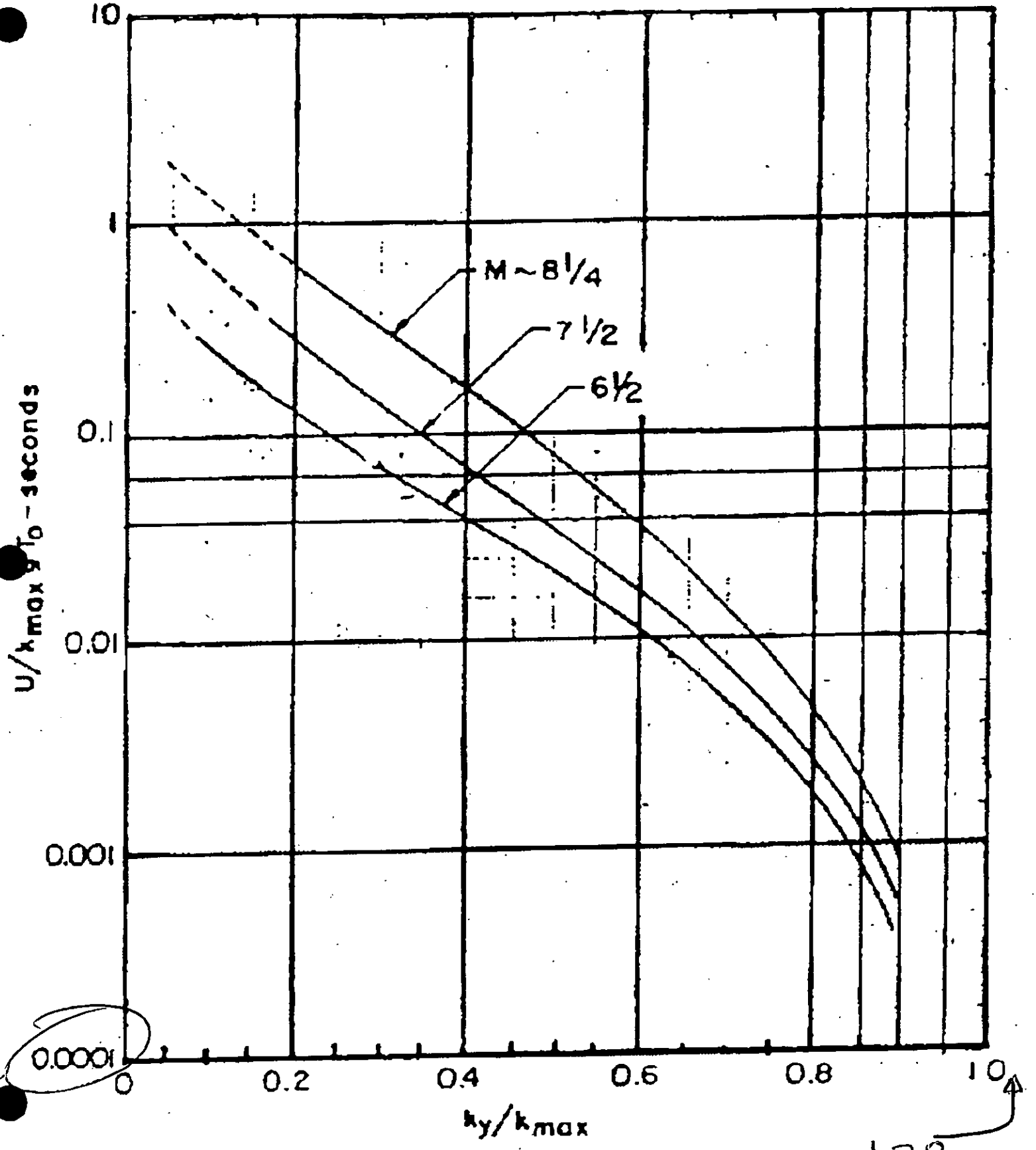
FIG. 4



1.38

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ATTACHMENT I

LIQUEFACTION ANALYSIS

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GEO ENGINEERING CONSULTING, LLC

3100 Lake Mendota Drive, #503 Madison, WI 53705 (608) 233-5794

COMPUTATION SHEET

PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
	By:	Date:	By:	Date:	
Venice, IL Liquefaction Analysis	JMT	11/03/10	TBE	11/07/10	Natural Resource Technology Inc.

OBJECTIVE

Estimate the liquefaction potential of the saturated component of the flyash fill at the Ameren Missouri's Venice, Illinois, flyash disposal pond closure system using an evaluation of the susceptibility of the flyash to liquefaction using criteria outlined by Seed and Idriss (1982), an analysis procedure outlined by the Tennessee Division of Solid Waste (1993), supplemented with data on flyash behavior reported by Zand et al. (2007).

BACKGROUND

The term *liquefaction* is generally used to describe the phenomenon in which saturated, cohesionless soil looses effective strength during a vibration event (e.g., earthquake, blasting), thus causing deformation and flow type of responses. In general, soil will not liquefy except if all three of the following criteria are met (Seed and Idriss, 1982):

1. Water content, w, > 0.9 x the liquid limit, LL
2. LL < 35
3. Fines (< 0.005 mm) content < 15%

Based on flyash characterization of the flyash at the site by Kaskaskia (2010), the flyash specimens analyzed showed non-plastic material at an elevated water content (14% < w < 88%), with clay (< 0.075 mm) content at 5% or less; thus, that flyash material shows the potential for liquefaction according to the criteria listed above and thus the necessity of a liquefaction analysis. Furthermore, Zand et al. (2007) considered flyash as liquefiable material and performed a liquefaction potential evaluation for impounded flyash.

A. Site Background

- Site is located on the east bank of the Mississippi River in Venice, Illinois
- Flyash impoundments in question consist of two 'pond' systems - No. 2 (northern, approximately 30 acres) and No. 3 (southern, 30 acres), with a river flood control levee embankment to the west
- Plant began operating in 1942 as a coal-combustion power plant, but turbines were converted to oil/gas in 1972 and 1979, respectively; thus, sluicing operations to the ash ponds were suspended at that time
- The ash ponds were used for plant storm water management through 2005

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PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Liquefaction Analysis	By: JMT	Date: 11/03/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

- Site is in planning for long-term closure

B. Subsurface Soil Investigation Data Available

Hanson Engineers Inc. 2000. "Hydrogeological Investigation, Former Ash Disposal Pond System, AmerenUE Venice Power Plant."

- 14 soil borings in June/July 1999 using 5-ft-long CME split-barrel sampler
- 11 converted to monitoring wells
- Site geology is generally clayey silt overlying sand
- Levees classified as "fill" material
- The base of the flyash is generally at or above EL 406 ft
- The existing upper elevation of the flyash is at EL 432 ft

Kaskaskia Engineering Group LLC. 2010. "MRB IDOT Access Road 1."

- 5 borings using SPT at 2.5-ft intervals advanced in February of 2010
- Focus on the haul road berm on the east side of the impoundment
- Water content (14 to 88) higher than expected for given N values, likely due to cementation
- For the silty flyash material, ϕ' of 26° and c' = 50psf used

C. Slope Stability Analysis

Natural Resource Technology Inc. 2010. "Global Slope Stability Evaluation, Ash Pond Closures at Ameren Missouri's Venice, Illinois Plant." Technical Memorandum.

Soil Horizons and Input Parameters (note, for liquefaction analysis, the unit weights are input parameters):

Soil Type	Unit Weight (pcf)	Cohesion (psf)	ϕ (deg)
Regraded Ash	90	0	26
Existing Ash	100	50	28
Fill	115	0	30
Upper Granular	125	0	30
Silt – Clay	120	0	32
Lower Granular	130	0	32

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PROJECT/PROPOSAL NAME	PREPARED		CHECKED		CLIENT
Venice, IL Liquefaction Analysis	By: JMT	Date: 11/03/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

APPROACH AND ANALYSIS - DETERMINATION OF LIQUEFACTION POTENTIAL

Although Illinois does not have specific technical guidance for seismic deformation analysis of landfill closures, nearby State guidance (Tennessee and Missouri) do. The Tennessee Division of Solid Waste has published a simplified method for the determination of liquefaction potential and its impact on waste fills. The general procedure requires the eight procedural steps, discussed and presented as follows:

Step 1. Determine the Maximum Horizontal Acceleration from a USGS Seismic Hazard Map:

- a_{max} = 0.23 per NRT (2010).

Step 2. Determine the Total Overburden Pressure (σ) and the Effective Overburden Pressure (σ') on the Flyash Layer in Question:

- The point of evaluation is the mid-point of the potentially saturated flyash layer.
  - Per NRT (2010), the groundwater elevation within the closure cell has been correlated to be approximately EL 410 ft at Mississippi flood stage.
  - Per Hanson Engineers Inc. (2000), the base of the flyash is approximately EL 406 ft (see attached FIG. 1).
  - The midpoint is thus $\text{Midpoint} = 406' + \frac{410' - 406'}{2} = 408'$
  - The thickness of the saturated flyash layer is thus EL 410 - EL 406 = 4 ft
- Calculate overburden pressure:
  - Per the Final Grading Plan (NRT, 2010), the high point of the cell will be EL 447 ft (see FIG. 2).
  - Assume that regraded flyash material will be placed above EL 432 ft, which is the existing high point of flyash (FIG. 1).
  - Per NRT (2010), regraded flyash has moist unit weight of 90 pcf and undisturbed flyash has moist unit weight of 100 pcf.
  - Assume that cover material (EL 444 to 447 ft) has a unit weight of 120 pcf.

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- Thus,
$$\sigma = (447' - 444') \cdot 120pcf + (444' - 432') \cdot 90pcf + (432' - 408') \cdot 100pcf = 3840psf$$

- Calculate effective stress at the midpoint of the flyash:
$$\sigma' = 3840psf - (410' - 408') \cdot 62.4pcf = 3715psf$$

Step 3. Correct the Standard Penetration Test Value (N) for the Effect of Overburden Pressure.

- N_{avg} = 12 per Kaskaskia (2010)
- Determine the blow count overburden correction factor, C_N, using a correlation provided in NAVFAC DM 7.3 (FIG. 3):
  - In tons per square foot, tsf, $\sigma' = \frac{3715psf}{2000\frac{lb}{ton}} = 1.9tsf$
  - From FIG. 3, C_N = 0.74 and
  - $N_{corrected}$ = 0.74 x 12 = 9

Step 4. Determine the Stress Reduction Factor, r_d:

- Depth = EL 447 ft – EL 408 ft = 39 ft
- r_d = 0.86 per correlation (FIG. 4)

Step 5. Compute the Cyclic Stress Ratio, R_i, Developed in the Field During Design Earthquake:

$$R_i = \frac{\tau_{avg}}{\sigma'} = 0.65(a_{max})\left(\frac{\sigma}{\sigma'}\right)r_d$$

$$R_i = 0.65 \cdot 0.23 \cdot \left(\frac{3840psf}{3715psf}\right) \cdot 0.86 = 0.16$$

Step 6. Estimate the Cyclic Stress Ratio, R_f, Required to Cause Liquefaction:

- Assume earthquake magnitude, M = 7.5
- R_f = 0.10 (FIG. 5)

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Venice, IL Liquefaction Analysis	By: JMT	Date: 11/03/10	By: TBE	Date: 11/07/10	Natural Resource Technology Inc.

Step 7. Calculate the Factor of Safety, F_s, Against Liquefaction for the Flyash Layer:

$$F_s = \frac{R_t}{R_i} = \frac{0.10}{0.16} = 0.62 < 1.2$$

∴ There is the potential for liquefaction of the saturated flyash layer given an elevated water table in the cell (EL 410 ft) and a design earthquake of a_{max} = 0.23.

Step 8. Determine if the Potential Liquefaction will Result in Damaging Movements on the Surface:

- Thickness of the liquefiable layer = EL 410 - EL 406 = 4 ft = 1.2 m
- Thickness of the surface layer = EL 447 - EL 410 = 37 ft = 11.3 m
- From FIG. 6, **NO SURFACE DAMAGE IS PREDICTED**.

CONCLUSIONS:

Using simplified liquefaction analysis procedures recommended by the Tennessee Division of Solid Waste, the saturated flyash at the site is potentially liquefiable, but no surface damage is predicted given a high water table of EL 410 ft and the design earthquake of a_{max} = 0.23. The saturated flyash layer is of limited thickness (4 ft) and at great depth; thus, the minimal impact.

REFERENCES:

Hanson Engineers Inc. 2000. Hydrogeological Investigation, Former Ash Disposal Pond System, Ameren Venice Power Plant, Venice, Illinois, January 2000.

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Natural Resource Technology, Inc. 2010. Global Slope Stability Evaluation, Ash Pond Closures at Ameren Missouri's Venice, Illinois Plant. Technical Memorandum Dated November 2010.

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Tennessee Division of Solid Waste, a Division of the Tennessee Department of Environment and Conservation (TDEC). 1993. *Technical Guidance Document: Earthquake Evaluation Guidance Policy*. 41 pp.

Zand, B., Wei, T., Amaya, P.J., Wolfe, W.E., Butalia, T. 2007. Evaluation of Liquefaction Potential of Impounded Fly Ash. *World of Coal Ash*. May 7-10, Northern Kentucky, USA.

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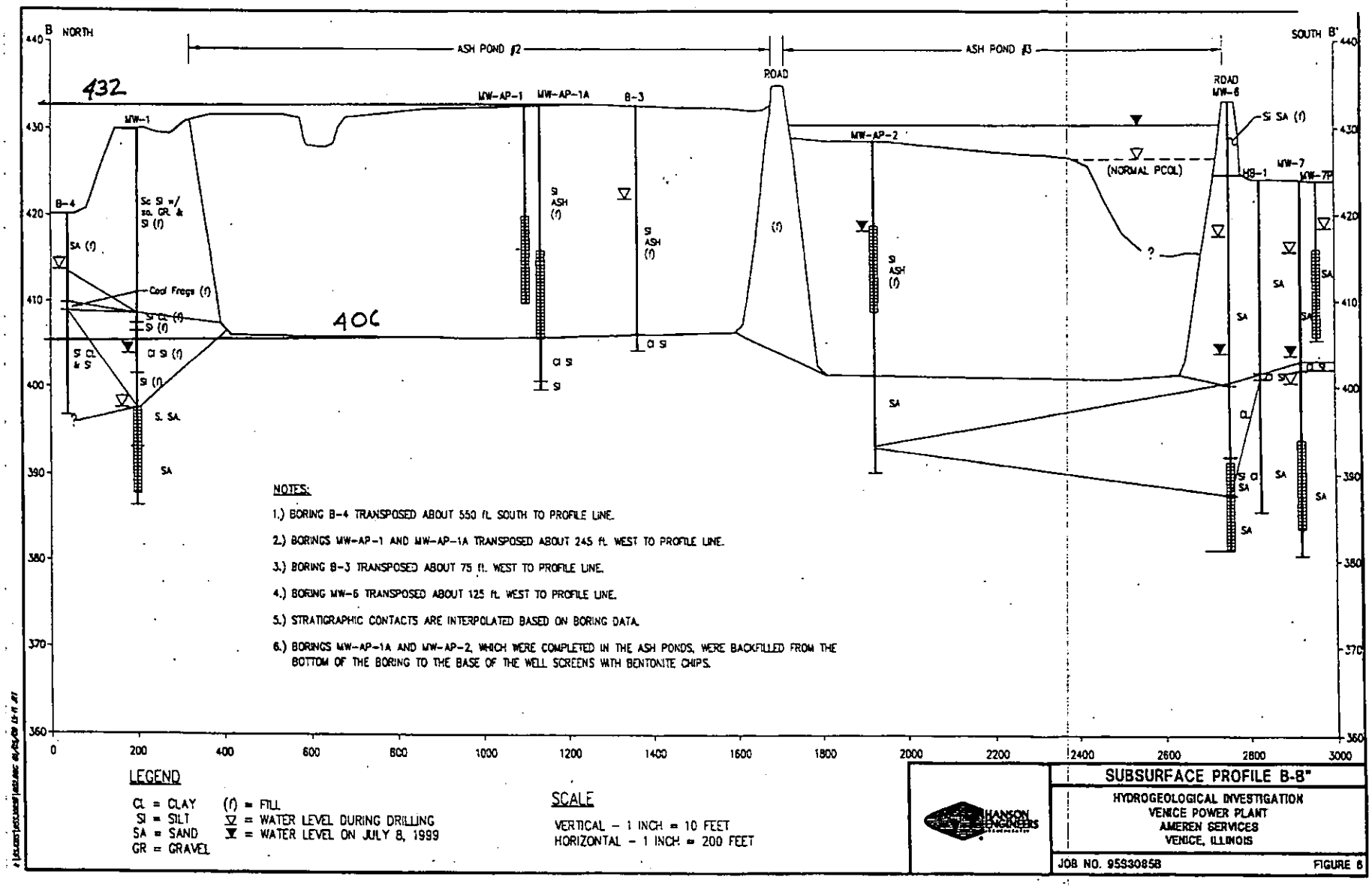
	By:	Date:	By:	Date:	
Venice, IL Liquefaction Analysis	JMT	11/03/10	TBE	11/07/10	Natural Resource Technology Inc.

Analysis Figures



NOTES:

1.) BORING B-4 TRANSPOSED ABOUT 550 ft. SOUTH TO PROFILE LINE.

2.) BORINGS MW-AP-1 AND MW-AP-1A TRANSPOSED ABOUT 245 ft. WEST TO PROFILE LINE.

3.) BORING B-3 TRANSPOSED ABOUT 75 ft. WEST TO PROFILE LINE.

4.) BORING MW-6 TRANSPOSED ABOUT 125 ft. WEST TO PROFILE LINE.

5.) STRATIGRAPHIC CONTACTS ARE INTERPOLATED BASED ON BORING DATA.

6.) BORINGS MW-AP-1A AND MW-AP-2, WHICH WERE COMPLETED IN THE ASH PONDS, WERE BACKFILLED FROM THE BOTTOM OF THE BORING TO THE BASE OF THE WELL SCREENS WITH BENTONITE CHIPS.

LEGEND

CL = CLAY
SI = SILT
SA = SAND
GR = GRAVEL
(f) = FILL
▽ = WATER LEVEL DURING DRILLING
▼ = WATER LEVEL ON JULY 8, 1999

SCALE

VERTICAL - 1 INCH = 10 FEET
HORIZONTAL - 1 INCH = 200 FEET

HANSON ENGINEERS

SUBSURFACE PROFILE B-B'

HYDROGEOLOGICAL INVESTIGATION
VENICE POWER PLANT
AMEREN SERVICES
VENICE, ILLINOIS

JOB NO. 95330858 FIGURE 8

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FIG. 2

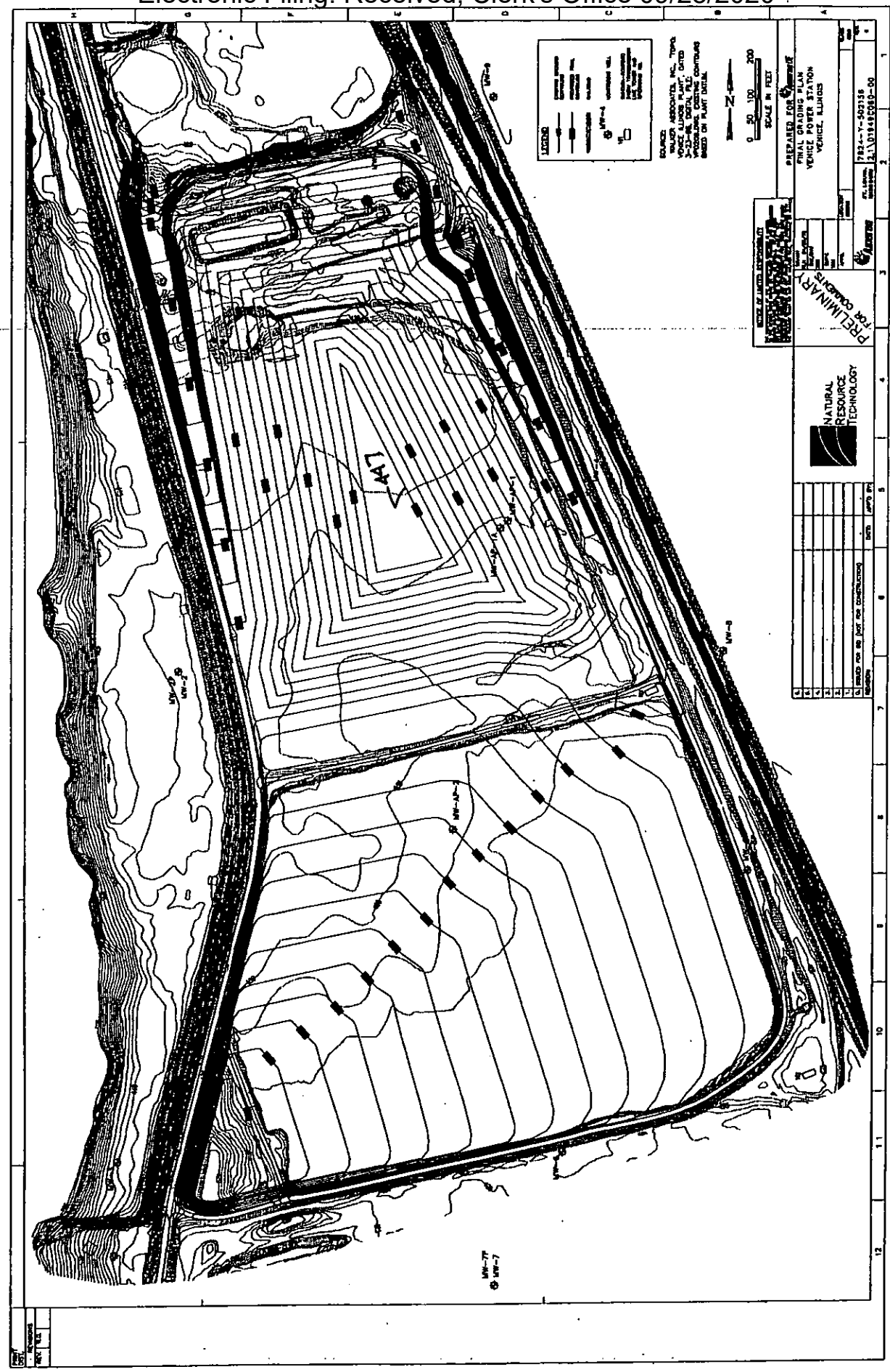
PREPARED FOR
FINAL GRADING PLAN
VENICE POWER STATION
VENICE, ILLINOIS
NATURAL RESOURCE TECHNOLOGY
PRELIMINARY FOR COMMENTS
SCALE IN FEET
447

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FIG. 3

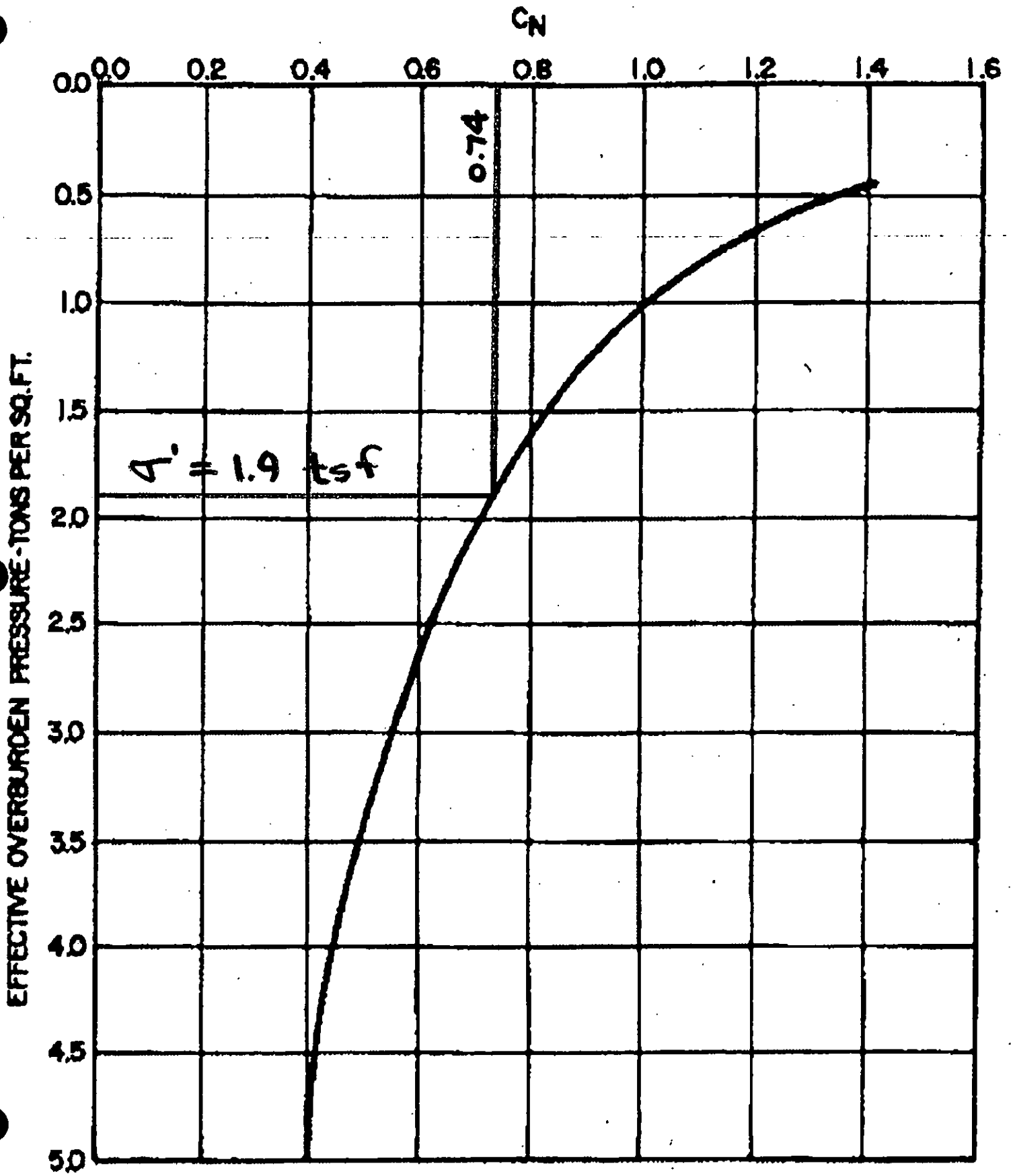

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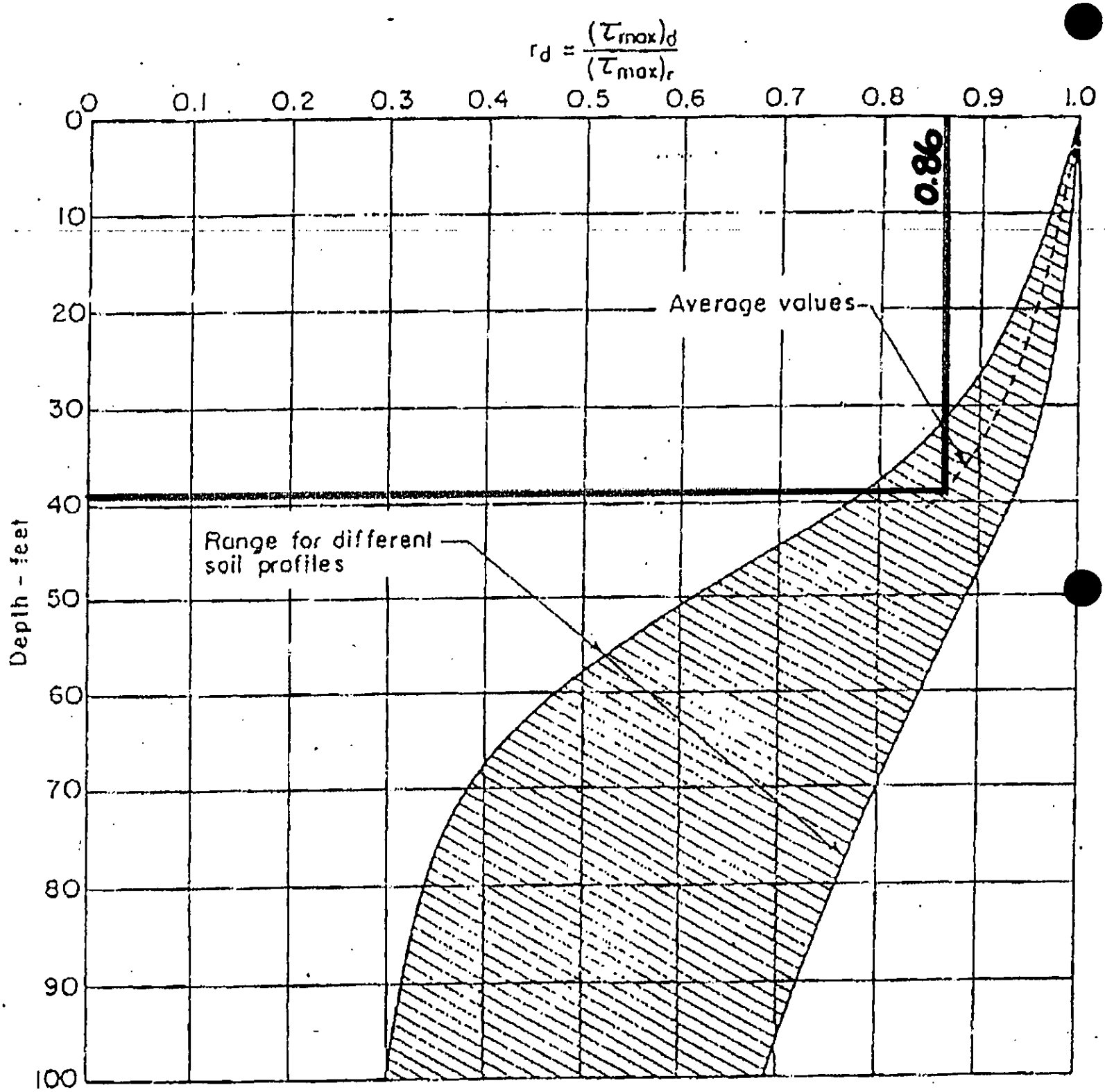
FIG. 4



—RANGE OF VALUES OF r_d FOR DIFFERENT SOIL PROFILES

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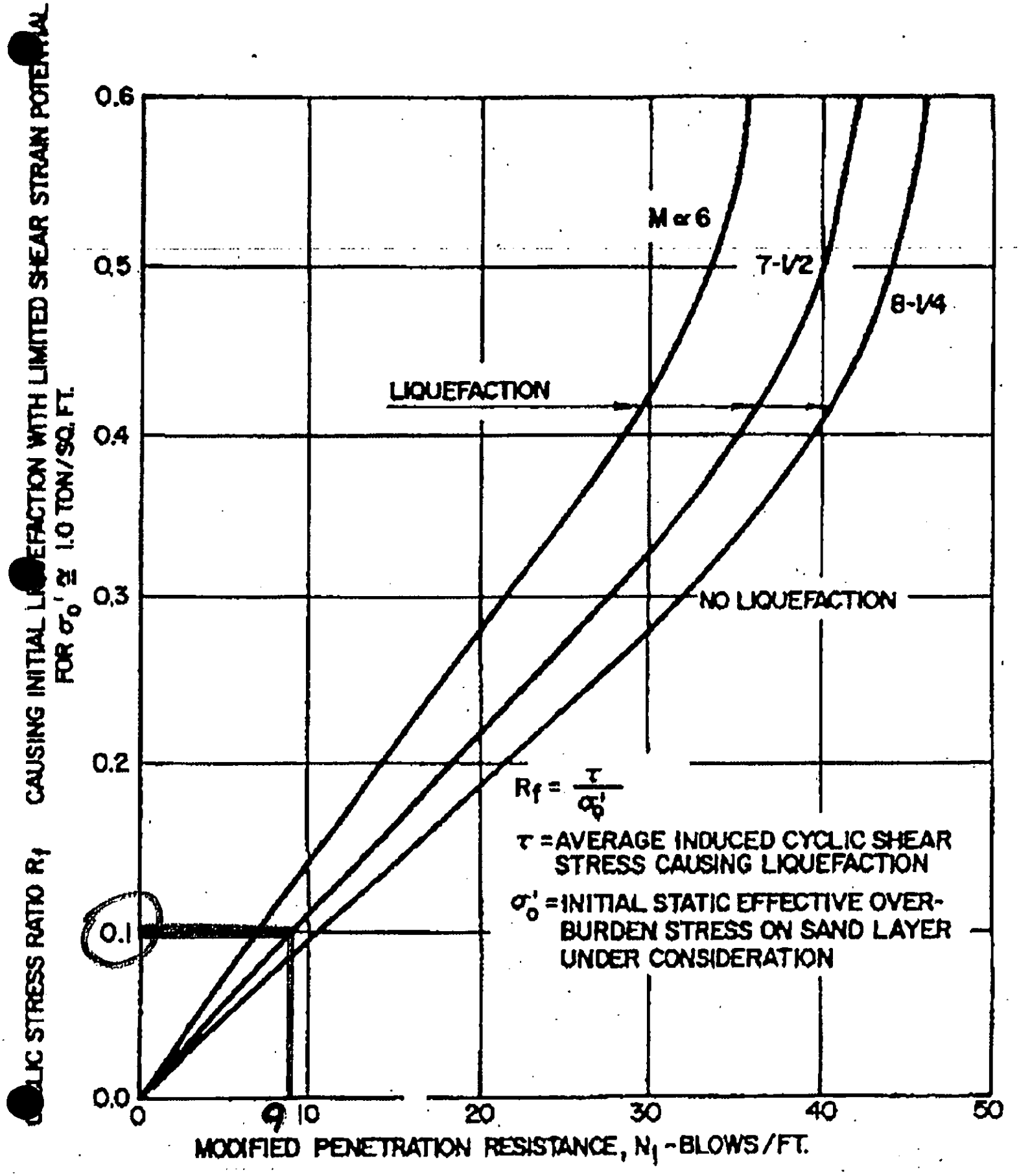
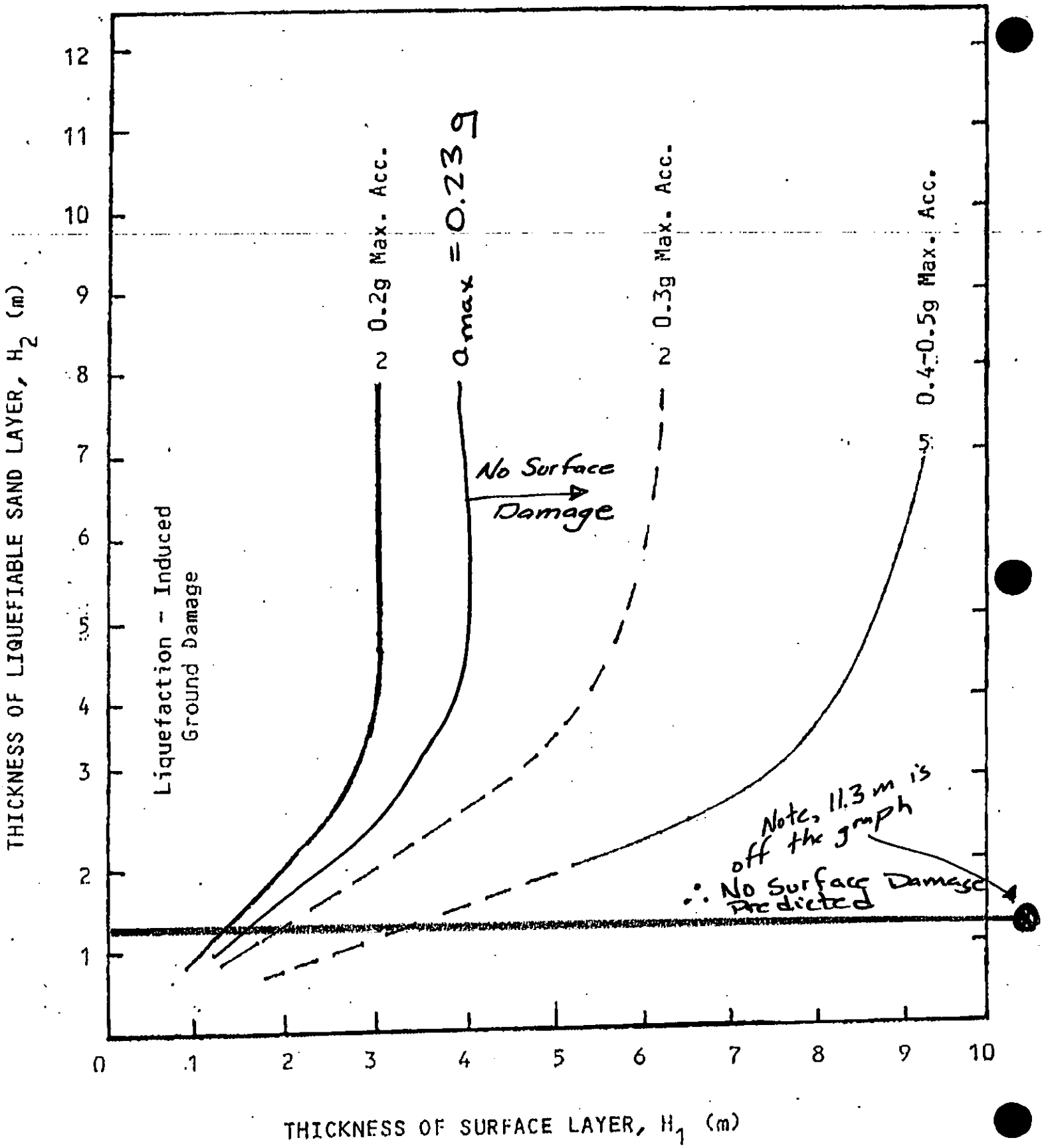
FIG. 5




THICKNESS OF LIQUEFIABLE SAND LAYER, H_2 (m)
THICKNESS OF SURFACE LAYER, H_1 (m)
0
1
2
3
4
5
6
7
8
9
10
11
12
0.2g Max. Acc.
a_{max} = 0.23g
0.3g Max. Acc.
0.4-0.5g Max. Acc.
No Surface Damage
Liquefaction - Induced Ground Damage
Note, 11.3 m is off the graph
∴ No Surface Damage Predicted

J

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APPENDIX J

VENEER SLOPE STABILITY EVALUATION – ASH POND CLOSURES AT AMEREN MISSOURI'S VENICE, ILLINOIS POWER PLANT

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NATURAL RESOURCE TECHNOLOGY

TECHNICAL MEMORANDUM

www.naturalrt.com

Date: **November 5, 2010**

Subject: **Veneer Slope Stability Evaluation**
Ash Pond Closures at Ameren Missouri's Venice, Illinois Plant

From: **Andrew Millspaugh, EIT**
Environmental Engineer

Objective and Summary of Results

This technical memorandum evaluates the static and pseudo-static (seismic) veneer slope stability of the planned construction activities to regrade and cap Ash Pond Nos. 2 and 3 at the Ameren Missouri electric power generating station in Venice, Illinois. Veneer analysis considers the interface stability of the various components of the multi-layer cap. Planned closure activities must be reviewed and approved by both the Illinois Environmental Protection Agency (IEPA) and the U.S. Army Corps of Engineers (USACE).

Based on this evaluation, the veneer stability of the closed ash impoundment for the maximum proposed slope satisfies the minimum requirements of 35 IAC 811.304(d) with a static and pseudo-static safety factor of at least 1.5 and 1.3, respectively.

Geo Engineering Consulting, LLC, a subconsultant to NRT, acted in an advisory role to NRT on this project and also peer reviewed the analysis, results, and conclusions.

Historical Operation of Ash Pond System

Historical operation of the ash pond system is described in a companion technical memorandum for this project titled *"Global Slope Stability Analysis."*

Closure Design

The closure design at the time of the veneer analysis called for placement of a geosynthetic cap over the ash (Figure 1) that will comprise the following layers in ascending order: a 40-mil polyvinylchloride (PVC) geomembrane directly over the ash, a geonet above the PVC, and a needle-punched, nonwoven geotextile above the geonet. Lastly, 3 ft of soil consisting of 2.5 ft of locally available undifferentiated soil and 0.5 ft of topsoil will uniformly cover the entire geosynthetic cap. The material layers of the closure design provide interface surfaces where sliding failure could occur; therefore, a veneer stability analysis was performed under static and pseudo-static conditions to evaluate corresponding safety factors.

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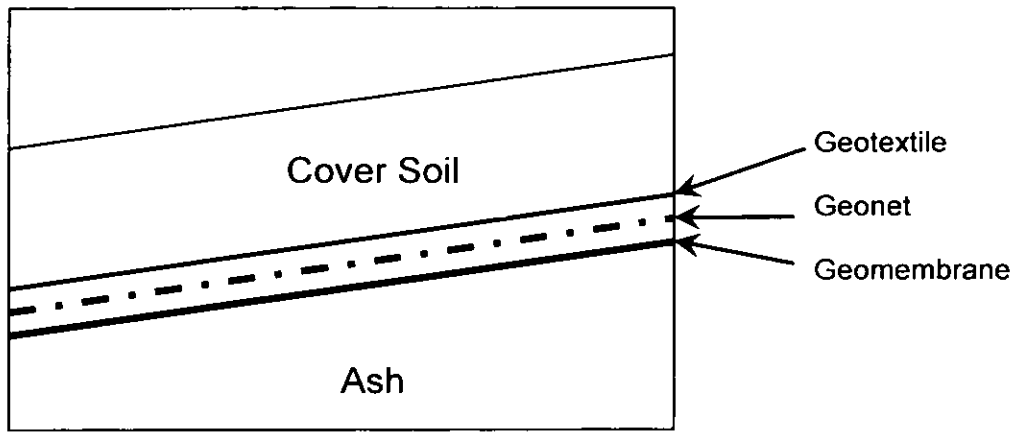

Figure 1: Representation Sketch of Geosynthetic Cap Evaluated

The closure design has since been changed to incorporate a geocomposite drainage layer over the PVC geomembrane instead of a separate geonet and geotextile. The geocomposite drainage layer consists of a geonet with geotextile bound to both the top and bottom. Interface strength parameters are greater for the geocomposite than the geonet alone; therefore, the veneer stability analysis is conservative by not incorporating the design change.

Static Veneer Stability Analysis

The static veneer stability analysis was performed for a finite slope length with cover soil of uniform thickness over a geosynthetic cap at a given angle and acted upon only by gravity (Koerner and Soong, 2005). A Microsoft (MS) Excel spreadsheet was used to simplify the calculations after input parameters were selected. The spreadsheet was constructed to accept input parameters in metric (SI) units; therefore, input parameters listed in Table 1 appear in both English and SI units. A copy of the calculation spreadsheet appears in Attachment A.

Table 1: Input Parameters for Static Veneer Slope Stability Analysis

Input Parameter	Value
Cover soil thickness (h)	3 ft (0.91 m)
Soil slope angle beneath the geomembrane (β)	2 % (1.2°)
Length of slope measured along the geomembrane (L)	400 ft (121.9 m)
Unit weight (moist) of the cover soil (γ)	110 pcf (17.3 kN/m^3)
Friction angle of the cover soil (ϕ)	30°
Cohesion of the cover soil (c)	0 psf (0 kPa)
Critical (lowest) interface friction angle, between geocomposite and geomembrane (δ)	18°
Adhesion between cover soil and geomembrane (ca)	0 psf (0 kPa)

The cover soil thickness, slope angle, and slope length were governed by the current closure design. Because a specific borrow source and cover soil have yet to be identified, 30° was selected as a conservative internal friction angle based on a typical range for soils. Granular soils typically have an internal friction angle in the range of 30°–45° depending on particle shape and relative density (Das, 2005). Undisturbed fine-grained soils of low plasticity, common in the area, typically have an internal friction angle in the range of 30°–36° (Bowles, 1979).

The interface friction angle for the geosynthetic components was selected based on the assumption that the governing failure interface would be between the geonet drainage layer and the underlying PVC geomembrane. Published data for large-scale direct shear tests between PVC and a geonet reported peak and residual interface friction angles of 23° and 18°, respectively (Environmental Protection, Inc., 2000). The lower residual angle of 18° was selected in the absence of site-specific data. Strength contributions from both the cover soil cohesion and the PVC to Geonet adhesion were assumed to be negligible. The residual interface friction angle between a geocomposite drainage layer and PVC is 23°, which is greater and more conservative than the selected angle of 18° (Environmental Protection, Inc., 2000).

The computed **factor of safety against sliding failure was 24.78** for the static stability analysis. This greatly exceeds the minimum factor of safety of 1.5 required by 35 IAC 811.304(d) for slope failure.

Pseudo-Static Veneer Slope Stability Analysis

The pseudo-static veneer stability analysis was also performed for a finite slope length with cover soil of uniform thickness over a geosynthetic cap at a given angle (Koerner and Soong, 2005). Along with gravitational forces, this seismic analysis incorporated a horizontal force acting on the centroid of the cover soil. Another MS Excel spreadsheet (Attachment B) was used to simplify the calculations after input parameters were selected.

The pseudo-static input parameters are the same as the static stability analysis with the addition of a seismic coefficient used in calculating the horizontal force. Based on a U.S. Geological Survey chart of seismic activity for the eastern United States, the peak horizontal ground acceleration (PGA) with a 2% probability of occurrence in 50 years is in the range of 0.20-0.26 for the St. Louis vicinity (NRT Global Stability Tech Memo, Attachment F). An average PGA of 0.23 was selected for the analysis.

The computed **factor of safety against sliding was 1.56** for the pseudo-static stability analysis. This exceeds the minimum factor of safety of 1.3 required by 35 IAC 811.304(d) for slope failure.

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References

Bowles, Joseph E., 1979. *Physical and Geotechnical Properties of Soils,* McGraw Hill.

Das, Braja M., 2005. *Fundamentals of Geotechnical Engineering, 2nd Edition*, Toronto, Ontario, Nelson.

Environmental Protection, Inc., 2000. *PVC Geomembrane / Geosynthetic Interface Strengths*, PGI Technical Bulletin, Urbana, Illinois, April, 2000.

Koerner, R.M., and Soong, T.-Y., 2005. *Analysis and design of veneer cover soils,* Geosynthetics International, Special Issue on the Giroud Lectures, 12, No. 1, 28-49.

U.S. Geological Survey Earthquake Hazards Program, "Lower 48 States Maps and Data," http://earthquake.usgs.gov/hazards/products/conterminous/.

Enclosures

Attachment A: Static Veneer Stability Calculation Spreadsheet

Attachment B: Pseudo-static Veneer Stability Calculation Spreadsheet

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ATTACHMENT A

STATIC VENEER STABILITY CALCULATION SPREADSHEET

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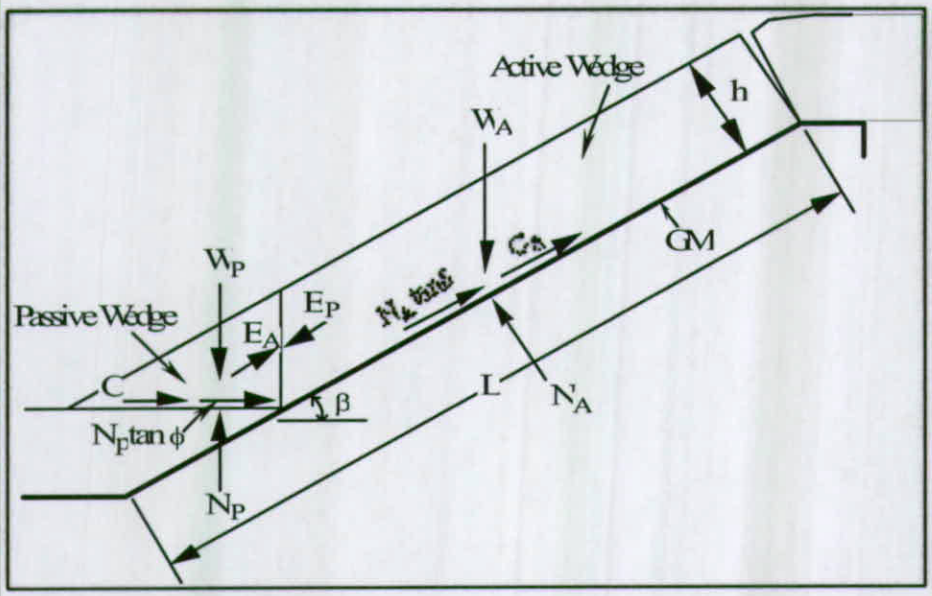
Uniform Cover Soil Thickness Stability Worksheet



Calculation of FS

Active Wedge:

Wa= 1206.6 kN

Na= 1206.4 kN

Passive Wedge:

Wp= 360.1 kN

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

a= 0.5

b= -12

c= 0.1

FS= 24.78

thickness of cover soil = h =	0.91	m		
soil slope angle beneath the geomembrane = β =	1.2	°	*= 0.02 (rad.)*	
length of slope measured along the geomembrane = L =	121.9	m		
unit weight of the cover soil = γ =	17.3	kN/m^3		
friction angle of the cover soil = ϕ =	30.0	°	*= 0.52 (rad.)*	
cohesion of the cover soil = c =	0.0	kN/m^2	*C= 0*	*kN*
interface friction angle between cover soil and geomembrane = δ =	18.0	°	*= 0.31 (rad.)*	
adhesion between cover soil and geomembrane = ca =	0.0	kN/m^2	*Ca= 0*	*kN*

Note: numbers in boxes are input values

numbers in Italics are calculated values

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ATTACHMENT B

PSEUDO-STATIC VENEER STABILITY CALCULATION SPREADSHEET

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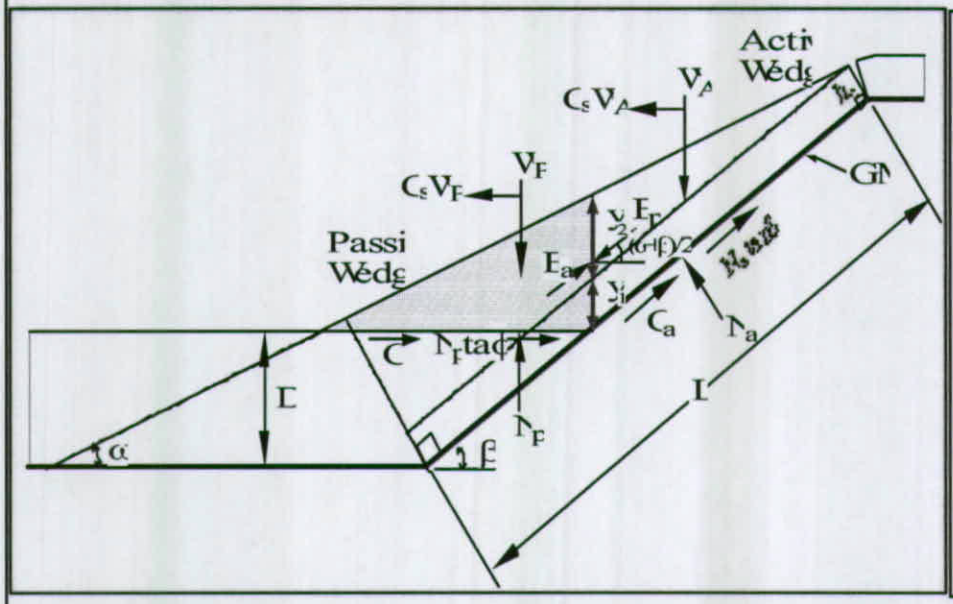
Uniform and/or Tapered Cover Soil with Consideration of Seismic Forces



Calculation of FS

Active Wedge:

Wa=	*2193.9*	*kN*
Na=	*2193.4*	*kN*
Ca=	*0.0*	*kN*

Passive Wedge:

Wp=	*654.7*	*kN*
C=	*0.0*	*kN*

$$FS=\frac{-b+\sqrt{b^2-4ac}}{2a}$$

a=	*699.1*
b=	*-1097*
c=	*8.3*

FS= 1.56

(Note: for uniform cover soil thickness the input value of ω = β)

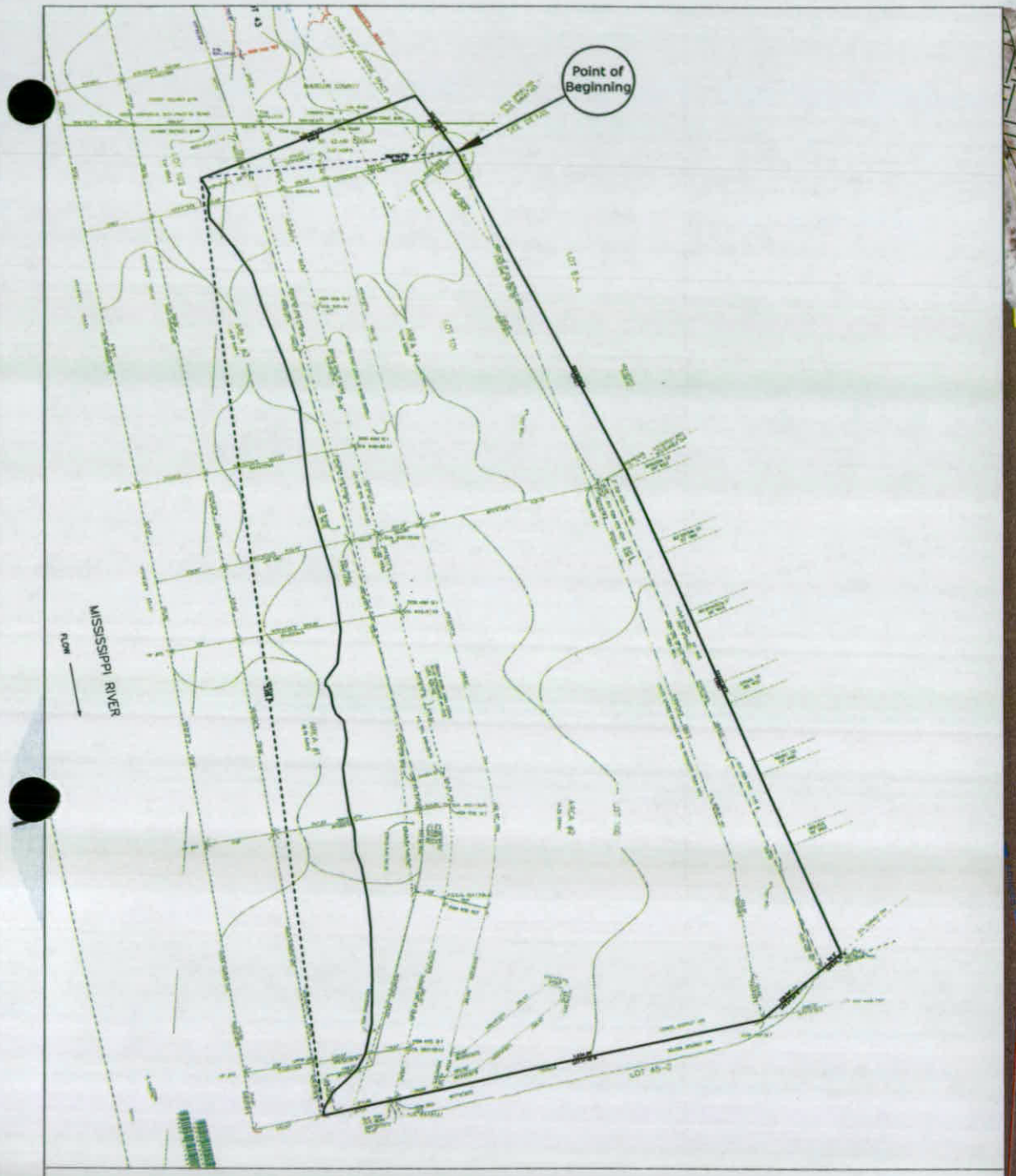
thickness of cover soil at top (crest) of the slope = hc =	0.91	m	
thickness of cover soil along the bottom of the site = D =	0.91	m	
soil slope angle beneath the geomembrane = β =	1.2	°	= 0.02 (rad.)
finished cover soil slope angle = ω =	1.2	°	= 0.02 (rad.)
length of slope measured along the geomembrane = L =	121.9	m	

y2=	*0.00*	*(m)*
y1=	*0.91*	*(m)*
(ω+β)/2=	*0.020*	*(rad.)*
(=	*1.2*	*°)*

unit weight of the cover soil = γ =	31.4	kN/m^3	
friction angle of the cover soil = ϕ =	30.0	°	= 0.52 (rad.)
cohesion of the cover soil = c =	0.0	kN/m^2	
interface friction angle between cover soil and geomembrane = δ =	18.0	°	= 0.31 (rad.)
adhesion between cover soil and geomembrane = ca =	0.0	kN/m^2	
seismic coefficient = Cs =	0.23	g	

Note: numbers in boxes are input values

numbers in Italics are calculated values



Groundwater Management Zone, Venice Plant, Madison and St. Clair Counties in Illinois.
(March 2011 Description)

A tract of land situated partly in the County of Madison and party in the County of St. Clair, State of Illinois, located in Southwest Quarter (SW¼) of Section 36, Township 3 North Range 10 West and Section 1, Township 2 North Range 10 West of the Third Principal Meridian, more particularly described as follows: Starting at a point which is marked by an Old Iron Pin in the Northwest corner of U.S Survey 623 which has Illinois State Plane coordinates of N 52868.31 E 55930.60, is the Point of Beginning;

Thence 1,342.7 ft. S 26°58'50"E to a point that is on the line between U.S. Survey 623 and 764, thence 1,980.7 ft. S 23°02'58"E to a point , thence 84.5 ft. S48°09'30"W to a point which is the intersection of the east line of Lot 100, as shown and described on a plat prepared by Julius Pitzman, City Surveyor of St. Louis, Missouri, and filed for record in Plat Book "H", Page 31 , of the records of St. Clair County, Illinois, and U.S. Survey 764, said point having an Illinois State Plane coordinate of N 49792.782 E 57252.320,, thence 290.84 ft. S48°24'34"W to a point which is the southwest corner of US Survey 764, thence 1,634.28 ft. S 77°11'49"W to the east shore line of the Mississippi River, thence following the east shore line of the Mississippi River in a northerly direction to a point that is 3,556.4 ft. N07°5'19"W of the last described point and 934.1 ft. S 83°45'07"W from the Northwest corner of U.S Survey 623 (point of beginning); thence 840.8 ft. N 68°00'47"E to a point, thence 259.98 ft. S 34°55'54"E back to the point of the Point of Beginning. Said parcel containing approximately 104 +/- acres at normal river stage.

N



S

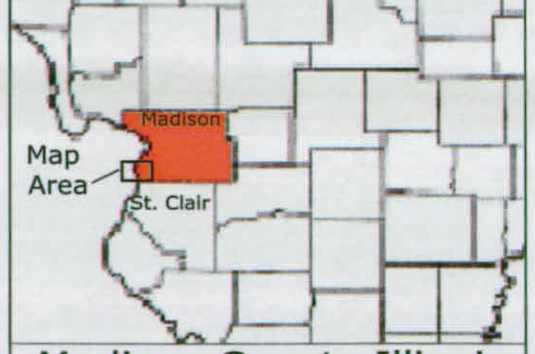
Rev.4

Venice Groundwater Management Zone

LEGEND

- Railroad
- Ameren Property Boundary Line
- NFS Railroad Property
- Levee (Easement)
- Ground Water Management Zone

General Location Legend



Madison County Illinois

N

SCALE	
1/300	Ameren Real Estate
PLOT DATE	
03/2011	
FILE NAME	
G:VENICE PROPERTY CONTROL MAP	

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K

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APPENDIX K

GROUNDWATER MODEL INPUT AND OUTPUT FILES

[ON CD]

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APPENDIX L

PROPOSED GROUNDWATER MANAGEMENT ZONE MAP

Sheets

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DRAWINGS

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SEE LARGE FORMAT MAP OR PLAN SHEET

DESCRIPTION:

Site #: W1190150002
Cat #: 06L
Date: 09/18/2014
Permit #: N/A
Log #: N/A
Keyword: N/A
Comment: N/A

	Type or Description	SEE COLOR	Date of Plan	Figure/Diagram
1.	Venice Power Plant Site Vicinity	Yes	01/28/2011	None
2.	Existing Conditions Ash Pond Closure Plan	None	01/28/2011	None
3.	Final Cover Grading And Storm Water Management Plan Ash Pond Closure Plan	None	01/28/2011	None
4.	Geomembrane Subgrade Grading Plan Ash Pond Closure Plan	None	01/28/2011	None
5.	Final Cover Sections And Details Ash Pond closure Plan	None	01/28/2011	Yes
6.	Final Cover Sections And Details Ash Pond closure Plan	None	01/28/2011	Yes
7.	South Pump Station Plan View Ash Pond closure Plan	None	01/28/2011	None
8.	North Pump Station Plan View Ash Pond closure Plan	None	01/28/2011	None
9.	Storm Water Pump Stations Sections And Details Ash Pond Closure Plan	None	01/28/2011	Yes
10.	Pump Station Profiles Ash Pond Closure Plan	None	01/28/2011	Yes

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Exhibit 8

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3119050002
065

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-2829
James R. Thompson Center, 100 West Randolph, Suite 11-300, Chicago, IL 60601 • (312) 814-6026

PAT QUINN, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

May 6, 2011

John C. Pozzo
Managing Supervising Engineer
1 Ameren Plaza
1901 Chouteau Ave.
St. Louis, Missouri 63103

Dear Mr. Pozzo:

The Illinois Environmental Protection Agency (Illinois EPA) has reviewed the Closure Plan Venice Power Plant Ash Ponds 2 & 3 (Closure Plan) dated February 14, 2011, submitted by Ameren, which contains a proposal to establish a Groundwater Management Zone (GMZ) at the Venice site.

The February 14, 2011 submission was amended by letter and revised Closure Plan pages dated March 25, 2011. The amendments reflect a reduction is size of the proposed GMZ that will limit the GMZ's extent to Ameren's property. Upon review of the Amended submittal, the depth to which the GMZ was to extend was not clear. In a letter dated April 25, 2011 Ameren clarified the intended depth of the GMZ, as discussed in the "Geology" Section (Section 2.2.1) of the amended Closure Plan. Ameren also corrected a 2011 date, which had erroneously been listed as 2010.

The Illinois EPA concurs that the Closure Plan, with the amendments and clarifications as discussed above, meets the conditions of 35 Ill. Adm. Code 620.250(a). Therefore, a GMZ is hereby established at the Venice Power Plant within the three dimensional area described in the Closure Plan. Ameren should initiate the Closure Plan at its earliest convenience.

If you have any question concerning this letter, please contact me or Lynn Dunaway of my staff at 217/785-4787.

Sincerely,

William E. Buscher

William E Buscher, P.G.
Manager, Hydrogeology and Compliance Unit
Groundwater Section
Division of Public Water Supplies
Bureau of Water

IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE
APR 05 2012
REVIEWER EAV

CC: Rick Cobb
Alan Keller
Darin LeCrone
Lynn Dunaway
Records Unit

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Exhibit 9

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GEOTECHNOLOGY INC
FROM THE GROUND UP

CONSTRUCTION QUALITY ASSURANCE REPORT
CLOSURE OF ASH POND A, ASH POND B, ASH POND C, AND BOTTOM ASH POND
HUTSONVILLE POWER STATION
15142 EAST 1900 AVENUE
CRAWFORD COUNTY, ILLINOIS

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, L.L.C.

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J019896.05

November 21, 2016

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GEOTECHNOLOGY INC
FROM THE GROUND UP

November 21, 2016

J019896.05

Mr. Mike Wagstaff, P. E.
Ameren Missouri
3700 South Lindbergh Boulevard
St. Louis, Missouri

Re: Construction Quality Assurance Report
Closure of Ash Pond A, Ash Pond B, Ash Pond C, and Bottom Ash Pond
Hutsonville Power Station
15142 East 1900 Avenue
Crawford County, Illinois

Dear Mr. Wagstaff:

Attached is the Construction Quality Assurance report for the referenced site. This report is documentation of the activities associated with the closure of Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Pond at the Hutsonville Power Station in Crawford County, Illinois.

If you have any questions or comments regarding the attached information, please feel free to contact the undersigned at (314) 997-7440.

Very truly yours,

GEOTECHNOLOGY, INC.

Anna M. Saindon, P.E., Ph.D.
Project Manager

JYH/AMS/MSR:jyh/jsj

J019896.05

CONSTRUCTION QUALITY ASSURANCE REPORT
CLOSURE OF ASH POND A, ASH POND B, ASH POND C, AND BOTTOM ASH POND
HUTSONVILLE POWER STATION
15142 EAST 1900 AVENUE
CRAWFORD COUNTY, ILLINOIS

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J019896.05

CONSTRUCTION QUALITY ASSURANCE REPORT
CLOSURE OF ASH POND A, ASH POND B, ASH POND C, AND BOTTOM ASH POND
HUTSONVILLE POWER STATION
15142 EAST 1900 AVENUE
CRAWFORD COUNTY, ILLINOIS

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J019896.05

CONSTRUCTION QUALITY ASSURANCE REPORT
CLOSURE OF ASH POND A, ASH POND B, ASH POND C, AND BOTTOM ASH POND
HUTSONVILLE POWER STATION
15142 EAST 1900 AVENUE
CRAWFORD COUNTY, ILLINOIS

1.0 PROJECT BACKGROUND

The AmerenEnergy Medina Valley Cogen, L.L.C. (Ameren) Hutsonville Power Station (Hutsonville) is located at 15142 East 1900 Avenue, Hutsonville, Illinois. This report is documentation of the completed Construction Quality Assurance (CQA) program for the closure of four ash ponds: Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Pond. The plan has been completed in general accordance with the coal combustion byproduct (CCB) surface impoundment closure requirements of 35 Illinois Administration Code (IAC) 840.146 entitled Construction Quality Assurance Program.

Ash Pond A was operational from 1986 until the plant ceased operations in December 2011. Fly ash from the operating units was collected by an electrostatic precipitator and sluiced to Ash Pond A. The pond was constructed with an 80 mil high-density polyethylene (HDPE) liner. Ash was sluiced to the pond where solids were permitted to settle out and supernatant liquids were decanted. The pond contained fly ash within an area of approximately 12 acres, with an average ash depth of approximately 20 feet. Prior to closure initiation, it was estimated that Ash Pond A contained approximately 81,000 cubic yards of ash. The ash pond was contained by a 2,400 foot long perimeter embankment approximately 15 feet high.

Ash Pond B, an HDPE-lined pond, was placed in service in 2000 for disposal of sluiced fly ash and bottom ash. This pond received wastewater and/or storm water for periodic discharge and was permitted under the facility's National Pollutant Discharge Elimination System (NPDES) and Subpart B permits. Ash Pond B had a surface area of approximately 4.4 acres, with a maximum embankment height of 17 feet. Prior to closure initiation, it was estimated that Ash Pond B contained approximately 12,400 cubic yards of ash. Ash Pond B functioned as a secondary settling pond (polishing pond), receiving flow via a triplex pump station in Ash Pond C and flow from Ash Pond A before discharging to the Wabash River via NPDES-permitted outfall #002 (IL0000175).

Ash Pond C was an HDPE-lined pond placed in service in 2000 for disposal of sluice water from the Bottom Ash Pond. This pond received storm water and was permitted under the facility's NPDES and Subpart B permits. Storm water from the Bottom Ash Pond and Ash Pond C was discharged to Ash Pond B via a pump station. Ash Pond C was incised with a surface area of approximately 2 acres. Prior to closure initiation, it was estimated that Ash Pond C contained approximately 10,000 cubic yards of ash.

The Bottom Ash Pond was put into service in 1969 for disposal and reuse of bottom ash. The Bottom Ash Pond had a surface area of approximately 1.2 acres, with a maximum embankment height of 15 feet. Prior to closure initiation, it was estimated that the Bottom Ash Pond contained approximately 23,000 cubic yards of bottom ash. This pond received storm water for periodic discharge and was permitted under the facility's NPDES and Subpart B permits.

In summary, the closure activities for the three clean-closure ash ponds included: removal of CCB, removal of geomembrane, grading, construction of surface water control structures, and vegetation. The closure activities for Ash Pond A included: placement of CCB from the three clean-closure ash ponds, CCB subgrade grading, CCB subgrade compaction, placement of 40-mil HDPE geomembrane, placement of a three-foot thick final cover soil layer, construction of surface water control structures, and vegetation. As required in the CQA Plan, a scheduled program of monitoring, inspecting, sampling, and testing was performed. The CQA Plan was used to evaluate compliance with the intent of the closure plans[1] and specifications[2]. A summary of the site activities, construction observation, field testing, laboratory testing, and surveying during the ash pond closures are included in this CQA report. Presented in Appendix A are the weekly memorandums, daily reports, meeting minutes, and photograph logs. Presented in Appendix B are the CQA certifications.

2.0 CLEAN CLOSURE ACTIVITIES

2.1 CCB Removal Activities

CCB was removed from Ash Pond B, Ash Pond C, and the Bottom Ash Pond to facilitate clean closure of these ponds. CCB removal began on June 4, 2015 and concluded on September 24, 2015. A CQA representative periodically observed the CCB removal activities to assess the completeness of CCB removal. The CCB removed from Ash Pond B, Ash Pond C, and the Bottom Ash Pond was placed in Ash Pond A. After the CCB was removed, the ponds were brought to final grade, storm water controls were installed, and the ponds were vegetated.

[1] *Construction Plans for the Closure of Ash Ponds A, B, C and Bottom Ash Pond, Medina Valley Cogen, LLC, Hutsonville Power Station, Revised August 2014*; prepared by Hanson Professional Services Inc. for Ameren Energy Generating Company, 2014.

[2] *Construction Specification UE-2165 for Closure of Ash Ponds A, B, C and Bottom Ash Pond at Medina Valley Cogen, LLC Hutsonville Power Station*; prepared by Hanson Professional Services Inc. for Ameren Energy Generating Company, 2014.

2.2 Coal Yard

The Coal Yard previously stored coal for use at the power plant. The excess coal stored in the Coal Yard after the power plant operation ceased was removed prior to the beginning of the project. Coal spoils were still present in the Coal Yard after these removal activities. The top twelve inches of coal spoils were removed from the surface of the Coal Yard and placed in Ash Pond A. The top twelve inches were then backfilled with excess soil from on site.

2.3 Ash Pond D Slope at the Bottom Ash Pond

Ash Pond D was closed on the site in 2012. The slope of Ash Pond D adjacent to the east end of the Bottom Ash Pond contained ash extending into Ash Pond D. The Ash Pond D slope, extending from a tie-in to the previously installed Ash Pond D geomembrane to the base of the slope, was installed using the same procedures outlined in Section 4.0 (Geomembrane) of this report. The Ash Pond D geomembrane was installed on November 5, 2015 and protective cover was installed on November 20, 2015.

2.4 Survey of Final Grade

The finished grade of Ash Pond B, Ash Pond C, and the Bottom Ash Pond was surveyed by a licensed surveyor for a final as-built drawing. The results of the survey are illustrated and summarized on Sheet S-XXX-001A.

2.5 Surface Water Management

Surface water management structures in Ash Pond B, Ash Pond C, and the Bottom Ash Pond, including ditches and outfalls, were built in accordance with the design and approved modifications thereof.

2.6 Vegetation

After Ash Pond B, Ash Pond C, the Bottom Ash Pond, and the Coal Yard were brought to final grade, they were fertilized and seeded using synthetic mats and straw as needed to establish vegetation.

3.0 ASH POND A SUBGRADE PREPARATION

Subgrade preparation began on May 11, 2015 and was completed on October 30, 2015. In summary, subgrade preparation activities consisted of placing CCB material excavated from Ash Pond B, Ash Pond C, and the Bottom Ash Pond, placing spoils excavated from the Coal Yard, grading CCB in Ash Pond A, compacting the top 1 foot of subgrade material, performing compaction testing, and surveying the final subgrade elevations. In addition, the prepared subgrade was visually assessed by the CQA Officer to observe that the surface was relatively smooth and free of deleterious materials (i.e. jagged, irregularly-shaped protrusions) that could damage the geomembrane.

3.1 Laboratory Testing

Three CCB bulk samples were obtained from the existing subgrade. Index testing (moisture content and Atterberg limits) was performed on select samples. Standard Proctor moisture-density relationship was performed on the three bulk samples. The laboratory test results are summarized and presented in Appendix C.

3.2 Subgrade Compaction

Nuclear gauge density tests were performed on the upper 12 inches of the prepared subgrade at a frequency of five tests per acre (refer to Table 1). The field density tests were compared to the standard Proctor moisture-density relationship laboratory test data (Appendix C) to provide information regarding subgrade compaction. The project specifications required the subgrade to be compacted to 90 percent of the maximum standard Proctor dry density. Areas of failed density tests were recompacted and retested as needed. Based on the laboratory test results and field density test results, the subgrade was compacted in conformance with the CQA plan. The field tests are summarized in Table 1 and provided in the field observation reports in Appendix A.

3.3 Subgrade Survey

The subgrade was surveyed by a licensed surveyor. In addition, the subgrade was observed by the CQA Officer to verify that the prepare slopes did not have sharp grade changes, depressions, or protrusions. Repairs were made to areas that did not meet these criteria prior to geomembrane placement. A final as-built survey of the subgrade was performed. The results of the survey are illustrated and summarized on Sheet SUV-1. After the subgrade was smoothed, certification of the survey data and general condition of the subgrade was provided by the CQA Officer prior to installation of the 40-mil HDPE geomembrane liner (Appendix B).

4.0 GEOMEMBRANE

Geomembrane placement began on October 30, 2015 and was completed on November 13, 2015.

4.1 Prequalification Testing

The geomembrane manufacturer supplied an inventory list of the 40-mil HDPE geomembrane rolls to the owner and the CQA Officer. The geomembrane manufacturer submitted samples from the prequalification rolls to an independent geosynthetics laboratory for verification of selected manufacturer's guaranteed properties (presented in Appendix D). On each geomembrane roll selected for sampling, a 3-foot long sample was collected along the entire width of the roll.

In addition, the manufacturer submitted documentation that the materials supplied were tested for the parameters listed in the manufacturers list of guaranteed properties at the required testing frequency. The results of the testing, including identification of tested rolls, were submitted to the CQA Officer for review. The manufacturer certified that all rolls met the manufacturer's guaranteed properties in accordance with the specified testing frequency rate (Appendix D).

Geomembrane prequalification testing was completed prior to delivery. Copies of the testing results are provided in Appendix D.

4.2 Installer Certification of Placement Surface

The geomembrane installer's inspection and acceptance of the prepared subgrade surface as suitable for the geomembrane installation is documented through Certificates of Acceptance (Appendix E). Certificates of Acceptance were provided to the CQA Officer each day for the area covered by geomembrane that day.

4.3 Seam Overlap Testing

The general contractor and geomembrane installer arranged the geomembrane panels in an orientation to reduce the number of field seams. Within the geomembrane footprint, seam overlaps were field measured by the geomembrane installer to verify that the required 3 inches of overlap was met for all seams. Seam overlaps were "shingled" in the direction of the downslope. The CQA Officer and field representatives made independent measurements of the seam overlaps for additional verification.

4.4 Non-Destructive Testing

The geomembrane installer performed non-destructive testing of seams at the frequency specified in the CQA Plan. The seams were non-destructively tested over the full-length using a vacuum test unit, air pressure test, or other methods (i.e., spark testing for geomembrane boots around vent pipes) approved by the CQA Officer. Vacuum testing and air pressure testing procedures are presented in Sections 4.4.1 and 4.4.2. Continuity testing was completed as the seaming progressed. The CQA Officer and field representatives observed the non-destructive testing performed by the geomembrane installer. The geomembrane installer submitted all non-destructive field-testing results to the CQA Officer (Appendix C).

4.4.1 Vacuum Testing (Extrusion Welds)

Extrusion welds were typically used for repairs, protrusions through the geomembrane, and the tie-in to the existing geomembrane of Ash Pond D. Vacuum testing procedures for extrusion welds follow.

Equipment

The following equipment was used:

- Vacuum box assembly consisting of a rigid housing with a transparent viewing window, soft neoprene gasket attached to the bottom, port hole or valve assembly and a vacuum gauge;
- Vacuum tank and pump assembly equipped with a pressure controller and pipe connections;
- Rubber pressure or vacuum hose with fittings and connections;
- Bucket; and
- Soapy solution.

Procedures

The following procedures were followed:

1. The vacuum pump was energized and tank pressure was adjusted to approximately 10 inches of mercury.
2. A strip of geomembrane approximately 12 inches wide by 48 inches long (an area larger than the coverage of the vacuum box) was wetted with the soapy solution.
3. The box was placed over the wetted area.
4. The bleed valve was closed and the vacuum valve opened.
5. Creation of a leak tight seal was verified.

6. The geomembrane was observed for at least ten seconds through the viewing window for the presence of soap bubbles.
7. When bubbles were not observed after 10 seconds, the vacuum valve was closed, and the bleed valve opened. The box was moved to the next adjoining area, and the process was repeated.
8. All areas where soap bubbles appeared were marked, repaired, and retested until passing test results were obtained.

4.4.2 Air Pressure Testing (Double Fusion Welds)

Double fusion seams were typically used to fuse two panels of geomembrane together. Air pressure testing procedures for double fusion welds follow.

Equipment

The following equipment was used:

- Air pump (manual or motor driven) equipped with pressure gauge capable of generating and sustaining a pressure of 25 to 30 pounds per square inch (psi) and mounted on a cushion to protect the geomembrane;
- Rubber hose with fittings and connections; and
- Sharp hollow needle.

Procedures

The following procedures were followed:

1. Both ends of the seam to be tested were sealed.
2. A needle was inserted into the tunnel created by the fusion weld.
3. A protective cushion was inserted between the air pump and the geomembrane.
4. The air pump was energized to a pressure between 25 psi and 30 psi. The valve was closed, and the pressure was sustained for a minimum of five minutes.
5. If loss of pressure exceeded 3 psi or did not stabilize, the leaking area was located, then repaired and retested until passing test results were obtained.
6. At the conclusion of a passing air pressure test, the opposite end of the seam was slit and the subsequent drop in pressure was observed. Our observation of the pressure drop indicated that the seam passed.
7. The needle was removed and the needle hole sealed.

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4.5 Destructive Testing

Destructive seam tests were performed at randomly selected geomembrane locations as seaming work progressed. The purpose of the destructive seam tests was to evaluate seam strength. The CQA Officer and field representatives observed the destructive testing performed by the geomembrane installer.

The geomembrane installer submitted the results of the field destructive testing to the CQA Officer. An independent laboratory, selected by the CQA Officer, performed the destructive seam tests that included peel and shear strength testing. The destructive seam testing results (field-testing and independent testing) are presented in Appendix D.

4.5.1 Testing Location and Frequency

The CQA Officer or field representative selected the destructive test locations where seam samples were removed for testing at a minimum frequency of one sample per 500 feet of seaming. In addition, the CQA Officer or field representative could select additional destructive seam sample locations at their discretion. Destructive seam test locations include random seam testing and areas of possible defects (excess crystallinity, contamination, offset welds, equipment malfunction).

4.5.2 Sampling Procedures

Destructive seam samples were obtained as the seaming progressed. This method was used to facilitate approval of the geomembrane results prior to covering the geomembrane with the next layer of the closure construction. The geomembrane installer assigned a number to each destructive seam sample and marked the location and seaming information on each collected sample. The destructive seam sample location was recorded on an as-built drawing. The locations of the destructive seam samples were repaired in accordance with the CQA Plan. The continuity of the repairs was subsequently vacuum tested.

4.5.3 Field Testing

The geomembrane installer used a tensiometer to test ten 1-inch wide strips from each sample identified for destructive testing. In accordance with the CQA Plan, the field destructive tests consisted of five samples for peel adhesion and five samples for shear strength. Upon successful field-testing, the remaining destructive seam samples were qualified to be submitted for independent laboratory testing.

4.5.4 Laboratory Testing

Samples that passed the prequalifying field-tests were submitted to the independent testing laboratory. Ten specimens from each destructive seam sample were tested, including five shear strength tests and five peel adhesion tests. Laboratory testing was in accordance with "Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods" (ASTM D 6392). Acceptance was based on the criteria outlined in the Geosynthetic Research Institute (GRI) standard GRI GM19 as provided in the CQA Plan.

4.5.5 Procedures for Failed Destructive Tests

If a destructive sample did not pass either a field or a laboratory test, the geomembrane installer had two options to remediate the failure. The geomembrane installer could reconstruct and repair the seam between any two passed test locations completed by the same technician on the same day. Alternatively, the geomembrane installer could trace the welding path to an intermediate location at least 10 feet from the failed test in either direction and take additional destructive seam samples. The additional samples were then field-tested prior to sending to the independent laboratory as previously described. If the additional samples passed, then the seam was reconstructed between the two passing samples. If the additional samples failed, then the process was repeated to establish the zone in which the seam should be reconstructed.

Reconstructed seams were bounded by two locations with passing laboratory destructive tests. In cases that exceeded 150 feet of reconstructed seam, a destructive sample was taken from the zone in the reconstructed area. The geomembrane installer documented the actions taken in conjunction with destructive test failures (Appendix D).

5.0 FINAL COVER

After the geomembrane was constructed and approved, 3 feet of final cover (soil) was placed over the 40-mil HDPE geomembrane. Soil grading began on November 23, 2015. On December 22, 2015, the protective cover was winterized for completion in the spring; all parts of the HDPE geomembrane were covered by at least two feet of protective cover as of this date. Protective cover placement, shaping, and grading resumed on April 6, 2016 and were completed on June 6, 2016.

The final cover installer's inspection and acceptance of the geomembrane surface as suitable for the final cover installation is documented through Certificates of Acceptance (Appendix E). Certificates of Acceptance were provided to the CQA Officer each day for the area of geomembrane covered by final cover that day.

The soil grading activities consisted of:

- Visually observing that the geomembrane surface was free of defects prior to soil placement,
- Removing deleterious materials (such as roots and rocks) from the soil that could damage the geomembrane,
- Spreading the soil over the geomembrane,
- Preparing the partial cover for the winter months,
- Repairing erosive damage to the partial cover when work resumed in the spring,
- Surveying the final subgrade elevations on the established 100-foot grid points, and
- Calculating the difference between the ash subgrade and the final surface to confirm that a minimum of 3 feet of soil as a final cover was present over the geomembrane.

The soil was placed in a 2-foot thick lift by a low pressure bulldozer. During the placement of the 2-foot thick lift, a 3-foot thick road was built and maintained to allow haul trucks to transport soil onto Ash Pond A. The soil was then brought to final grade in a second grading phase after the geomembrane surface was covered. The final surface survey data and calculated thickness are provided on Sheet SUV-1. Discussions of the soil placement are provided on the field observation reports presented in Appendix A.

After the final cover was graded and the surface water management controls constructed, Ash Pond A was fertilized and seeded using synthetic mats and straw as needed to establish vegetation.

6.0 SURFACE WATER MANAGEMENT

Berms and channels were constructed on the final cover for surface water management. Construction of the berms and channels were observed and an as-built survey was performed.

A copy of the surface water management structure survey data is provided on Sheet S-XXX-001A. Additional information on the field observations are provided in Appendix A.

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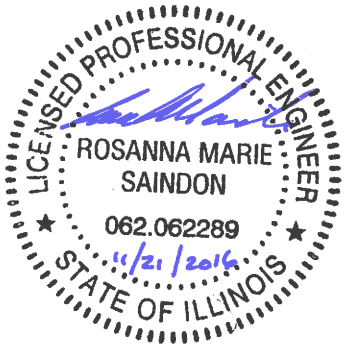
7.0 SIGNATURE

As Construction Quality Assurance (CQA) Officer for the construction of the closure of Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Pond (from April 14, 2015 to October 12, 2016), located at the AmerenEnergy Medina Valley Cogen, Hutsonville Plant in Hutsonville, Illinois, I am familiar with the plans and specifications, and the CQA Plan as prepared and approved for the project. Based on my observations and the observations of the Construction Quality Assurance Officers-In-Absentia (Cassandra Baresel, Steve Graham, and Jessie Hahn), it is my professional opinion that the construction was completed as described in this Report. CQA certification by the owner's representative does not relieve the contractor of their obligations to furnish all work in accordance with the contract.





Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.

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TABLE 1

SUMMARY OF FIELD DENSITY TESTING - SUBGRADE
ASH POND A
HUTSONVILLE POWER STATION
CRAWFORD COUNTY, ILLINOIS

Location			TEST DATE	LIFT NUMBER (1-lower, 2-upper)	Compaction					Pass (P)/ Fail (F)	Notes/ Passing Test Reference	Material Description
Point Number	Latitude (°N)	Longitude (°W)			Max. Dry Density (pcf)	Optimum Moisture (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Compaction (%)			
41	39.13022	-87.66171	10/01/15	2	79.0	NA	104.0	13.17	131.7%	P	Retested (see 41R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	106.7	12.16	135.1%	P	Retested (see 41R)	Grey Ash with Sand
42	39.12998	-87.66149	10/01/15	2	79.0	NA	103.7	13.79	131.2%	P	Retested (see 42R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	102.7	12.98	130.0%	P	Retested (see 42R)	Grey Ash with Sand
43	39.12981	-87.66132	10/01/15	2	79.0	NA	116.6	9.76	147.6%	P	Retested (see 43R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	115.1	10.49	145.7%	P	Retested (see 43R)	Grey Ash with Sand
44	39.12967	-87.66117	10/01/15	2	79.0	NA	101.7	13.36	128.7%	P	Retested (see 44R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	107.4	12.34	135.9%	P	Retested (see 44R)	Grey Ash with Sand
36	39.12947	-87.66137	10/01/15	2	79.0	NA	105.5	11.62	133.6%	P	Retested (see 36R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	99.4	11.08	125.8%	P	Retested (see 36R)	Grey Ash with Sand
35	39.12958	-87.66150	10/01/15	2	79.0	NA	116.4	10.34	147.4%	P	Retested (see 35R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	119.2	9.68	150.8%	P	Retested (see 35R)	Grey Ash with Sand
34	39.12977	-87.66173	10/01/15	2	79.0	NA	106.4	11.82	134.7%	P	Retested (see 34R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	106.7	11.24	135.1%	P	Retested (see 34R)	Grey Ash with Sand
33	39.12999	-87.66195	10/01/15	2	79.0	NA	112.6	12.08	142.6%	P	Retested (see 33R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	114.3	11.34	144.7%	P	Retested (see 33R)	Grey Ash with Sand
40	39.13004	-87.66194	10/01/15	2	79.0	NA	110.0	11.91	139.3%	P	Retested (see 40R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	110.0	11.32	139.3%	P	Retested (see 40R)	Grey Ash with Sand
39	39.13058	-87.66209	10/01/15	2	79.0	NA	104.1	14.14	131.8%	P	Retested (see 39R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	105.2	13.94	133.2%	P	Retested (see 39R)	Grey Ash with Sand
48	39.13075	-87.66188	10/01/15	2	79.0	NA	94.5	17.12	119.7%	P	Retested (see 48R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	97.8	16.73	123.8%	P	Retested (see 48R)	Grey Ash with Sand
49	39.13057	-87.66156	10/01/15	2	79.0	NA	58.4	41.80	74.0%	F	Retested (see 49R)	Grey Ash with Sand and Coal
			10/01/15	1	79.0	NA	55.6	44.73	70.5%	F	Retested (see 49R)	Grey Ash with Sand and Coal
50	39.13036	-87.66141	10/01/15	2	79.0	NA	79.1	29.10	100.1%	P	Retested (see 50R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	87.9	26.94	111.2%	P	Retested (see 50R)	Grey Ash with Sand
51	39.13005	-87.66115	10/01/15	2	79.0	NA	105.2	13.04	133.2%	P	Retested (see 51R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	105.7	12.31	133.8%	P	Retested (see 51R)	Grey Ash with Sand
52	39.12988	-87.66092	10/01/15	2	79.0	NA	92.8	16.75	117.5%	P	Retested (see 52R)	Grey Ash with Sand
			10/01/15	1	79.0	NA	98.6	13.89	124.8%	P	Retested (see 52R)	Grey Ash with Sand
33R	39.12992	-87.66199	10/07/15	2	79.0	NA	108.2	16.90	137.0%	P		Grey Ash
			10/07/15	1	79.0	NA	109.5	16.00	138.6%	P		Grey Ash
25	39.12992	-87.66224	10/07/15	2	79.0	NA	110.3	16.00	139.6%	P		Grey Ash
			10/07/15	1	79.0	NA	110.2	15.23	139.4%	P		Grey Ash

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Location			TEST DATE	LIFT NUMBER (1-lower, 2-upper)	Compaction					Pass (P)/ Fail (F)	Notes/ Passing Test Reference	Material Description
Point Number	Latitude (°N)	Longitude (°W)			Max. Dry Density (pcf)	Optimum Moisture (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Compaction (%)			
26	39.12973	-87.66199	10/07/15	2	79.0	NA	95.5	16.93	120.9%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	98.7	16.91	124.9%	P		Grey Ash with Sand
27	39.12953	-87.66174	10/07/15	2	79.0	NA	104.9	9.96	132.8%	P		Grey Ash
			10/07/15	1	79.0	NA	105.9	10.28	134.1%	P		Grey Ash
28	39.12950	-87.66169	10/07/15	2	79.0	NA	104.7	10.80	132.5%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	104.1	10.29	131.8%	P		Grey Ash with Sand
20	39.12925	-87.66206	10/07/15	2	79.0	NA	100.6	13.53	127.3%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	102.8	13.88	130.1%	P		Grey Ash with Sand
31	39.13049	-87.66231	10/07/15	2	79.0	NA	110.3	15.81	139.6%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	113.0	15.62	143.0%	P		Grey Ash with Sand
23	39.13044	-87.66241	10/07/15	2	79.0	NA	108.5	12.41	137.4%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	108.9	12.64	137.9%	P		Grey Ash with Sand
16	39.13037	-87.66267	10/07/15	2	79.0	NA	110.9	10.14	140.4%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	113.8	10.08	144.1%	P		Grey Ash with Sand
17	39.12993	-87.66277	10/07/15	2	79.0	NA	110.8	9.64	140.3%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	112.4	9.99	142.3%	P		Grey Ash with Sand
18	39.12783	-87.66257	10/07/15	2	79.0	NA	106.2	15.58	134.5%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	111.0	13.22	140.5%	P		Grey Ash with Sand
19	39.12950	-87.66229	10/07/15	2	79.0	NA	104.6	16.27	132.4%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	104.8	15.45	132.7%	P		Grey Ash with Sand
13	39.12949	-87.66231	10/07/15	2	79.0	NA	100.9	14.29	127.7%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	101.6	13.15	128.6%	P		Grey Ash with Sand
12	39.12951	-87.66233	10/07/15	2	79.0	NA	103.9	16.48	131.5%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	102.4	16.42	129.7%	P		Grey Ash with Sand
11	39.12976	-87.66296	10/07/15	2	79.0	NA	110.0	14.02	139.3%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	110.1	14.31	139.3%	P		Grey Ash with Sand
24	39.13011	-87.66251	10/07/15	2	79.0	NA	108.7	14.69	137.6%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	113.4	13.58	143.5%	P		Grey Ash with Sand
32	39.13013	-87.66247	10/07/15	2	79.0	NA	104.0	12.85	131.6%	P		Grey Ash with Sand
			10/07/15	1	79.0	NA	113.2	11.40	143.4%	P		Grey Ash with Sand
34R	39.12980	-87.66173	10/08/15	2	79.0	NA	99.4	17.28	125.8%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	101.1	17.37	128.0%	P		Grey Ash with Sand
35R	39.12963	-87.66155	10/08/15	2	79.0	NA	117.5	6.10	148.7%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	122.6	5.99	155.2%	P		Grey Ash with Sand
36R	39.12948	-87.66138	10/08/15	2	79.0	NA	102.0	11.78	129.1%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	98.0	12.59	124.1%	P		Grey Ash with Sand

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Point Number	Latitude (°N)	Longitude (°W)			Max. Dry Density (pcf)	Optimum Moisture (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Compaction (%)			
60	39.12944	-87.66131	10/08/15	2	79.0	NA	87.8	21.40	111.1%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	89.0	20.82	112.6%	P		Grey Ash with Sand
45	39.12922	-87.66096	10/08/15	2	79.0	NA	89.3	18.81	113.0%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	90.2	17.93	114.1%	P		Grey Ash with Sand
44R	39.12926	-87.66095	10/08/15	2	79.0	NA	100.8	11.65	127.6%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	101.8	11.44	128.8%	P		Grey Ash with Sand
43R	39.12971	-87.66125	10/08/15	2	79.0	NA	108.8	6.36	137.7%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	114.2	6.38	144.6%	P		Grey Ash with Sand
42R	39.12975	-87.66128	10/08/15	2	79.0	NA	107.7	12.41	136.9%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	104.9	12.82	132.7%	P		Grey Ash with Sand
41R	39.13016	-87.66167	10/08/15	2	79.0	NA	108.4	13.34	137.2%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	109.1	12.47	138.1%	P		Grey Ash with Sand
40R	39.13032	-87.66180	10/08/15	2	79.0	NA	111.1	10.64	140.7%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	118.6	10.22	149.8%	P		Grey Ash with Sand
39R	39.13039	-87.66179	10/08/15	2	79.0	NA	106.4	13.53	134.7%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	109.8	13.58	139.0%	P		Grey Ash with Sand
48R	39.13043	-87.66183	10/08/15	2	79.0	NA	86.7	20.17	109.8%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	96.9	18.27	122.6%	P		Grey Ash with Sand
49R	39.13045	-87.66182	10/08/15	2	79.0	NA	75.7	18.53	95.8%	P	Retested (see 49R2)	Grey Ash with Sand and Coal
			10/08/15	1	79.0	NA	66.9	22.51	84.7%	F	Retested (see 49R2)	Grey Ash with Sand and Coal
50R	39.13044	-87.66178	10/08/15	2	79.0	NA	99.2	12.25	125.5%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	105.9	10.46	134.1%	P		Grey Ash with Sand
51R	39.13043	-87.66175	10/08/15	2	79.0	NA	107.4	11.14	136.0%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	107.8	12.27	136.5%	P		Grey Ash with Sand
52R	39.12992	-87.66094	10/08/15	2	79.0	NA	93.2	13.87	118.0%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	89.9	13.95	113.8%	P		Grey Ash with Sand
10	39.12980	-87.66324	10/08/15	2	79.0	NA	107.2	13.81	135.6%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	111.7	12.70	141.4%	P		Grey Ash with Sand
5	39.12977	-87.66326	10/08/15	2	79.0	NA	96.2	18.17	121.7%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	95.6	18.20	121.0%	P		Grey Ash with Sand
6	39.12972	-87.66327	10/08/15	2	79.0	NA	101.4	15.14	128.3%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	105.9	14.07	134.1%	P		Grey Ash with Sand
7	39.12936	-87.66284	10/08/15	2	79.0	NA	104.4	10.25	132.1%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	105.6	11.02	133.7%	P		Grey Ash with Sand
59	39.12936	-87.66280	10/08/15	2	79.0	NA	88.9	22.06	112.6%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	89.8	22.28	113.6%	P		Grey Ash with Sand

J019896.05

TABLE 1

SUMMARY OF FIELD DENSITY TESTING - SUBGRADE
ASH POND A
HUTSONVILLE POWER STATION
CRAWFORD COUNTY, ILLINOIS

Location			TEST DATE	LIFT NUMBER (1-lower, 2-upper)	Compaction					Pass (P)/ Fail (F)	Notes/ Passing Test Reference	Material Description
Point Number	Latitude (°N)	Longitude (°W)			Max. Dry Density (pcf)	Optimum Moisture (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Compaction (%)			
46	39.12933	-87.66329	10/08/15	2	79.0	NA	89.6	14.90	113.4%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	86.0	14.54	108.8%	P		Grey Ash with Sand
3	39.12941	-87.66347	10/08/15	2	79.0	NA	93.8	16.26	118.7%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	93.2	16.50	118.0%	P		Grey Ash with Sand
2	39.12948	-87.66350	10/08/15	2	79.0	NA	98.6	18.43	124.8%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	96.1	18.69	121.6%	P		Grey Ash with Sand
4	39.12984	-87.66366	10/08/15	2	79.0	NA	85.5	13.60	108.2%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	88.5	13.02	112.0%	P		Grey Ash with Sand
9	39.13003	-87.66350	10/08/15	2	79.0	NA	102.8	13.81	130.2%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	102.8	13.11	130.1%	P		Grey Ash with Sand
15	39.13029	-87.66322	10/08/15	2	79.0	NA	105.0	15.40	133.0%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	105.2	15.23	133.1%	P		Grey Ash with Sand
22	39.13047	-87.66290	10/08/15	2	79.0	NA	108.7	15.63	137.6%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	109.5	14.61	138.6%	P		Grey Ash with Sand
30	39.13048	-87.66285	10/08/15	2	79.0	NA	101.5	16.79	128.4%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	104.9	15.69	132.8%	P		Grey Ash with Sand
29	39.13072	-87.66258	10/08/15	2	79.0	NA	103.5	15.14	131.0%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	100.7	14.91	127.5%	P		Grey Ash with Sand
21	39.13058	-87.66306	10/08/15	2	79.0	NA	82.4	25.55	104.3%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	82.5	22.95	104.4%	P		Grey Ash with Sand
14	39.13039	-87.66348	10/08/15	2	79.0	NA	96.3	18.45	121.9%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	94.2	19.38	119.3%	P		Grey Ash with Sand
8	39.13001	-87.66371	10/08/15	2	79.0	NA	95.0	18.60	120.2%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	90.8	18.64	115.0%	P		Grey Ash with Sand
49R2	39.13045	-87.66182	10/08/15	2	79.0	NA	98.6	13.31	124.8%	P		Grey Ash with Sand and Coal
			10/08/15	1	79.0	NA	104.4	12.98	132.2%	P		Grey Ash with Sand and Coal
37	39.13103	-87.66231	10/08/15	2	79.0	NA	91.9	17.49	116.3%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	90.5	17.88	114.6%	P		Grey Ash with Sand
38	39.13094	-87.66227	10/08/15	2	79.0	NA	96.5	20.30	122.1%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	91.3	21.40	115.6%	P		Grey Ash with Sand
47	39.13087	-87.66187	10/08/15	2	79.0	NA	96.2	22.21	121.8%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	101.2	20.05	128.0%	P		Grey Ash with Sand
55	39.13088	-87.66180	10/08/15	2	79.0	NA	99.6	16.96	126.1%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	103.9	16.22	131.5%	P		Grey Ash with Sand
56	39.13086	-87.66147	10/08/15	2	79.0	NA	86.9	23.16	110.0%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	82.3	23.81	104.1%	P		Grey Ash with Sand

Electronic Filing: Received, Clerk's Office 09/28/2020

TABLE 1

SUMMARY OF FIELD DENSITY TESTING - SUBGRADE
ASH POND A
HUTSONVILLE POWER STATION
CRAWFORD COUNTY, ILLINOIS

Location			TEST DATE	LIFT NUMBER (1-lower, 2-upper)	Compaction					Pass (P)/ Fail (F)	Notes/ Passing Test Reference	Material Description
Point Number	Latitude (°N)	Longitude (°W)			Max. Dry Density (pcf)	Optimum Moisture (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Compaction (%)			
57	39.13060	-87.66131	10/08/15	2	79.0	NA	67.1	35.47	84.9%	F	Retested (see 57R)	Grey Ash with Sand and Coal
			10/08/15	1	79.0	NA	85.7	26.22	108.4%	P	Retested (see 57R)	Grey Ash with Sand and Coal
58	39.13031	-87.66109	10/08/15	2	79.0	NA	105.7	13.53	133.8%	P		Grey Ash with Sand
			10/08/15	1	79.0	NA	108.8	12.11	137.8%	P		Grey Ash with Sand
57R	39.13060	-87.66131	10/09/15	2	79.0	NA	79.6	29.27	100.7%	P		Grey Ash with Sand and Coal
			10/09/15	1	79.0	NA	92.3	22.82	116.8%	P		Grey Ash with Sand and Coal
53	39.12956	-87.66075	10/09/15	2	79.0	NA	96.0	20.95	121.5%	P		Grey Ash with Sand
			10/09/15	1	79.0	NA	93.2	20.41	118.0%	P		Grey Ash with Sand
54	39.12997	-87.66091	10/09/15	2	79.0	NA	102.1	14.67	129.2%	P		Grey Ash with Sand
			10/09/15	1	79.0	NA	103.8	14.08	131.4%	P		Grey Ash with Sand
1	39.12931	-87.66362	10/09/15	2	79.0	NA	96.5	17.52	122.2%	P		Grey Ash with Sand
			10/09/15	1	79.0	NA	97.8	17.38	123.9%	P		Grey Ash with Sand

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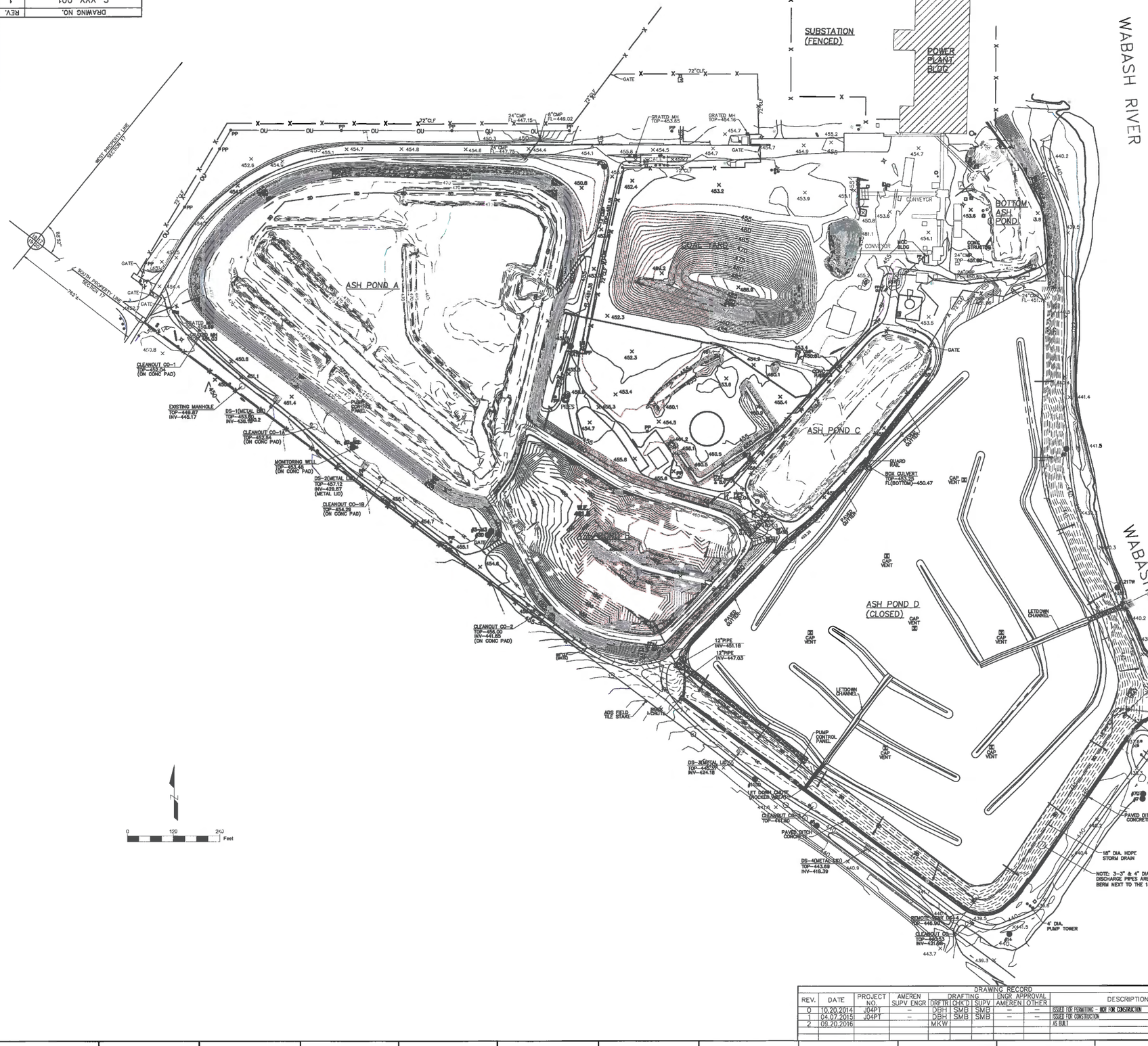
DRAWING NO.	REV.
S-XXX-001	1

SHEET NO. NNN



GENERAL SURVEY NOTES:

Aerial topographic information shown was taken from a photogrammetric data provided by Continental Mapping Consultants as flown April, 2010 including contours on ground surfaces.

Contours within ponds were determined by bottom of pond elevations established by the surveyor, and supplemented with surveys provided by Lamac Engineering Company in April 2014

Boundary information was taken from information provided to the surveyor by Ameren from a survey prepared February 1984 shown on sheet K-547.

The adopted coordinate system used for this survey was taken from the above mentioned survey of 1984.

The benchmark used was taken from the above mentioned survey of 1984 located near the main power plant shown as elevation 454.14'.

SYMBOLS & ABBREVIATIONS

PP	POWER POLE W/GUY WIRE	AC	ACRES
PP	POWER POLE	ASPH	ASPHALT
	STREET SIGN	BK	BOOK
GV	GAS VALVE	BLDG	BUILDING
GM	GAS METER	CLF	CHAIN LINK FENCE
WV	WATER VALVE	CONC	CONCRETE
WM	WATER METER	DB	DEED BOOK
WF	WATER FAUCET	E	EAST
CO	CLEAN OUT	E MH	ELECTRIC MANHOLE
YD	YARD DRAIN	ELEV	ELEVATION
EB/EM	ELECTRIC BOX OR METER	FF	FIRST FLOOR
MB	MAIL BOX	FL	FLOW LINE
	CAP VENT	L	LENGTH
TB	TELEPHONE BOX	MH	MANHOLE
LS	LIGHT STANDARD	N	NORTH
FH	FIRE HYDRANT	NTS	NOT TO SCALE
TS	TRAFFIC SIGNAL	PB	PLAT BOOK
EYL	ELECTRIC YARD LIGHT	PG	PAGE
	TEST HOLE	PVC	POLYVINYL CHLORIDE
OU	OVERHEAD UTILITY LINE	PVMT	PAVEMENT
G	UNDERGROUND ELECTRIC	R	RADIUS
UE	GAS LINE	RCP	REINFORCED CONCRETE PIPE
UT	UNDERGROUND TELEPHONE	REC	RECORD
SS	SANITARY SEWER	S	SOUTH
	STORM SEWER	SA	SANITARY
X	FENCE LINE	SBM	SITE BENCHMARK
	TREE DRIP LINE W/RADIUS	SF	SQUARE FEET
	TREE LINE	SIR	SET 5/8"x18" IRON ROD W/PLASTIC CAP
±	PLUS OR MINUS	SPM	SET 5/8"X24" IRON ROD W/ALUMINUM CAP
10"	TREE W/ SIZE	ST	STORM
		SURV	SURVEY
		TRANS	TRANSFORMER
48"	BUSH W/ SIZE	VCP	VITRIFIED CLAY PIPE
		W	WEST
W	WELL	W MH	WATER MANHOLE
×	AERIAL TOPOGRAPHIC SPOT ELEVATION	W/	DENOTES WITH
×	FIELD SPOT ELEVATIONS (INCLUDING BOTTOM OF POND)		

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING - NOT FOR CONSTRUCTION
1	04.07.2015	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION
2	09.20.2016			MKW					AS BUILT

NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK SHOWN ON PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SEAL, SIGNATURE OR INITIALS. THE ENGINEER DOES NOT HAVE AUTHORITY OVER THE PRODUCTS, PROCESS OR PROCEDURES OF OTHERS AND THE UNDERSIGNED DISCLAIMS ANY RESPONSIBILITY FOR SUCH WORK UNDER SUBSEQUENT REVISIONS AND ANY OTHER DOCUMENTS ASSOCIATED WITH THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

MARK UP DRAWING NO.	REV.
–	–
SHEET NO. ---	

SCALE –

EXISTING CONDITIONS MAP

AS-BUILT PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

SITE: HUTSONVILLE POWER STATION

UNIT NO. –

DWG. SIZE 24X36

SUB CLASS –

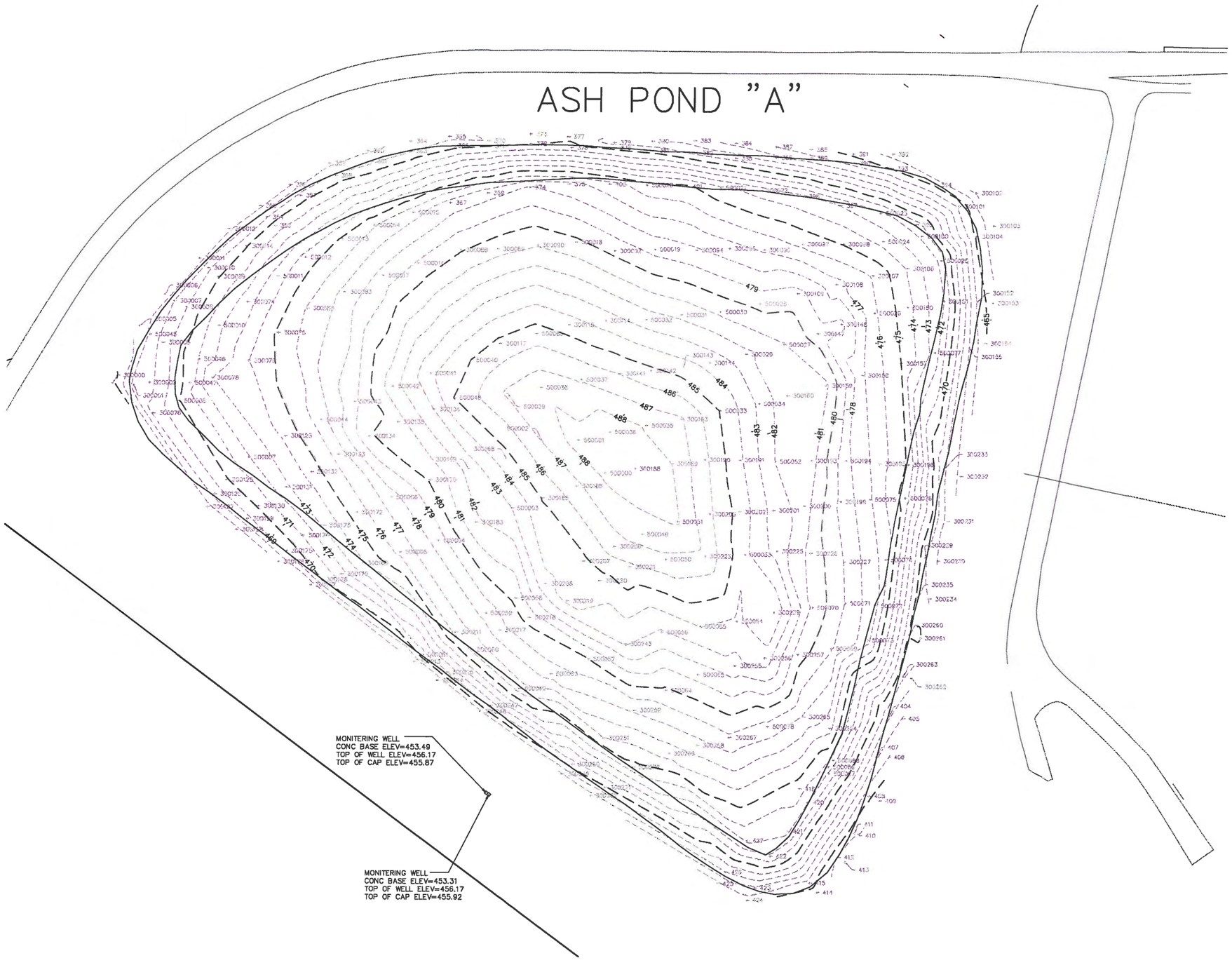
Ameren MISSOURI

DRAWING NO.	REV.
S-XXX-001	1
SHEET NO. 001	

Electronic Filing: Received, Clerk's Office 09/28/2020

POND CAP SURVEY

A TRACT OF LAND BEING PART OF AMEREN HUTSONVILLE POWER STATION
HUTSONVILLE, ILLINOIS



MASSMANN & ASSOCIATES
913 South 13th Street
St. Louis, MO 63103
314-862-5577, 314-862-5579 FAX

STATE OF ILLINOIS — WILLIAM F. MASSMANN, JR. — NUMBER 035-002885 — PROFESSIONAL LAND SURVEYOR

MISSOURI PROFESSIONAL LAND SURVEYING LIMITED LIABILITY CO.
No. 2016004723
(EXPIRES 12-31-2016)

ILLINOIS DESIGN FIRM
LAND SURVEYOR, LLC REGISTRATION
No. 184-003753
(EXPIRES 04-30-2017)

PROJECT REVISION:

NO:	DATE:	DESCRIPTION:
1.	06/09/16	CLIENT COMMENTS
2.	06/16/16	CLIENT COMMENTS
3.	06/17/16	CLIENT COMMENTS

POND CAP SURVEY
A TRACT OF LAND BEING PART OF
AMEREN HUTSONVILLE POWER STATION
HUTSONVILLE, ILLINOIS

DATE: 06/08/16
BOOK NO.: 97
DRAFTED BY: DAW
APPROVED BY: WFM
FILE NAME: 10022.DWG

SHEET TITLE:
POND CAP
SURVEY

SHEET NUMBER:

SUV-1

SHEET NO: 1 OF 2

PROJECT NO: 10022.01.002

POND CAP SURVEY

Electronic Filing: Received, Clerk's Office 09/28/2020

A TRACT OF LAND BEING PART OF AMEREN HUTSONVILLE POWER STATION
HUTSONVILLE, ILLINOIS

Cover Grade Certification Points						
Point Number	Northing (ft)	Easting (ft)	As-Built Base (ft)	As-Built Cover (ft)	Calculated Thickness(ft)	Description
353	4693.39	3373.92	465.91	470.42	4.51	COVER GRADE
354	4702.29	3364.65	465.25	468.93	3.68	COVER GRADE
355	4714.28	3357.04	466.59	466.64	0.05	COVER GRADE
356	4736.55	3388.53	466.75	466.85	0.10	COVER GRADE
357	4725.43	3399.46	465.58	469.29	3.71	COVER GRADE
358	4746.47	3436.80	465.73	469.22	3.49	COVER GRADE
359	4759.60	3429.90	466.35	467.63	1.28	COVER GRADE
360	4772.96	3470.55	467.26	467.82	0.56	COVER GRADE
361	4761.67	3474.76	467.13	468.71	1.58	COVER GRADE
363	4772.70	3516.19	467.38	468.92	1.54	COVER GRADE
364	4783.22	3516.24	467.61	468.26	0.65	COVER GRADE
365	4788.24	3557.33	465.98	468.66	2.68	COVER GRADE
366	4778.50	3560.49	465.72	469.53	3.81	COVER GRADE
367	4718.43	3559.00	474.28	477.41	3.13	COVER GRADE
500015	4694.15	3478.24	473.63	476.77	3.14	COVER GRADE
369	4728.81	3598.49	474.59	477.61	3.02	COVER GRADE
370	4783.94	3599.02	466.07	469.05	2.98	COVER GRADE
371	4778.28	3599.56	465.99	469.97	3.98	COVER GRADE
372	4780.93	3643.60	466.29	469.88	3.59	COVER GRADE
373	4791.15	3643.27	466.52	469.69	3.17	COVER GRADE
374	4734.95	3642.70	475.00	478.08	3.08	COVER GRADE
375	4738.51	3684.35	474.16	477.35	3.19	COVER GRADE
376	4776.96	3686.84	466.43	470.46	4.03	COVER GRADE
377	4788.65	3682.72	466.20	469.64	3.44	COVER GRADE
378	4776.87	3732.73	466.23	469.67	3.44	COVER GRADE
379	4782.48	3732.45	466.60	468.65	4.09	COVER GRADE
380	4784.03	3773.07	466.40	468.10	1.70	COVER GRADE
381	4774.16	3774.51	465.59	469.52	3.93	COVER GRADE
382	4771.56	3820.62	465.45	468.69	3.24	COVER GRADE
383	4784.41	3818.39	466.02	467.49	1.47	COVER GRADE
384	4781.87	3861.85	465.29	466.69	1.43	COVER GRADE
385	4766.02	3861.85	464.31	468.60	4.29	COVER GRADE
386	4766.82	3905.01	463.89	467.22	3.33	COVER GRADE
387	4778.21	3905.18	464.14	465.98	1.84	COVER GRADE
388	4775.25	3941.86	463.71	465.39	1.68	COVER GRADE
389	4766.41	3942.29	463.71	466.29	2.58	COVER GRADE
390	4761.18	3987.44	462.45	465.61	3.16	COVER GRADE
391	4770.63	3986.64	463.24	464.79	1.55	COVER GRADE
392	4770.58	4028.65	462.65	463.64	0.99	COVER GRADE
393	4755.25	4027.50	461.40	464.94	3.54	COVER GRADE
394	4738.25	4073.84	460.83	464.80	3.01	COVER GRADE
395	4695.92	4054.23	468.40	471.48	3.08	COVER GRADE
500023	4708.06	4016.04	469.57	472.69	3.12	COVER GRADE
397	4716.36	3973.78	469.94	472.96	3.02	COVER GRADE
398	4725.86	3933.90	470.19	473.24	3.05	COVER GRADE
500022	4732.00	3890.05	470.63	473.81	3.18	COVER GRADE
500021	4734.74	3846.80	471.34	474.48	3.14	COVER GRADE
401	4736.09	3810.36	471.98	475.19	3.21	COVER GRADE
500020	4737.59	3767.43	472.57	475.68	3.01	COVER GRADE
403	4738.49	3727.57	473.19	476.43	3.24	COVER GRADE
404	4177.67	4027.62	464.44	468.14	3.70	COVER GRADE
405	4174.73	4042.12	464.67	466.91	3.33	COVER GRADE
406	4134.25	4027.93	464.37	465.95	1.58	COVER GRADE
407	4134.05	4014.07	463.12	467.17	4.05	COVER GRADE
408	4093.24	4008.21	462.59	465.29	2.70	COVER GRADE
409	4088.03	4017.73	463.61	464.17	0.56	COVER GRADE
410	4051.57	3987.00	461.12	463.93	2.81	COVER GRADE
411	4053.78	3991.54	460.41	464.08	3.67	COVER GRADE
412	4028.61	3974.59	459.51	463.91	4.40	COVER GRADE
413	4023.51	3981.45	460.09	463.60	3.51	COVER GRADE
414	3991.41	3952.06	460.73	464.42	3.69	COVER GRADE
415	4001.55	3944.38	461.54	465.56	3.92	COVER GRADE
500068	4130.68	3958.64	470.80	473.98	3.18	COVER GRADE
500067	4116.75	3964.13	470.34	473.48	3.14	COVER GRADE
418	4100.64	3933.04	471.43	474.48	3.05	COVER GRADE
500066	4123.75	3963.45	470.69	473.95	3.26	COVER GRADE
420	4086.30	3941.56	470.13	473.13	3.00	COVER GRADE
421	4055.81	3920.70	470.10	473.27	3.17	COVER GRADE
422	4029.51	3902.57	468.74	471.83	3.09	COVER GRADE
423	3986.75	3886.01	463.11	466.87	3.76	COVER GRADE
424	3982.97	3878.07	464.40	465.45	1.05	COVER GRADE
425	4000.79	3846.53	464.56	465.72	1.16	COVER GRADE
426	4012.85	3855.30	464.41	467.99	3.58	COVER GRADE
427	4045.99	3878.06	470.21	473.21	3.00	COVER GRADE

Cover Grade Certification Points						
Point Number	Northing (ft)	Easting (ft)	As-Built Base (ft)	As-Built Cover (ft)	Calculated Thickness(ft)	Description
300000	4528.33	3203.88	464.30	464.67	0.37	COVER GRADE
300001	4524.15	3226.29	463.61	467.27	3.66	COVER GRADE
300002	4527.13	3243.01	463.85	467.68	3.83	COVER GRADE
300003	4569.40	3256.54	463.98	468.45	4.47	COVER GRADE
500045	4577.97	3242.54	464.12	467.29	3.17	COVER GRADE
300005	4586.87	3231.62	464.69	466.42	1.73	COVER GRADE
300006	4620.25	3258.13	464.83	466.21	1.38	COVER GRADE
300007	4613.46	3267.87	464.49	468.00	3.51	COVER GRADE
300008	4607.10	3280.79	464.47	468.96	4.49	COVER GRADE
300009	4639.16	3313.53	465.14	469.87	4.73	COVER GRADE
300010	4648.37	3303.19	464.64	468.77	4.13	COVER GRADE
300011	4658.55	3293.72	465.46	466.31	0.85	COVER GRADE
300012	4689.71	3324.72	465.72	466.69	0.97	COVER GRADE
300014	4671.74	3343.23	465.37	469.88	4.51	COVER GRADE
500010	4587.64	3315.18	468.77	471.91	3.14	COVER GRADE
500046	4552.01	3295.13	468.12	471.16	3.04	COVER GRADE
500047	4526.87	3285.23	467.67	470.76	3.09	COVER GRADE
300074	4612.64	3345.09	469.59	472.59	3.00	COVER GRADE
300075	4580.42	3378.08	472.11	475.13	3.02	COVER GRADE
300076	4494.81	3247.10	463.98	468.29	4.31	COVER GRADE
500008	4507.89	3274.54	466.94	470.06	3.12	COVER GRADE
300078	4532.44	3309.22	469.33	472.97	3.64	COVER GRADE
300079	4550.63	3346.55	470.95	473.96	3.01	COVER GRADE
300080	4606.27	3408.32	473.06	476.08	3.02	COVER GRADE
500011	4640.09	3376.86	470.61	473.69	3.08	COVER GRADE
500012	4660.03	3405.68	471.42	474.47	3.05	COVER GRADE
300083	4623.76	3447.61	474.19	477.24	3.05	COVER GRADE
500013	4579.60	3444.99	472.18	475.29	3.11	COVER GRADE
500014	4694.15	3478.24	472.96	476.11	3.15	COVER GRADE
500017	4641.25	3488.24	475.49	478.60	3.11	COVER GRADE
500016	4654.33	3525.41	476.14	479.30	3.16	COVER GRADE
300088	4668.47	3570.50	476.88	479.90	3.02	COVER GRADE
500038	4523.36	3656.79	484.53	487.94	3.11	COVER GRADE
500037	4532.00	3699.12	483.91	486.99	3.08	COVER GRADE
300141	4538.45	3739.79	482.90	485.96	3.06	COVER GRADE
300142	4541.41	3772.96	482.16	485.22	3.06	COVER GRADE
300143	4545.58	3808.07	481.39	484.41	3.02	COVER GRADE
300144	4549.79	3835.82	480.65	483.66	3.01	COVER GRADE
500029	4559.04	3874.41	479.38	482.45	3.07	COVER GRADE
500027	4569.22	3914.52	478.28	481.42	3.14	COVER GRADE
300147	4580.83	3950.56	476.37	479.48	3.11	COVER GRADE
300148	4590.86	3675.53	475.14	479.48	4.34	COVER GRADE
500026	4602.61	4010.56	475.21	478.39	3.18	COVER GRADE
300150	4608.40	4045.38	471.26	474.34	3.08	COVER GRADE
300151	4615.06	4083.72	468.99	472.02	3.03	COVER GRADE
300152	4614.72	4119.33	461.30	465.83	4.53	COVER GRADE
300153	4613.17	4135.74	463.56	464.32	0.76	COVER GRADE
300154	4570.38	4127.40	464.35	465.22	0.87	COVER GRADE
300155	4566.01	4110.85	473.06	466.99	3.02	COVER GRADE
500077	4560.72	4074.58	469.70	472.85	3.15	COVER GRADE
300157	4549.35	4038.95	471.97	475.00	3.03	COVER GRADE
300158	4536.87	3997.62	474.08	477.15	3.07	COVER GRADE
300159	4528.02	3959.44	476.13	481.19	5.06	COVER GRADE
300160	4515.35	3918.49	478.17	481.19	3.02	COVER GRADE
500034	4506.83	3888.84	479.82	483.13	3.31	COVER GRADE
500033	4499.36	3847.17	481.97	485.37	3.40	COVER GRADE
300163	4490.17	3806.08	484.18	487.85	3.67	COVER GRADE
500035	4483.60	3768.68	484.92	487.99	3.07	COVER GRADE
500036	4476.42	3730.12	485.96	489.26	3.30	COVER GRADE
500001	4467.95	3696.54	485.67	488.78	3.11	COVER GRADE
500002	4466.02	3658.70	484.09	487.24	3.15	COVER GRADE
300168	4448.18	3776.89	481.59	484.66	3.07	COVER GRADE
300169	4437.35	3580.72	479.34	482.36	3.02	COVER GRADE
300170	4425.44	3580.72	476.93	480.09	3.16	COVER GRADE

Cover Grade Certification Points						
Point Number	Northing (ft)	Easting (ft)	As-Built Base (ft)	As-Built Cover (ft)	Calculated Thickness(ft)	Description
500006	4407.02	3429.67	474.63	477.73	3.10	COVER GRADE
300172	4390.98	3463.25	472.49	475.51	3.02	COVER GRADE
300173	4377.02	3428.21	470.19	473.19	3.00	COVER GRADE
300174	4366.42	3405.76	466.74	471.03	4.29	COVER GRADE
300175	4350.24	3389.37	466.04	469.22	3.18	COVER GRADE
300176	4336.60	3381.06	466.78	467.12	0.34	COVER GRADE
300177	4314.40	3414.83	467.27	467.40	0.13	COVER GRADE
300178	4319.83	3426.87	466.44	469.99	3.55	COVER GRADE
300179	4325.78	3447.34	467.32	471.60	4.28	COVER GRADE
300180	4337.20	3469.77	470.86	473.92	3.06	COVER GRADE
500005	4349.27	3509.27	473.32	476.37	3.05	COVER GRADE
500004	4361.50	3549.12	475.41	478.51	3.10	COVER GRADE
300183	4380.90	3588.58	477.87	481.82	3.95	COVER GRADE
500003	4395.98	3626.62	479.99	483.08	3.09	COVER GRADE
300185	4406.64	3658.70	481.90	485.05	3.15	COVER GRADE
300186	4419.37	3694.57	483.72	486.76	3.04	COVER GRADE
500000	4431.15	3724.57	485.32	488.47	3.15	COVER GRADE
300188	4437.85	3756.89	485.75	488.77	3.02	COVER GRADE
300189	4443.00	3796.79	484.96	487.97	3.01	COVER GRADE
300190	4447.33	3831.61	483.15	486.21	3.06	COVER GRADE
300191	4447.19	3868.77	481.12	484.16	3.04	COVER GRADE
500052	4445.90	3906.22	479.12	482.39	3.27	COVER GRADE
300193	4448.59	3944.87	477.04	481.38	4.35	COVER GRADE
300194	4446.50	3981.05	475.15	478.27	3.12	COVER GRADE
300195	4443.36	4016.80	473.45	476.50	3.05	COVER GRADE
300196	4442.37	4046.80	471.72	474.87	3.15	COVER GRADE
500076	4407.03	4043.67	471.88	475.09	3.21	COVER GRADE
500075	4365.69	4006.74	474.18	477.33	3.15	COVER GRADE
300199	4403.36	3975.82	475.69	478.75	3.06	COVER GRADE
300200	4398.68	3936.56	477.79	481.52	3.73	COVER GRADE
300201	4394.09	3904.24	479.63	482.65	3.02	COVER GRADE
300202	4392.64	3868.29	481.53	484.64	3.11	COVER GRADE
300203	4389.87	3837.10	483.12	486.16	3.04	COVER GRADE
500051	4382.07	3802.44	485.48	488.74	3.26	COVER GRADE
500049	4368.55	3764.59	484.58	487.69	3.11	COVER GRADE
300206	4355.62	3734.99	483.43	486.53	3.10	COVER GRADE
300207	4340.10	3702.21	481.73	484.75	3.02	COVER GRADE
300208	4316.20	3662.64	478.98	483.76	4.78	COVER GRADE
500058	4301.01	3631.14	477.26	480.28	3.02	COVER GRADE
500059	4285.25	3600.45	475.39	478.52	3.13	COVER GRADE
300211	4264.96	3568.30	473.23	476.38	3.15	COVER GRADE
500061	4241.16	3534.14	467.69	470.83	3.14	COVER GRADE
300213	4233.76	3524.41	467.79	468.11	0.32	COVER GRADE
300214	4214.10	3548.07	467.95	468.16	0.21	COVER GRADE
300215	4222.72	3559.08	467.22	470.92	3.70	COVER GRADE
500060	4246.62	3585.20	473.25	476.41	3.16	COVER GRADE
300217	4267.22	3614.42	475.55	478.57	3.02	COVER GRADE
300218	4280.55	3645.82	477.28	480.35	3.07	COVER GRADE
300219	4298.09	3685.36	479.49	484.24	4.75	COVER GRADE
300220	4316.60	3719.97	481.49	484.52	3.03	COVER GRADE
300221	4334.12	3751.27	482.79	485.81	3.02	COVER GRADE
500050	4342.08	3790.05	483.81	486.84	3.03	COVER GRADE
300223	4345.33	3832.20	483.65	486.74	3.09	COVER GRADE
500053	4347.44	3874.99	481.30	484.37	3.07	COVER GRADE
300225	4351.02	3908.23	479.56	482.64	3.08	COVER GRADE
300226	4348.69	3943.71	477.68	480.71	3.03	COVER GRADE
300227	4339.92	3979.79	475.87	478.95	3.08	COVER GRADE
500074	4342.07	4023.26	473.63	476.84	3.21	COVER GRADE
300229	4344.16	4065.60	465.69	469.10	3.41	COVER GRADE
300230	4340.76	4078.54	465.78	467.92	2.14	COVER GRADE
300231	4382.73	40898.03	464.88	467.46	2.58	COVER GRADE
300232	4430.04	4102.77	464.63	466.67	2.04	COVER GRADE
300233	4437.67	4084.53	464.55	468.18	3.63	COVER GRADE
300234	4300.73	4070.85	466.21	468.84	2.63	COVER GRADE
300235	4302.75	4057.64	466.11	469.70	3.59	COVER GRADE
500072	4298.55	4013.53	474.40	477.54	3.14	COVER GRADE
500071	4298.36	3980.83	476.00	479.29	3.29	COVER GRADE
500070	4291.70	3946.17	477.80	480.89	3.09	COVER GRADE
300239	4286.49	3905.60	480.21	484.87	4.66	COVER GRADE
500054	4277.08	3866.19	480.88	484.01	3.13	COVER GRADE
500055	4271.70	3827.57	481.07	484.19	3.12	COVER GRADE
500056	4270.40	3785.50	479.91	483.00	3.09	COVER GRADE
300243	4253.02	3746.68	478.57	483.10	4.53	COVER GRADE
500057	4236.92	3708.43	476.98	480.12	3.14	COVER GRADE
500063	4221.24	3669.21	475.59	478.67	3.08	COVER GRADE
500062	4205.78	3636.04	473.70	476.80	3.10	COVER GRADE
300247	4187.87	3605.92	467.66	471.44	3.78	COVER GRADE
300248	4181.37	3594.37	468.02	468.78	0.76	COVER GRADE
300249	4115.70	3681.41	467.57	467.96	0.39	COVER GRADE
300250	4126.05	3692.30	467.25	470.57	3.32	COVER GRADE
300251	4153.83	3724.77	472.84	475.98	3.04	COVER GRADE
300252	4182.73	3757.09	475.09	478.12	3.03	COVER GRADE
500064	4204.01	3790.60	476.84	479.84	3.00	COVER GRADE
500065	4220.68	3824.77	478.38	481.46	3.08	COVER GRADE
300255	4230.26	3863.99	479.64	482.64	3.00	COVER GRADE
300256	4238.39	3895.68	478.88	483.67	4.79	COVER GRADE
300257	4242.13	3931.09	477.41	480.50	3.09	COVER GRADE
500069	4248.55	3966.09	476.20	479.30	3.10	COVER GRADE
500073	4257.34	4004.49	474.77	477.95	3.18	COVER GRADE
300260	4262.95	4048.48	466.13	470.08	3.95	COVER GRADE
300261	4259.51	4060.00	466.62	470.11	3.49	COVER GRADE
300262	4216.97	4051.12	466.09	468.46	2.37	COVER GRADE
300263	4219.12	4042.14	465.43	469.16	3.73	COVER GRADE
300264	4164.45	3964.82	473.26	476.38	3.12	COVER GRADE
300265	4176.52	3936.61	474.85	477.93	3.08	COVER GRADE
500078	4166.36	3899.09	475.73	478.86	3.13	COVER GRADE
300267	4154.78	3858.12	475.74	478.81	3.07	COVER GRADE
300268	4146.23	3824.49	474.38	477.59	3.01	COVER GRADE
300269	4137.51	3784.67	473.46	476.47	3.05	COVER GRADE
500079	4123.05	3756.53	471.66	474.74	3.08	COVER GRADE
300271	4101.78	3726.48	466.49	469.80	3.31	COVER GRADE
300272	4092.93	3711.27	466.70	467.49	0.79	COVER GRADE

MASSMANN & ASSOCIATES
913 South 13th Street
St. Louis, MO 63103
314-862-5577, 314-862-5579 FAX

STATE OF ILLINOIS — WILLIAM F. MASSMANN, JR. — NUMBER 035-002885 — PROFESSIONAL LAND SURVEYOR

MISSOURI PROFESSIONAL LAND SURVEYING LIMITED LIABILITY CO.
No. 2018004723
(EXPIRES 12-31-2016)

ILLINOIS DESIGN FIRM
LAND SURVEYOR, LLC REGISTRATION
No. 184-003753
(EXPIRES 04-30-2017)

PROJECT REVISION:

NO:	DATE:	DESCRIPTION:
1.	06/09/16	CLIENT COMMENTS
2.	06/16/16	CLIENT COMMENTS
3.	06/17/16	CLIENT COMMENTS

POND CAP SURVEY
A TRACT OF LAND BEING PART OF AMEREN HUTSONVILLE POWER STATION
HUTSONVILLE, ILLINOIS

DATE: 06/08/16
BOOK NO.: 97
DRAFTED BY: DAW
APPROVED BY: WFM
FILE NAME: 10022.DWG

SHEET TITLE:
POND CAP SURVEY

SHEET NUMBER:
SUV-1

SHEET NO: 2 OF 2

PROJECT NO: 10022.01.002

Electronic Filing: Received, Clerk's Office 09/28/2020



GENERAL SURVEY NOTES:

Original pre-construction topographic information shown was taken from a photogrammetric data provided by Continental Mapping Consultants as flown April, 2010 including contours on ground surfaces.

Original pre-construction contours within ponds were determined by bottom of pond elevations established by the surveyor, and supplemented with surveys provided by Lamoc Engineering in April 2014.

As-built contours were taken from a combination of photogrammetric data flown on August 9, 2016 and ground survey on August 29, 2016.

Boundary information was taken from information provided to the surveyor by Ameren from a survey prepared February 1984 shown on sheet K-547.

The adopted coordinate system used for this survey was taken from the above mentioned survey of 1984.

The benchmark used was taken from the above mentioned survey of 1984 located near the main power plant shown as elevation 454.14'.

SYMBOLS & ABBREVIATIONS

⟷PP	POWER POLE W/GUY WIRE	ASPH	ASPHALT
●PP	POWER POLE	BLDG	BUILDING
⊸	STREET SIGN	CLF	CHAIN LINK FENCE
⧖	CAP VENT	CONC	CONCRETE
——OU——	OVERHEAD UTILITY LINE	ELEV	ELEVATION
- - -UE- - -	UNDERGROUND ELECTRIC	FL	FLOW LINE
×	AERIAL TOPOGRAPHIC SPOT ELEVATION	MH	MANHOLE
✖	FIELD SPOT ELEVATIONS (INCLUDING BOTTOM OF POND)	RCP	REINFORCED CONCRETE PIPE
		VCP	VITRIFIED CLAY PIPE

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR	DRAFTING DRFTR	DRAFTING CHK'D	ENGR APPROVAL SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2015	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION
2	09.20.2016			MKW					AS BUILT

NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK SHOWN OR PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SEAL, SIGNATURE OR INITIALS. HE/SHE DOES NOT HAVE AUTHORITY OVER THE PROJECT AS A WHOLE. THE UNDERSIGNED DISCLAIMS ANY RESPONSIBILITY FOR "SHOP/FIELD CHANGES" OR OTHER CHANGES TO THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

MARK UP DRAWING NO.	REV.
–	–

SHEET NO. ----

SCALE: –

FINAL CONDITIONS MAP

AS-BUILT PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

UNIT NO.: –

SITE: HUTSONVILLE POWER STATION

DWG. SIZE: 24X36

SUB CLASS: –

Ameren MISSOURI

DRAWING NO.	REV.
S-XXX-001A	1

SHEET NO. 001

APPENDIX A

WEEKLY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: September 29, 2015

SUBJECT: Weekly Summary Report for September 15, 2015 to September 18, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (^{O}F) lows ranged from 47 to 63°F, and temperature highs ranged from 82 to 89°F.

Construction Activities

Ash was removed from Ash Pond B and placed in Ash Pond A. The top one foot of material was removed from the Coal Yard and placed in Ash Pond A. Grading activities occurred in Ash Pond B and Ash Pond A. Wet materials in Ash Pond A were scarified to improve drying. The geomembrane liner was exposed and cleaned at the interface between the Bottom Ash Pond and the previously closed Ash Pond D.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 backhoes (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), and 1 water truck (Caterpillar 623B).

WB Koester had 12 employees working on site: 2 laborers, 1 mechanic, and 9 equipment operators.

Lamac Engineering was on site on Friday, September 18 to survey the ash ponds.

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Meetings

A weekly progress meeting was held on Wednesday, September 16, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Ash from Ash Pond B and spoils from the Coal Yard were placed in Ash Pond A.

Testing/Sampling

One sample of soil from a potential borrow source was obtained from Quality Lime Company for benzene, toluene, ethylbenzene and xylenes (BTEX) analysis.

Signature of CQA Officer



Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/15/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: JYH

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 1130 Depart: 1630 Travel: 3.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 56 F
PM Conditions: Clear
PM Temperature: 82 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: WB Koester: 2 backhoes, 3 dump trucks, 3 bulldozers, 1 water truck (see additional notes)
Personnel: WB Koester: 12 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash excavated at Pond B and placed at Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/15/2015 Date

Geotechnology, Inc. Engineer 9-28-2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/15/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:
Loaded out steel from the coal yard so that the top 1' can be removed to Ash Pond A. Ongoing demolition of buildings. Don Shaver (Ameren) indicated that the hydrogen tanks will be purged Wednesday or Thursday this week so that the tanks can be removed.

WB Koester:

Equipment details: 2 backhoes (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 4 dump trucks (John Deere 400D) (3 in use), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B)

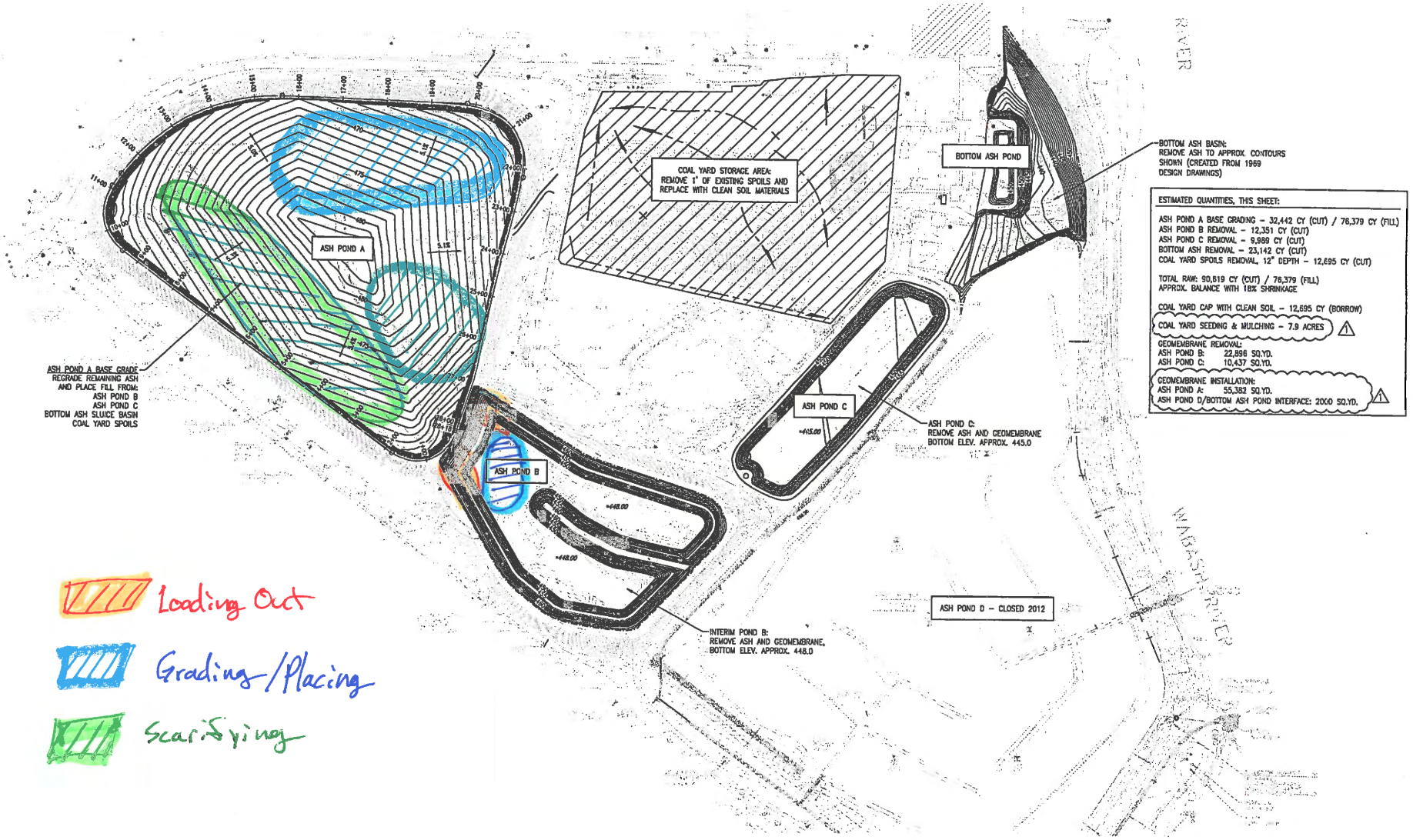
Excavated ash at the northwest corner of Ash Pond B with two excavators and placed ash on eastern half of Ash Pond A with three dump trucks (a fourth dump truck is currently out of service for repairs on site). Graded bottom of Ash Pond B with one GPS bulldozer. Graded eastern berms of Ash Pond A with one GPS bulldozer. Scarified western half of Pond A with one non-GPS bulldozer to allow material to dry (material is visibly wet). Water truck sprayed road areas with water to reduce dust.

Other:

Bottom Ash Pond is waiting on the removal of hydrogen tanks and steel debris by Brandenberg before activity continues. Observed ash in Ash Pond C on the northeast end of the southeast wall adjacent to the roadway. Observed ash in Ash Pond B along northeast , southwest, and southeast ends. Ash on Ash Pond A is visibly wet on the western half and drier on the eastern half. There is ponded water in the northeast corner.

Electronic Filing: Received, Clerk's Office 09/28/2020

9/15/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES 1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. 1

1 CLEAN CLOSURE PLAN
004 100 0 100 200

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO.	REV.
–	–
SHEET NO.	---

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04P1	–	DBH	SMB	SMB	–	–	ISSUED FOR PLOTTING – NOT FOR CONSTRUCTION
1	04.07.2014	J04P1	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren MISSOURI

DRAWING NO.	REV.
S-XXX-004	1
SHEET NO. 004	

DRAWING NO.	REV.
S-XXX-004	1
SHEET NO. 004	

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/16/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: - Total: 9.50

AM Conditions: Clear
AM Temperature: 73 F
PM Conditions: Clear
PM Temperature: 84 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: WB Koester: 2 backhoes, 3 dump trucks, 3 bulldozers, 1 water truck (see additional notes)
Personnel: WB Koester: 12 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash excavated at Pond B and placed at Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B; Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. — Date: 9/16/2015
Geotechnology, Inc. Engineer — Date: 9/28/2015

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/16/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:
Loaded out steel from the coal yard so that the top 1' can be removed to Ash Pond A. Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 backhoes (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B)

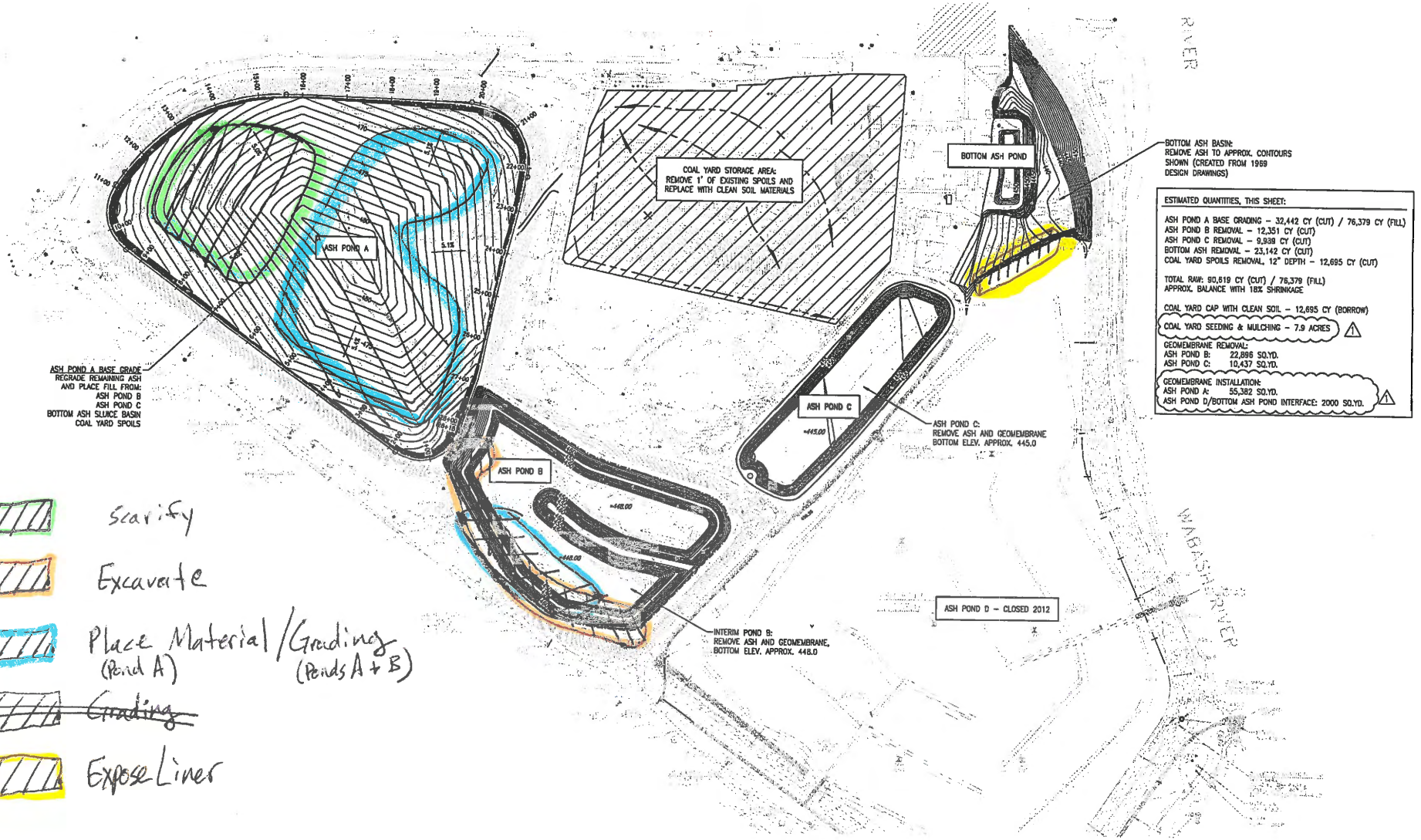
Excavated ash at the southwest wall of Ash Pond B with one excavator and placed ash on eastern half of Ash Pond A with three dump trucks (a fourth dump truck is currently out of service for repairs on site). Graded bottom and sides of Ash Pond B with one GPS bulldozer. Graded eastern berms of Ash Pond A with one GPS bulldozer. Scarified western half of Ash Pond A with one non-GPS bulldozer and one excavator to allow material to dry in the early morning. Graded northeast portion of Ash Pond A with one non-GPS bulldozer in the late morning/afternoon. Moved soil to expose HDPE geomembrane liner at the interface between the Bottom Ash Pond and Ash Pond D with one excavator. Water truck sprayed road areas with water to reduce dust. Late afternoon both backhoes loading ash out of Ash Pond B (southwest and southeast corners) into Ash Pond A.

1330: Talked with Chris Atkinson (WB Koester) about remaining ash locations in the Bottom Ash Pond.

Other:

Progress meeting held today at 1030. Refer to the meeting minutes for more information.

9/16/2015



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ASH POND C REMOVAL – 9,938 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1

GEOMEMBRANE REMOVAL:
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ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

DRAWING NO.	REV.
S-XXX-004	1
SHEET NO. 004	

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING DRF. BY	DSN. BY	SUPV.	FINCE APPROVAL AMEREN	OTHER	DESCRIPTION
0	10.20.2014	304P1	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2015	304P1	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ----

SCALE –
UNIT NO. –
DWG. SIZE 24X36
ISSUE CLASS –

CLEAN CLOSURE–ASH MOVING PLAN

CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Ameren MISSOURI

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Weekly Progress Meeting

Meeting Minutes

Date: 9-16-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff (phone), Ken Beckman, John Patterson (phone), Tim Free

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Make sure to wash and scrape the parking lot on Friday.
- Discuss with work crews that all must wear seat belts.

Manpower

- Man hours
  - Start of Job (4-27-15) through 9-14-15
    - Total = 6963 hrs.
- Next week expected manpower
  - WBK = 1 superintendent, 1 mechanic, 7 operators, 2 laborer, 1 teamster
  - 10 hrs days approx.

Review old minutes and action items

- Silt Fence removal will be performed on a T&M basis as opposed to lump sum.
- Mike checked with Hanson regarding lowering the bottom ash pond berm, said to only lower it 5' lower than existing elevation).
- Bob submitted flowable fill mix design and it was approved.
- Geotechnology, Inc was given 5 gallon bucket of Quality Lime borrow soil to test. Jessie will obtain more at site to test for BTEX.

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Next Meeting Scheduled: September 23, 2015 at 9:00 CST

Action Items

- Bob Fisher
  - Prepare schedule of values
  - Provide T&M price for a temp generator?
- Mike Wagstaff –
  - Call farmer back to have him produce lease agreement. If not then WBK can borrow out of field.
  - If borrow out of field is ok then check with LAMAC to see if they can amend SWPPP Plan to include the field.
- Don Shaver
  - Take pictures during structure demolitions for records.
- Geotechnology, Inc.
  - Jessie to obtain more sample of Quality Lime borrow soil for BTEX testing
  - Jessie to obtain sample of farm field soil for testing.

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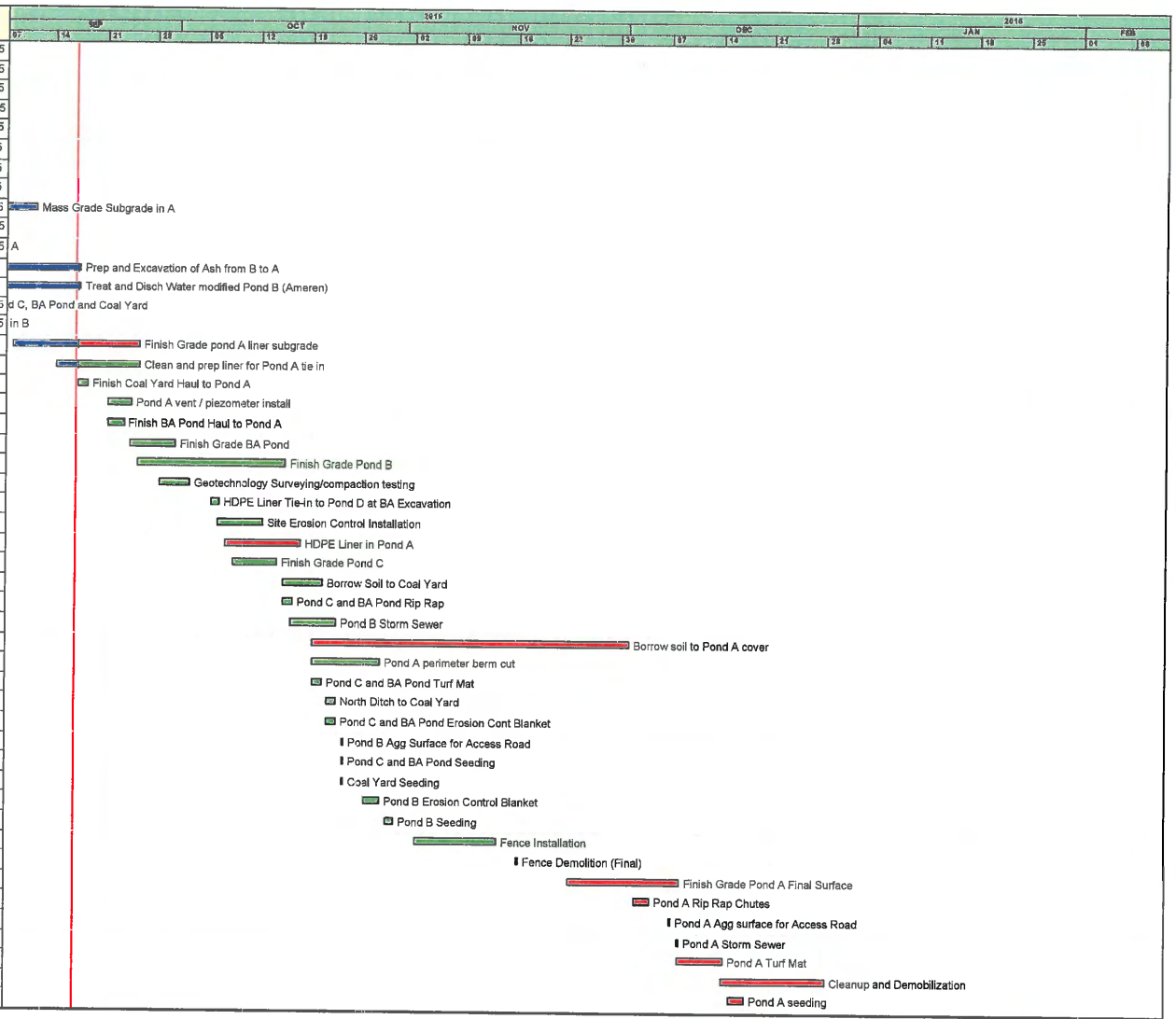
Act ID	Description	Orig Dur	Early Start	Early Finish	Actual Start	Actual Finish
1000	Mobilization	24d6h	27APR15 A	15JUN15 A	27APR15	15JUN15
1010	Remove Existing Fencing Initial	10d	27APR15 A	06MAY15 A	27APR15	06MAY15
1020	Install temporary Fencing	2d	30APR15 A	01MAY15 A	30APR15	01MAY15
1050	Initial Site Prep / Dewatering/ Haul routes	24d	11MAY15 A	02AUG15 A	11MAY15	02AUG15
1060	Exc of Ash from C to A	15d4h	08JUN15 A	26JUN15 A	08JUN15	26JUN15
1090	Excavation of Coal Yard Spoils	14d	29JUN15 A	17JUL15 A	29JUN15	17JUL15
1490	Haul Stockpile from outside fence	7d	13JUL15 A	21JUL15 A	13JUL15	21JUL15
1500	Treat and Discharge Water from Pond B (Ameren)	11d	15JUL15 A	29JUL15 A	15JUL15	29JUL15
1510	Mass Grade Subgrade in A	42d	15JUL15 A	11SEP15 A	15JUL15	11SEP15
1530	Pump Water From BA Pond	24d	17JUL15 A	14AUG15 A	17JUL15	14AUG15
1480	Excavation of Ash from BA Pond to A	20d	22JUL15 A	14AUG15 A	22JUL15	14AUG15
1100	Prep and Excavation of Ash from B to A	38d	27JUL15 A	17SEP15	27JUL15	
1540	Treat and Disch Water modified Pond B (Ameren)	38d	27JUL15 A	17SEP15	27JUL15	
1180	Pond B soil to Pond C, BA Pond and Coal Yard	17d	13AUG15 A	25AUG15 A	13AUG15	25AUG15
1110	Demo Liner partial in B	5d	17AUG15 A	25AUG15 A	17AUG15	25AUG15
1130	Finish Grade pond A liner subgrade	14d	08SEP15 A	25SEP15	08SEP15	
1120	Clean and prep liner for Pond A tie in	10d	14SEP15 A	25SEP15	14SEP15	
1520	Finish Coal Yard Haul to Pond A	2d	17SEP15 A	18SEP15	17SEP15	
1140	Pond A vent / piezometer install	4d	21SEP15	24SEP15		
1210	Finish BA Pond Haul to Pond A	5d	21SEP15 A	23SEP15	21SEP15	
1550	Finish Grade BA Pond	5d	24SEP15	30SEP15		
1230	Finish Grade Pond B	15d	25SEP15	15OCT15		
1560	Geotechnology Surveying/compaction testing	5d	28SEP15	02OCT15		
1080	HDPE Liner Tie-in to Pond D at BA Excavation	2d	05OCT15	06OCT15		
1030	Site Erosion Control Installation	5d	06OCT15	12OCT15		
1150	HDPE Liner in Pond A	10d	07OCT15	17OCT15		
1220	Finish Grade Pond C	5d	08OCT15	14OCT15		
1270	Borrow Soil to Coal Yard	4d	15OCT15	20OCT15		
1400	Pond C and BA Pond Rip Rap	2d	15OCT15	16OCT15		
1350	Pond B Storm Sewer	5d	16OCT15	22OCT15		
1200	Borrow soil to Pond A cover	30d	19OCT15	01DEC15		
1240	Pond A perimeter berm cut	8d	19OCT15	28OCT15		
1410	Pond C and BA Pond Turf Mat	2d	19OCT15	20OCT15		
1280	North Ditch to Coal Yard	2d	21OCT15	22OCT15		
1420	Pond C and BA Pond Erosion Cont Blanket	2d	21OCT15	22OCT15		
1370	Pond B Agg Surface for Access Road	1d	23OCT15	23OCT15		
1430	Pond C and BA Pond Seeding	1d	23OCT15	23OCT15		
1440	Coal Yard Seeding	1d	23OCT15	23OCT15		
1380	Pond B Erosion Control Blanket	3d	26OCT15	28OCT15		
1390	Pond B Seeding	2d	29OCT15	30OCT15		
1450	Fence Installation	10d	02NOV15	13NOV15		
1470	Fence Demolition (Final)	1d	16NOV15	16NOV15		
1300	Finish Grade Pond A Final Surface	10d	23NOV15	08DEC15		
1310	Pond A Rip Rap Chutes	3d	02DEC15	04DEC15		
1360	Pond A Agg surface for Access Road	1d	07DEC15	07DEC15		
1320	Pond A Storm Sewer	1d	08DEC15	08DEC15		
1330	Pond A Turf Mat	5d	08DEC15	14DEC15		
1460	Cleanup and Demobilization	9d	14DEC15	28DEC15		
1340	Pond A seeding	3d	15DEC15	17DEC15		



Start date	04MAY15
Finish date	28DEC15
Data date	16SEP15
Run date	17SEP15
Page number	1A
Project name	amer2
© Primavera Systems, Inc.	

WB Koester Construction, LLC
Ameren Hutsonville Ash Pond Closure

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone poin

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/17/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0730 Depart: 1600 Travel: - Total: 9.50

AM Conditions: Clear
AM Temperature: 71 F
PM Conditions: Clear
PM Temperature: 84 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: WB Koester: 2 backhoes, 3 dump trucks, 3 bulldozers, 1 water truck (see additional notes)
Personnel: WB Koester: 12 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash excavated at Ash Pond B and the Coal Yard and placed at Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B; Bottom Ash Pond. See attached location drawing for more information.

9/17/2015
Geotechnology, Inc. Rep. Date

9/28/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/17/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Finished loading out steel from the coal yard. Ongoing demolition of buildings. Began purging of the hydrogen tank located at the west end of the Bottom Ash Pond.

WB Koester:

Equipment details: 2 backhoes (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B)

One excavator spent one hour in the morning cleaning off the HDPE geoembrane liner at the interface between the Bottom Ash Pond and Ash Pond D. Two laborers cleaned off the HDPE geomembrane liner between Ash Pond D and the Bottom Ash Pond with shovels in the morning.

Excavated ash at the southern edge of Ash Pond B and at the western corner of Ash Pond B with two excavators and placed ash on eastern half of Ash Pond A with three dump trucks. Graded bottom and sides of Ash Pond B with one GPS bulldozer and one excavator. Graded eastern berms of Ash Pond A with one non-GPS and one GPS bulldozer.

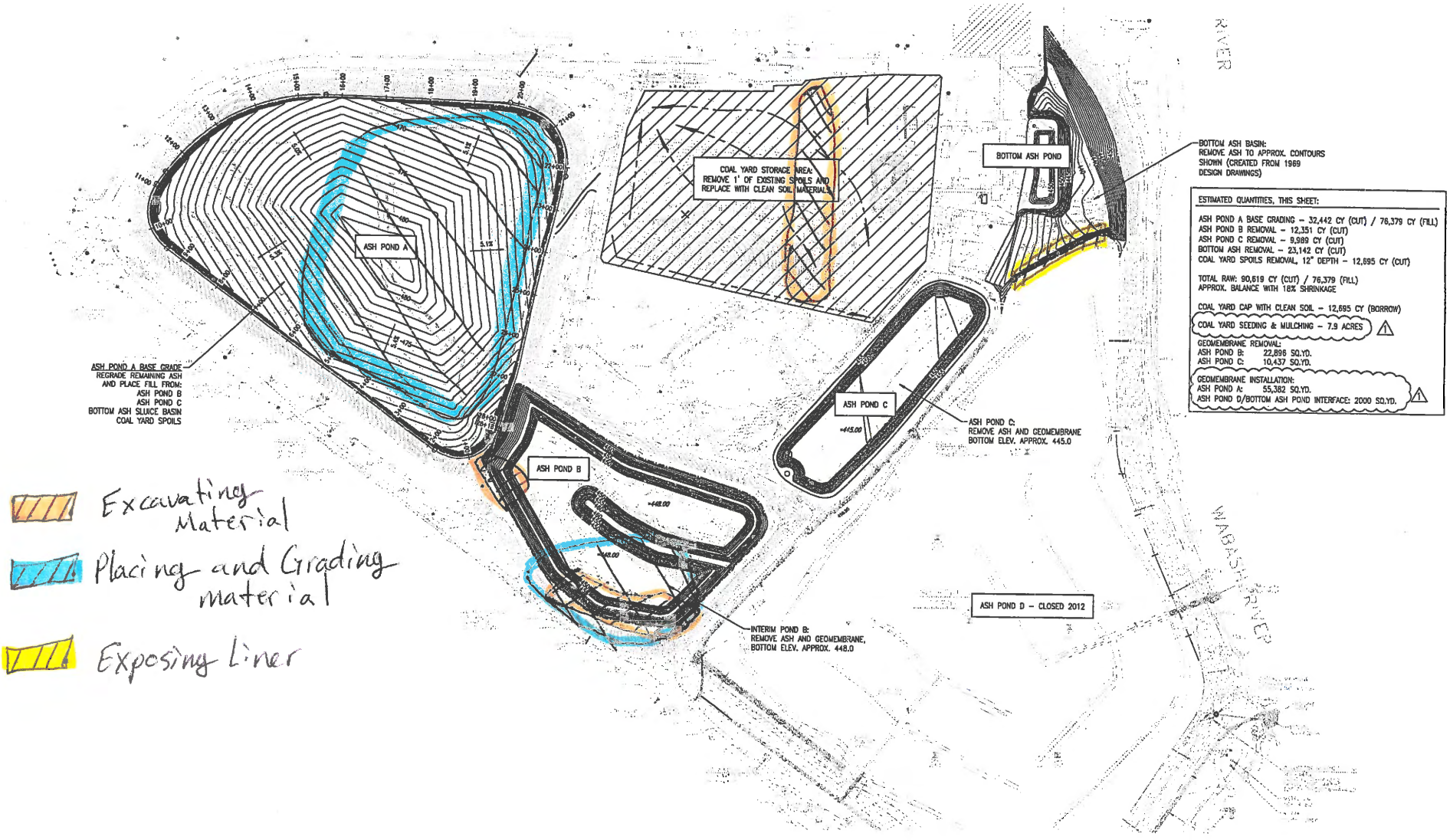
Around 0930, one excavator and one GPS-bulldozer moved to the Coal Yard to remove the top 1 foot of material. Three dump trucks transported the removed material to Ash Pond A. This activity continued for the remainder of the day.

Water truck sprayed road areas with water to reduce dust.

One tracked jackhammer arrived on site around 1400 this afternoon.

One bulldozer (non-GPS, previously grading material placed on Ash Pond A) out of service and under repair at 1530 site walk.

9/17/2015



1 CLEAN CLOSURE PLAN
004
100 0 100 200

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DRAWING NO.	REV.
S-XXX-004	1

SHEET NO. 004

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR	DRAFTING DSH	DSGN'D	SUPV	AMEREN	OTHER	DESCRIPTION
0	10.20.2014	JOB1	–	DSH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2015	JOB1	–	DSH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY
THE PERFORMANCE OF THE ELECTRONIC FORMATS IS LIMITED TO THE VIEWING, PRINTING, AND PLOTTING OF THE ELECTRONIC DRAWING FILES. ANY ALTERATION OF THE ELECTRONIC DRAWING FILES SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO THE ENGINEER. UNDER NO CIRCUMSTANCES SHALL ANY ELECTRONIC DRAWING FILE BE USED BY THE RECIPIENT OR ANY THIRD PARTY FOR ANY PURPOSE OTHER THAN THAT SPECIFICALLY AGREED TO AND SET FORTH IN THE AGREEMENT UNDER WHICH THE ELECTRONIC DRAWING FILES ARE PROVIDED. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY THE ENGINEER FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO THE ENGINEER. USER SHALL INDEMNIFY AND HOLD HARMLESS THE ENGINEER FROM ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

MARK UP DRAWING NO.	REV.
–	–

SHEET NO. ---

SCALE: –
UNIT NO. –
DWG. SIZE: 24X36
SUB CLASS: –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren MISSOURI

DRAWING NO.	REV.
S-XXX-004	1

SHEET NO. 004

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/18/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0730 Depart: 1200 Travel: 3.00 Total: 7.50

AM Conditions: Cloudy
AM Temperature: 72 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: WB Koester: 2 backhoes, 3 dump trucks, 3 bulldozers, 1 water truck (see additional notes)
Personnel: WB Koester: 12 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Spoils excavated at the Coal Yard and placed at Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B; Coal Yard. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/18/2015 Date

Geotechnology, Inc. Engineer 9/28/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/18/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Finished loading out steel from the coal yard. Ongoing demolition of buildings. Continued purging of the hydrogen tank located at the west end of the Bottom Ash Pond.

WB Koester:

Equipment details: 2 backhoes (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B)

The bulldozer that was under repair yesterday (9/17/15) afternoon is back in service.

Graded bottom and sides of Ash Pond B with one GPS bulldozer. Graded Ash Pond A with one non-GPS bulldozer. At 1000 the GPS bulldozer at Ash Pond B moved to Ash Pond A to continue grading activities.

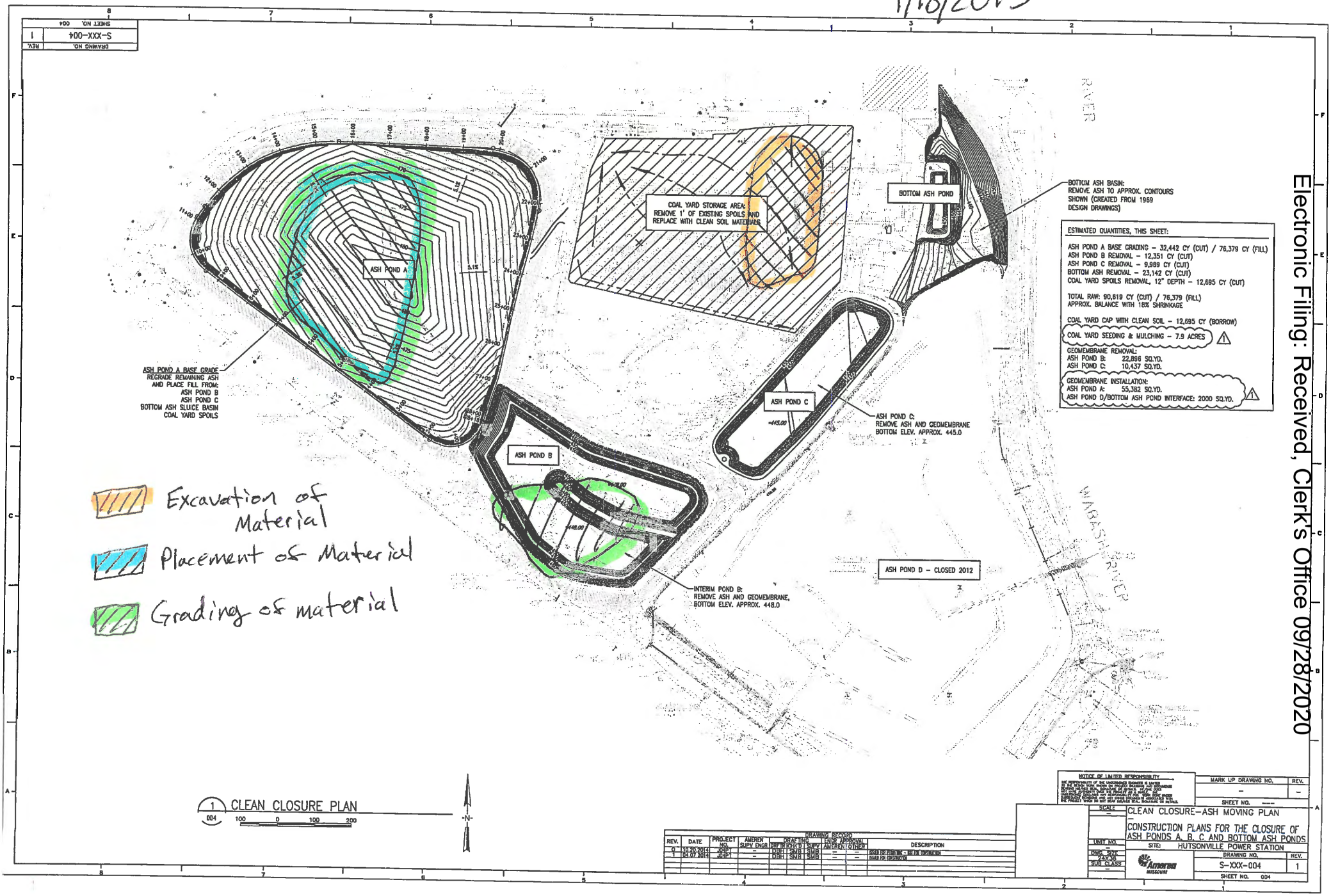
Two excavators and one GPS bulldozer removed the top 1 foot of spoils and debris in the Coal Yard. Three dump trucks transported the material to Ash Pond A.

Water truck sprayed road areas with water to reduce dust.

Used one bulldozer to scrape material from roads.

WB Koester had a surveyor on site to generate an updated topo for the Ash Pond B and Ash Pond A to evaluate additional ash volume in Ash Pond A and to update grade design on Ash Pond B.

9/18/2015



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COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)

COAL YARD SEEDING & MULCHING – 7.9 ACRES 1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. 1

NOTICE OF LIMITED RESPONSIBILITY

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR REVIEW – NOT FOR CONSTRUCTION
1	04.07.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren MISSOURI

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

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PHOTOGRAPH LOG



Photograph 1 - View of the north portion of the Bottom Ash Pond looking southeast, showing groundwater leaching and subsequent dewatering.



Photograph 2 - View of the southern portion of the Bottom Ash Pond, looking south into Ash Pond C.

Photographs taken by Jessie Hahn of Geotechnology, Inc. September 15-18, 2015.



Photograph 3 - View of Ash Pond C from the northwest corner, looking southeast.



Photograph 4 - View of Ash Pond C from the southern end, looking north.



Photograph 5 - View of the southeastern end of Ash Pond B, looking south.



Photograph 6 - View of the western end of Ash Pond B, looking west.



Photograph 7 - View of the western end of Ash Pond B, looking west.



Photograph 8 - View of the northern end of Ash Pond A, looking northeast.



Photograph 9 - View of the western end of Ash Pond A, looking west.



Photograph 10 - View of excavation and grading of ash and soils at the south levee of Ash Pond B, looking south.



Photograph 11 - View of material placement and grading on Ash Pond A, looking southwest.



Photograph 12 - View of an excavator moving material to promote drying of wet material on Ash Pond A, looking southwest.



Photograph 13 - Overview of Ash Pond B, looking south, showing loadout of material at southwest corner.



Photograph 14 - View of material placement and grading on Ash Pond A, looking northwest.

Photographs taken by Jessie Hahn of Geotechnology, Inc. September 15-18, 2015.



Photograph 15 - View of exposing the Ash Pond D liner at the Bottom Ash Pond, looking southwest.



Photograph 16 - Overview of Ash Pond B showing grading of material, looking east.



Photograph 17 - View of material placement and grading on Ash Pond A, looking southwest.



Photograph 18 - Overview of Ash Pond B, looking east.



Photograph 19 - View of loadout activity in the Coal Yard, looking northwest.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 2, 2015

SUBJECT: Weekly Summary Report for September 21, 2015 to September 25, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (^{O}F) lows ranged from 44 to 53°F, and temperature highs ranged from 79 to 87°F.

Construction Activities

Ash was removed from the Bottom Ash Pond and placed on Ash Pond A. The Bottom Ash Pond was graded. Ash Pond A was graded and compacted. Wet portions of Ash Pond A (near the edges of the pond) were spread and scarified to encourage drying. Seven piezometers/vents were installed in Ash Pond A by Illini Drilled Foundations, Inc. on September 21-23, 2015. The electric line adjacent to the eastern bank of Ash Pond B was taken down and re-installed by ENR on September 22-24, 2015.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 backhoes (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot compactor (CA 251), 1 smooth drum roller (CS-433E), and 1 skidsteer (Caterpillar 247B).

WB Koester had 9 employees working on site: 2 laborers, 1 mechanic, and 6 equipment operators.

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Illini Drilled Foundations, Inc. was on site September 21-23 with 3 operators. Illini had 1 Caterpillar 312B auger machine, 1 forklift, and 1 backhoe/front-end loader on site.

ENR was on site September 22-24 with two electricians. ENR had 1 manlift on site.

Meetings

A weekly progress meeting was held on Wednesday, September 23, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Ash from the Bottom Ash Pond was placed in Ash Pond A. Four-inch HDPE piezometers were installed in Ash Pond A at seven locations.

One delivery of HDPE geomembrane arrived on site on September 21, 2015.

Testing/Sampling

One protective cover soil sample was obtained from a farm field near the site for prequalification testing.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/21/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 1030 Depart: 1630 Travel: 3.50 Total: 9.50

AM Conditions: Clear
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 77 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Illini, Brandenberg
Equipment: WB Koester: 2 excavators, 3 bulldozers, 1 sheepsfoot roller (see additional notes)
Illini: 1 drilling machine, 1 fork lift, 1 backhoe
Personnel: WB Koester: 9 workers; Illini: 3 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Materials for the installation of the 4" HDPE vents in Ash Pond A (see additional notes)
Deliveries: 12 rolls of HDPE geomembrane were delivered to the site at 1530.
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/21/2015 Date

Geotechnology, Inc. Engineer 9/29/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/21/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 sheepsfoot roller compactor (CA 251).

Cleaned ash at the northeast corner of Ash Pond B and shaped the slopes with one excavator and dump trucks.

Mike Wagstaff (Ameren) was on site in the morning reviewing site issues and concerns. Per his direction, the east wall of Ash Pond C (where ash is visible) and the northeast corner of Ash Pond B (where ash is visible) will be covered with a protective cap of soil.

Graded Ash Pond A with three bulldozers (two with GPS). Two excavators shaped the HDPE geomembrane anchor trench at various locations at the Ash Pond A levees. In the morning, one sheepsfoot roller compacted in the northern half of Ash Pond A levees.

Illini Drilled Foundations, Inc.:

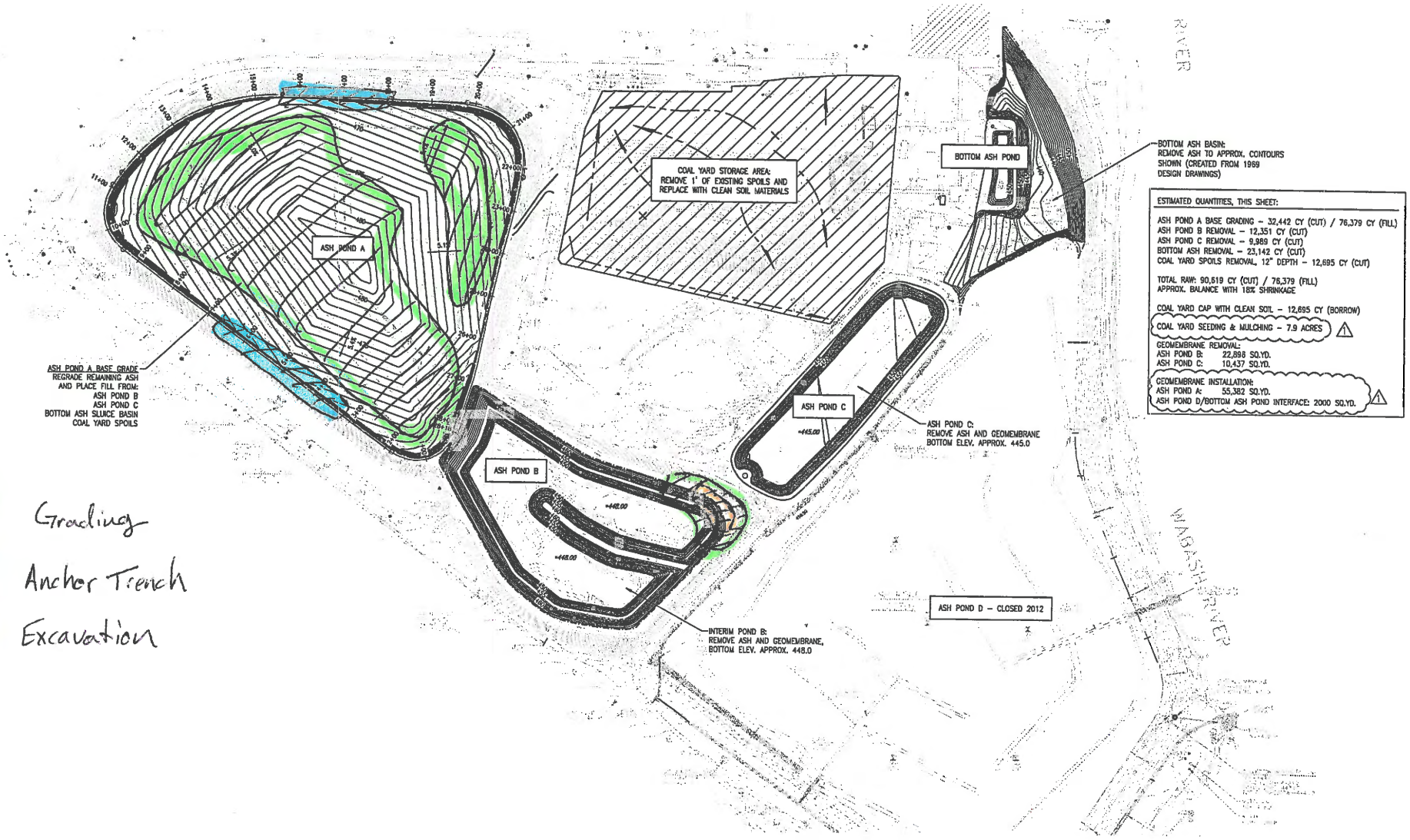
Equipment details: 1 Caterpillar 312B auger machine, 1 Caterpillar TL934C fork lift, 1 Caterpillar 420E backhoe/front-end loader.

Used auger machine to auger vents in Ash Pond A at locations indicated on attached plans. The vent borings were advanced by auger until the material was too wet, and then advanced by bucket. An 18-24 inch casing was advanced as the material was removed. The vents consist of a 4-inch HDPE pipe with four ½-inch holes at approximately 6-inch intervals. The HDPE pipe is enclosed in a sock to the approximate ground level and has three centralizers spaced evenly along its length. The borings had a diameter of approximately 18-24 inches. The annular space was backfilled with gravel and the casing removed.

At 1115, Illini had to send someone back to their Danville, IL office to pick up a correctly-sized bucket for picking up wet material. In the absence of proper tools, two other borings were advanced to the depth possible with the auger tool. The bucket arrived on site at around 1400 and normal production continued.

Two vents were completed on 9/21/2015, and a third vent was advanced to the depth possible with an auger.

9/21/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)

COAL YARD SEEDING & MULCHING – 7.9 ACRES 1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,898 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. 1

1 CLEAN CLOSURE PLAN
004

100 0 100 200

-N-

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO.	REV.
–	–
SHEET NO.	---

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JO4P1	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	JO4P1	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

SCALE –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

UNIT NO. –

SITE: HUTSONVILLE POWER STATION

DWG. SIZE 24X36

SUB CLASS –

Ameren MISSOURI

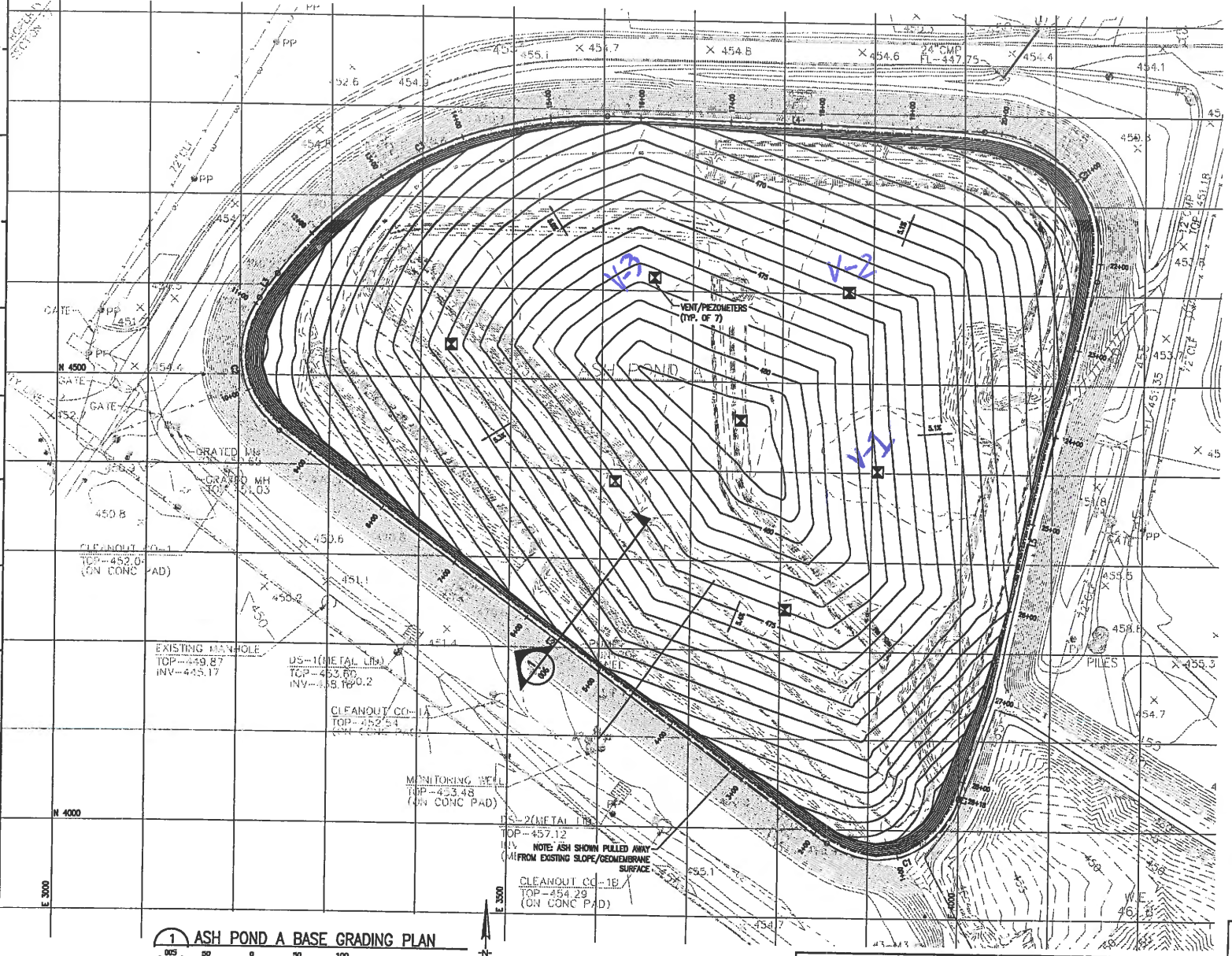
DRAWING NO.	REV.
S-XXX-004	1
SHEET NO. 004	

DRAWING NO.	REV.
S-XXX-004	1
SHEET NO. 004	

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

~~9/15/2015~~ 9/21/2015



1 ASH POND A BASE GRADING PLAN

NOTES:

1. THIS PLAN SHOWS APPROXIMATE GRADES FOR FINAL ASH BASE. GRADING PLAN SHOWN INCLUDES MATERIAL FROM THE COAL YARD, ASH POND B, ASH POND C, AND BOTTOM ASH POND. CLEAN CLOSURE GRADING CONTOURS FOR THESE FACILITIES ARE SHOWN ON SHEET 004.
2. SEE CQA PLAN FOR CLEAN CLOSURE APPROVAL GUIDELINES.
3. GEOMEMBRANE IN PONDS B AND C SHALL BE DISPOSED OF OFF SITE IN A LICENSED LANDFILL.

V-1 + V-2 fully installed

V-3 advanced with auger to depth possible

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JOAPT	–	DBH	SMB	SMB	–	–	ISSUED FOR VERIFYING – NOT FOR CONSTRUCTION
1	04.07.2014	JOAPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –

SHEET NO. ---

SCALE –

UNIT NO. –

DWG. SIZE 24X36

SUB CLASS –

ASH POND A BASE GRADING PLAN

CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

SITE: HUTSONVILLE POWER STATION

Ameren MISSOURI

DRAWING NO. S-XXX-005 REV. 1

SHEET NO. 005

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/22/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0700 Depart: 1630 Travel: 0.00 Total: 9.00

AM Conditions: Clear
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 83 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Illini, ENR, Brandenberg
Equipment: **WB Koester:** 2 excavators, 3 bulldozers (see additional notes)
Illini: 1 drilling machine, 1 fork lift, 1 backhoe; **ENR:** 1 manlift
Personnel: **WB Koester:** 9 workers; **Illini:** 3 workers; **ENR:** 2 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Materials for the installation of the 4" HDPE vents in Ash Pond A (see additional notes)
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B. See attached location drawing for more information.

9/22/2015
Geotechnology, Inc. Rep. Date

9/29/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/22/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings. Demolition of hydrogen tank and foundation over bottom ash adjacent to the Bottom Ash Pond at the northwest corner.

Illini Drilled Foundations, Inc.:

Equipment details: 1 Caterpillar 312B auger machine, 1 Caterpillar TL934C fork lift, 1 Caterpillar 420E backhoe/front-end loader.

Advancement, materials, and vent construction performed as described in the 9/21/2015 daily report.

Four vents were completed on 9/22/2015.

ENR (Electricians):

Equipment details: 1 JLG Lift 600S manlift

Used manlift and one WB Koester excavator to take down the power line from the power poles on the east side of Ash Pond B. Exposed underground power lines at southeast corner of Ash Pond B. Rewired power poles after the poles were reinstalled by WB Koester.

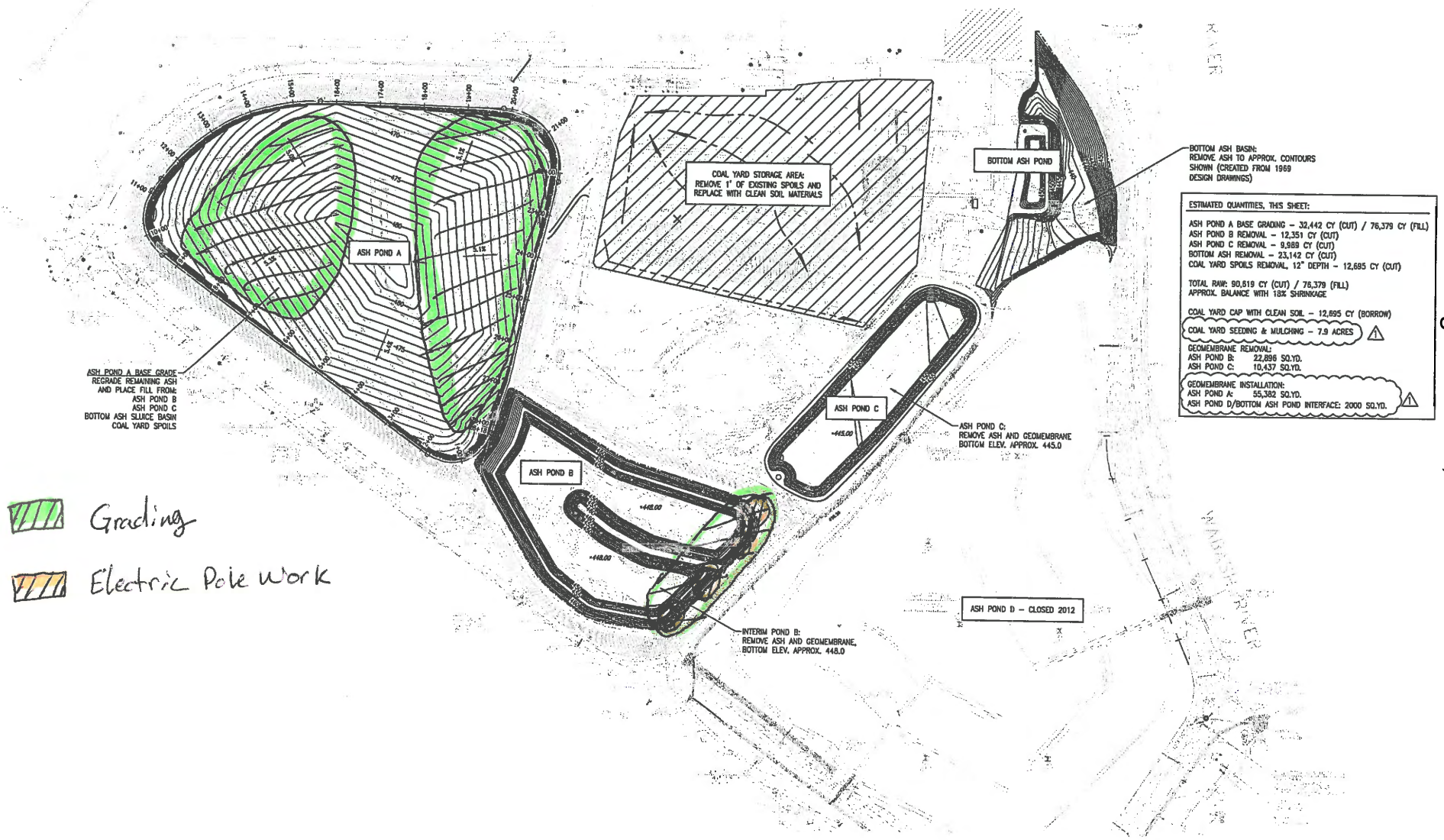
WB Koester:

Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS).

Graded Ash Pond A with three bulldozers (two with GPS). Two excavators shaped the HDPE geomembrane anchor trench at various locations at the Ash Pond A levees.

One excavator assisted in removing the power line along the east side of Ash Pond B. Once the power line was down (0900), two excavators and one GPS bulldozer graded the west slope of Ash Pond B and removed a large concrete structure near the southern end of that slope. The two excavators reinstalled the power poles after grading was completed (beginning around 1200). One excavator dug trenching to expose existing electric lines (southeast corner of Ash Pond B) and for burial of electric lines (northeast corner of Ash Pond B).

9/22/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING DRFTR	CHK'D	SUPV	AMEREN	OTHER	DESCRIPTION
0	10/29/2014	JKHPT	–	DRFT	SMB	SMB	–	–	ISSUED FOR PLANNING – DO NOT ORDER MATERIAL
1	04/07/2014	JKHPT	–	DRFT	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. –

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF
ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

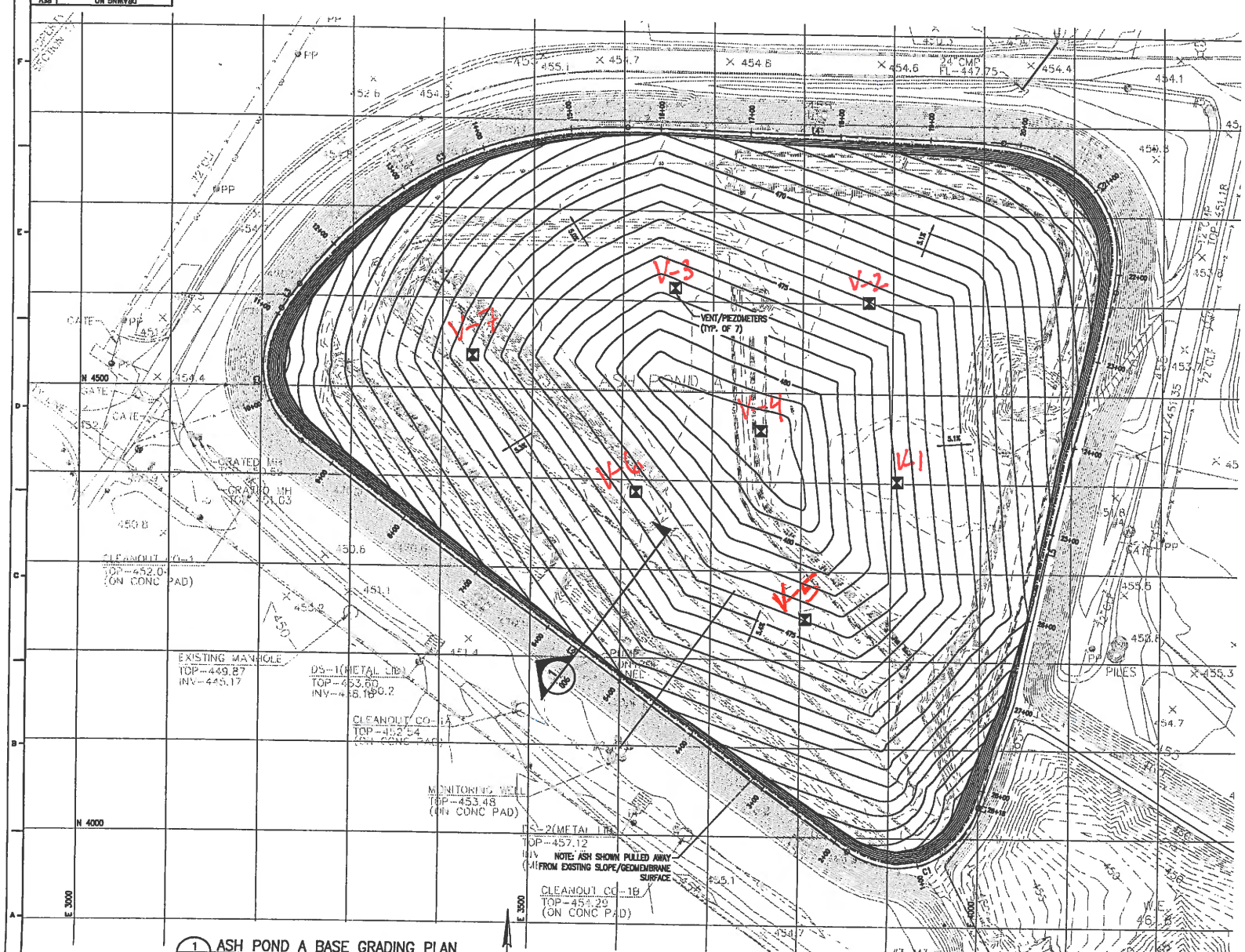
Ameren Missouri

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

9/22/2015



1 ASH POND A BASE GRADING PLAN

NOTES:

1. THIS PLAN SHOWS APPROXIMATE GRADES FOR FINAL ASH BASE. GRADING PLAN SHOWN INCLUDES MATERIAL FROM THE COAL YARD, ASH POND B, ASH POND C, AND BOTTOM ASH POND. CLEAN CLOSURE GRADING CONTOURS FOR THESE FACILITIES ARE SHOWN ON SHEET 004.
2. SEE COA PLAN FOR CLEAN CLOSURE APPROVAL GUIDELINES.
3. GEOMEMBRANE IN PONDS B AND C SHALL BE DISPOSED OF OFF SITE IN LICENSED LANDFILL.

V-1 + V-2 completed 9/21/2015.

V-3, V-4, V-5, V-6 completed 9/22/2015

Depths

V-1	27'
V-2	24'
V-3	27'
V-4	33'
V-5	27'
V-6	29'
V-7	21'

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRT TR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JOAPT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	JOAPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –

SHEET NO. ---

SCALE –

ASH POND A BASE GRADING PLAN

CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

SITE: HUTSONVILLE POWER STATION

UNIT NO. –

DWG. SIZE 24X36

SUB CLASS –

Ameren MISSOURI

DRAWING NO. S-XXX-005 REV. 1

SHEET NO. 005

DRAWING NO. S-XXX-005 REV. 1

SHEET NO. 005

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/23/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0700 Depart: 1630 Travel: 0.00 Total: 9.00

AM Conditions: Clear
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 82 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Illini, ENR, Brandenberg
Equipment: **WB Koester:** 2 excavators, 3 bulldozers, 1 dump truck, 1 compactor (see additional notes)
Illini: 1 drilling machine, 1 fork lift, 1 backhoe; **ENR:** 1 manlift
Personnel: **WB Koester:** 9 workers; **Illini:** 2 workers; **ENR:** 2 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Materials for the installation of the 4" HDPE vents in Ash Pond A (see additional notes)
Ash material from Ash Pond B placed in Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A; Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/23/2015 Date

Geotechnology, Inc. Engineer 9/29/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/23/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings. Steel above concrete structure was removed to make concrete structure accessible for removal.

Illini Drilled Foundations, Inc.:

Equipment details: 1 Caterpillar 312B auger machine, 1 Caterpillar TL934C fork lift, 1 Caterpillar 420E backhoe/front-end loader.

Advancement, materials, and vent construction performed as described in the 9/21/2015 daily report.

One vent was completed on 9/23/2015. This completes the vent installation in Ash Pond A. Illini off site by 1200 on 9/23/2015. Equipment remains on site.

ENR (Electricians):

Equipment details: 1 JLG Lift 600S manlift

Installed power line on reinstalled power poles and in adjoining trenches.

WB Koester:

Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 dump truck (John Deere 400D), 1 sheepsfoot roller (CA 251).

Graded and compacted Ash Pond A with two GPS bulldozers and one sheepsfoot roller.

Two excavators worked at Ash Pond B: loaded out material at the northeast corner of Ash Pond B with one dump truck in the early morning for 2-3 hours, set two power poles, and backfilled electrical trenches.

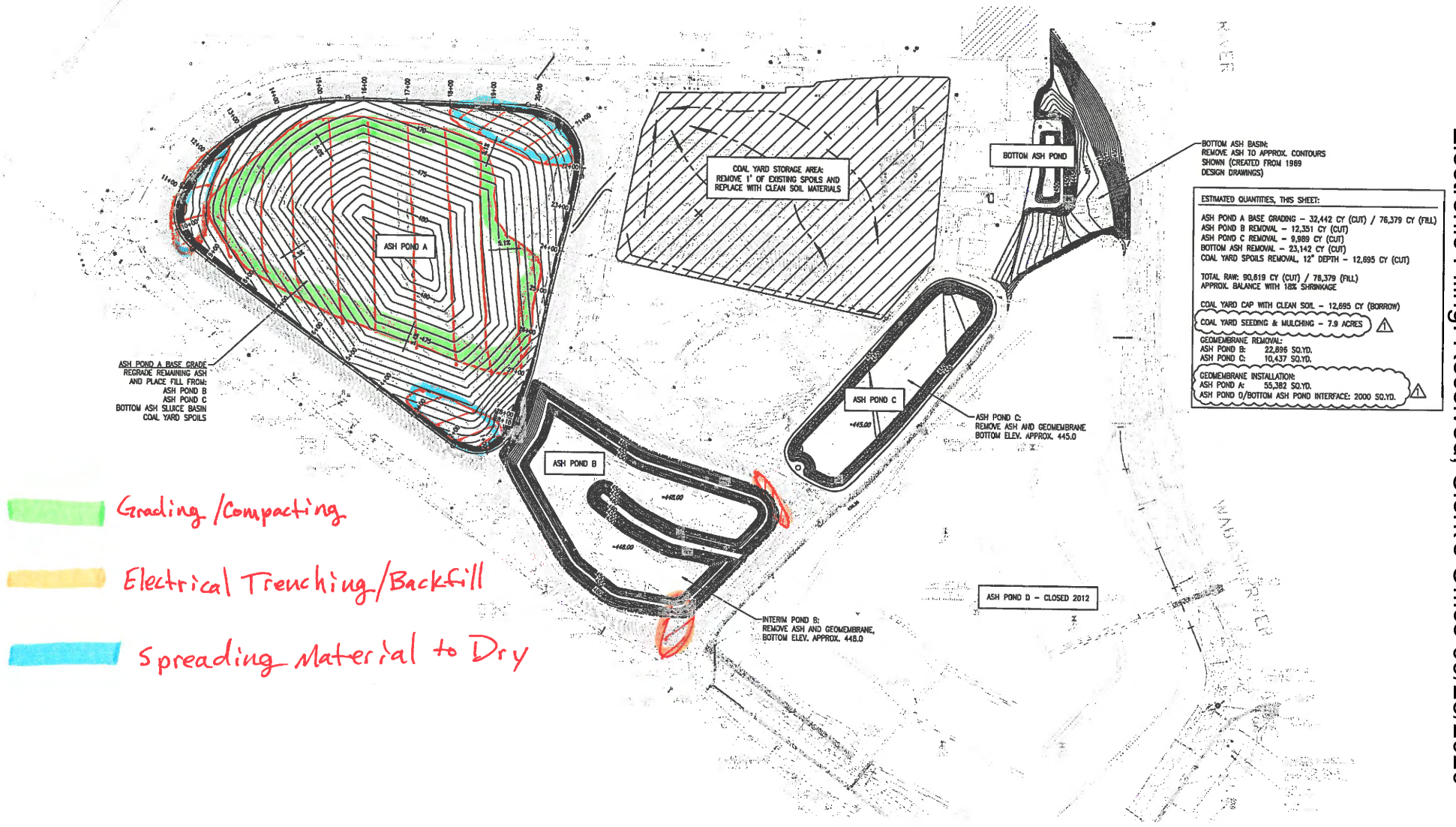
In the afternoon, two excavators worked at Ash Pond A spreading wet material from the corners to dry.

Other:

Progress meeting held at 0900. See meeting minutes for additional information.

Preliminary density testing was performed at the request of WB Koester.

9/23/2015



Grading /Compacting

Electrical Trenching/Backfill

Spreading Material to Dry

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR	DRAFTING DRFTR	DRFTR CHKD	SUPV	DSGN APPROVAL AMEREN	DSGN APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JO4PT	–	DJBT	SMB	SMB	–	–	ISSUED FOR PLOTTING – NOT FOR CONSTRUCTION
1	04.07.2015	JO4PT	–	DJBT	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –

SHEET NO. ----

SCALE –

UNIT NO. –

DWG. SIZE 24X36

SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN

CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004 REV. 1

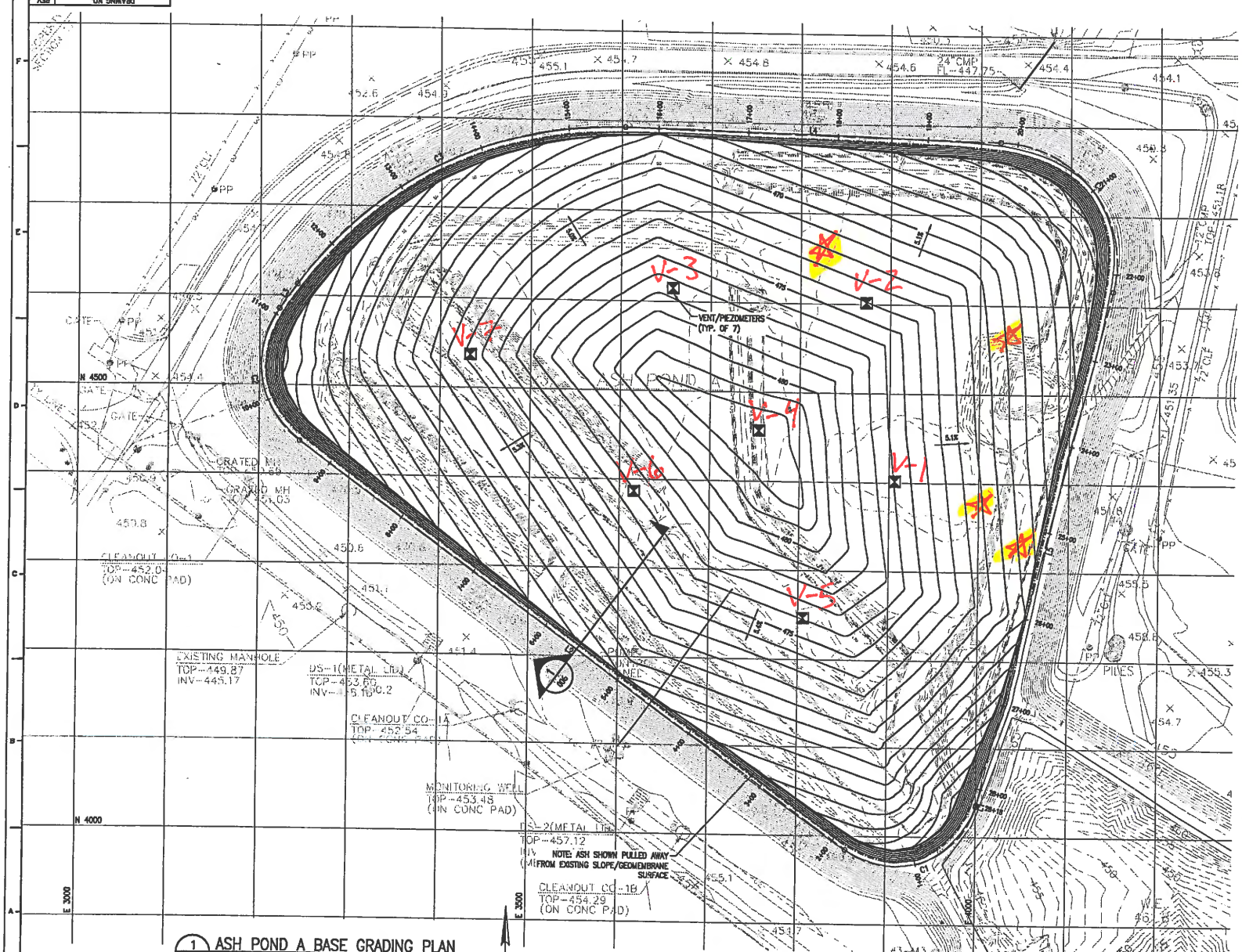
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1

SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

9/23/2015



1 ASH POND A BASE GRADING PLAN

*Compaction Test Location

NOTES:

1. THIS PLAN SHOWS APPROXIMATE GRADES FOR FINAL ASH BASE. GRADING PLAN SHOWN INCLUDES MATERIAL FROM THE COAL YARD, ASH POND B, ASH POND C, AND BOTTOM ASH POND. CLEAN CLOSURE GRADING CONTOURS FOR THESE FACILITIES ARE SHOWN ON SHEET 004.
2. SEE COA PLAN FOR CLEAN CLOSURE APPROVAL GUIDELINES.
3. GEOMEMBRANE IN PONDS B AND C SHALL BE DISPOSED OF OFF SITE IN LICENSED LANDFILL.

Vent	Target Depth	Date Completed
1	27'	9/21/2015
2	24'	9/21
3	27'	9/22
4	33'	9/22
5	27'	9/22
6	29'	9/22
7	21'	9/23

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JO4PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	JO4PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –

SHEET NO. ---

SCALE –

ASH POND A BASE GRADING PLAN

CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

SITE: HUTSONVILLE POWER STATION

UNIT NO. –

DWG. SIZE 24X36

SUB CLASS –

Ameren MISSOURI

DRAWING NO. S-XXX-005 REV. 1

SHEET NO. 005

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 9-23-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , Ken Beckman, John Patterson, Tim Free

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Make sure to wash and scrape the parking lot on Friday.

Manpower

- Man hours
  - Start of Job (4-27-15) through 9-21-15
    - Total = 7547 hrs.
- Next week expected manpower
  - WBK = 1 superintendent, 1 mechanic, 5 operators, 2 laborer
  - 10 hrs days approx.

Review old minutes and action items

- Bob provided schedule of values and invoice to Mike.
- Mike talked to farmer and we are ok to borrow out of farm field. Seed and Lime at conclusion. Strip and save topsoil and replace. Mike to look into amending SWPPP plan. Bob to get LAMAC to look at providing plan?

Material Issues

- No issues discussed.

Quality Control Issues

- No issues discussed.

Schedule Compliance

- Liner roll off boxes and disposal on going.
- WBK is continuing to shape pond A subgrades and placing ash in Pond A.
- Ash is out of Pond B. Ash around power poles will be removed this week.
- Brandenberg removed hydrogen tank and concrete trench. Ash to be removed in these areas by the end of week.
- Illini Drilled Foundation install piezometers this week.
- National Lining Systems moved to October 5th to start liners. Liner to be delivered starting Monday September 21.
- Brandenberg Divers on site Sept 28th. Will need WBK to build retention levee in Bottom ash pond for them to pump into.
-

Cost and Budget Control

- Silt fence removal in Pond D to be by T&M and not Lump sum.

Next Meeting Scheduled: September 30, 2015 at 9:00 CST

Action Items

- Bob Fisher
  - See if LAMAC and work on SWPPP Plan in needed.
- Mike Wagstaff –
  - Look to make sure SWPPP can just be amended.
- Don Shaver
  - Take pictures during structure demolitions for records.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/24/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0730 Depart: 1600 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 65 F
PM Conditions: Clear
PM Temperature: 85 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, ENR, Brandenberg
Equipment: **WB Koester:** 2 excavators, 3 bulldozers, 1 dump truck, 1 compactor (see additional notes)
ENR: 1 manlift
Personnel: **WB Koester:** 9 workers; **ENR:** 2 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash material from the Bottom Ash Pond placed in Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/24/2015 Date

Geotechnology, Inc. Engineer 9/29/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/24/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings. Steel above concrete structure was removed to make concrete structure accessible for removal. Concrete structure in the Bottom Ash Pond removed to make ash accessible for removal by WB Koester.

ENR (Electricians):

Equipment details: 1 JLG Lift 600S manlift

Installed power line on reinstalled power poles and in adjoining trenches.

WB Koester:

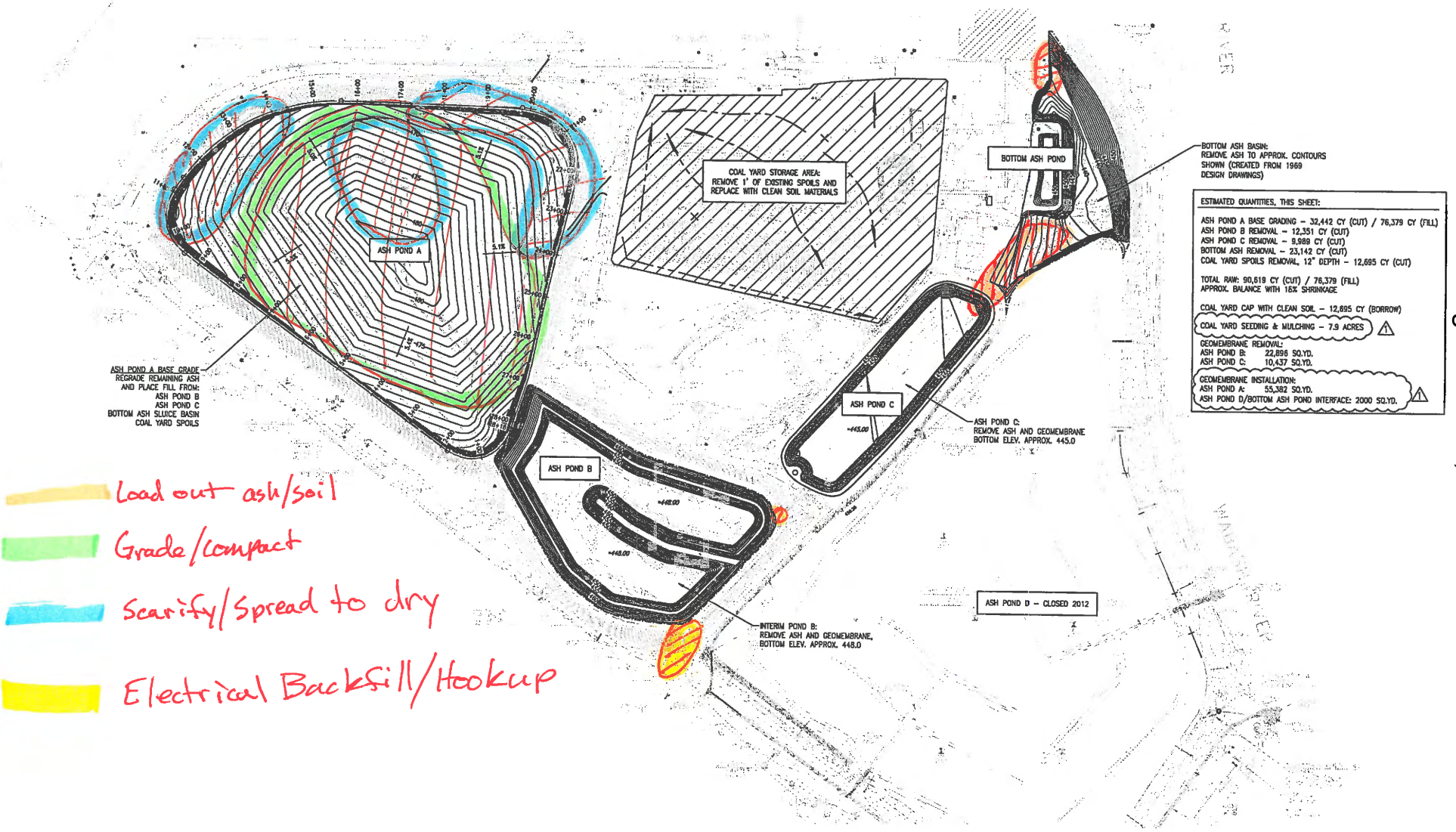
Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 dump truck (John Deere 400D), 1 sheepsfoot roller (CA 251).

Graded and compacted Ash Pond A with two GPS bulldozers and one sheepsfoot roller. When not performing other activity, the two excavators were spreading wet material to dry adjacent to the edges of Ash Pond A.

One excavator backfilled an electrical trench adjacent to the southeast corner of Ash Pond B for 1 hour in the morning.

Loaded out ash material from the Bottom Ash Pond to Ash Pond A with one excavator, one non-GPS bulldozer, and one dump truck.

9/24/2015



Load out ash/soil

Grade/compact

Scarify/Spread to dry

Electrical Backfill/Hookup

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

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DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRP	CHK'D	SUPV	AMEREN	OTHER	DESCRIPTION
0	10/30/2014	JOHPT	–	HDR1	SMB	SMB	–	–	ISSD FOR CONSTR. – NOT IN CIRCULATION
1	04/07/2015	JOHPT	–	HDR1	SMB	SMB	–	–	ISSD FOR CONSTR.

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/25/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0700 Depart: 1200 Travel: 3.50 Total: 8.00

AM Conditions: Clear
AM Temperature: 71 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 2 excavators, 3 bulldozers, 1 skidsteer, 1 compactor (see additional notes)
Personnel: **WB Koester:** 9 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries: One skidsteer and one flat compactor for WB Koester arrived at 0730.
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/25/2015 Date

Geotechnology, Inc. Engineer 9/29/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/25/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 dump truck (John Deere 400D), 1 sheepsfoot roller (CA 251), 1 skidsteer (Caterpillar 247B), 1 flat roller (CS-433E).

Graded and compacted Ash Pond A with two GPS bulldozers and one flat roller. Two excavators spread wet material to dry adjacent to the edges of Ash Pond A and brought the edges of the Ash Pond A to grade.

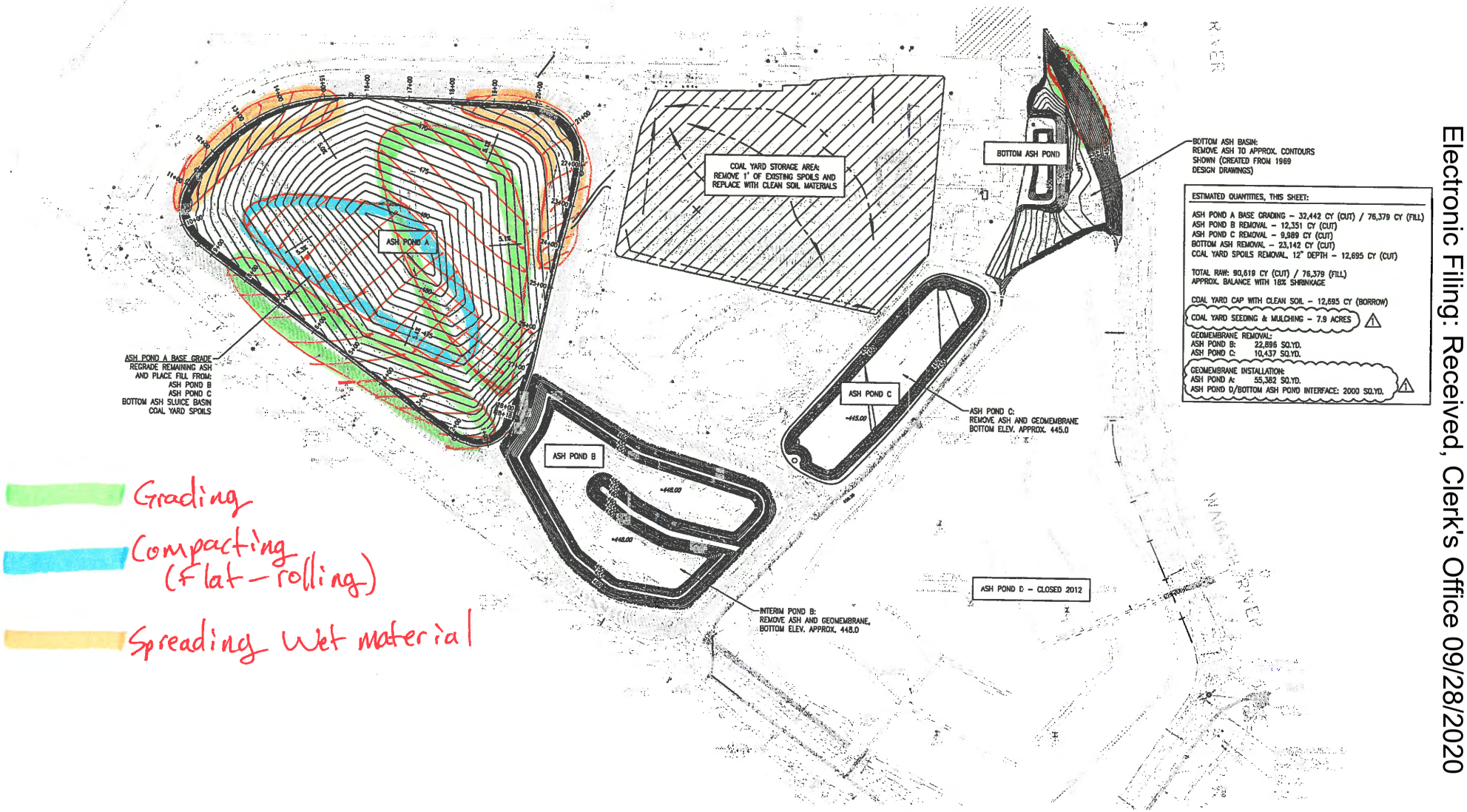
One non-GPS bulldozer removed the top two feet of the north levee at the Bottom Ash Pond and graded the Bottom Ash Pond.

Other:

At 1000, Illini's drill rig was removed from site.

Jessie Hahn (Geotechnology) took soil samples from a nearby borrow field for analysis.

9/25/2015



Grading

Compacting (flat-rolling)

Spreading Wet material

1 CLEAN CLOSURE PLAN
004
100 0 100 200

-N-

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

DRAWING RECORD									
REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR	DRAFTING DRFTR	DRFTG CHK'D	SUPV SUPV	UTIL APPROVAL AMEREN	UTIL APPROVAL OTHER	DESCRIPTION
0	10/29/2014	JOHPT	–	DEBT	SMB	SMB	–	–	ISSD FOR PERMITTING – NOT IN USE/SERVICE
1	04/07/2015	JOHPT	–	DEBT	SMB	SMB	–	–	ISSD FOR CONSTRUCTION

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

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PHOTOGRAPH LOG



Photograph 1 - View of vent installation at Ash Pond A, looking north.



Photograph 2 - View of soil grading on Ash Pond A.

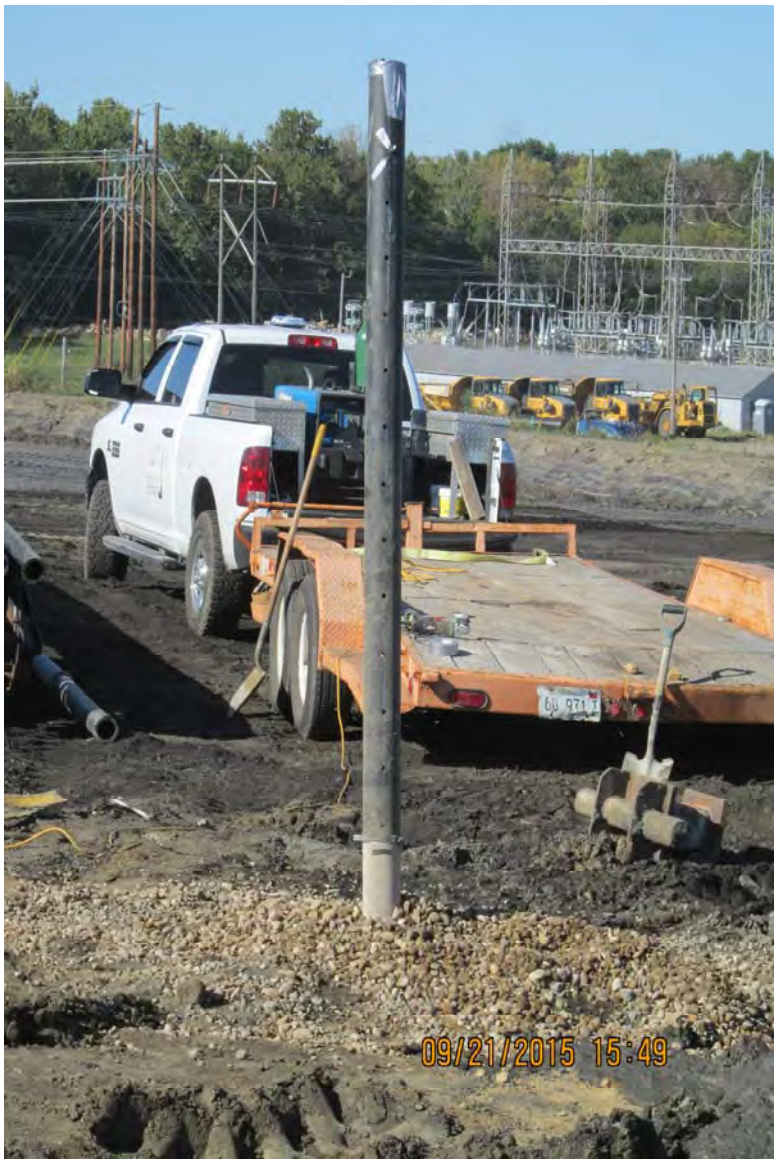


Photograph 3 - View of anchor trench excavation at Ash Pond A, northwest embankment.



Photograph 4 - View of gravel placement in the annular space of the vents on Ash Pond A.

Photographs taken by Jessie Hahn of Geotechnology, Inc. September 21-25, 2015.



Photograph 5 - View of an installed vent at Ash Pond A.



Photograph 6 - View of HDPE geomembrane unloading.



Photograph 7 - View of power line removal at the southeast corner of Ash Pond B.

Photographs taken by Jessie Hahn of Geotechnology, Inc. September 21-25, 2015.



Photograph 8 - View of the 4-inch HDPE vent pipes enclosed in socks with centralizers for Ash Pond A.



Photograph 9 - View of casing removal after vent placement on Ash Pond A.



Photograph 10 - View of electrical conduit trench adjacent to the southeast corner of Ash Pond B, looking south.



Photograph 11 - View of a power pole installation along the eastern bank of Ash Pond B, looking northwest.



Photograph 12 - View of hydrogen tank and foundation demolition at the northwest corner of the Bottom Ash Pond.



Photograph 13 - View of wet ash drying activities at the west corner of Ash Pond A.



Photograph 14 - View of material removal from the southeast corner of the Bottom Ash Pond, looking southwest.



Photograph 15 - View of material removal at the location of the former hydrogen tank (west end of the Bottom Ash Pond), looking west.



Photograph 16 - View of wet ash drying activities at the northwest corner of Ash Pond A, looking east.



Photograph 17 - View of Ash Pond A grading, looking west.



Photograph 18 - View of a smooth-drum roller compacting material on Ash Pond A, looking northeast.



Photograph 19 - View of Bottom Ash Pond grading, looking northeast.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 13, 2015

SUBJECT: Weekly Summary Report for September 28, 2015 to October 2, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 48 to 61°F, and temperature highs ranged from 69 to 84°F.

Construction Activities

Ash Pond B and the Bottom Ash Pond were graded. A levee was built in the Bottom Ash Pond for use by Brandenburg as a siltation basin.

Concrete structures in Ash Pond B and Ash Pond A were demolished and removed.

Ash Pond A was graded and compacted. The wet ash material in the corners and edges of Ash Pond A, especially the western corner, was dug out and spread to dry. Ponded water in the corners was pumped out of Ash Pond A and the wet material was spread and mixed to dry. Dry soil from the pond levees was spread over wet ash near the levees to increase stability.

The outfall structure at Ash Pond A was abandoned-in-place by encasing in concrete at both ends.

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Equipment and Personnel On-Site

WB Koester had the following equipment on site: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C, 1 Caterpillar 308E), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller, 1 smooth drum roller (CS-433E), 1 skidsteer.

WB Koester had 11 employees working on site: 2 laborers, 1 mechanic, and 8 equipment operators.

Meetings

The weekly progress meeting was held on Wednesday, September 30, 2015. Refer to the meeting minutes provided by WB Koester for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Flowable fill was used to enclose both ends of the outfall structure at the southeast corner of Ash Pond A.

Testing/Sampling

Nuclear density tests were conducted at fifteen locations on Ash Pond A. See testing forms for additional information.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/28/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0900 Depart: 1630 Travel: 3.00 Total: 10.0

AM Conditions: Clear
AM Temperature: 69 F
PM Conditions: Cloudy
PM Temperature: 83 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 2 excavators, 3 bulldozers, 1 flat roller, 1 skidsteer (see additional notes)
Personnel: **WB Koester:** 11 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries: 12 rolls of HDPE geomembrane were delivered to the site before 0900.
12 rolls of HDPE geomembrane were delivered to the site at 1400.
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 9/28/2015 Date

Geotechnology, Inc. Engineer 9/5/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/28/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

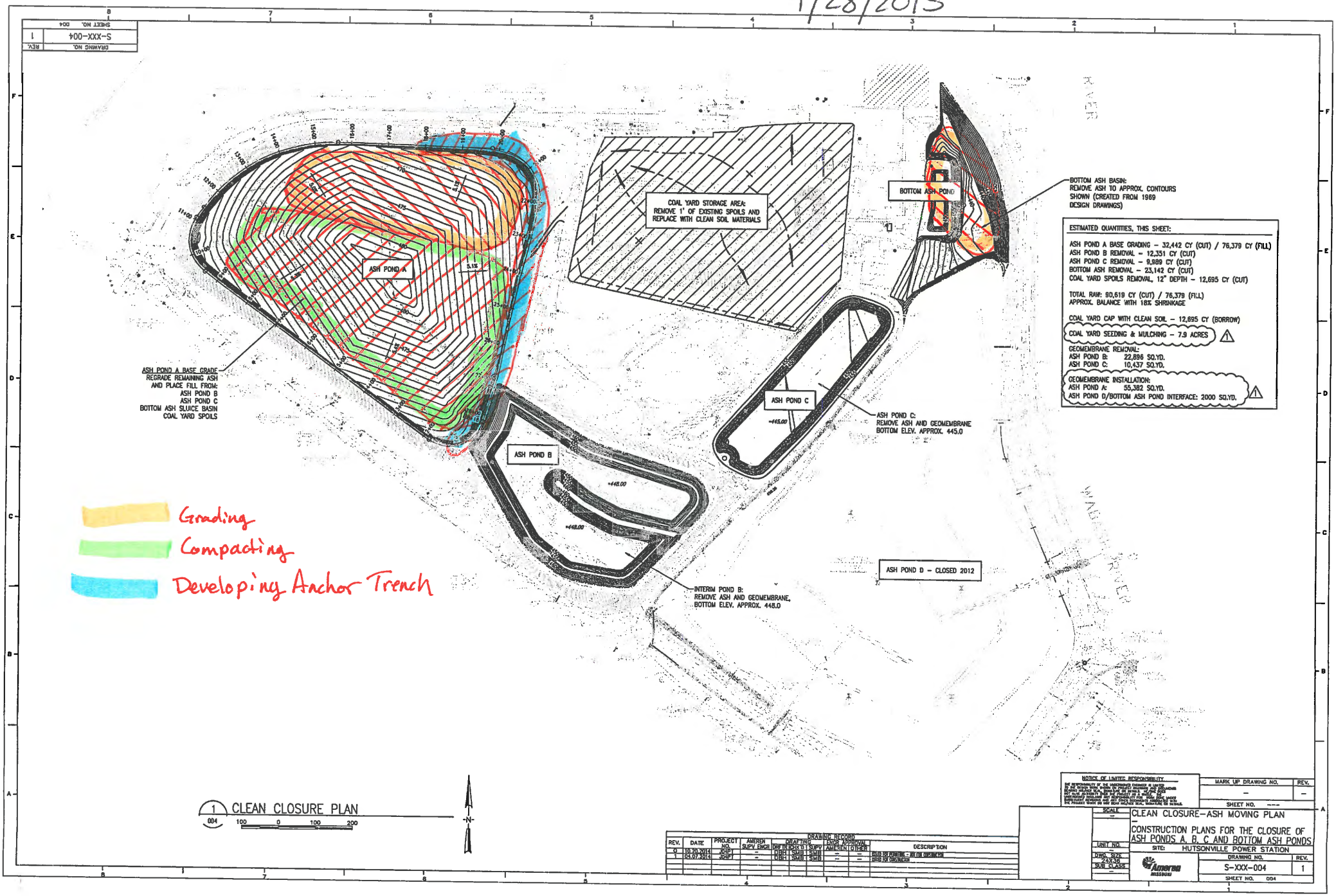
Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 flat roller (CS-433E).

Graded and compacted Ash Pond A with one GPS bulldozer and one flat roller. Two excavators developed the anchor trench adjacent to the edges of Ash Pond A and brought the edges of the Ash Pond A to grade.

One non-GPS bulldozer and one GPS bulldozer graded the Bottom Ash Pond and began building a levee partway down its length for use by Brandenburg as a siltation basin.

The skidsteer cleaned the roads at 1430. The water truck sprayed the roads to cut down on dust throughout the day.

9/28/2015


DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
Grading
Compacting
Developing Anchor Trench
1 CLEAN CLOSURE PLAN
004
100 0 100 200
-N-
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. – REV. –
SHEET NO. ---
SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
Ameren MISSOURI
DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRF TR CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 JO4PT – DBH SMB SMB – – ISSUED FOR PERMITTING – BID FOR CONSTRUCTION
1 04.07.2014 JO4PT – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/29/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0730 Depart: 1230 Travel: 0.00 Total: 8.00

AM Conditions: Cloudy, Rain – Rain Day Called 0930
AM Temperature: 67 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 3 excavators, 3 bulldozers, 1 flat roller, 1 skidsteer (see additional notes)
Personnel: **WB Koester:** 11 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries: One Case CX210C excavator arrived on site at 0800.
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Bottom Ash Pond. **See** attached location drawing for more information.

Geotechnology, Inc. Rep. 9/24/15 Date

Geotechnology, Inc. Engineer 10/5/15 Date

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/29/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester: Rain day – Left site at 0930.

Equipment details: 3 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 flat roller (CS-433E).

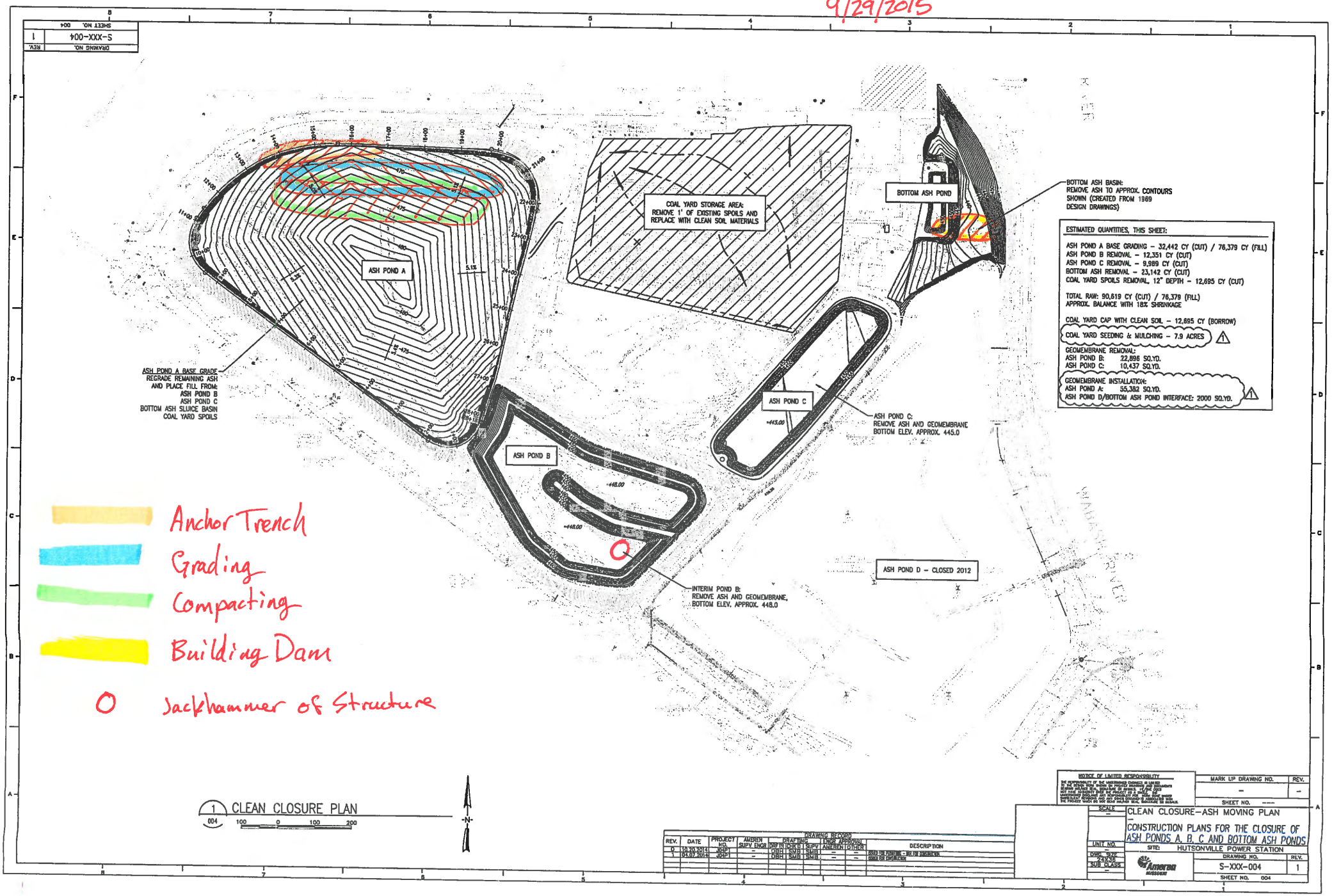
Graded and compacted Ash Pond A with one GPS bulldozer and one flat roller. Two excavators developed the anchor trench adjacent to the edges of Ash Pond A and brought the edges of the Ash Pond A to grade.

One non-GPS bulldozer and one GPS bulldozer graded the Bottom Ash Pond and continued building a levee partway down its length for use by Brandenburg as a siltation basin.

One Case excavator with a jackhammer attachment was delivered to the site. The jackhammer was used to break up the large concrete structure remaining in Ash Pond B.

The skidsteer was used to clean the roads.

9/29/2015



ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
WABASH RIVER
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Anchor Trench
Grading
Compacting
Building Dam
Jackhammer of Structure
1 CLEAN CLOSURE PLAN
004
100 0 100 200
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO.
REV.
SHEET NO.
SCALE
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO.
DWG. SIZE 24X36
SUB CLASS
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRF'N CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 JOHP1 – OBH SMB SMB – – ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1 04.07.2014 JOHP1 – OBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 9/30/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0715 Depart: 1545 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 71 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 3 excavators, 3 bulldozers, 1 flat roller, 1 skidsteer (see additional notes)
Earth Images: 1 trencher
Personnel: **WB Koester:** 11 workers, **Earth Images:** 4 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Bottom Ash Pond. See attached location drawing for more information.

Jessie Hahn 9/30/15
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 10/5/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 9/30/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 3 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 flat roller (CS-433E).

One excavator developed the anchor trench adjacent to the edges of Ash Pond A in the morning.

Water was pumped from the western corner of Ash Pond A in the morning.

One non-GPS bulldozer finished building a levee partway down its length for use by Brandenburg as a siltation basin. This was completed around 0800.

One GPS bulldozer and one non-GPS bulldozer graded Ash Pond B.

One excavator with a jackhammer attachment was used to break up the large concrete structure remaining in Ash Pond B. One excavator was used to remove the structure.

Two excavators (one with a jackhammer attachment) were used to break up and remove stabilized levee soil at the western corner of Ash Pond A to facilitate draining and drying of the ash.

Four sawcuts (at two locations) were made in the asphalt near the northern corner of Ash Pond A for future installation of HDPE culverts.

The skidsteer was used to clean the roads. The water truck sprayed the roads throughout the day.

Earth Images:

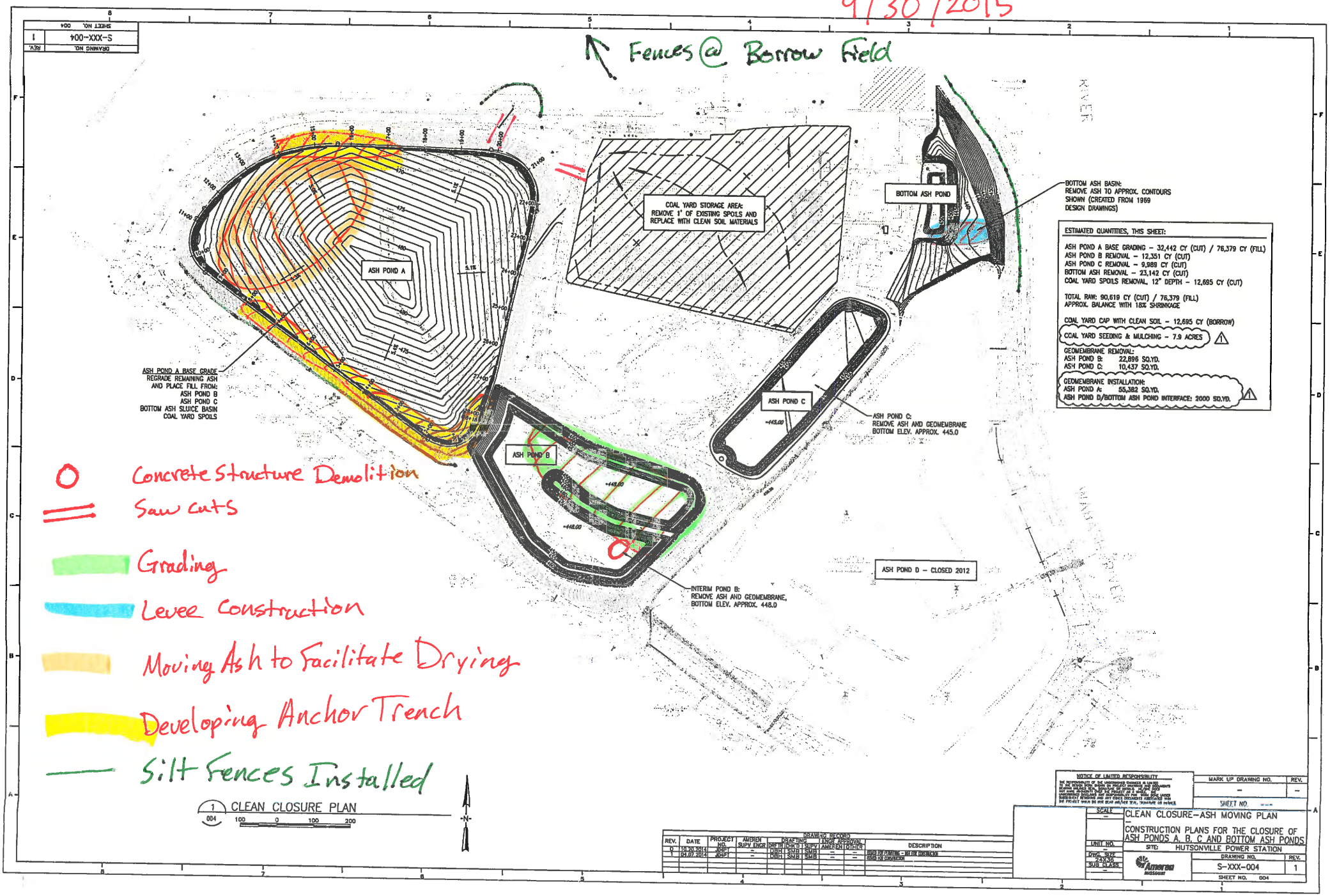
Silt fences were installed at the locations indicated on the attached work areas map.

Other:

The manlift used by the electricians was removed from site.

The weekly progress meeting was held at 0900. See the meeting minutes for additional details.

9/30/2015


Fences @ Borrow Field
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Concrete Structure Demolition
Saw cuts
Grading
Levee Construction
Moving Ash to Facilitate Drying
Developing Anchor Trench
Silt Fences Installed
1 CLEAN CLOSURE PLAN
004
100 0 100 200
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO.
REV.
SHEET NO.
SCALE
UNIT NO.
DWG. SIZE 24X36
SUB CLASS
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRFTR CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 JDHPT – DBH SMB SMB – – ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1 04.07.2014 JDHPT – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 9-30-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , Ken Beckman, John Patterson, Tim Free

WB Koester: Chris Atkinson, Bob Fisher, Greg Head, Mike Rexing

Geotechnology, Inc.: Jessie Hahn, Vince Epps, Anna Saindon

Topics:

Safety/Housekeeping

- No issues
- Chris cleaned roads sufficient last week.
- Make sure to wash and scrape the parking lot each Friday and as necessary.

Manpower

- Man hours
  - Start of Job (4-27-15) through 9-28-15
    - Total = 8042 hrs.
- Next week expected manpower
  - WBK = 1 superintendent, 1 mechanic, 6 operators, 2 laborer, 1 teamster
  - 10 hrs days approx.

Review old minutes and action items

- Mike Smallwood with Ameren completed and submitted SWPPP plan for farm field on Monday/Tuesday. LAMAC supplied drawing of erosion control features. Mike W. says it is fine to install silt fence and construction entrance while we wait for the 30 day review period to take place.

Material Issues

- No issues

Quality Control Issues

- No issues

Schedule Compliance

- Liner roll off boxes and disposal on going.
- WBK is continuing to shape pond A subgrades and placing ash in Pond A.
- No more ash from site is expected to be brought to pond A.
- National Lining Systems moved to October 12th to start liners, weather permitting. All liner has been delivered to site.
- Brandenberg Divers on site this week to begin pumping, waiting on a guard but they will try to dive today. WBK has built berm for the retention pond for them. Brandenberg installed piping. WBK to keep pump on site to pump water to pond b outlet. Silt in detention pond will remain in place at end.
- WBK met with Mike W. to discuss changes to design in Pond B, C and Bottom ash pond. Bob to send revised Auto Cad files to Mike to review (possibly with Hanson). Excess soil from Pond B and Bottom ash pond levee will be used to seal off Bottom ash pond base, and cover Pond C slopes and coal yard
- Goal is to try and get some seeding completed ASAP and cover the areas that require turf mat ASAP as well. Will have to discuss with Brandenberg to determine how much of coal yard they will use as a laydown area and we will not seed that area.
- 1" of rain at site on Tuesday. Pumping water out of Pond A to help dry it out. Many rills in previously smooth drum rolled areas that will have to be re-rolled.
- Pond A SW corner is still soft. Discussed lime addition. Anna says that the 1' clean separation layer (ie. ash not mixed with lime) would apply to the top HDPE as well as the existing HDPE. WB Koester to visit site after meeting and determine plan of action to treat the ash in SW corner. (Note: WB Koester has decided to undercut the soft areas in SW corner and spread them over Pond A to dry. Replace with a bridge lift of drier ash from pond A and test compaction. Will check on availability of lime as well as a back up plan.) Update all

on schedule for completion of Pond A (for testing and surveying) as soon as we see how the SW corner work is progressing.

- Chris saw cut the entrance road and access road where the new pipe installations will be. Will not remove until ready to install pipe. Possibly next week.
- Chris demolishing structures in Pond A and B today. Will plug structure and pipe in Pond A this week.
- Silt fence installation around Bottom ash pond berm outlet and farm field borrow area taking place today (Earth Images is subcontractor installing)

Cost and Budget Control

- None discussed.

Next Meeting Scheduled: October 7, 2015 at 9:00 CST

Action Items

- Bob Fisher
  - Send Mike W. AutoCads of Pond B, C and Bottom ash pond proposed re-design
  - Update all with schedule after SW corner work starts and progress and be projected.
- Mike Wagstaff – n/a
- Don Shaver
  - Take pictures during structure demolitions for records.
- Chris Atkinson – make sure roads are cleaned regularly

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/01/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0730 Depart: 1600 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 60 F
PM Conditions: Clear, Windy
PM Temperature: 70 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 4 excavators, 3 bulldozers, 1 skidsteer, 1 haul truck (see notes)
Personnel: **WB Koester:** 11 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries: 1 Caterpillar 308E Excavator
Testing: Jessie Hahn (Geotechnology) conducted nuclear density tests at 15 locations on Ash Pond A. One location failed.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. Date 10/1/2015

Geotechnology, Inc. Engineer Date 10/5/15

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/01/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C, 1 Caterpillar 308E), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 flat roller (CS-433E), 1 skidsteer.

Water was pumped from the northern corner of Ash Pond A in the morning and the southeast corner in the afternoon.

One non-GPS bulldozer graded Ash Pond B in the morning.

Two excavators (one with a jackhammer attachment) were used to demo the outfall structure at the southeast corner of Ash Pond A and another concrete structure along the northeast wall of Ash Pond A.

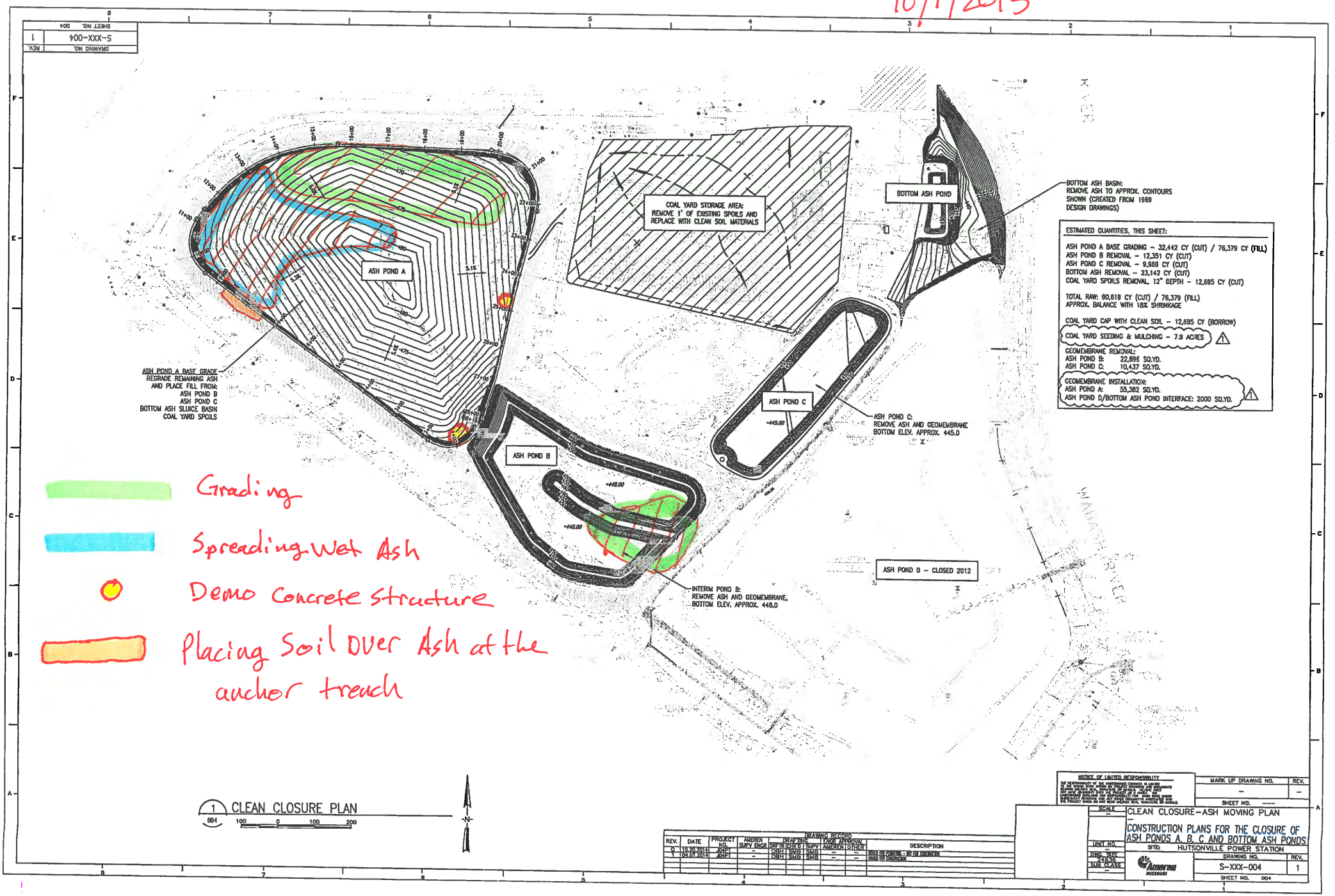
Various pieces of equipment moved, mixed, and spread ash on Ash Pond A to promote drying, including three bulldozers, three excavators, and a dump truck at different times throughout the day.

One small excavator (Caterpillar 308E) was used to place loose soil over ash at the anchor trenches.

One GPS bulldozer graded Ash Pond A.

The skidsteer was used to clean the roads.

10/1/2015



DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ESTIMATED QUANTITIES, THIS SHEET:
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ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
ASH POND A
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND B
ASH POND C
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
WABASH RIVER
Grading
Spreading Wet Ash
Demo Concrete Structure
Placing Soil over Ash at the anchor trench
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. – REV. –
SHEET NO. ---
SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
Ameren MISSOURI
DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRFTR CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 JOHP1 – DBH SMB SMB – – ISSUED FOR PLANNING – NOT FOR CONSTRUCTION
1 04.07.2014 JOHP1 – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/02/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0730 Depart: 1400 Travel: 0.00 Total: 8.00

AM Conditions: Cloudy
AM Temperature: 56 F
PM Conditions: Partly Cloudy
PM Temperature: 70 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 4 excavators, 3 bulldozers, 1 skidsteer, 1 haul truck (see notes)
Personnel: **WB Koester:** 11 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Concrete
Deliveries: 1 Hyundai 290 Excavator
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Jessie Hahn 10/02/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 10/5/15
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/02/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C, 1 Caterpillar 308E), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 flat roller (CS-433E), 1 haul truck (John Deer 400D), 1 skidsteer.

Water was pumped from the western corner of Ash Pond A in the morning.

Various pieces of equipment moved, mixed, and spread ash on Ash Pond A to promote drying, including three bulldozers, three excavators, and a dump truck throughout the day.

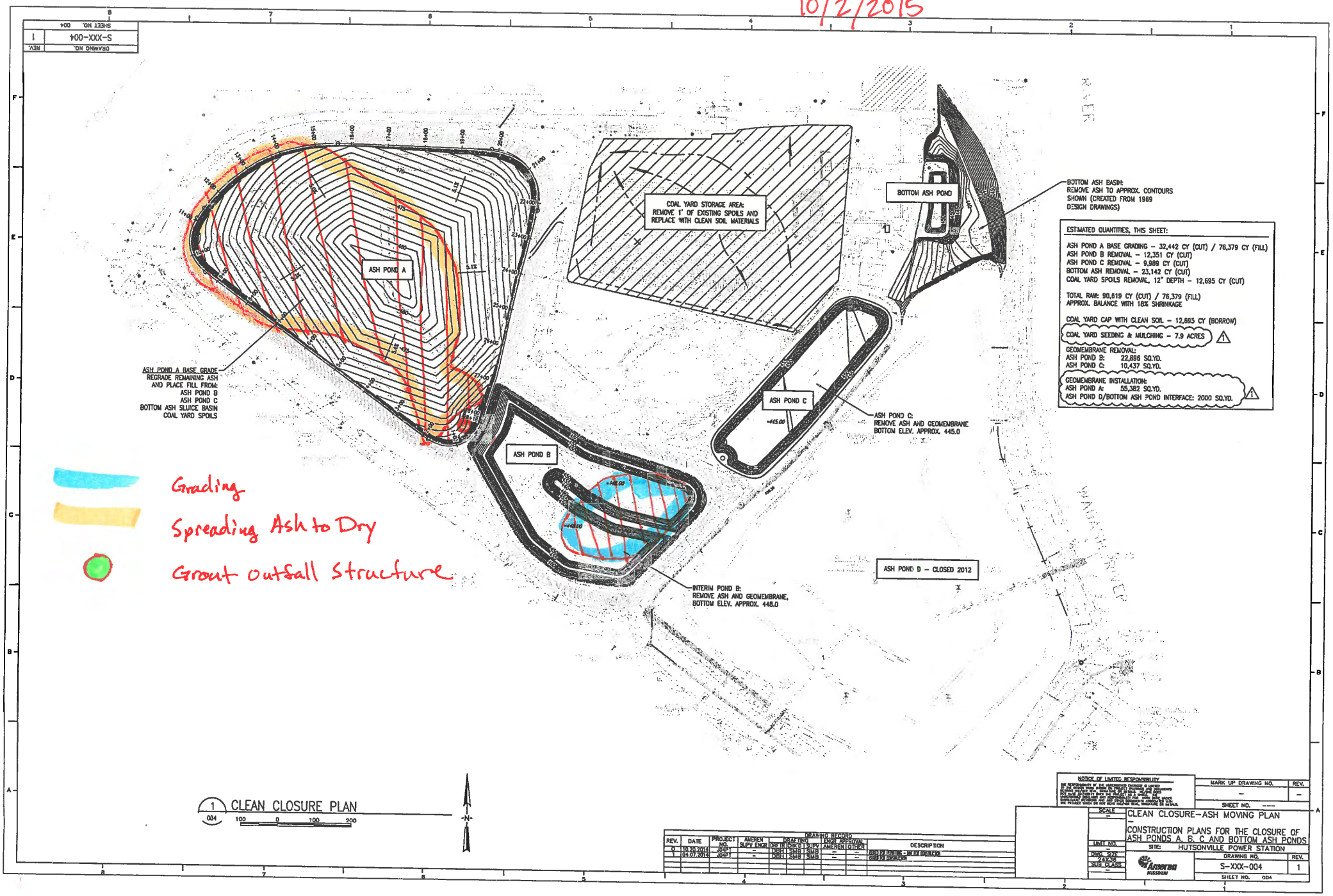
One excavator was used to place loose soil over ash at the anchor trenches.

The outfall structure at Ash Pond A was grouted with concrete at 1030. The structure was grouted from the top and bottom.

One GPS bulldozer graded Ash Pond B in the afternoon.

The skidsteer was used to clean the roads. The water truck sprayed the roads to keep the dust down.

10/2/2015



DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
BOTTOM ASH POND
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Grading
Spreading Ash to Dry
Grout outfall Structure
1 CLEAN CLOSURE PLAN
004
100 0 100 200
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. –
REV. –
SHEET NO. ---
SCALE –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –
Ameren MISSOURI
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. | DATE | PROJECT NO. | AMEREN SUPV ENGR | DRAFTING DRFTR | DRFTR CHK'D | SUPV ENGR | ENGR APPROVAL AMEREN | OTHER | DESCRIPTION
0 | 10.20.2014 | JO4P1 | – | DBH | SMB | SMB | – | – | CODE FOR PERMITTING – NOT FOR CONSTRUCTION
1 | 04.07.2014 | JO4P1 | – | DBH | SMB | SMB | – | – | CODE FOR CONSTRUCTION

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PHOTOGRAPH LOG



Photograph 1 - View of Bottom Ash Pond grading, looking east.



Photograph 2 - View of smooth drum roller compacting Ash Pond A, looking north.



Photograph 3 - View of anchor trench excavation on the east edge of Ash Pond A, looking southeast.



Photograph 4 - View of Ash Pond A grading, looking north.



Photograph 5 - View of the western side of Ash Pond A, looking west, showing the smooth-rolled top of Ash Pond A and the wet ash in the western corner of Ash Pond A.



Photograph 6 - View of the western corner of Ash Pond A, looking north, showing wet condition.

Photographs taken by Jessie Hahn of Geotechnology, Inc. between 9-28 and 10-2-15.



Photograph 7 - View of the siltation levee at the Bottom Ash Pond nearing completion.



Photograph 8 - Typical view of smooth-rolled portions of Ash Pond A after rain, showing rill development.

Photographs taken by Jessie Hahn of Geotechnology, Inc. between 9-28 and 10-2-15.



Photograph 9 - View of southeast corner of Ash Pond A after rain, showing ponded water.



Photograph 10 - View of western corner of Ash Pond A after rain, showing ponded water.

Photographs taken by Jessie Hahn of Geotechnology, Inc. between 9-28 and 10-2-15.



Photograph 11 - View of northern corner of Ash Pond A after rain, showing ponded water.



Photograph 12 - View of road sawcuts for HDPE culvert installation.



Photograph 13 - View of silt fence installed south of Ash Pond A.



Photograph 14 - View of grading and structure demolition activity in Ash Pond B.



Photograph 15 - View of liner demolition and anchor trench construction at the southeast corner of Ash Pond A.



Photograph 16 - View of water pumped into siltation basin in the Bottom Ash Pond.



Photograph 17 - View of placing dry soil to bridge over wet ash at the west corner of Ash Pond A.



Photograph 18 - View of dumping wet ash to be spread and dried.



Photograph 19 - View of excavators removing ash and placing dry soil at the western corner of Ash Pond A.



Photograph 20 - View of Ash Pond A outfall structure abandonment-in-place.



Photograph 21 - View of concrete placement to plug the Ash Pond A outfall pipe.



Photograph 22 - View of saturated ash level at the western corner of Ash Pond A.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 15, 2015

SUBJECT: Weekly Summary Report for October 5, 2015 to October 09, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 51 to 55°F, and temperature highs ranged from 67 to 80°F.

Construction Activities

Ash Pond A was shaped, graded, and compacted. Ponded water in the corners was pumped out of Ash Pond A. The edges of Ash Pond A were cleaned and shaped.

Excess soil was moved from Ash Pond B to the Coal Yard. Ash Pond B and the Coal Yard were graded.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller (CA251), 1 smooth drum roller (CS-433E), and 1 skidsteer.

WB Koester had 16 employees working on site: 7 laborers, 1 mechanic, and 8 equipment operators.

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Meetings

The weekly progress meeting was held on Wednesday, October 7, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Excess soil from Ash Pond B was placed in the Coal Yard.

Testing/Sampling

Moisture/density tests were conducted at sixty locations on Ash Pond A by Jessie Hahn of Geotechnology. Refer to testing forms for additional information.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/05/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0830 Depart: 1600 Travel: 3.00 Total: 10.00

AM Conditions: Clear
AM Temperature: 69 F
PM Conditions: Clear
PM Temperature: 78 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 3 excavators, 2 bulldozers, 1 skidsteer, 2 compactors, 1 haul truck (see notes)
Personnel: **WB Koester:** 16 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/5/15 Date

Geotechnology, Inc. Engineer 10/12/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/05/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C, 1 Caterpillar 308E), 2 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 smooth roller (CS-433E), 1 haul truck (John Deer 400D), 1 skidsteer.

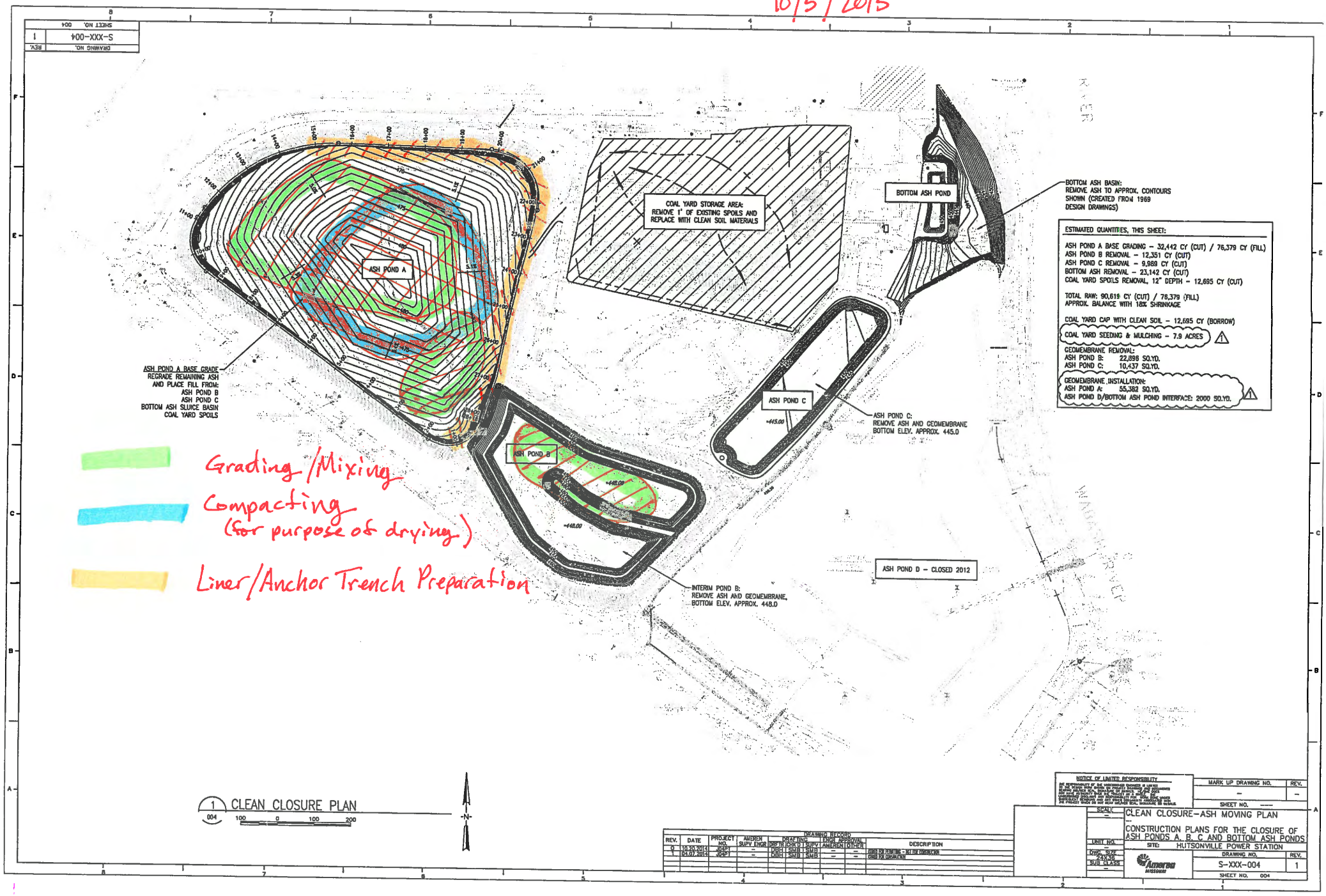
In the morning water was pumped from the western corner of Ash Pond A. Two excavators removed wet material and replaced it with loose, dry soil. A smooth drum roller compacted the placed soil.

Two bulldozers graded the wet ash on Ash Pond A. One sheepsfoot roller compacted ash on Ash Pond A in the afternoon. One GPS bulldozer graded Ash Pond B.

Three excavators exposed the HDPE liner and moved soil in preparation for the new HDPE liner and anchor trench at the Ash Pond A levees. Laborers repaired tears in the lower HDPE liner.

The skidsteer was used to clean the roads. The water truck sprayed the roads to keep the dust down.

10/5/2015


ASH POND A
ASH POND B
ASH POND C
ASH POND D – CLOSED 2012
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
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TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
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COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
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ASH POND A: 55,382 SQ.YD.
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ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
Grading/Mixing
Compacting (for purpose of drying)
Liner/Anchor Trench Preparation
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
DRAWING RECORD
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO.
SHEET NO.
SCALE
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO.
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/06/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0730 Depart: 1600 Travel: 0.00 Total: 8.00

AM Conditions: Foggy and cloudy
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 77 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 3 excavators, 2 bulldozers, 1 skidsteer, 2 compactors, 1 haul truck (see notes)
Personnel: **WB Koester:** 16 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/6/15 Date

Geotechnology, Inc. Engineer 10/12/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/06/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C, 1 Caterpillar 308E), 2 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 smooth roller (CS-433E), 1 haul truck (John Deer 400D), 1 skidsteer.

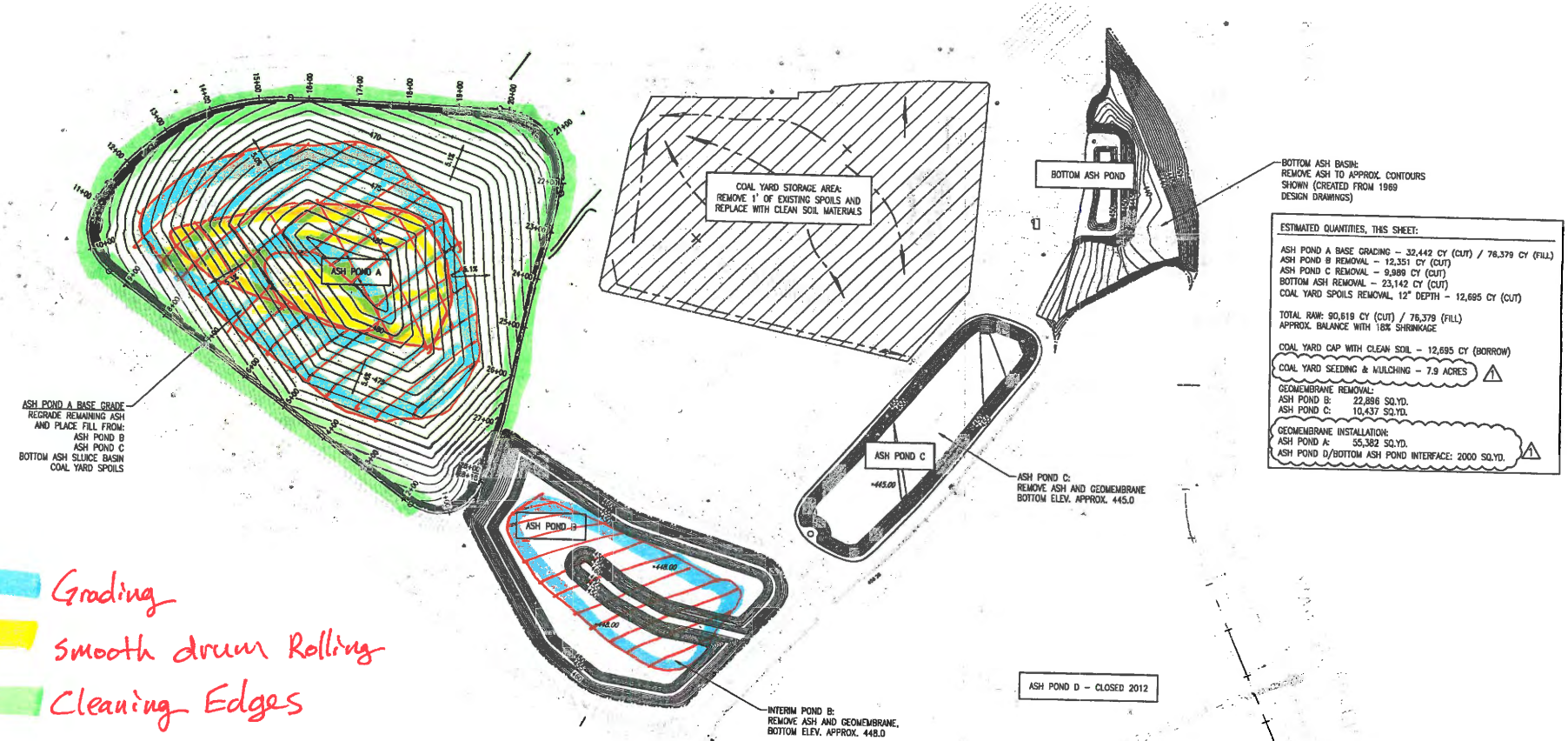
One GPS bulldozer graded the wet ash on Ash Pond A. One smooth drum roller compacted ash on Ash Pond A.

Three excavators exposed the HDPE liner and moved soil in preparation for the new HDPE liner and anchor trench at the Ash Pond A levees. Laborers repaired tears in the lower HDPE liner. The skidsteer was used to clean the lower geomembrane.

One GPS bulldozer graded Ash Pond B.

The water truck sprayed the roads to keep the dust down.

10/6/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

1 CLEAN CLOSURE PLAN
004
100 0 100 200

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DSN	DRAFTING CHK	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10/09/2014	40487	–	DJH	SMB	SMB	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04/07/2015	40487	–	DJH	SMB	SMB	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY
THE SUPERVISORY OF THE UNDERSIGNED EXTENDED AS LIMITED [illegible]

MARK UP DRAWING NO. –
REV. –
SHEET NO. –

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/07/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0700 Depart: 1600 Travel: 0.00 Total: 8.50

AM Conditions: Foggy, Clear by 0830
AM Temperature: 60 F
PM Conditions: Clear
PM Temperature: 74 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 4 excavators, 2 bulldozers, 1 skidsteer, 2 compactors, 1 haul truck (see notes)
Personnel: **WB Koester:** 16 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing: Jessie Hahn (Geotechnology) conducted nuclear density tests at 17 locations on Ash Pond A. All tested locations passed.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/7/15 Date

Geotechnology, Inc. Engineer 10/12/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/07/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Case CX210C, 1 Caterpillar 308E), 2 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 smooth roller (CS-433E), 1 haul truck (John Deer 400D), 1 skidsteer.

Two GPS bulldozers graded Ash Pond A. One smooth drum roller compacted Ash Pond A.

Three excavators moved and shaped soil in preparation for the new HDPE liner and anchor trench at the Ash Pond A levees. Laborers repaired tears in the lower HDPE liner. The skidsteer was used to clean the lower geomembrane.

Laborers and the skidsteer removed deleterious material from smooth-rolled portions of Ash Pond A.

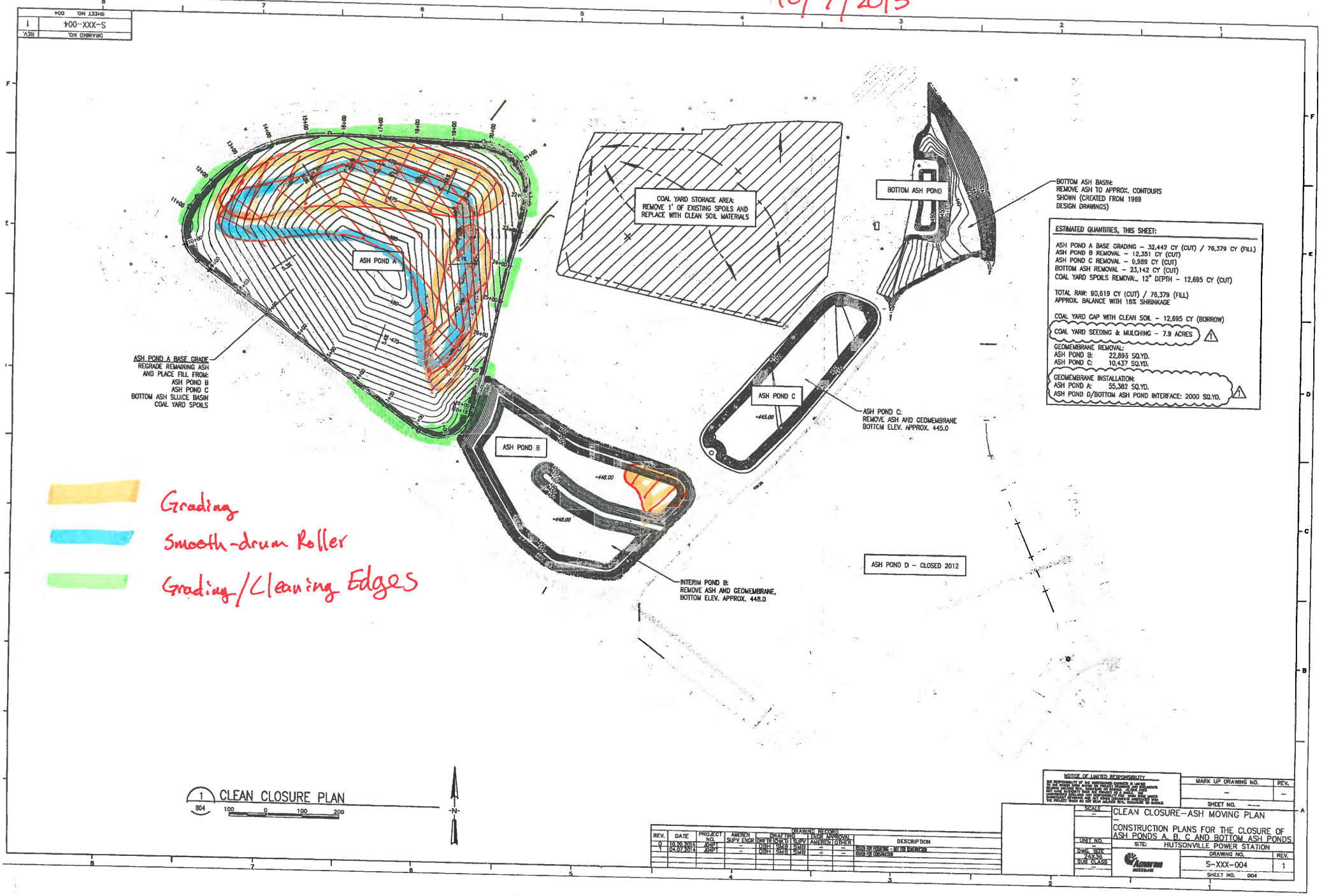
In the late afternoon, one GPS bulldozer graded the northeast corner of Ash Pond B.

The water truck sprayed the roads to keep the dust down.

Other:

The weekly progress meeting was held at 0900. See the meeting minutes for additional details.

10/7/2015


DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Grading
Smooth-drum Roller
Grading/Cleaning Edges
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. – REV. –
SHEET NO. ---
SCALE –
UNIT NO.
DWG. SIZE 24X36
SUB CLASS –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRF'R CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 JO4PT – DBH SMB SMB – – ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1 04.07.2014 JO4PT – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 10-7-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , Ken Beckman, Tim Free

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Chris cleaned roads sufficient last week.
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.
- Chris to pick up loose liner pieces so they don't get blown away in high winds.
- Chris to move grease barrels closer to trailer so they don't get hit with equipment.

Manpower

- Man hours
  - Start of Job (4-27-15) through 10-5-15
    - Total = 8705 hrs.
- Next week expected manpower
  - WBK = 1 superintendent, 1 mechanic, 6 operators, 6 laborer, 1 teamster, 1 surveyor
  - 10 hrs days approx. (Daylight to dusk)

Review old minutes and action items

- Bob sent Mike W. Autocad files for the proposed designs in Ponds B, C and Bottom ash pond. He was fine with them. Would like a swale lined with turf mat in B coming out of detention area. In Pond C would like a rip rap

chute following the side slopes at the box culvert areas leading to the center swale. Turf line that swale also.

Material Issues

- No issues

Quality Control Issues

- Jessie testing compaction and today all 8 have passed.
- SE corner still leaching water so may need to undercut it like the SW corner.

Schedule Compliance

- Liner roll off boxes and disposal on going.
- Pond A should be shaped, graded and smooth rolled by end of day Thursday.
- Mike says he will try and schedule Massman to survey on Monday.
- Jessie to continue getting all compaction testing completed by end of day Friday.
- Bob to schedule liner guys for October 19th .
- Next week Chris will continue to grade Pond B and use excess soil to finish off Pond C and Coal Yard.
- Brandenberg Divers on site this week. Began pumping to Bottom Ash pond. May take 6-7 weeks for them to complete. WBK to continue pumping during that time. Silt in detention pond will remain in place at end.
- Mike says LAMAC may be used to do the final surveys at the site.
- North Farm field borrow area – 3700' of silt fence was installed last week.

Cost and Budget Control

- Bob to submit invoice which can include the cost for the stored HDPE liner (need to submit copy of National Lining Systems invoice as well).

Next Meeting Scheduled: October 14, 2015 at 9:00 CST

Action Items

- Bob Fisher
  - Bob to submit Invoice.
  - Schedule liner sub to start Oct 19th.
- Mike Wagstaff – Schedule Massman to survey on Monday Oct 12th.
- Chris Atkinson –
  - make sure roads are cleaned regularly
  - move grease barrels
  - gather liner pieces and put in dumpster.
  - Finish Pond A grading and compaction so Jessie can complete compaction testing.
- Jessie Hahn – Continue compaction testing, complete by Friday if possible.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/08/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0730 Depart: 1600 Travel: 0.00 Total: 8.50

AM Conditions: Partly Cloudy
AM Temperature: 62 F
PM Conditions: Clear
PM Temperature: 79 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 3 excavators, 2 bulldozers, 1 skidsteer, 2 compactors, 1 haul truck (see notes)
Personnel: **WB Koester:** 16 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing: Jessie Hahn (Geotechnology) conducted nuclear density tests at 40 locations on Ash Pond A. See testing results for additional details.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/8/2015 Date

Geotechnology, Inc. Engineer 10/12/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/08/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E), 2 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 smooth roller (CS-433E), 1 skidsteer.

One GPS bulldozers graded Ash Pond A. One smooth drum roller compacted Ash Pond A.

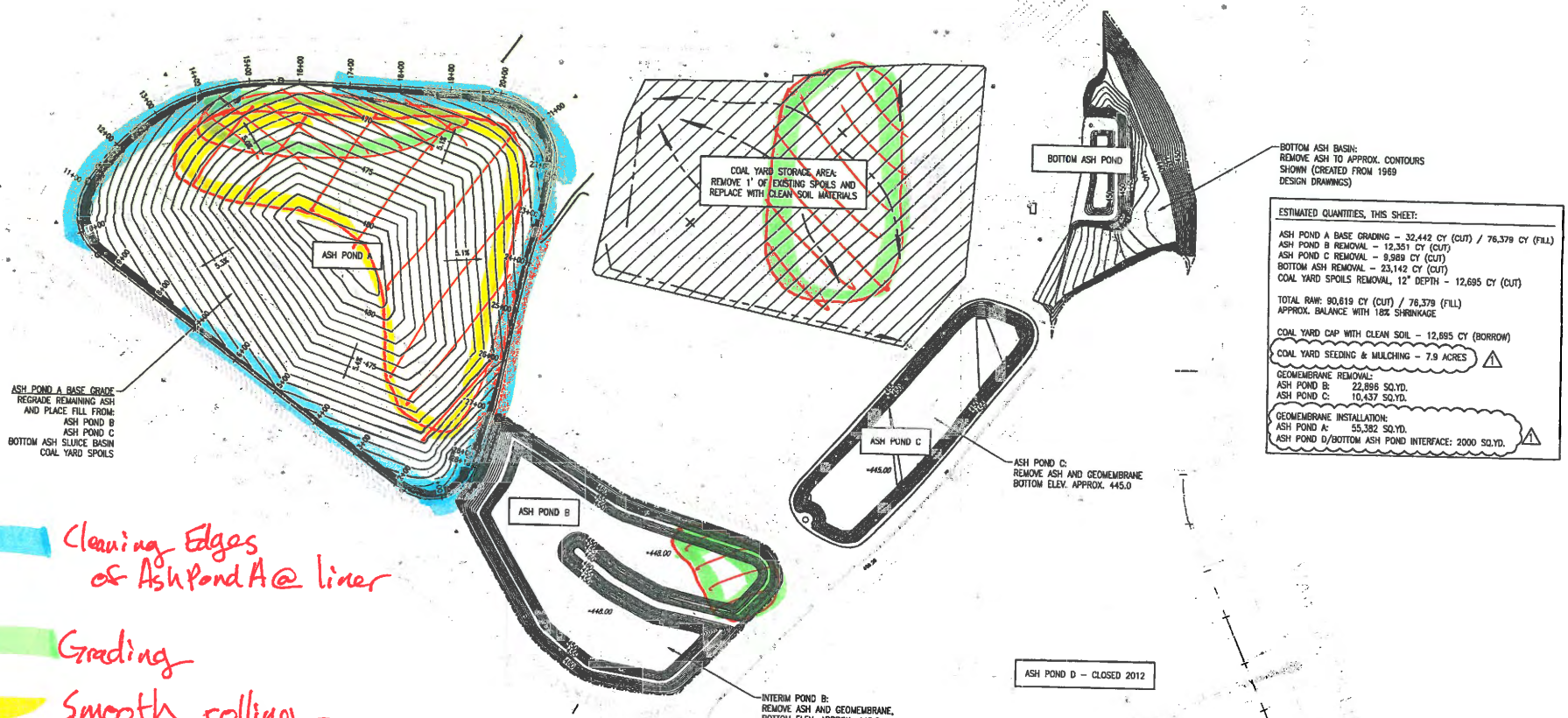
Three excavators moved and shaped soil in preparation for the new HDPE liner and anchor trench at the Ash Pond A levees. Laborers repaired tears in the lower HDPE liner and dressed the slopes near the exposed liner. The skidsteer was used to clean the lower geomembrane.

Laborers and the skidsteer removed deleterious material from smooth-rolled portions of Ash Pond A.

One GPS bulldozer graded the Coal Yard and placed two feet of soil over exposed ash at the northeast corner of Ash Pond B.

The water truck sprayed the roads to keep the dust down.

10/8/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,898 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

Cleaning Edges of Ash Pond A @ liner

Grading

Smooth rolling

1 CLEAN CLOSURE PLAN
004
100 0 100 200

-N-

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAWING RECORD DRAFTING			PRIOR APPROVAL		DESCRIPTION
				DRF'R	CHK'D	SUPV	AMEREN	OTHER	
0	12-20-2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR REVIEW – NOT FOR CONSTRUCTION
1	04-07-2015	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ---

SCALE: –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/09/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0700 Depart: 1300 Travel: 3.50 Total: 9.50

AM Conditions: Cloudy
AM Temperature: 60 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 2 excavators, 2 bulldozers, 1 skidsteer, 1 compactors, 2 haul truck (see notes)
Personnel: **WB Koester:** 16 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash Pond B material placed in the Coal Yard.
Deliveries:
Testing: Jessie Hahn (Geotechnology) conducted nuclear density tests at 4 locations on Ash Pond A. See testing results for additional details.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Coal Yard. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/09/2015 Date
Geotechnology, Inc. Engineer 10/12/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/09/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 2 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 smooth roller (CS-433E), 1 skidsteer, 2 haul trucks (John Deere 400D).

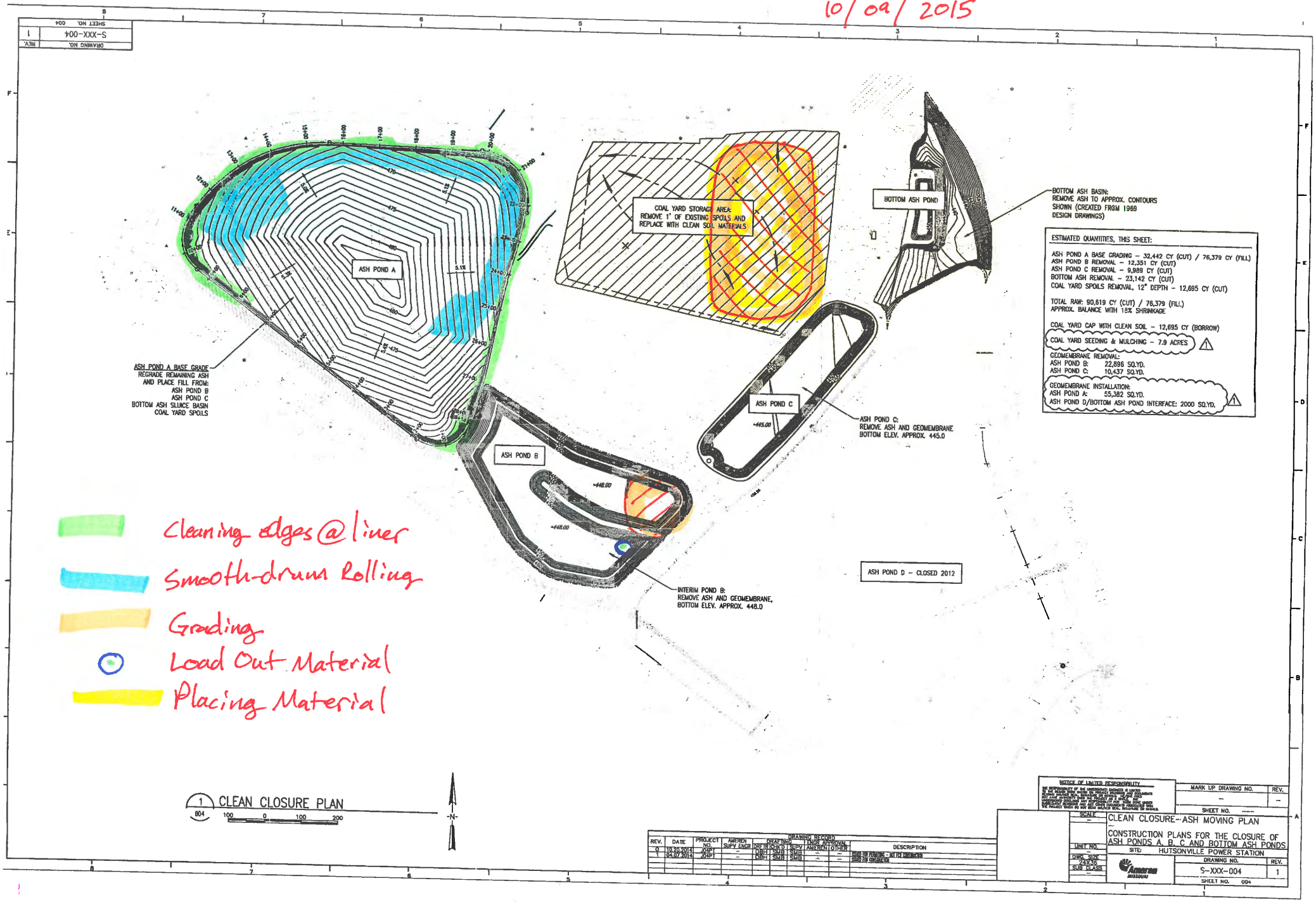
One GPS bulldozers cleaned the edges of Ash Pond A. One smooth drum roller compacted Ash Pond A.

Laborers repaired tears in the lower HDPE liner and dressed the slopes near the exposed liner. The skidsteer was used to clean the lower geomembrane. Laborers and the skidsteer removed deleterious material from smooth-rolled portions of Ash Pond A.

One GPS bulldozer graded Ash Pond B. One excavator loaded out excess material from Ash Pond B. Two haul trucks moved the excess material to the Coal Yard. One GPS bulldozer graded the Coal Yard.

The water truck sprayed the roads to keep the dust down. The skidsteer cleaned the roads.

10/09/2015



DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Cleaning edges @ liner
Smooth-drum Rolling
Grading
Load Out Material
Placing Material
1 CLEAN CLOSURE PLAN
804
100 0 100 200
N
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. –
REV. –
SHEET NO. ---
SCALE –
CLEAN CLOSURE--ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO.
DWG. SIZE 24X36
SUB CLASS
Ameren MISSOURI
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. | DATE | PROJECT NO. | AMEREN SUPV ENGR | DRAFTING DRFTR | DRAFTING CHK'D | DRAFTING SUPV | ENGR APPROVAL AMEREN | ENGR APPROVAL OTHER | DESCRIPTION
0 | 10.20.2014 | J04P1 | – | DBH | SMB | SMB | – | – | ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1 | 04.07.2014 | J04P1 | – | DBH | SMB | SMB | – | – | ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of placing dry soil over wet ash at the western corner of Ash Pond A.



Photograph 2 - View of smooth drum roller compacting dry soil over wet ash at the western corner of Ash Pond A.

Photographs taken by Jessie Hahn of Geotechnology, Inc. October 5-9, 2015.



Photograph 3 - View of sheepsfoot roller compacting wet ash to promote drying.



Photograph 4 - View of excavators cleaning the liner at the Ash Pond A levees, looking northeast.

Photographs taken by Jessie Hahn of Geotechnology, Inc. October 5-9, 2015.



Photograph 5 - View of grading in Ash Pond B, looking south.



Photograph 6 - View of grading and smooth drum rolling on Ash Pond A, looking west.



Photograph 7 - View of deleterious material removal from the surface of Ash Pond A, looking north.



Photograph 8 - View of smoothing ash with an excavator bucket, looking north.



Photograph 9 - View of grading soil over ash at the northeast corner of Ash Pond B, looking south.



Photograph 10 - View of skidsteer cleaning roads.



Photograph 11 - View of placing and grading material at the Coal Yard, looking west.



Photograph 12 - View of grading and loading out material at Ash Pond B, looking south.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 21, 2015

SUBJECT: Weekly Summary Report for October 12, 2015 to October 16, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 34 to 51°F, and temperature highs ranged from 64 to 80°F.

Construction Activities

The edges of Ash Pond A were cleaned and shaped. Ash Pond A was smooth-drum rolled. A proof roll was conducted on Ash Pond A on October 15-16. On Monday, October 12, Ash Pond A was surveyed by Massmann Surveying.

Excess material was moved from Ash Pond C to the Coal Yard and the plant entrance field. Excess material was moved from Ash Pond B to the levees of Ash Pond C to form a two foot soil cap. Ash Pond B, Ash Pond C, and the Coal Yard were graded.

On October 15-16, the outfall adjacent to the Bottom Ash Pond at the Wabash River was installed.

On October 14-16, Skinner well drillers were on site to install Monitoring Wells MW-2D, MW-22S, and MW-22D and abandon Monitoring Well MW-1.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 3 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller (CA251), 1 smooth drum roller (CS-433E), and 1 skidsteer.

Electronic Filing: Received, Clerk's Office 09/28/2020

WB Koester had 11 employees working on site: 3 laborers, 1 mechanic, and 7 equipment operators.

Massmann Surveying had 2 surveyors working on site on October 12.

Skinner had 1 well driller on site on October 14-15 and 2 driller's helpers on site October 14-16.

Meetings

The weekly progress meeting was held on Wednesday, October 14, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Well installation materials, including 2" PVC well casing and screen, sand, bentonite, hole plug, well covers, and concrete were used for the installation of three monitoring wells.

Rip-rap, gravel bedding, and filter fabric were used for the installation of the outfall adjacent to the Bottom Ash Pond at the Wabash River.

Testing/Sampling

A survey of Ash Pond A ash subgrade was performed by Massmann Surveying on Monday, October 12.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/12/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0830 Depart: 1600 Travel: 3.00 Total: 10.00

AM Conditions: Clear and Windy
AM Temperature: 71 F
PM Conditions: Clear to Cloudy. Brief, light shower at 1600.
PM Temperature: 74 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg, Massman Surveying
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 1 skidsteer, 2 compactors, 2 haul trucks (see notes)
Personnel: **WB Koester:** 11 workers; **Massman:** 2 surveyors
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash Pond C material placed in the Coal Yard and at the Ash Pond A ramp.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Coal Yard. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/12/2015 Date

Geotechnology, Inc. Engineer 10/19/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/12/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 2 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 smooth roller (CS-433E), 1 sheepsfoot roller (CA 251), 1 skidsteer, 2 haul trucks (John Deere 400D).

One smooth drum roller compacted Ash Pond A.

Laborers repaired tears in the lower HDPE liner and dressed the slopes near the exposed liner. The skidsteer was used to clean the lower geomembrane.

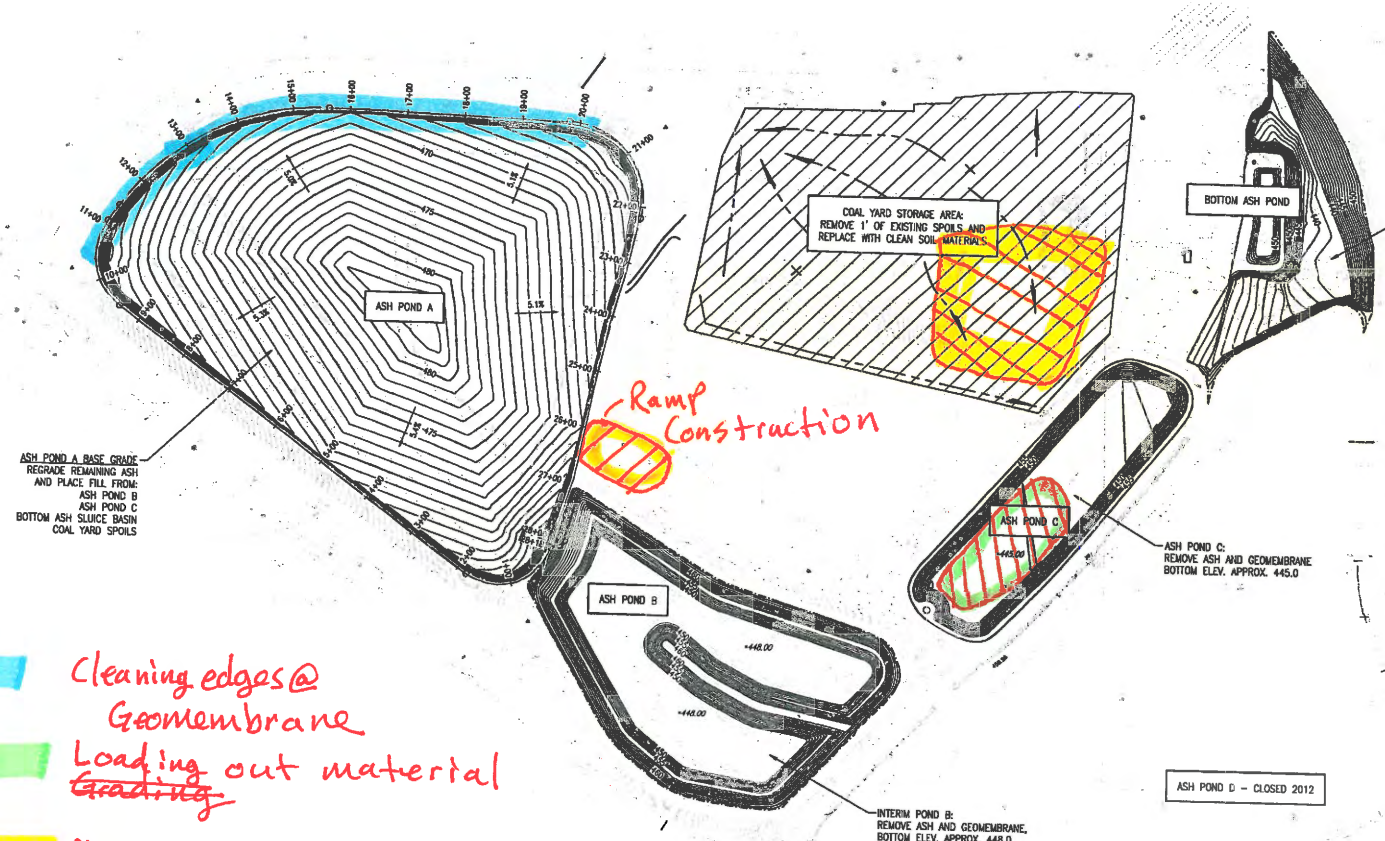
One GPS bulldozer graded Ash Pond C. One excavator loaded out excess material from Ash Pond C. In the morning, two haul trucks moved the excess material to the Coal Yard, one GPS bulldozer graded the Coal Yard, and one sheepsfoot roller compacted the Coal Yard. In the afternoon, one haul truck moved the excess material to build the new ramp onto Ash Pond A, one GPS bulldozer graded the ramp, and one sheepsfoot roller compacted the ramp.

The water truck sprayed the roads to keep the dust down. The skidsteer cleaned the roads.

Massman Surveying:

Two surveyors arrived on site at 1200 and surveyed Ash Pond A.

10/12/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

Cleaning edges @ Geomembrane

Loading out material ~~Grading~~

Placing & Grading & Compacting

1 CLEAN CLOSURE PLAN
004
SCALE 1" = 100'

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	CHK'D	SUPV	AMEREN	OTHER	DESCRIPTION
0	10.20.2014	JOBPT	–	DBH	SMB	SMB	–	–	ISSUED FOR BIDDING – WITH CONSTRUCTION
1	04.07.2014	JOBPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY
BY PERFORMING ALL OR PORTIONS OF THE INVESTIGATIVE ENGINEER AS LISTED IN THE WORK PLAN, THE CONSULTANT

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/13/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0730 Depart: 1530 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 57 F
PM Conditions: Clear
PM Temperature: 67 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 1 compactor, 2 haul trucks (see notes)
Personnel: **WB Koester:** 11 workers
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash Pond C material placed in the Coal Yard and at the Ash Pond A ramp.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Coal Yard, . See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/13/2015 Date

Geotechnology, Inc. Engineer 10/19/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/13/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

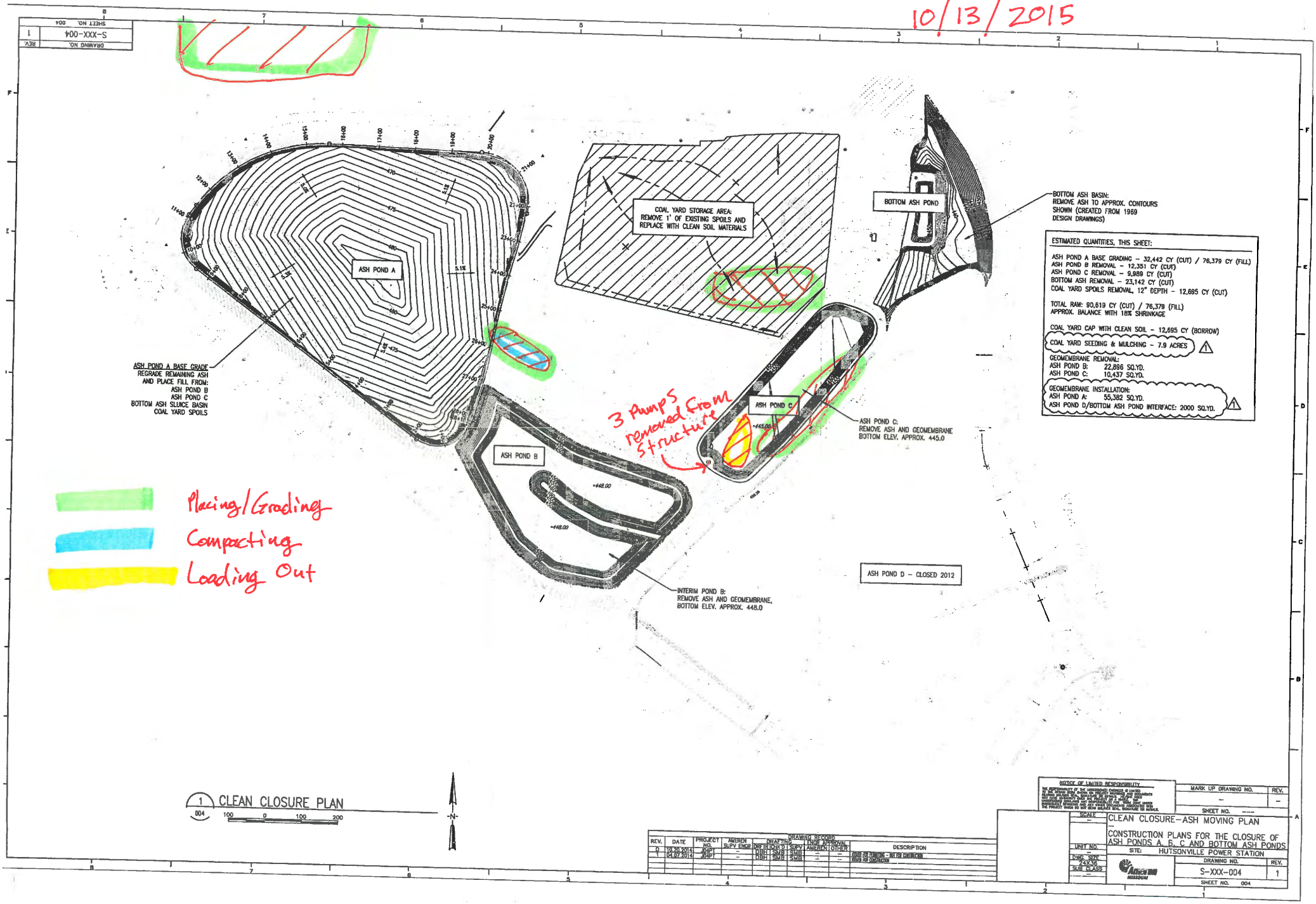
Equipment details: 1 excavator (1 Komatsu PC 350 LC), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 sheepsfoot roller (CA 251), 1 skidsteer, 2 haul trucks (John Deere 400D).

One excavator loaded out excess material from Ash Pond C. Two haul trucks moved excess material to the Coal Yard, the Ash Pond A ramp, and the field near the site entrance. One GPS bulldozer graded Ash Pond C. One GPS bulldozer graded the ramp, the Coal Yard, and the site entrance field. One sheepsfoot roller compacted the Ash Pond A ramp.

At 1030, a haul truck hit and knocked over an electric pole with a light near the site entrance. Ameren stated that the line was de-energized at the time of the incident. WB Koester prepared an incident report. Refer to the incident report for additional information.

The water truck sprayed the roads to keep the dust down. The skidsteer cleaned the roads.

10/13/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

1 CLEAN CLOSURE PLAN
004
100 0 100 200

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHKD	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JDHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR PLANNING – NOT FOR CONSTRUCTION
1	04.07.2014	JDHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. –

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/14/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1700 Travel: 0.00 Total: 10.00

AM Conditions: Clear
AM Temperature: 51 F
PM Conditions: Clear
PM Temperature: 68 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg, Skinner
Equipment: **WB Koester:** 2 excavators, 1 bulldozer, 2 haul trucks (see notes)
Skinner: 1 drill rig
Personnel: **WB Koester:** 11 employees; **Skinner:** 3 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash Pond B material placed at Ash Pond C levees.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond B, Ash Pond C, . See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/14/2015 Date
Geotechnology, Inc. Engineer 10/19/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/14/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 1 excavator (1 Komatsu PC 350 LC, 1 Caterpillar 308E), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 sheepsfoot roller (CA 251), 1 skidsteer, 2 haul trucks (John Deere 400D).

One excavator loaded out excess material from Ash Pond B. Two haul trucks moved excess material to the levees of Ash Pond C. One GPS bulldozer graded Ash Pond C.

Two laborers and one excavator removed the silt fence around Ash Pond D.

The water truck sprayed the roads and Ash Pond A to keep the dust down. The skidsteer cleaned the roads.

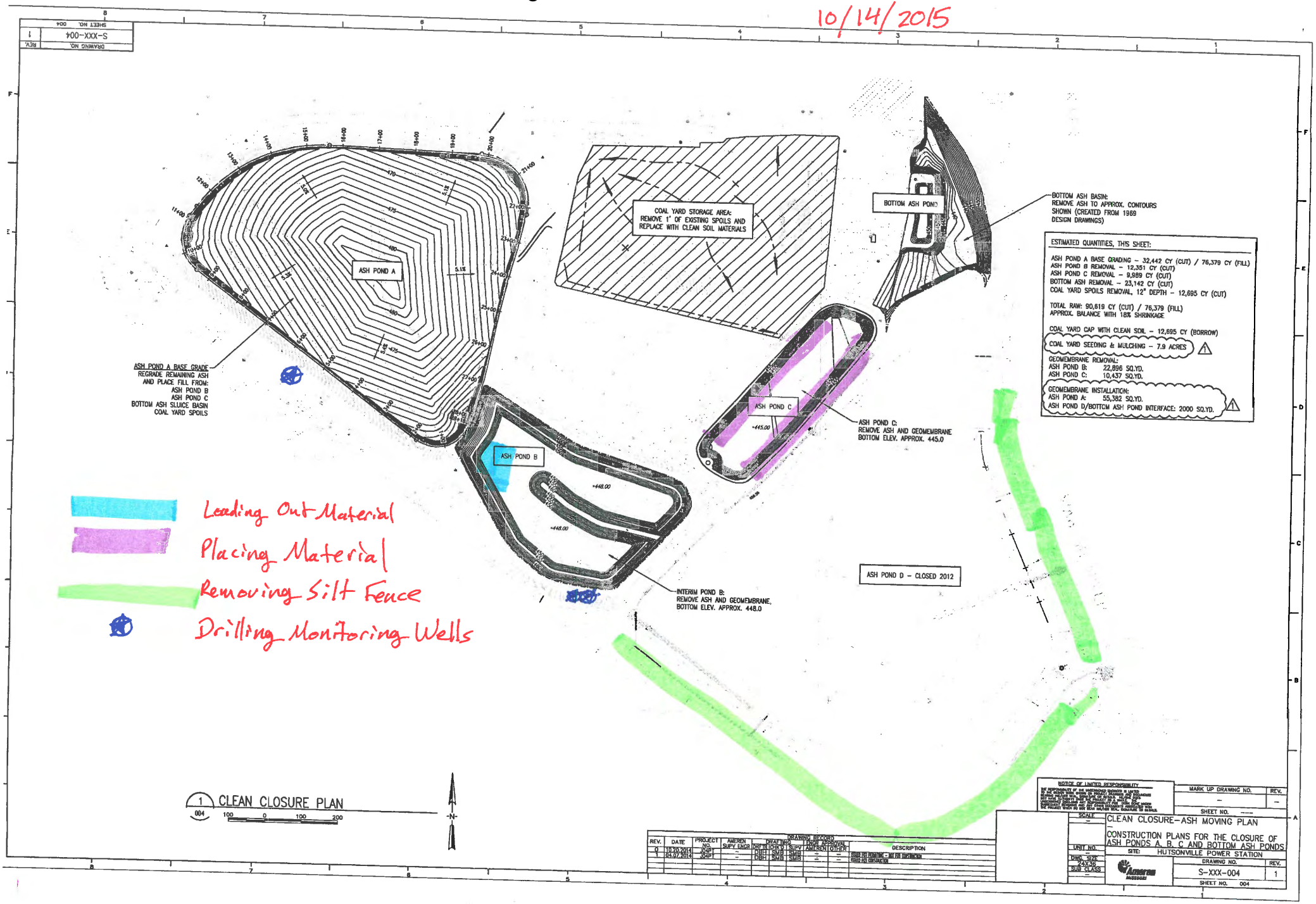
Skinner:

Drilled and installed three wells at locations indicated on attached location drawing.

Other:

The weekly progress meeting was held at 0900. See the meeting minutes for additional details.

10/14/2015


ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA:
REMOVE 1' OF EXISTING SPOILS AND
REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN:
REMOVE ASH TO APPROX. CONTOURS
SHOWN (CREATED FROM 1989
DESIGN DRAWINGS)
ASH POND A BASE GRADE
REGRADE REMAINING ASH
AND PLACE FILL FROM:
ASH POND B
ASH POND C
BOTTOM ASH SLUICE BASIN
COAL YARD SPOILS
ASH POND C:
REMOVE ASH AND GEOMEMBRANE
BOTTOM ELEV. APPROX. 445.0
INTERIM POND B:
REMOVE ASH AND GEOMEMBRANE,
BOTTOM ELEV. APPROX. 448.0
ASH POND D - CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING - 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL - 12,351 CY (CUT)
ASH POND C REMOVAL - 9,989 CY (CUT)
BOTTOM ASH REMOVAL - 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH - 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL - 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING - 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Loading Out Material
Placing Material
Removing Silt Fence
Drilling Monitoring Wells
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
CLEAN CLOSURE-ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF
ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
S-XXX-004
1

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 10-14-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , Ken Beckman (phone), Tim Free

WB Koester: Chris Atkinson

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- Artic truck ran into de-energized power line at the stockpile area outside the gate while delivering cover soil. Chris wrote report and discussed the issue with crew. Reiterate that you don't move trucks until beds are completely back in place. Driver was off work for 3 days as discipline.
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.
- Continue to pick up loose liner pieces as encountered but most have been picked up by now.

Manpower

- Man hours
  - Start of Job (4-27-15) through 10-12-15
    - Total = 9345 hrs.
- Next week expected manpower
  - WBK = 1 superintendent, 1 mechanic, 4 operators, 6 laborer, 1 teamster
  - 8 hrs days approx.

Review old minutes and action items

- Bob submitted invoice
- Mike scheduled Massman to survey this week,
- Jessie completed compaction testing

- Anna to review data in anticipation that liner company will start October 19th.

Material Issues

- No issues

Quality Control Issues

- No issues

Schedule Compliance

- Liner roll off boxes and disposal on going.
- Massman completed with survey, Jessie completed with compaction testing. Anna to review data. Chris will proof roll Pond A as well this week.
- Liner guys scheduled for October 19th .
- Chris will continue to grade Pond B and C and use excess soil to finish off Pond C slopes, Pond B slopes and Coal Yard.
- Brandenberg may take 6-7 weeks for them to complete. WBK to continue pumping during that time. Silt in detention pond will remain in place at end.
    - Discussed installing the sampling outlet point through the berm to the river and then divert the Brandenberg water through the outlet.
- Chris needs to relocate the temporary fence at the bottom ash pond to allow for the outlet construction and levee removal.
- Looking to seed Coal yard, Pond C, Pond B and stockpile area outside fence as soon as they are covered.
- May start to demo silt fence at Pond D this week.
- May demo concrete pump structure at Pond C this week. Will demo as much as we can and then grout rest with flowable fill.

Cost and Budget Control

- n/a

Next Meeting Scheduled: October 21, 2015 at 9:00 CST

Action Items - n/a

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/15/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0645 Depart: 1615 Travel: 0.00 Total: 9.00

AM Conditions: Clear
AM Temperature: 51 F
PM Conditions: Clear
PM Temperature: 76 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg, Skinner
Equipment: **WB Koester:** 2 excavators, 1 bulldozer, 1 haul truck, 2 compactors (see notes)
Skinner: 1 drill rig
Personnel: **WB Koester:** 10 employees; **Skinner:** 3 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash Pond B material placed at Ash Pond C levees.
Deliveries: Rip-rap and bedding material for the outfall construction delivered to site.
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond B, Ash Pond C, . See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/15/2015 Date
Geotechnology, Inc. Engineer 10/19/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/15/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 320B), 1 bulldozer (Caterpillar D6N LGP with GPS), 1 sheepsfoot roller (CA 251), 1 smooth drum roller (CS-433E), 1 skidsteer, 1 haul truck (John Deere 400D).

One excavator loaded out excess material from Ash Pond B. Two haul trucks moved excess material to the levees of Ash Pond C. One GPS bulldozer graded Ash Pond C. One sheepsfoot roller compacted the Ash Pond C levees.

One excavator cleared trees and excavated the Bottom Ash Pond outfall location. A power line was uncovered (dug by hand once tape was revealed) at a higher elevation than expected, which would place it in the rip-rap of the final outfall. WB Koester dug out 50 feet from the exposed location in either direction in order to allow the line to sag to a lower elevation.

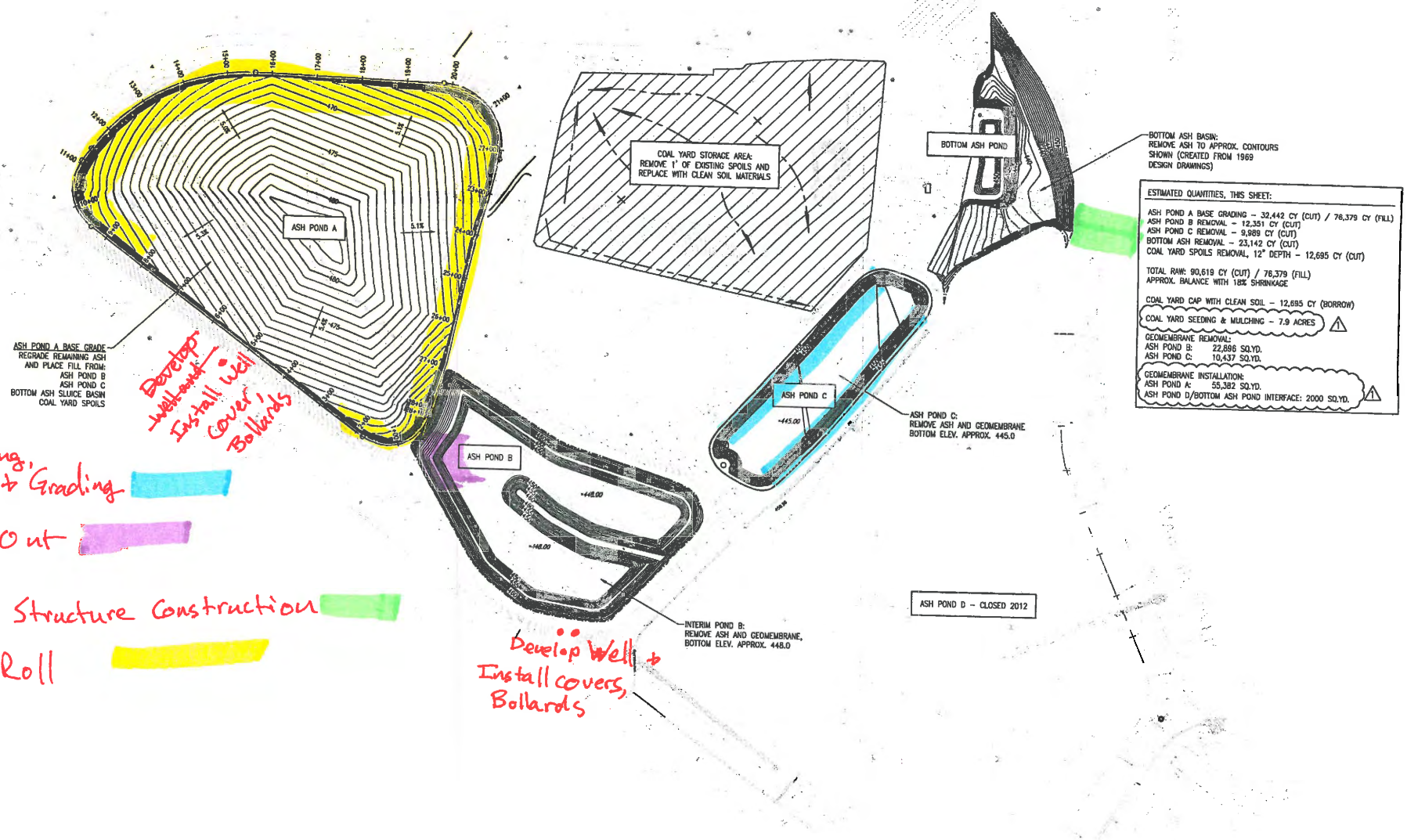
A proof roll of the wet parts of Ash Pond A was performed with the smooth drum roller.

The water truck sprayed the roads to keep the dust down. The skidsteer cleaned the roads.

Skinner:

Developed two wells, abandoned one well, and installed covers and bollards at three wells. Locations are indicated on attached location drawing.

10/15/2015



1 CLEAN CLOSURE PLAN
004
SCALE 100 0 100 200

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFT	CHKD	SUPV	OWNER APPROVAL AMEREN	OTHER	DESCRIPTION
0	10-20-2014	JCHPT	-	DBH	SMB	SMB	-	-	ISSUED FOR PERMITTING - NOT FOR CONSTRUCTION
1	04-07-2014	JCHPT	-	DBH	SMB	SMB	-	-	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. -
REV. -
SHEET NO. -

SCALE -
UNIT NO. -
DWG. SIZE 24X36
SUB CLASS -

CLEAN CLOSURE-ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/16/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0645 Depart: 1215 Travel: 3.00 Total: 8.50

AM Conditions: Clear
AM Temperature: 41 F
PM Conditions: Clear
PM Temperature: 62 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg, Skinner
Equipment: **WB Koester:** 2 excavators, 1 bulldozer, 1 haul truck (see notes)
Personnel: **WB Koester:** 10 employees; **Skinner:** 2 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Rip-rap, gravel, and filter fabric placed at the outfall.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond C, Outfall. See attached location drawing for more information.

Jessie Hahn 10/16/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 10/19/2015
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/16/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 320B), 1 bulldozer (Caterpillar D6N LGP with GPS), 1 skidsteer, 1 haul truck (John Deere 400D).

One excavator loaded out excess material from Ash Pond B. Two haul trucks moved excess material to the levees of Ash Pond C. One GPS bulldozer graded Ash Pond C. One sheepsfoot roller compacted the Ash Pond C levees.

One excavator cleared trees and excavated the Bottom Ash Pond outfall location. A power line was uncovered (dug by hand once tape was revealed) at a higher elevation than expected, which would place it in the rip-rap of the final outfall. WB Koester dug out 50 feet from the exposed location in either direction in order to allow the line to sag to a lower elevation.

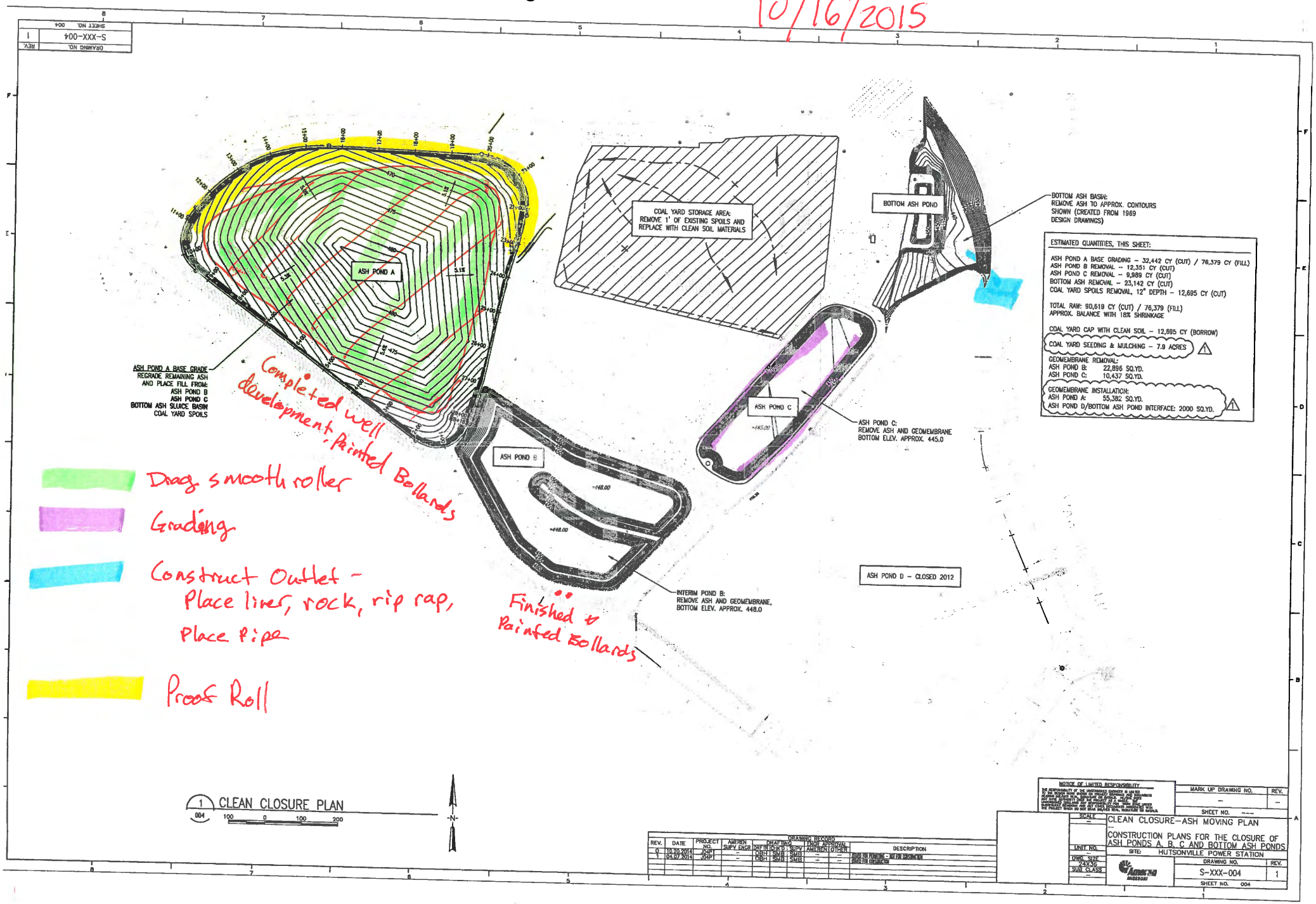
Proof rolling using a loaded haul truck was performed on select areas of Ash Pond A.

The water truck sprayed the roads keep the dust down. The skidsteer cleaned the roads.

Skinner:

Painted bollards at three wells and finished developing one well. Locations are indicated on attached location drawing.

10/16/2015


ASH POND A
ASH POND B
ASH POND C
BOTTOM ASH POND
COAL YARD STORAGE AREA:
REMOVE 1' OF EXISTING SPOILS AND
REPLACE WITH CLEAN SOIL MATERIALS
ASH POND A BASE GRADE
REGRADE REMAINING ASH
AND PLACE FILL FROM:
ASH POND B
ASH POND C
BOTTOM ASH SLUICE BASIN
COAL YARD SPOILS
ASH POND C:
REMOVE ASH AND GEOMEMBRANE
BOTTOM ELEV. APPROX. 445.0
INTERIM POND B:
REMOVE ASH AND GEOMEMBRANE,
BOTTOM ELEV. APPROX. 448.0
ASH POND D - CLOSED 2012
BOTTOM ASH BASIN:
REMOVE ASH TO APPROX. CONTOURS
SHOWN (CREATED FROM 1969
DESIGN DRAWINGS)
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING - 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL - 12,351 CY (CUT)
ASH POND C REMOVAL - 9,989 CY (CUT)
BOTTOM ASH REMOVAL - 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH - 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL - 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING - 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Completed well development; Painted Bollards
Drag smooth roller
Grading
Construct Outlet -
Place liner, rock, rip rap,
Place Pipe
Proof Roll
Finished & Painted Bollards
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SMPY ENGR DRAFTING DRWN CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 JOAPT - DBH SMB SMB - - ISSUED FOR PERMITTING - NOT FOR CONSTRUCTION
1 04.07.2014 JOAPT - DBH SMB SMB - - ISSUED FOR CONSTRUCTION
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. REV.
SHEET NO.
SCALE
CLEAN CLOSURE-ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO.
DWG. SIZE 24X36
SUB CLASS
DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of placing and grading material at the Coal Yard, looking northwest.



Photograph 2 - View of cleaning the edges of Ash Pond A, looking east.



Photograph 3 - View of pump removal at the Ash Pond C lift structure.



Photograph 4 - View of material load out at Ash Pond C, looking southeast.



Photograph 5 - View of silt fence removal around Ash Pond D.



Photograph 6 - View of grading the two feet of material placed on the Ash Pond C levees, looking northeast.



Photograph 7 - View of materials for Monitoring Well MW-22D.



Photograph 8 - View of placing sand as filter pack in the Monitoring Well MW-22D annular space.



Photograph 9 - View of placing bentonite seal in Monitoring Well MW-22D annular space.



Photograph 10 - View of setup for monitoring well development.



Photograph 11 - View of compacting soil at the Ash Pond C levees, looking northeast.



Photograph 12 - View of material load out at Ash Pond B, looking southwest.



Photograph 13 - View of hand-exposing power lines at the outfall location.



Photograph 14 - View of installing well covers at Monitoring Wells MW-22S and MW-22D.



Photograph 15 - View of Monitoring Well MW-1 abandonment.



Photograph 16 - View of Monitoring Well MW-1 abandonment backfill.



Photograph 17 - View of smooth drag roller on Ash Pond A, looking west.



Photograph 18 - View of completed Monitoring Wells MW-22D and MW-22S.



Photograph 19 - View of completed Monitoring Wells MW-2D.



Photograph 20 - View of outfall construction showing filter fabric, gravel liner, and rip rap.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 29, 2015

SUBJECT: Weekly Summary Report for October 19, 2015 to October 23, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

NOTE: A Geotechnology representative was not present on site on Monday, October 19, 2015.

Weather

The weather was generally partly cloudy. Temperature (^{O}F) lows ranged from 32 to 54°F, and temperature highs ranged from 70 to 83°F.

Construction Activities

On Monday, October 19, Ash Pond A was surveyed by Massman Surveying due to a loss of data from their previous survey.

Ash Pond B, Ash Pond C, and the Coal Yard were graded. A perforated pipe was installed with gravel in the Bottom Ash Pond to facilitate draining of the anchor trench at the east levee. Excess cementitious soil material was moved from the levees of Ash Pond A to the Bottom Ash Pond as backfill and graded.

Reinforced concrete pipe was installed at the new outfall location at Ash Pond B. Corrugated plastic culvert was installed under the road near the north corner of Ash Pond A.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E, 1 Hyundai 290), 3 dump trucks (John Deere 400D), 3 bulldozers

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(Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller (CA251), 1 smooth drum roller (CS-433E), 1 skidsteer.

WB Koester had 8 employees working on site: 2 laborers, 1 mechanic, and 5 equipment operators.

Massman Surveying had 2 surveyors on site on October 19.

Meetings

The weekly progress meeting was held on Wednesday, October 21, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Gravel bedding, reinforced concrete pipe, and corrugated plastic culvert were installed on the site.

Testing/Sampling

Testing and sampling activities did not occur during the referenced time period.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/20/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1430 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 60 F
PM Conditions: Clear
PM Temperature: 73 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 2 excavators, 2 bulldozer, 1 haul truck (see notes)
Personnel: **WB Koester:** 8 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Coal Yard. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/20/2015 Date
Geotechnology, Inc. Engineer 10/26/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/20/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 320B), 1 bulldozer (Caterpillar D6N LGP with GPS), 1 skidsteer, 1 haul truck (John Deere 400D).

Two bulldozers graded Ash Pond B and the Coal Yard.

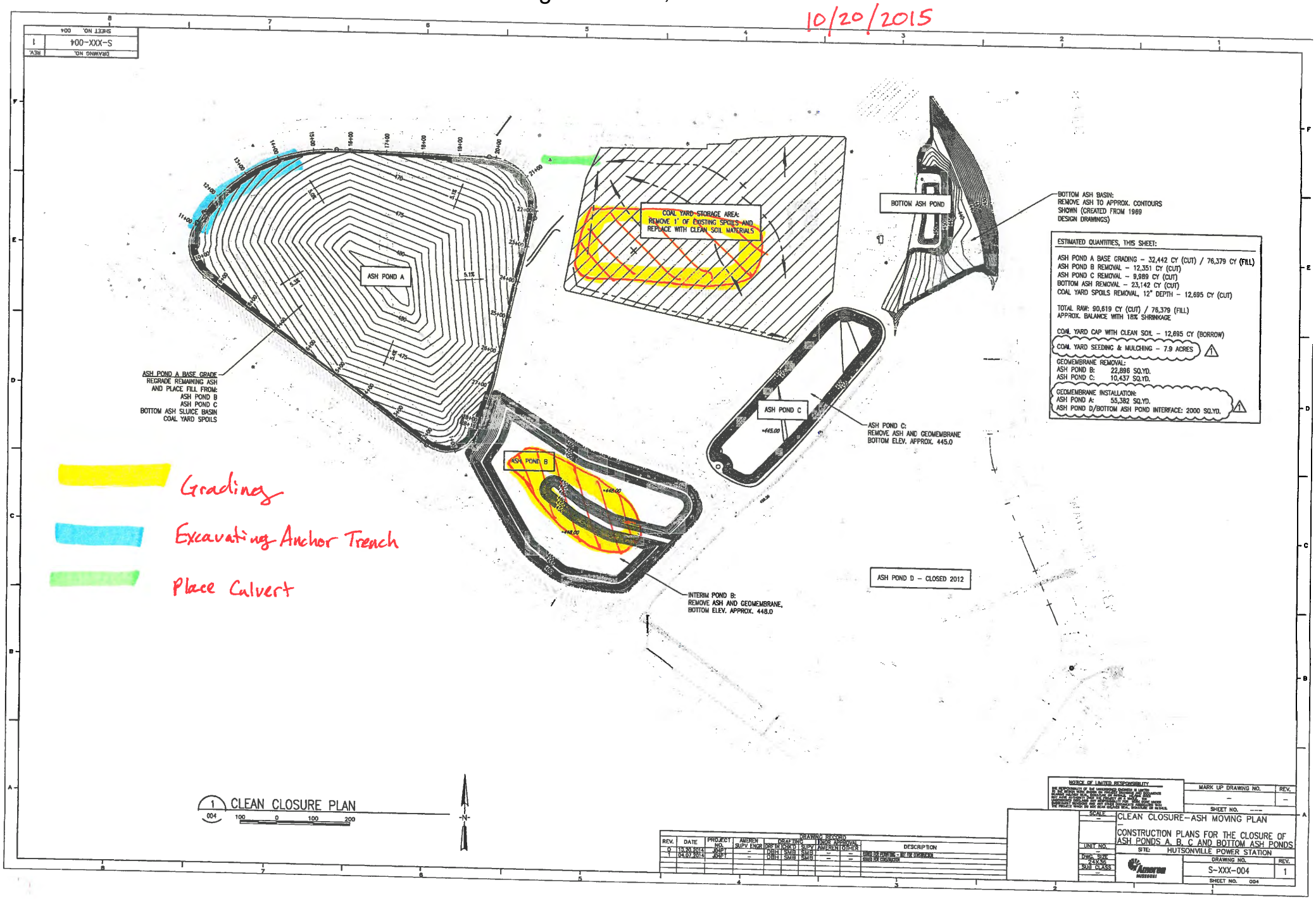
One excavator began excavating the anchor trench around Ash Pond A.

Laborers pumped ponded water out from location adjacent to the liner at Ash Pond A.

One excavator and one haul truck were used to place a plastic corrugated culvert under the road at the location indicated on the attached location drawing.

The water truck sprayed the roads keep the dust down. The skidsteer cleaned the roads.

10/20/2015


DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Grading
Excavating Anchor Trench
Place Culvert
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO.
REV.
SHEET NO. ---
SCALE
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO.
DWG. SIZE 24X36
SUB CLASS
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRF'R CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 J04P1 – DBH SMB SMB – – ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1 04.07.2014 J04P1 – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/21/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0700 Depart: 1500 Travel: 0.00 Total: 8.00

AM Conditions: Partly Cloudy, light shower 0830-0845
AM Temperature: 54 F
PM Conditions: Clear
PM Temperature: 78 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 2 excavators, 1 bulldozer (see notes)
Personnel: **WB Koester:** 8 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries: Concrete pipe was delivered to the site.
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond B, Bottom Ash Pond, Coal Yard. See attached location drawing for more information.

Jessie Hahn 10/21/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 10/26/2015
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/21/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 320B), 1 bulldozer (Caterpillar D6N LGP with GPS), 1 skidsteer.

One excavator and two laborers excavated and placed a perforated pipe as a drain in the Bottom Ash Pond, east of the temporary levee, in order to drain the pond and move the pump-out sump away from the location of anchor trench for the liner at the interface with Ash Pond D.

The lift structure at Ash Pond C was demolished to six feet below grade and filled with flowable fill.

Two excavators moved concrete piping in preparation for placment at the Ash Pond B outfall.

One bulldozer graded the Coal Yard.

The water truck sprayed the roads keep the dust down. The skidsteer cleaned the roads.

Other:

The weekly progress meeting was held at 0930. Refer to the meeting minutes for additional information.

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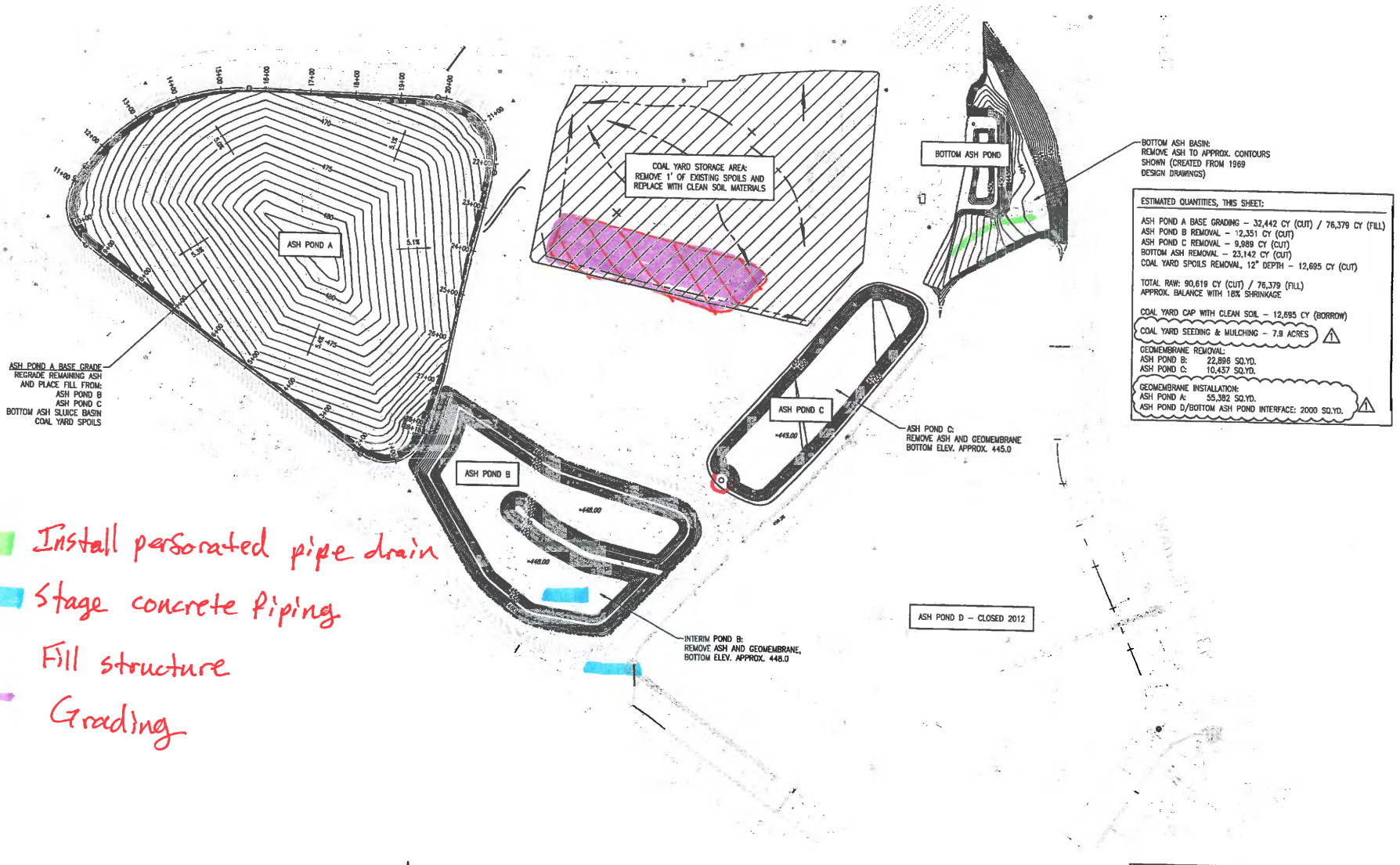
10/21/2015



Install perforated pipe drain

Stage concrete piping

Fill structure

Grading

1 CLEAN CLOSURE PLAN
004
SCALE: 100 0 100 200

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING RECORD									
REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING DRF	DRAFTING CHKD	DRAFTING SUPV	PRIOR APPROVAL AMEREN	PRIOR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	JOAP	–	DBH	SMB	SMB	–	–	ISSUED FOR INTERNAL + MVE DISTRIBUTION
1	04.07.2014	JOAP	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 10-21-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , John Patterson (phone), Tim Free

WB Koester: Chris Atkinson

Geotechnology, Inc.: Jessie Hahn, Anna Saindon

Topics:

Safety/Housekeeping

- No issues
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.
- Continue to pick up loose liner pieces as encountered but most have been picked up by now.

Manpower

- Man hours
  - Start of Job (4-27-15) through 10-19-15
    - Total = 9807 hrs.
- Next week expected manpower
  - WBK = 1 superintendent, 1 mechanic, 4 operators, 6 laborer, 1 teamster
  - 8 hrs days approx.

Review old minutes and action items

- Waiting on liner company to complete project in North Carolina and then they will mobilize to Hutsonville.

Material Issues

- No issues

Quality Control Issues

- No issues

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Schedule Compliance

- Liner roll off boxes and disposal on going.
- Liner guys scheduled for week of October 26th .
- Chris finished grading Pond C, Coal Yard and most of Pond B.
- Chris installed HDPE pipe across access road
- Chris installed RCP pipe outlet in Pond B.
- Chris installed rip rap at box culverts in Pond C.
- Chris demolished structure at Pond C and filled with flowable fill.
- Brandenberg may take 6-7 weeks for them to complete.
    - Installed the sampling outlet point through the berm to the river so we can divert the Brandenberg water through the outlet.
- Chris relocated the temporary fence at the bottom ash pond to allow for the outlet construction and levee removal.
- Looking to seed Coal yard, Pond C, Pond B and stockpile area outside fence week of October 26.
- Completed demo of silt fence at Pond D.

Cost and Budget Control

- n/a

Next Meeting Scheduled: October 28, 2015 at 9:00 CST

Action Items - n/a

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/22/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1430 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 62 F
PM Conditions: Clear
PM Temperature: 81 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 3 excavators, 1 bulldozer (see notes)
Personnel: **WB Koester:** 8 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/22/2015 Date
Geotechnology, Inc. Engineer 10/26/2015 Date

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/22/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 4 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 320B, 1 Hyundai 290, 1 Caterpillar 308E), 1 bulldozer (Caterpillar D6N LGP with GPS), 1 haul truck (John Deere 400D), 1 skidsteer.

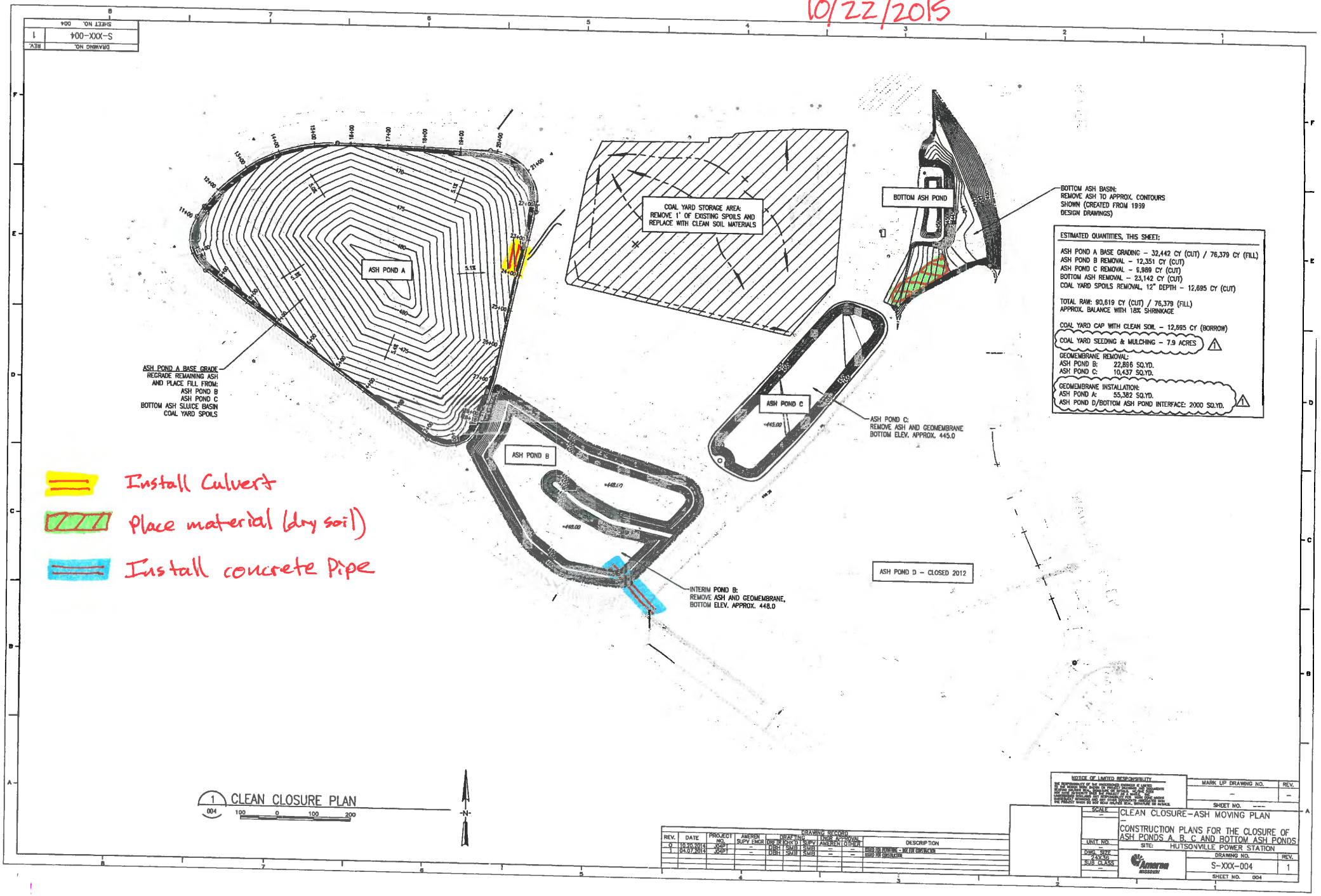
One excavator and the skidsteer installed a culvert at the Ash Pond A ramp adjacent to the liner.

One excavator and one bulldozer placed dry soil at Ash Pond D at the anchor trench location.

Two excavators and two laborers trenched, placed concrete piping, and backfilled at the outfall structure for Ash Pond B.

The water truck sprayed the roads keep the dust down. The skidsteer cleaned the roads.

10/22/2015


DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
ASH POND D – CLOSED 2012
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1959 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Install Culvert
Place material (dry soil)
Install concrete Pipe
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. –
REV. –
SHEET NO. ---
SCALE –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
UNIT NO.
DWG. SIZE 24X36
SUB CLASS –
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. | DATE | PROJECT NO. | AMEREN SUPV ENGR | DRAFTING DRFTR | CHKD | SUPV | ENGR APPROVAL AMEREN | OTHER | DESCRIPTION
0 | 10.20.2014 | J04PT | – | DBH | SMB | SMB | – | – | ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1 | 04.07.2014 | J04PT | – | DBH | SMB | SMB | – | – | ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/23/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1300 Travel: 3.00 Total: 9.50

AM Conditions: Cloudy
AM Temperature: 57 F
PM Conditions: Cloudy
PM Temperature: 74 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 1 haul truck (see notes)
Personnel: **WB Koester:** 8 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond C, Bottom Ash Pond. See attached location drawing for more information.

Jessie [signature] 10/23/2015
Geotechnology, Inc. Rep. Date

[signature] 10/26/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/23/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 1 excavator (1 Komatsu PC 350), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 haul truck (John Deere 400D), 1 skidsteer.

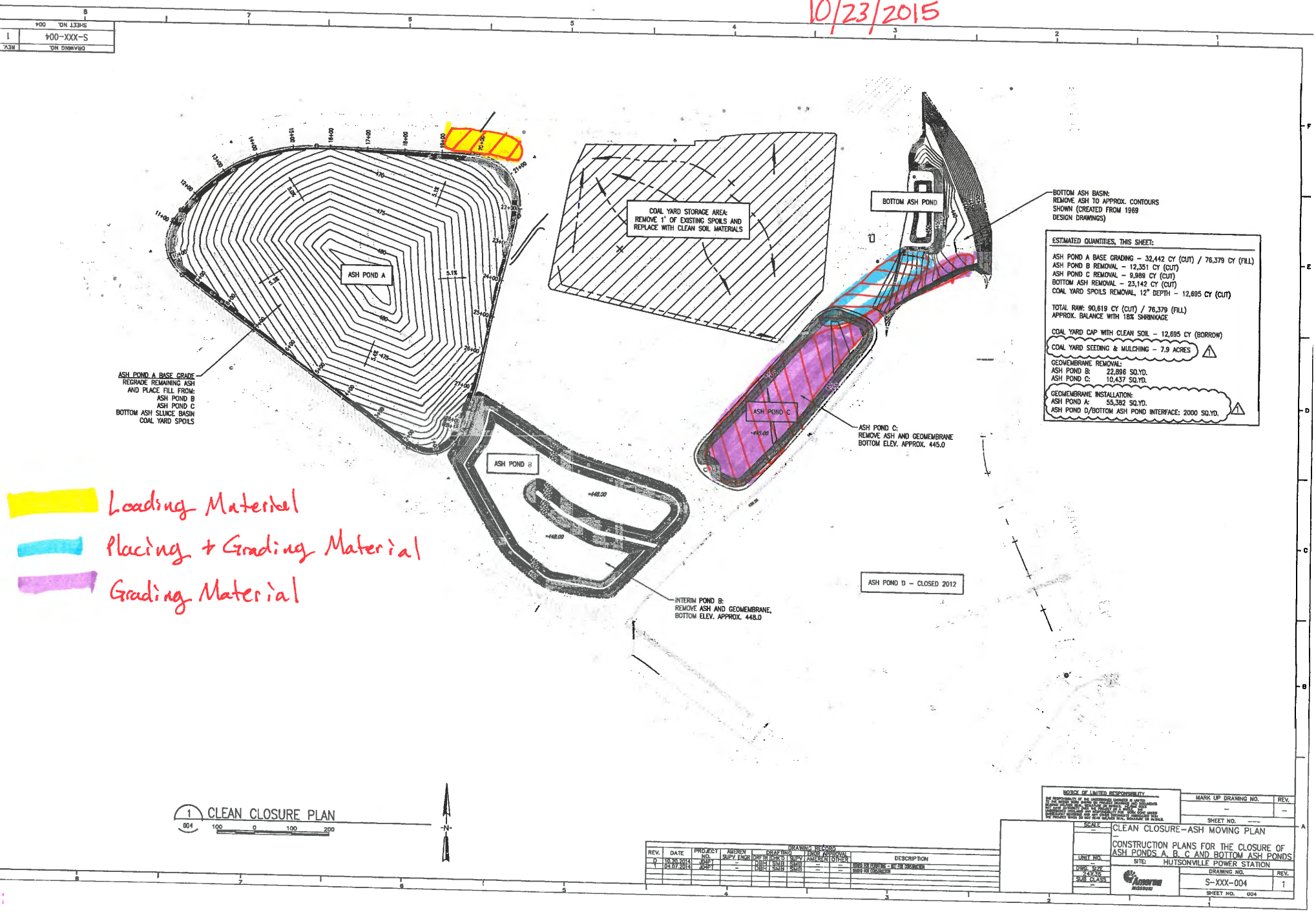
One bulldozer graded Ash Pond C.

One excavator was used to move the sump and pump away from the east side of the Bottom Ash Pond.

One excavator loaded large cementitious material from the levees of Ash Pond A into a haul truck. The material was deposited at the east end of the Bottom Ash Pond as fill. One bulldozer graded the Bottom Ash Pond.

The water truck sprayed the roads keep the dust down. The skidsteer cleaned the roads.

10/23/2015



1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING INIT.	DRAFTING CHK'D	AMEREN SUPV.	AMEREN OTHER	DESCRIPTION
0	10.20.2014	404PT	–	DBH	SMB	SMB	–	ISSUED FOR DRAWING – NOT FOR CONSTRUCTION
1	04.07.2014	404PT	–	DBH	SMB	SMB	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. –

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of culvert placement under the road between Ash Pond A and the Coal Yard.



Photograph 2 - View of completed outfall from the Bottom Ash Pond.



Photograph 3 - View of rip-rap apron at culvert in the west levee of Ash Pond C.



Photograph 4 - View of rip-rap apron at culvert in the east levee of Ash Pond C.

Photographs taken by Jessie Hahn of Geotechnology, Inc. October 20-23, 2015.



Photograph 5 - View of anchor trench construction on the west edge of Ash Pond A.



Photograph 6 - View of grading Ash Pond B, looking south.



Photograph 7 - View of grading the Coal Yard, looking northeast.



Photograph 8 - View of flowable fill placed over the demolished lift station at Ash Pond C.



Photograph 9 - View of perforated pipe installed to control seepage in the Bottom Ash Pond, looking south.



Photograph 10 - View of concrete pipe staging for installation, looking east.

Photographs taken by Jessie Hahn of Geotechnology, Inc. October 20-23, 2015.



Photograph 11 - View of placing dry soil over wet soil at the Bottom Ash Pond anchor trench.



Photograph 12 - View of placing concrete pipe at the Ash Pond B outfall location, looking southwest.



Photograph 13 - View of placing gravel pipe bedding over the concrete pipe at the Ash Pond B outfall.



Photograph 14 - View of placing material with cementitious material blocks at the Bottom Ash Pond, looking south.



Photograph 15 - View of loading material with cementitious material blocks at Ash Pond A, looking south.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: November 5, 2015

SUBJECT: Weekly Summary Report for October 26, 2015 to October 31, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 36 to 50°F, and temperature highs ranged from 54 to 68°F. No work was performed Tuesday, October 27, 2015 due to rain.

Construction Activities

Reinforced concrete pipe was installed under the main access road near the north corner of Ash Pond A and an associated ditch was excavated.

Excess material from Ash Pond B was placed at the former stockpile outside the gate. Ash Pond B and the former stockpile outside the gate were graded. Excess cementitious soil material was moved from the levees of Ash Pond A to the Bottom Ash Pond as backfill, then was graded and compacted.

After the rain on October 27, 2015 temporary drainage ditches were excavated at the Ash Pond A levees to promote drainage in preparation for HDPE geomembrane placement.

National Lining Systems (NLS) filled sand bags on October 28 and 29. NLS placed, seamed, and tested the 40 mil HDPE geomembrane on October 30 and 31, 2015.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E, 1 Hyundai 290), 3 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller (CA251), 1 smooth drum roller (CS-433E), and 1 skidsteer.

WB Koester had 8 employees working on site on October 26 and 28-30, 2015: 2 laborers, 1 mechanic, and 5 equipment operators. WB Koester had 5 employees working on site on October 31, 2015: 2 laborers and 3 equipment operators.

NLS had 10 employees working on site on October 28-31, 2015.

Meetings

The weekly progress meeting was held on Wednesday, October 28, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Gravel bedding, reinforced concrete pipe, and 40 mil HDPE geomembrane were installed on the site.

Testing/Sampling

Non-destructive air testing of HDPE geomembrane seams was performed on October 31, 2015. Testing of trial seams for the HDPE geomembrane was performed on October 30 and 31, 2015. Refer to the geomembrane logs for additional information.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/26/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0830 Depart: 1430 Travel: 3.00 Total: 9.00

AM Conditions: Clear
AM Temperature: 49 F
PM Conditions: Clear
PM Temperature: 67 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 2 excavators, 2 bulldozers, 2 haul trucks, 2 compactors (see notes)
Personnel: **WB Koester:** 8 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/26/2015 Date
Geotechnology, Inc. Engineer 10/2/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/26/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment details: 2 excavators (1 Komatsu PC 350, 1 Caterpillar 320B), 2 bulldozers (Caterpillar D6N LGP with GPS), 2 haul trucks (John Deere 400D), 1 sheepsfoot roller (CA 251), 1 smooth drum roller (CS 433E), 1 skidsteer.

Two excavators, one skidsteer, one haul truck, and one smooth drum roller installed a RCP culvert on the main access road near the northern corner of Ash Pond A. Access to the road was restored by 1100.

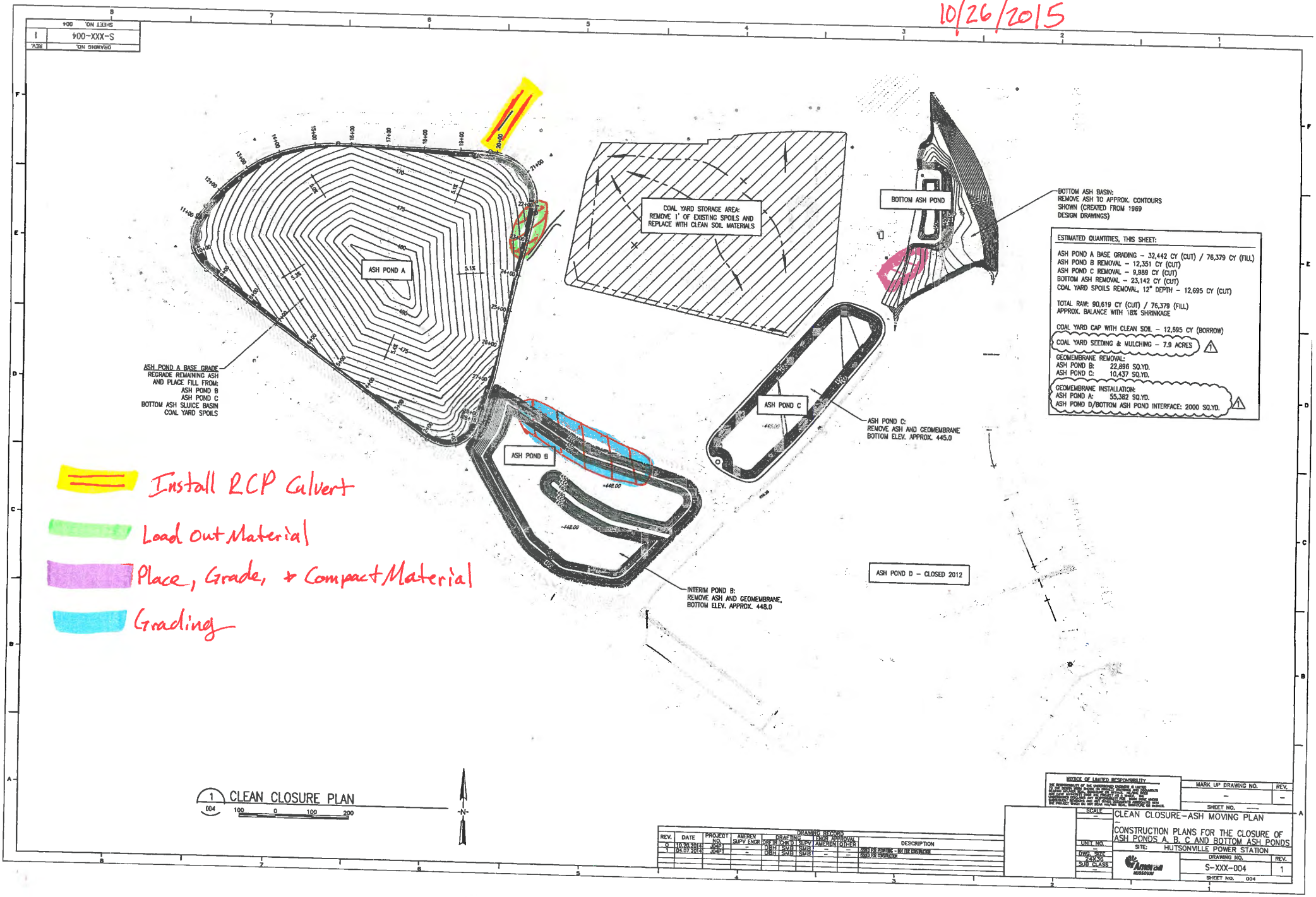
One excavator loaded large cementitious material from the levees of Ash Pond A into one haul truck. The material was deposited at the east end of the Bottom Ash Pond as fill. One bulldozer graded the Bottom Ash Pond. One sheepsfoot roller compacted the fill at the Bottom Ash Pond.

One bulldozer graded Ash Pond B.

The skidsteer cleaned the roads.

Electronic Filing: Received, Clerk's Office 09/28/2020

10/26/2015



DRAWING NO.	REV.
S-XXX-004	1
SHEET NO. 004	

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFT	DRFT	CHK'D	SUPV	ENGR APPROVAL AMEREN	OTHER	DESCRIPTION
0	10.26.2014	J04PT	–	DBH	SMB	SMB	–	–		ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	J04PT	–	DBH	SMB	SMB	–	–		ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ——

SCALE –
UNIT NO. –
Dwg. Size 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/27/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1430 Travel: 0.00 Total: 8.00

AM Conditions: Cloudy with Rain
AM Temperature: 51 F
PM Conditions: Cloudy with Rain
PM Temperature: 60 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment:
Personnel:
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Geotechnology, Inc. Rep. 10/27/15 Date
Geotechnology, Inc. Engineer 11/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/27/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Rain day. No work performed today.

The quantity of rain reported by accuweather.com for Hutsonville was 0.61 inches for the day.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/28/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1430 Travel: 0.00 Total: 8.00

AM Conditions: Cloudy with misting rain
AM Temperature: 57 F
PM Conditions: Cloudy with misting rain
PM Temperature: 60 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 excavators
Personnel: **WB Koester:** 6 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/28/15 Date
Geotechnology, Inc. Engineer 11/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/28/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E)

One excavator excavated a ditch to one culvert under the main entry road near the northern corner of Ash Pond A.

Two excavators developed and redeveloped drainage around the borders of Ash Pond A.

All employees except for the superintendent left site at 1200 due to the weather conditions.

National Lining Systems:

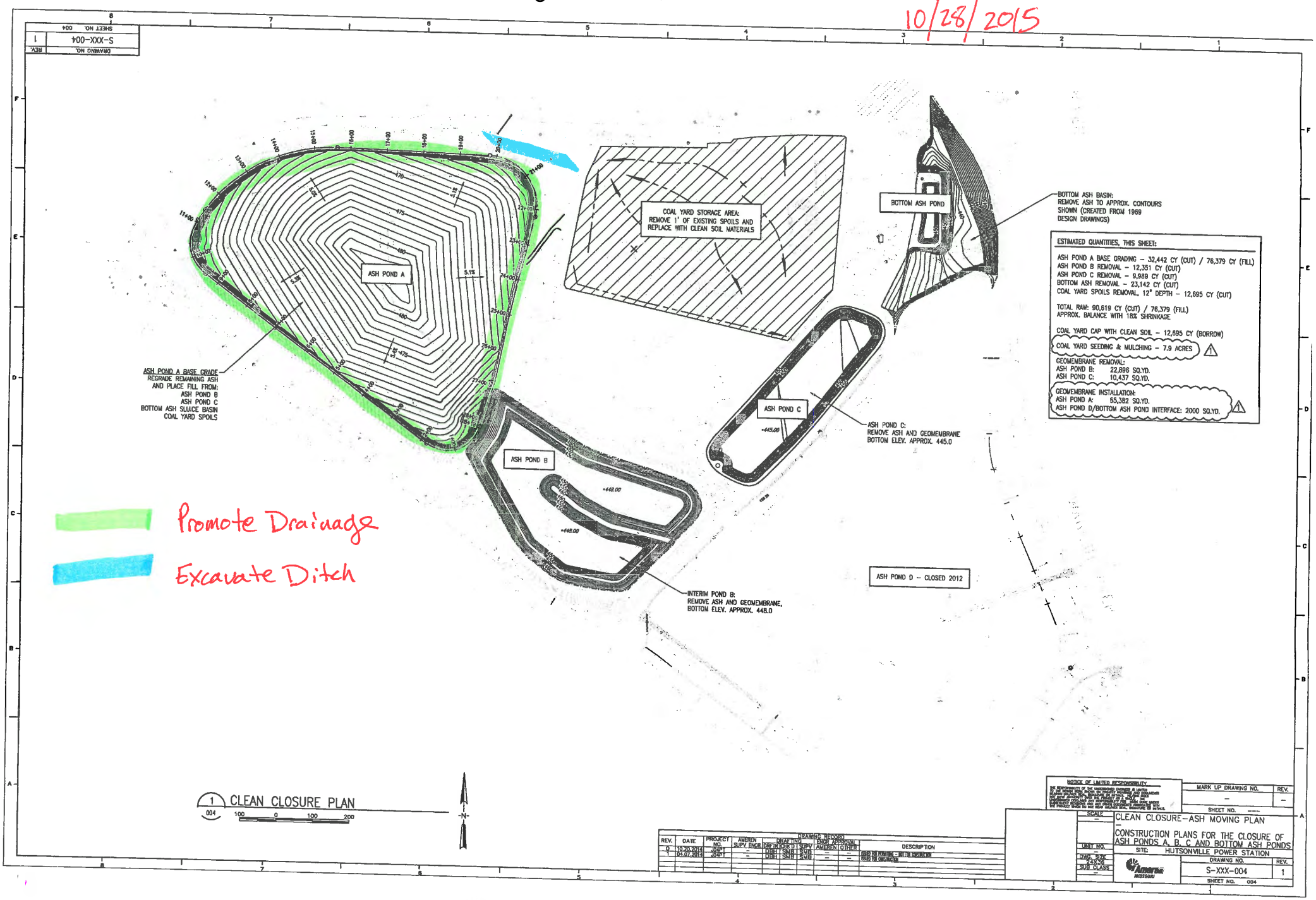
Arrived on site at 1000. Went through site safety orientation. Filled sand bags.

Other:

The quantity of rain reported by accuweather.com for Hutsonville was 0.34 inches for the day.

The weekly progress meeting was held at 1030. Refer to the meeting minutes for additional information.

10/28/2015



DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Promote Drainage
Excavate Ditch
1 CLEAN CLOSURE PLAN
004
100 0 100 200
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. – REV. –
SHEET NO. ---
SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRF'R CHK'D SUPV ENGR APPROVAL AMEREN OTHER DESCRIPTION
0 10.20.2014 J04PT – DBH SMB SMB – – ISSUED FOR PERMITTING – BOTTOM CONSTRUCTION
1 04.07.2014 J04PT – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 10-28-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , John Patterson (phone), Tim Free, Ken Beckman (phone)

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.

Manpower

- Man hours
  - Start of Job (4-27-15) through 10-26-15
    - Total = 10,075 hrs.
- Next week expected manpower
  - WBK = 8 total this week, 12 total next week
  - 5-8 hrs days approx. except Chris and operator will be on site whenever the Liner crew is working.
  - Liner crew (National Lining Systems) is on site and weather permitting will begin liner deployment this week. They have 10 employees and will likely work 6 – 5, and may work Saturdays and Sundays, weather permitting.
  - If Liner crew is working Sunday, Chris is to tell Don by Noon on Thursday.

Review old minutes and action items

- LAMAC has not been on site yet due to weather to locate the property boundaries of the borrow field.
- Archeological study has not been performed on field yet either.

Electronic Filing: Received, Clerk's Office 09/28/2020

Material Issues

- No issues

Quality Control Issues

- Steve with Geotechnology, Inc will be on site today to be QC for the liner install.

Schedule Compliance

- Natinal Lining Systems on site today filling sand bags. Will evaluate with Geotechnology to see if Pond A or the Pond D tie in location is stable/dry enough to begin installation this week.
- Likely will take 1 week after obtaining the liner destructive test samples to get results.
- Chris has about 1,000 CY of material to remove from Pond B to complete.
- Looking to seed Coal yard, Pond C, Pond B and stockpile area outside fence October 30 if it is dry enough.
- Existing Pond B outfall is still being utilized. Pump from BA pond to Pond B outfall. Once the BA Pond Levee is breached and turned into an outfall the pumping will stop and Pond B outfall will be plugged and abandoned. Bob to submit plugging procedure.
- New Pond B outlet pipe has 8" of soil cover, Mike would like it shaped up and additional vegetative soil cover placed. Can also use geotextile with Rip Rap.
- Brandenberg may take 6-7 weeks for them to complete.

Cost and Budget Control

- Bob to submit request for EWO to place erosion control blanket on slopes of Pond B and C.
- Mike will send Bob's Excel file on the EWO for Excess Ash and additional off site borrow needs to Don and Tim for review.
- August invoice should be paid this week. September invoice has been submitted and should be paid in a couple of weeks.

Next Meeting Scheduled: November 4, 2015 at 9:00 CST

Action Items -

- Bob to submit request for EWO for Erosion Control Blanket
- Bob to submit procedure for plugging pipe at Pond B outfall.
- Mike will send Bob's Excel file on the EWO for Excess Ash and additional off site borrow needs to Don and Tim for review.
- Chris to check on National Lining's operator's qualifications. They are deploying with a skid steer.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/29/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1730 Travel: 0.00 Total: 10.50

AM Conditions: Clear
AM Temperature: 44 F
PM Conditions: Clear
PM Temperature: 52 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 excavators, 2 bulldozers, 2 haul trucks
Personnel: **WB Koester:** 8 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/29/2015 Date
Geotechnology, Inc. Engineer 11/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/29/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 2 bulldozers with GPS (Caterpillar D6N LGP), 2 haul trucks (John Deere 400D), 1 water truck, 1 skid steer.

In the early morning for 1 hour, one excavator loaded rip rap into a haul truck and another excavator placed the rip rap at the new outfall inlet in the southeast corner of Ash Pond B.

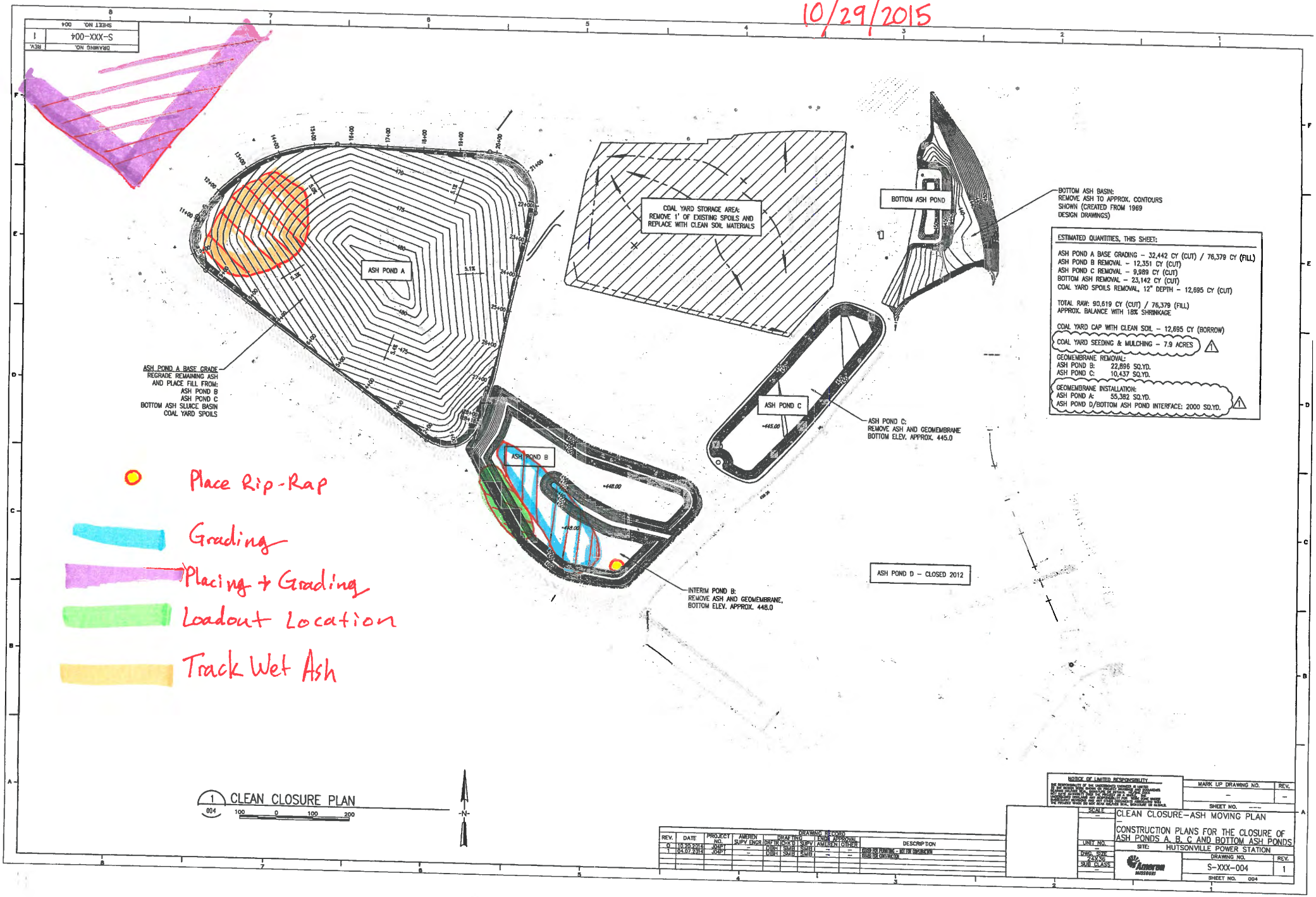
One bulldozer graded Ash Pond B. One excavator loaded excess material at Ash Pond B into haul trucks. Two haul trucks moved the excess material to the former stockpile location outside the gate. One bulldozer graded the material placed at the former stockpile location.

One bulldozer tracked ash in the southeast corner of Ash Pond A to promote drying.

National Lining Systems:

Filled sand bags. Site was too wet to begin liner.

10/29/2015



1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING DRT.	DRAFTING CHK'D	SUPV	ENGR. APPROVAL AMEREN	ENGR. APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR DRAWING – NOT FOR CONSTRUCTION
1	04.07.2015	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF
ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren MISSOURI

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/30/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 46 F
PM Conditions: Clear
PM Temperature: 55 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 excavators, 2 bulldozers, 1 skidsteer; **NLS:** 1 skidsteer
Personnel: **WB Koester:** 8 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location drawing for more information.

Geotechnology, Inc. Rep. 10/30/2015 Date
Geotechnology, Inc. Engineer 10/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/30/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 2 bulldozers with GPS (Caterpillar D6N LGP), 1 water truck, 1 skid steer.

Two bulldozers graded Ash Pond B.

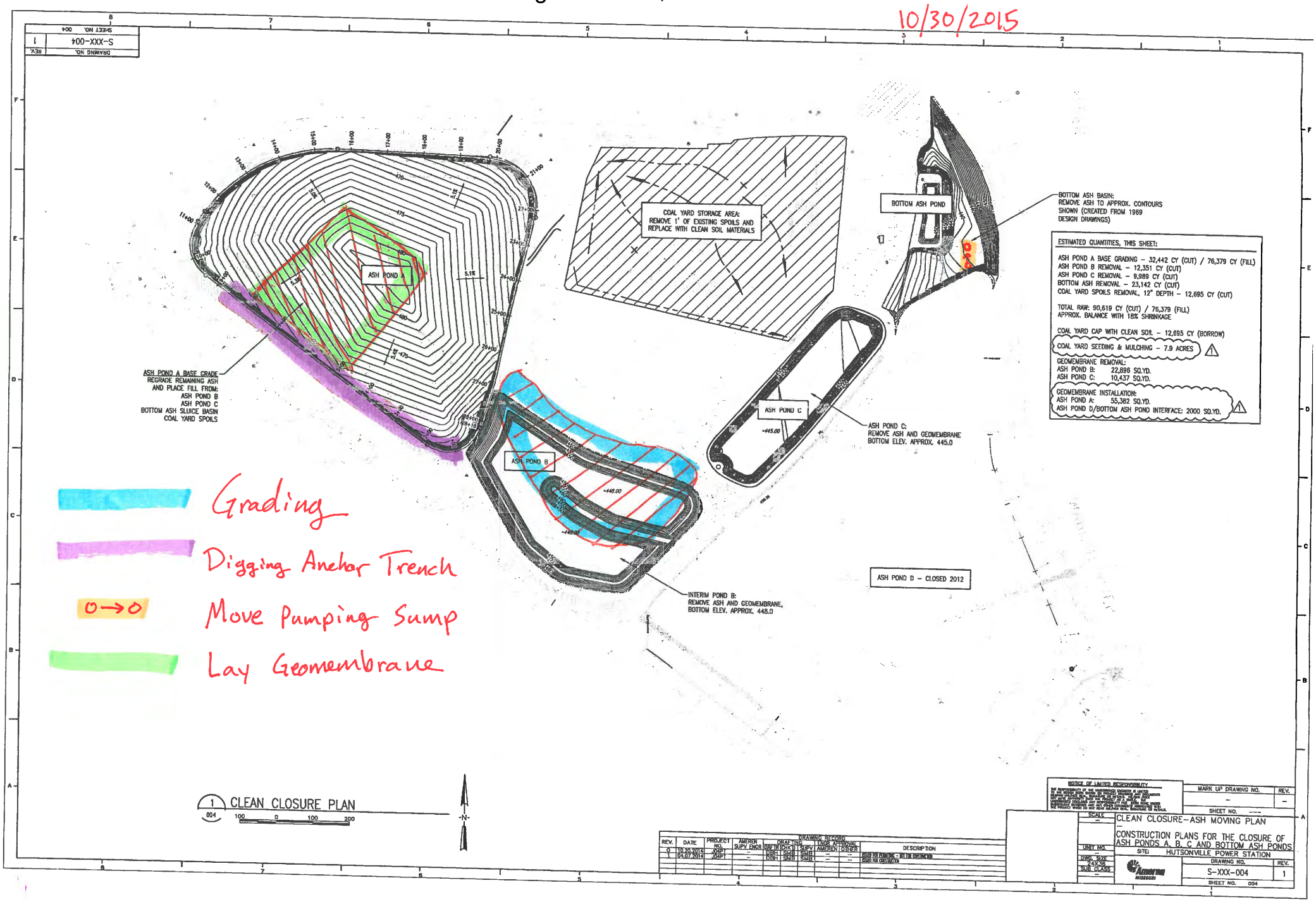
Two excavators dug an anchor trench at the south side of Ash Pond A for the HDPE geomembrane.

One excavator moved the pumping sump at the Bottom Ash Pond away from the location of the anchor trench at the base of the east levee.

National Lining Systems:

Installed liner on Ash Pond A. See field notes for additional information.

10/30/2015


DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004
ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA: REMOVE 1' OF EXISTING SPOILS AND REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
BOTTOM ASH BASIN: REMOVE ASH TO APPROX. CONTOURS SHOWN (CREATED FROM 1969 DESIGN DRAWINGS)
ASH POND A BASE GRADE REGRADE REMAINING ASH AND PLACE FILL FROM: ASH POND B ASH POND C BOTTOM ASH SLUICE BASIN COAL YARD SPOILS
ASH POND C: REMOVE ASH AND GEOMEMBRANE BOTTOM ELEV. APPROX. 445.0
INTERIM POND B: REMOVE ASH AND GEOMEMBRANE, BOTTOM ELEV. APPROX. 448.0
ASH POND D – CLOSED 2012
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Grading
Digging Anchor Trench
Move Pumping Sump
Lay Geomembrane
1 CLEAN CLOSURE PLAN
004
100 0 100 200
N
NOTICE OF LIMITED RESPONSIBILITY
MARK UP DRAWING NO. –
REV. –
SHEET NO. ---
SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
Ameren MISSOURI
DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004
DRAWING RECORD
REV. DATE PROJECT NO. AMEREN SUPV ENGR DRAFTING DRFTR CHK'D SUPV AMEREN OTHER DESCRIPTION
0 10.20.2014 JO4PT – DBH SMB SMB – – ISSUED FOR PLANNING – BUILT FOR CONSTRUCTION
1 04.07.2014 JO4PT – DBH SMB SMB – – ISSUED FOR CONSTRUCTION

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 10/31/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1330 Travel: 0.00 Total: 7.00

AM Conditions: Clear
AM Temperature: 42 F
PM Conditions: Clear
PM Temperature: 58 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 excavators, 1 bulldozer, 1 compactor, 1 skidsteer; **NLS:** 1 skidsteer
Personnel: **WB Koester:** 5 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

10/31/15
Geotechnology, Inc. Rep. Date

11/2/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 10/31/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 308E), 1 bulldozer with GPS (Caterpillar D6N LGP), 1 smooth drum roller (CA 251), 1 skid steer.

One bulldozer graded Ash Pond B.

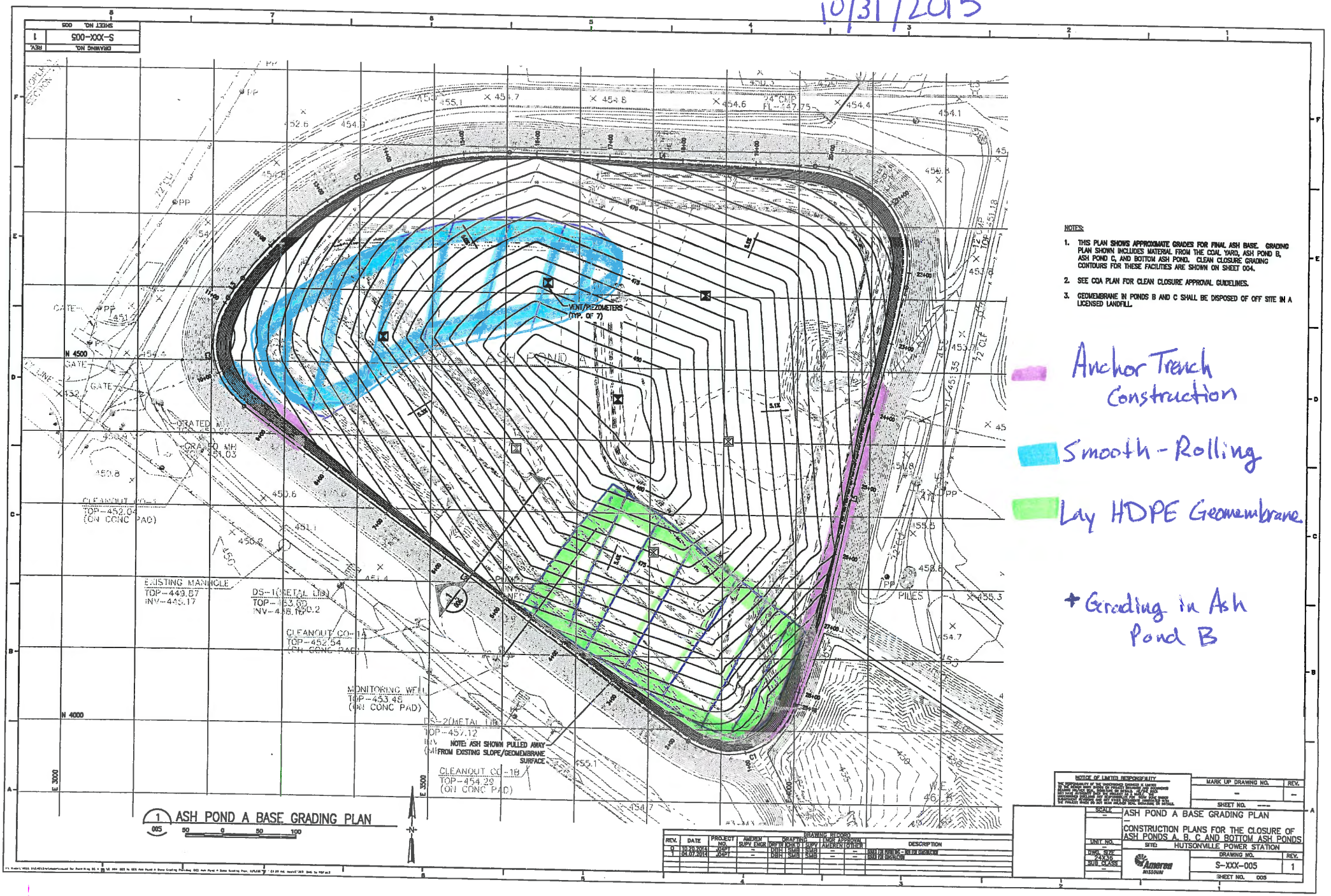
Two excavators dug an anchor trench at the south side of Ash Pond A for the HDPE geomembrane.

The skidsteer cleaned the road.

National Lining Systems:

Installed liner on Ash Pond A. See field notes for additional information.

10/31/2015


NOTES:
1. THIS PLAN SHOWS APPROXIMATE GRADES FOR FINAL ASH BASE. GRADING PLAN SHOWN INCLUDES MATERIAL FROM THE COAL YARD, ASH POND B, ASH POND C, AND BOTTOM ASH POND. CLEAN CLOSURE GRADING CONTOURS FOR THESE FACILITIES ARE SHOWN ON SHEET 004.
2. SEE CCA PLAN FOR CLEAN CLOSURE APPROVAL GUIDELINES.
3. GEOMEMBRANE IN PONDS B AND C SHALL BE DISPOSED OF OFF SITE IN A LICENSED LANDFILL.
Anchor Trench Construction
Smooth-Rolling
Lay HDPE Geomembrane
+ Grading in Ash Pond B
VENT/PIEZOMETERS (TYP. OF 7)
ASH POND A
EXISTING MANHOLE TOP=449.67 INV=445.17
CLEANOUT CO-1 TOP=452.06 (ON CONC PAD)
CLEANOUT CO-15 TOP=452.54 (ON CONC PAD)
MONITORING WELL TOP=453.45 (ON CONC PAD)
CLEANOUT CO-18 TOP=454.29 (ON CONC PAD)
NOTE: ASH SHOWN PULLED AWAY FROM EXISTING SLOPE/GEOMEMBRANE SURFACE
1 ASH POND A BASE GRADING PLAN
SCALE 1" = 50'
ASH POND A BASE GRADING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-005
REV. 1
SHEET NO. 005

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - Placing RCP culvert under the main access road near the northeast corner of Ash Pond A, looking south.



Photograph 2 - Placing gravel over RCP culvert under the main access road near the northeast corner of Ash Pond A, looking south.



Photograph 3 - Loading out large cementitious material from the Ash Pond east levee, looking north.



Photograph 4 - View of placing, grading, and compacting material from the Ash Pond Levee at the southwest corner of the Bottom Ash Pond, looking south.



Photograph 5 - View of Ash Pond C, looking north, showing wet conditions after a rainy day on 10/27/2015.



Photograph 6 - View of excavation of ditch between installed culverts at the intersection north of Ash Pond A, looking south.



Photograph 7 - View of excavator moving soil to allow drainage of Ash Pond A looking west, showing wet conditions on Ash Pond A.



Photograph 8 - View of National Lining Systems employees filling sand bags, looking northwest.

Photographs taken by Jessie Hahn of Geotechnology, Inc. October 26-30, 2015.



Photograph 9 - View of installation of filter fabric and rip-rap at the RCP inlet at the southeast corner of Ash Pond B.



Photograph 10 - View of loading out material from the southwest corner of Ash Pond B, looking southwest.



Photograph 11 - View of placing and grading material at the former CCW stockpile outside the gate, looking north.



Photograph 12 - View of testing trial seams on Ash Pond A, looking west.



Photograph 13 - View of placing panels on Ash Pond A, looking southeast.



Photograph 14 - View of new location for pumping sump at the Bottom Ash Pond, looking north.



Photograph 15 ⮝ - View of smooth-roller on the southwest corner of Ash Pond A, looking southwest.



Photograph 16 ⮝ - View of anchor trench excavation at the east levee of Ash Pond A, looking east.



Photograph 17 - View of fusion-welding two HDPE geomembrane panels on Ash Pond A, looking west.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: November 18, 2015

SUBJECT: Weekly Summary Report for November 1, 2015 to November 7, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 34 to 57°F, and temperature highs ranged from 58 to 74°F. No work was performed Friday, November 6, due to rain.

Construction Activities

Excess material from Ash Pond B was placed at the Bottom Ash Pond and into a stockpile at the southern side of the Coal Yard. Ash Pond B and the Bottom Ash Pond were graded.

WB Koester excavated an anchor trench for the HDPE geomembrane at Ash Pond A and the Bottom Ash Pond. After HDPE geomembrane placement, WB Koester backfilled the anchor trenches at Ash Pond A between seams.

Earth Images seeded the field outside the gate, the Coal Yard, Ash Pond B, and Ash Pond C.

National Lining Systems (NLS) placed, seamed, and tested 40 mil HDPE geomembrane on Ash Pond A.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E, 1 Hyundai 290), 3 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller (CA251), 1 smooth drum roller (CS-433E), and 1 skidsteer.

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WB Koester had 5 employees working on site: 2 laborers, 1 mechanic, and 2 equipment operators.

NLS had 10-11 employees working on site and 1 skidsteer.

Earth Images had 4 employees working on site and had 1 hydroseeder, 1 straw spreader, and 1 skidsteer on site.

Meetings

The weekly progress meeting was held on Wednesday, November 4, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

40 mil HDPE geomembrane and grass seed with straw were installed on the site.

Testing/Sampling

Testing of trial seams and non-destructive air testing of HDPE geomembrane seams were performed on site. Destructive samples of HDPE geomembrane seams were tested on site and then sent to an independent laboratory for further testing.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/01/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0700 Depart:1630 Travel: 0.00 Total: 9.00

AM Conditions: Clear
AM Temperature: 51 F
PM Conditions: Clear
PM Temperature: 66 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 excavators, 1 bulldozer, 1 haul truck, 1 skidsteer; **NLS:** 1 skidsteer
Personnel: **WB Koester:** 5 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B. See attached location drawing for more information.

Geotechnology, Inc. Rep. 11/1/15 Date
Geotechnology, Inc. Engineer 11/5/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/01/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 308E), 1 bulldozer with GPS (Caterpillar D6N LGP), 1 haul truck (John Deere 400D), 1 skidsteer.

One tractor with scraper/roller box cleaned the roads and central site.

Two excavators dug an anchor trench at Ash Pond A for the HDPE geomembrane.

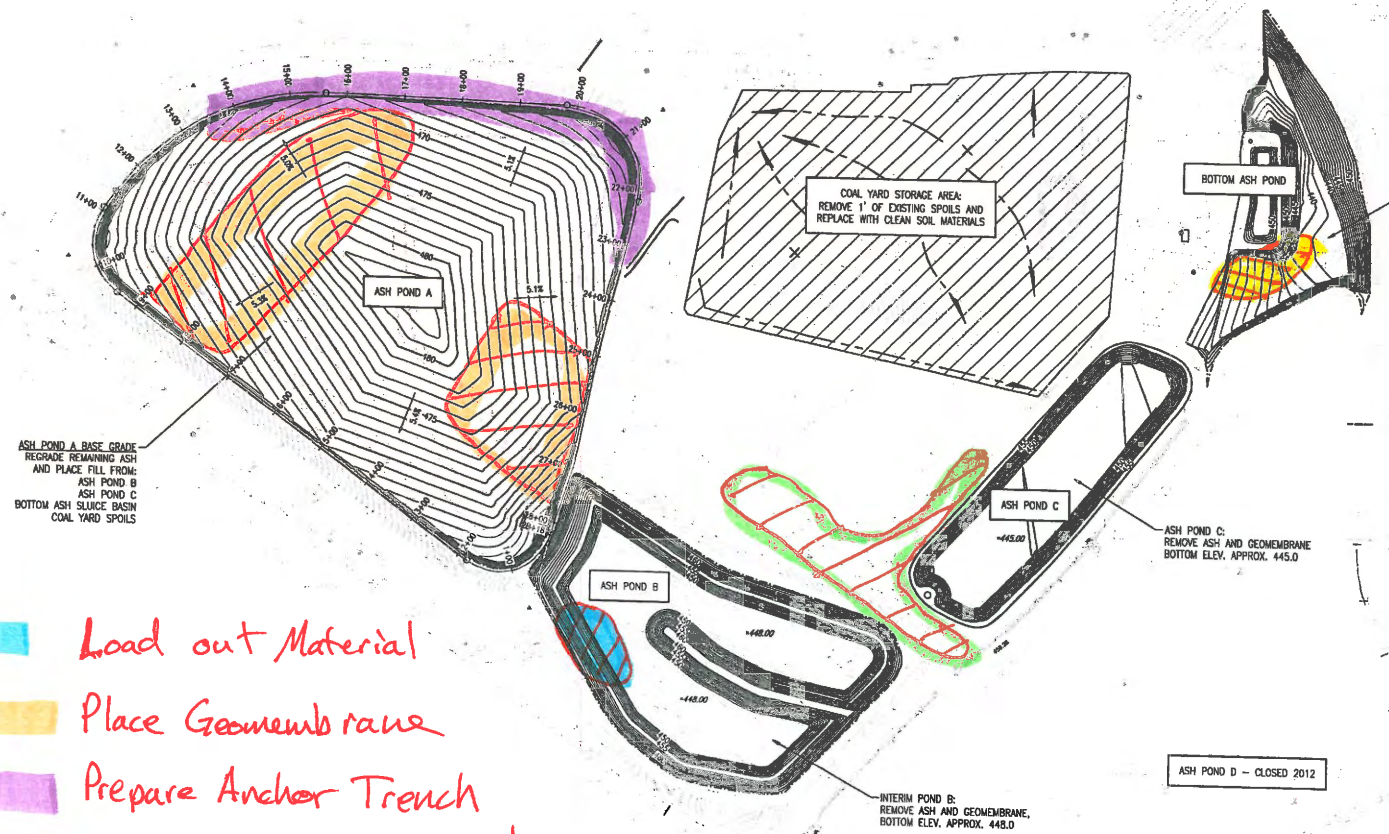
One bulldozer graded Ash Pond B. One excavator loaded out material from Ash Pond B. One haul truck transported the material to the Bottom Ash Pond. One bulldozer graded the material at the Bottom Ash Pond.

The skidsteer cleaned the road.

National Lining Systems:

Installed liner on Ash Pond A. See field notes for additional information.

11/1/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

Load out Material
Place Geomembrane
Prepare Anchor Trench
Place + Grade Material
General site cleanup

1 CLEAN CLOSURE PLAN
004
100 0 100 200

-N-

REV.	DATE	PROJECT NO.	DRAWING RECORD AMEREN SUPV ENGR	DRAFTING DSF	INITIATED	SUPV	ENGR APPROVAL AMEREN	OTHER	DESCRIPTION
0	10-20-2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION – WITH CONSTRUCTION
1	04-07-2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF
ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/02/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0700 Depart: 1700 Travel: 0.00 Total: 9.50

AM Conditions: Foggy, clearing by 1000
AM Temperature: 47 F
PM Conditions: Clear
PM Temperature: 67 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 excavators, 2 bulldozers, 1 haul truck, 1 skidsteer; **NLS:** 1 skidsteer
Personnel: **WB Koester:** 8 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, Coal Yard. See attached location drawing for more information.

Geotechnology, Inc. Rep. 11/2/2015 Date
Geotechnology, Inc. Engineer 11/5/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/02/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 excavators (1 Komatsu PC 350 LC, 1 Caterpillar 308E), 2 bulldozers with GPS (Caterpillar D6N LGP), 1 haul truck (John Deere 400D), 1 skidsteer.

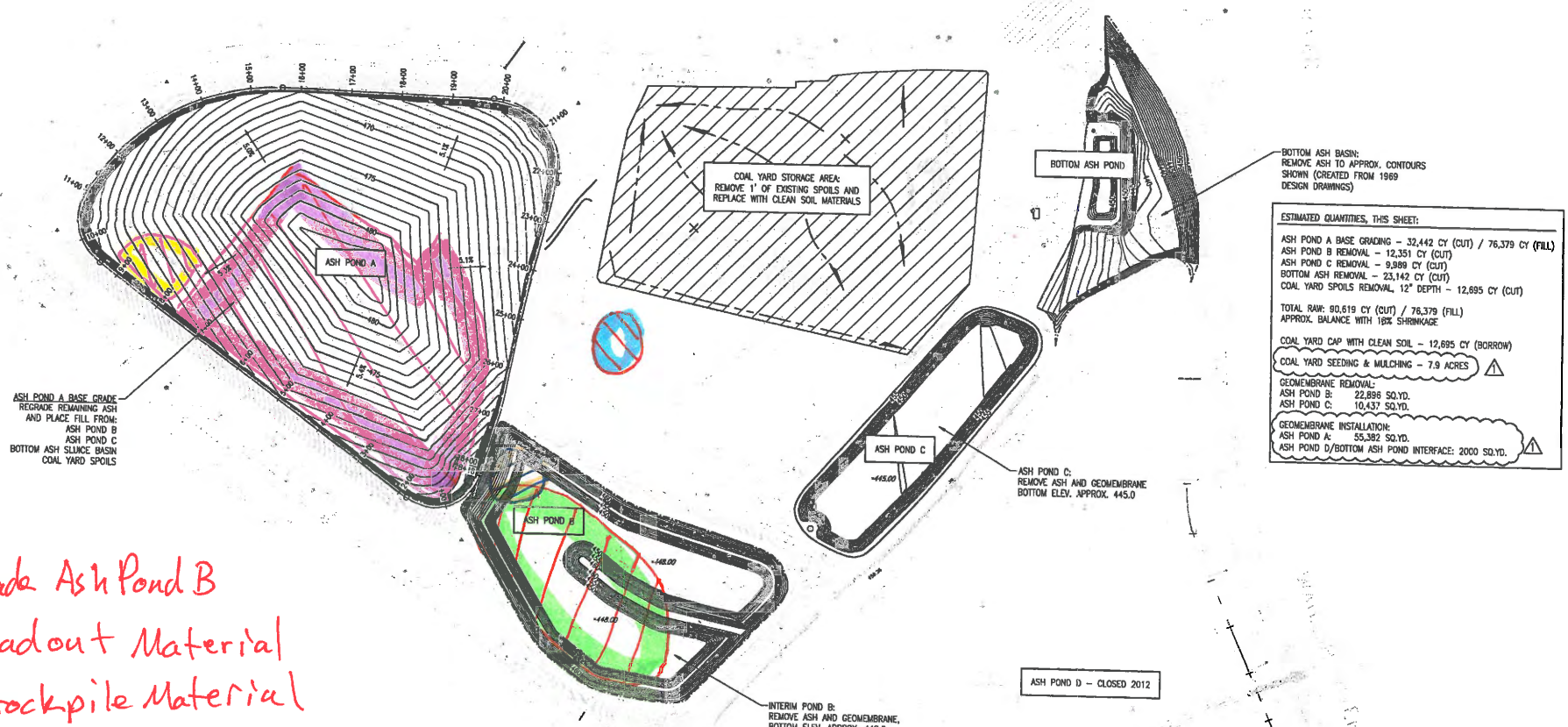
One bulldozer graded Ash Pond B. One excavator loaded out material from Ash Pond B. One haul truck transported the material to a stockpile location at the southeast corner of the Coal Yard. One bulldozer graded the material at the Coal Yard.

The skidsteer cleaned the road.

National Lining Systems:

Installed liner on Ash Pond A. See field notes for additional information.

11/2/15



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

Grade Ash Pond B

Loadout Material

Stockpile Material

Repairs and Testing Geomembrane

Smooth area ~~before it~~ for future placement of Geomembrane

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	CHK'D	SUPV	ENGR APPROVAL AMEREN	OTHER	DESCRIPTION
0	10.20.2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –

SHEET NO. –

SCALE –

CLEAN CLOSURE–ASH MOVING PLAN

CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS

UNIT NO. –

SITE: HUTSONVILLE POWER STATION

DWG. SIZE 24X36

SUB CLASS –

Ameren MISSOURI

DRAWING NO. S-XXX-004 REV. 1

SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1

SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/03/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart:1700 Travel: 0.00 Total: 10.00

AM Conditions: Clear
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 76 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 tractor with scraper roller box, 1 bulldozer, 1 skidsteer; **NLS:** 1 skidsteer
Personnel: **WB Koester:** 8 employees; **NLS:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Ash Pond B, field outside site gate. See attached location drawing for more information.

Geotechnology, Inc. Rep. 11/3/15 Date
Geotechnology, Inc. Engineer 11/5/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/03/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: One tractor with scraper roller box, 1 bulldozer with GPS (Caterpillar D6N LGP), 1 skidsteer.

One bulldozer graded Ash Pond B. One tractor with scraper/roller box graded the field outside the gate (former CCW stockpile). One skidsteer transported temporary culvert to a location adjacent to the potential borrow field in preparation for clearance to access the land.

The skidsteer cleaned the road.

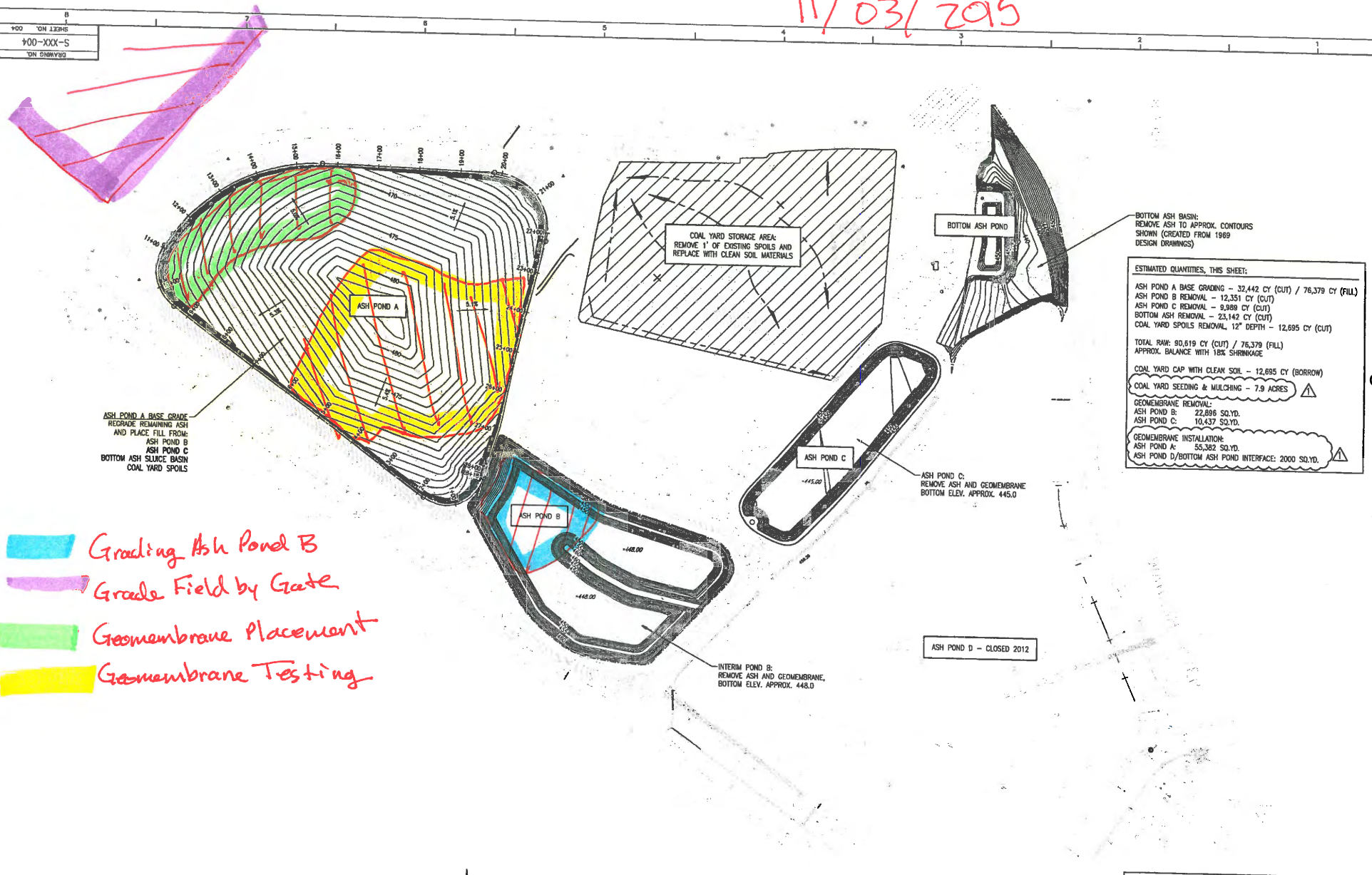
National Lining Systems:

Installed liner on Ash Pond A. See field notes for additional information.

At 1000, Jessie Hahn and Steve Graham of Geotechnology talked with Khamkhoun Thayravanh of NLS and indicated that they would like destructs cut and tested so that they could be sent off on 11/03/15. Thayravanh indicated that destructs would be cut and tested after lunch.

Destructs were tested immediately after trial welds after lunch.

11/03/2015



Grading Ash Pond B

Grade Field by Gate

Geomembrane Placement

Geomembrane Testing

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ----

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR	DRAFTING DSH	CHK'D	SUPV	ENGR APPROVAL AMEREN	OTHER	DESCRIPTION
0	10.20.2014	JOHP	–	DSH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	JOHP1	–	DSH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/04/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1700 Travel: 0.00 Total: 10.00

AM Conditions: Clear
AM Temperature: 63 F
PM Conditions: Clear
PM Temperature: 76 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 trackhoe, 1 bulldozer, 1 skidsteer; **NLS:** 1 skidsteer
Earth Images: 1 tractor, 1 hydroseeder, 1 straw spreader
Personnel: **WB Koester:** 5 employees; **NLS:** 11 employees; **Earth Images:** 4 employees.
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Ponds A and B, Coal Yard, field outside gate. See attached location drawing for more information.

Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/9/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/04/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 1 bulldozer with GPS (Caterpillar D6N LGP), 1 trackhoe, 1 skidsteer.

One backhoe excavated the vertical anchor trenches at the Ash Pond D slope.

One backhoe backfilled the anchor trench at Ash Pond A at specific locations, which were coordinated with National Lining Systems. Two laborers were present to remove larger pieces of cementitious material.

The skidsteer cleaned the road.

National Lining Systems:

Installed liner on Ash Pond A. See field notes for additional information.

At 1445, the skidsteer became stuck in the Ash Pond A subgrade adjacent to the access ramp location. The skidsteer was removed by WB Koester's bulldozer. The disturbed location was not covered by HDPE geomembrane.

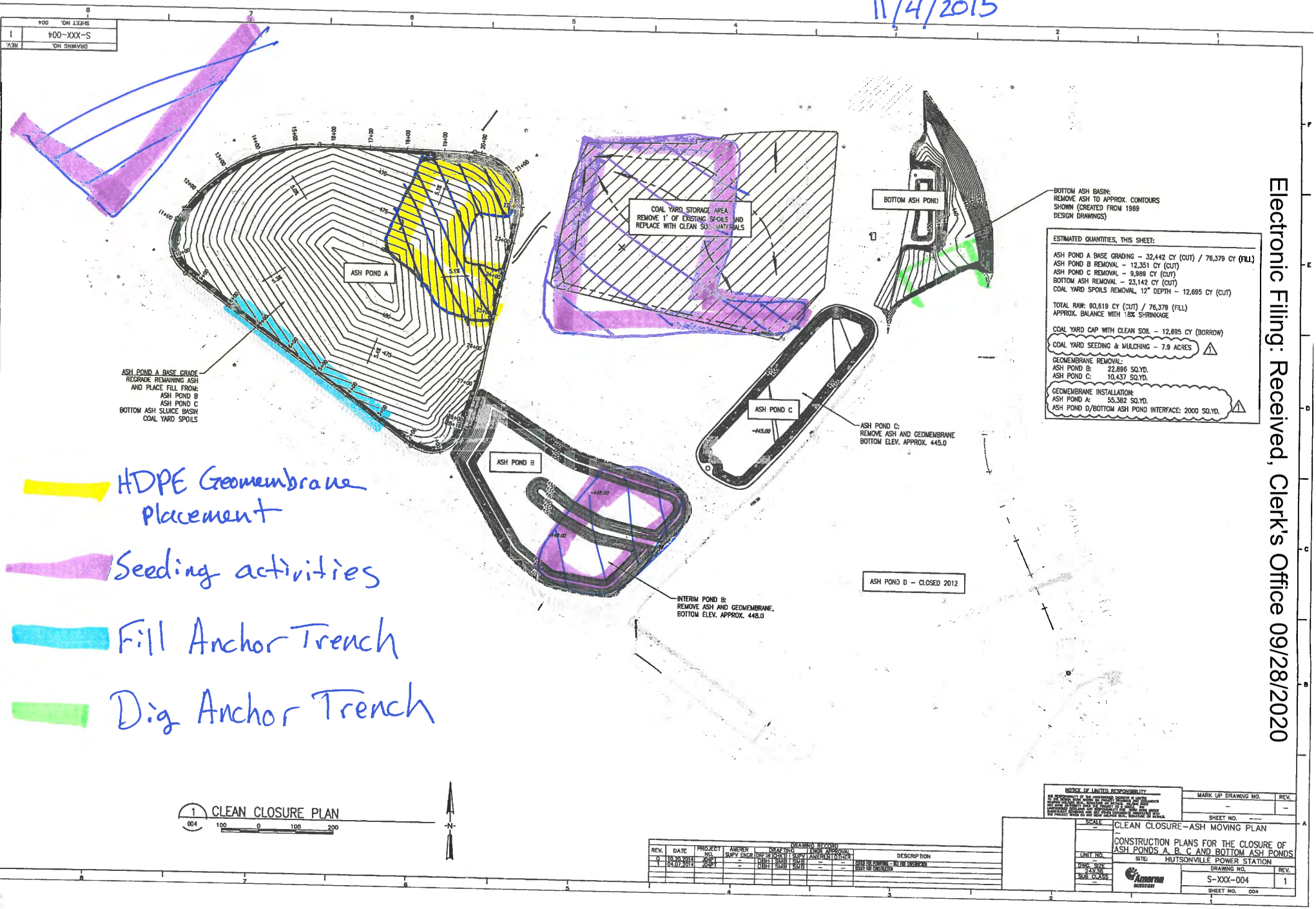
Earth Images:

Earth Images seeded the field outside the gate and the Coal Yard.

Other:

The weekly progress meeting was held at 0900. See the meeting minutes for additional information.

11/4/2015



DRAWING NO. S-XXX-004 REV. 1 SHEET NO. 004

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRFTR CHKD	SUPV	AMEREN APPROVAL AMEREN	OTHER	DESCRIPTION
0	10.20.2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONVENTING – NOT FOR CONSTRUCTION
1	04.07.2014	JOHPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ----

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

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Weekly Progress Meeting

Meeting Minutes

Date: 11-4-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff , John Patterson (phone), Mike Smallwood, Mike Bollinger

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.

Manpower

- Man hours
  - Start of Job (4-27-15) through 11-2-15
    - Total = 11,020 hrs.
- Next week expected manpower
  - WBK = 5 total this week
    - 5-8 hrs days approx. except Chris and operator will be on site whenever the Liner crew is working.
  - National Lining – 11 this week
    - Working 7 am to 5 pm.
    - Will work Saturday but not Sunday this week. Looking to complete by next Tuesday

Review old minutes and action items

- LAMAC has not been on site yet due to weather to locate the property boundaries of the borrow field.
- Archeological study has been performed on field, waiting on report from State

- Bob submitted EWO for additional erosion control blanket on slopes. Bob gave Mike W. sketch in meeting today.
- Bob needs to submit procedure for filling pond B outlet pipe with grout.
- Chris "task trained" National lining systems operator. Appears to be a very good operator per Chris and Don. The operator did sign into union on a project agreement.

Material Issues

- No issues

Quality Control Issues

- Steve with Geotechnology, Inc will be on site today to be QC for the liner install.

Schedule Compliance

- Liner placement continuing. Should have Pond A "blacked out" by end of day today, will then continue with testing and repairs on Pond A and will also install liner at Pond D tie in likely tomorrow.
  - Jessie say the liner installation is going good after they adjusted their welder.
  - A little behind on testing/repairs.
  - Gut feel is that testing/repairs can be complete by Friday Nov 13th.
- Archeological survey complete on borrow area. Waiting on results. Hopefully we will be good to go by early next week.
  - WBK will install gate to borrow area but will wait to strip topsoil.
- Seed Coal yard, Pond C, Pond B and stockpile area outside fence today.
- Existing Pond B outfall is still being utilized. Pump from BA pond to Pond B outfall. Once the BA Pond Levee is breached and turned into an outfall the pumping will stop and Pond B outfall will be plugged and abandoned. Bob to submit plugging procedure.
- Brandenberg may take 2 more weeks of pumping and then 2 weeks of grouting for them to complete. Still need to keep berm in Bottom Ash pond that whole time.

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Cost and Budget Control

- Bob submitted October invoice to Mike W. this week.
- Mike still evaluating EWO for the excess ash and borrow soil.

Next Meeting Scheduled: November 11, 2015 at 9:00 CST

Action Items -

- Bob to submit procedure for plugging pipe at Pond B outfall.
- Don to look into getting new locks for new wells. All keyed the same.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/05/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1330 Travel: 0.00 Total: 7.00

AM Conditions: Cloudy
AM Temperature: 63 F
PM Conditions: Cloudy, Rain
PM Temperature: 68 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Earth Images, Brandenberg
Equipment: **WB Koester:** 2 trackhoes, 1 skidsteer; **NLS:** 1 skidsteer
Earth Images: 1 tractor, 1 hydroseeder, 1 straw spreader
Personnel: **WB Koester:** 5 employees; **NLS:** 11 employees; **Earth Images:** 4 employees.
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Ponds A, B, and C and the Bottom Ash Pond. See attached location drawing for more information.

11/5/15
Geotechnology, Inc. Rep. Date

11/9/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/05/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Equipment Details: 2 trackhoes, 1 skidsteer.

One backhoe excavated the anchor trench at the base of the Ash Pond D slope.

One backhoe backfilled the anchor trench at Ash Pond A at specific locations, which were coordinated with National Lining Systems. Two laborers were present to remove larger pieces of cementitious material.

One backhoe removed the access ramp onto the Ash Pond A at the edge of the liner.

The skidsteer cleaned the road.

National Lining Systems:

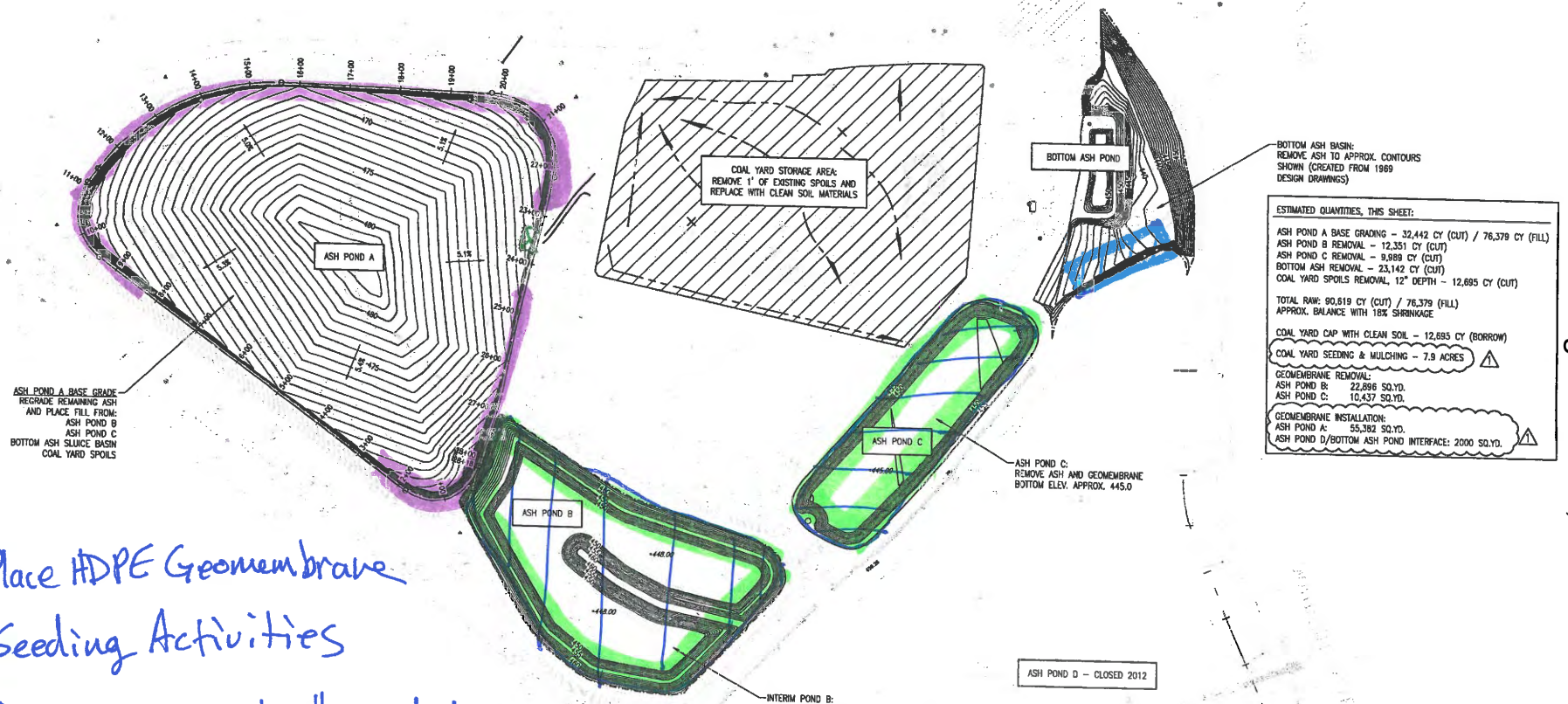
Installed liner on Ash Pond A. See field notes for additional information.

A rain day was called at 1315 and no further work was performed.

Earth Images:

Earth Images seeded Ash Pond B and Ash Pond C.

11/5/2015



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ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠

Place HDPE Geomembrane

Seeding Activities

Remove access to allow Membrane placement

Place soil in anchor trench (avoiding Geomembrane seams)

1 CLEAN CLOSURE PLAN
004
100 0 100 200

-N-

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DSGNR	SUPV	ENGR APPROVAL AMEREN	OTHER	DESCRIPTION
0	10.20.2014	JOBPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION – NOT TO BE CONSTRUCTED
1	04.07.2014	JOBPT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ----

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/06/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 0900 Travel: 3.00 Total: 6.00

AM Conditions: Cloudy
AM Temperature: 63 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 2 trackhoes, 1 skidsteer; **NLS:** 1 skidsteer
Personnel: **WB Koester:** 5 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Ponds A, B, and C and the Bottom Ash Pond. See attached location drawing for more information.

11/6/15
Geotechnology, Inc. Rep. Date

11/9/15
Geotechnology, Inc. Engineer Date

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/06/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Rain day. No work performed.

National Lining Systems:

Rain Day. No work performed.

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/07/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0700 Depart:1630 Travel: 0.00 Total: 9.00

AM Conditions: Clear
AM Temperature: 49 F
PM Conditions: Clear
PM Temperature: 58 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:**

Personnel: **WB Koester:** 1 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 11/18/15 Date
Geotechnology, Inc. Engineer 11/18/15 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/07/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

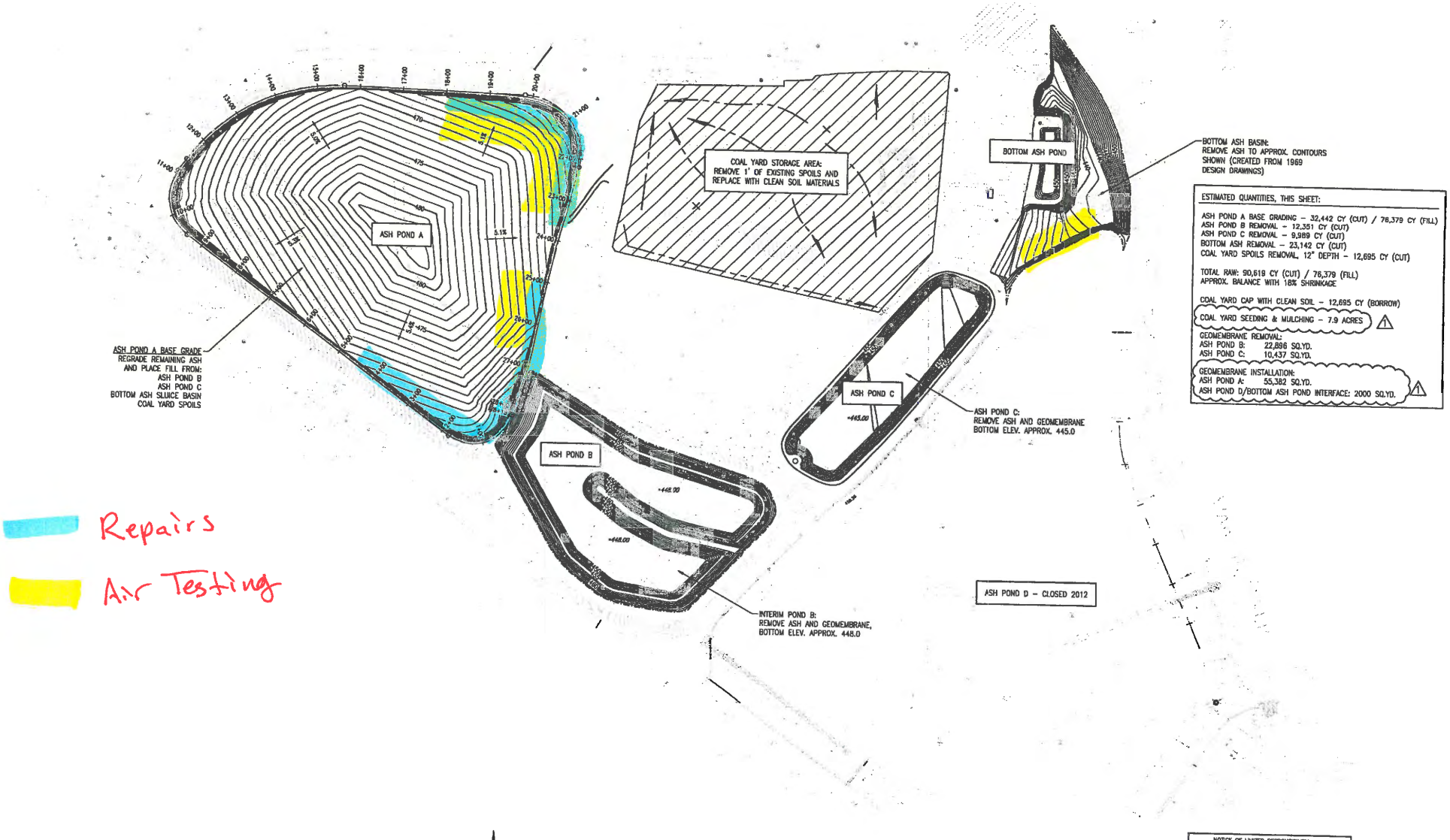
Ongoing demolition of buildings.

WB Koester:

National Lining Systems:

Repaired liner and ran air test on Ash Pond A. Ran air test on Ash Pond D slope. See field notes for additional information.

11/7/15



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 33,442 CY (CUT) / 78,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 78,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠

Repairs

Air Testing

1 CLEAN CLOSURE PLAN
004
100 0 100 200

-N-

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFT	DRFT CHK'D	SUPV	AMEREN	OTHER	DESCRIPTION
0	10.20.2014	ASPY	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2015	JCHT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - Preparation of surface before HDPE geomembrane installation on the east slope of Ash Pond A, facing north.



Photograph 2 - Excavating drainage swale in Ash Pond B, looking south.



Photograph 3 - Anchor trench excavation at the northeast corner of Ash Pond A, looking north.



Photograph 4 - Excess material excavation in Ash Pond B, looking south.



Photograph 5 - Material placement at the Bottom Ash Pond, looking north.



Photograph 6 - Trial fusion weld tests on Ash Pond A.



Photograph 7 - Fusion welding HDPE geomembrane on Ash Pond A, looking northeast.



Photograph 8 - Placing excess material from Ash Pond B into a stockpile in the south corner of the Coal Yard, looking west.



Photograph 9 - Preparing the Coal Yard for seeding, looking west.



Photograph 10 - Spreading straw over the seeded Coal Yard, looking northeast.



Photograph 11 - Placing HDPE geomembrane on the Ash Pond D slope, looking northeast.



Photograph 12 - Backfill material placement in the anchor trench.



Photograph 13 - Excavating the access ramp to Ash Pond A.



Photograph 14 - Preparing the Ash Pond D slope HDPE geomembrane for the tie-in to the existing Ash Pond D HDPE geomembrane, looking northeast.



Photograph 15 - View of Ash Pond A from 1900 Avenue, looking northeast.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: November 18, 2015

SUBJECT: Weekly Summary Report for November 9, 2015 to November 13, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 26 to 42°F, and temperature highs ranged from 53 to 70°F.

Construction Activities

Bottom Ash Pond levee material was used to backfill the anchor trench at the Ash Pond D slope and the Bottom Ash Pond was graded. The fencing around the site parking area was removed.

After HDPE geomembrane placement, WB Koester backfilled the anchor trenches at Ash Pond A and the Ash Pond D slope.

National Lining Systems (NLS) placed, seamed, and tested 40 mil HDPE geomembrane on Ash Pond A and the Ash Pond D north slope.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 4 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC, 1 Caterpillar 308E, 1 Hyundai 290), 3 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 water truck (Caterpillar 623B), 1 sheepsfoot roller (CA251), 1 smooth drum roller (CS-433E), and 1 skidsteer.

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WB Koester had 4-5 employees working on site: 1-2 laborers, 1 mechanic, and 2 equipment operators.

NLS had 11 employees working on site and 1 skidsteer.

Meetings

The weekly progress meeting was held on Wednesday, November 11, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

40 mil HDPE geomembrane and grass seed with straw were installed on the site.

Testing/Sampling

Testing of trial seams and non-destructive air testing of HDPE geomembrane seams were performed on site. Destructive samples of HDPE geomembrane seams were tested on site and then sent to an independent laboratory for further testing. Non-destructive vacuum box testing was conducted at HDPE extrusion welds on site and spark testing was conducted at boots on HDPE vents on Ash Pond A.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/09/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart:1700 Travel: 0.00 Total: 10.50

AM Conditions: Clear
AM Temperature: 49 F
PM Conditions: Clear
PM Temperature: 58 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 excavator
Personnel: **WB Koester:** 5 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

11/13/15
Geotechnology, Inc. Rep. Date

11/13/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/09/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

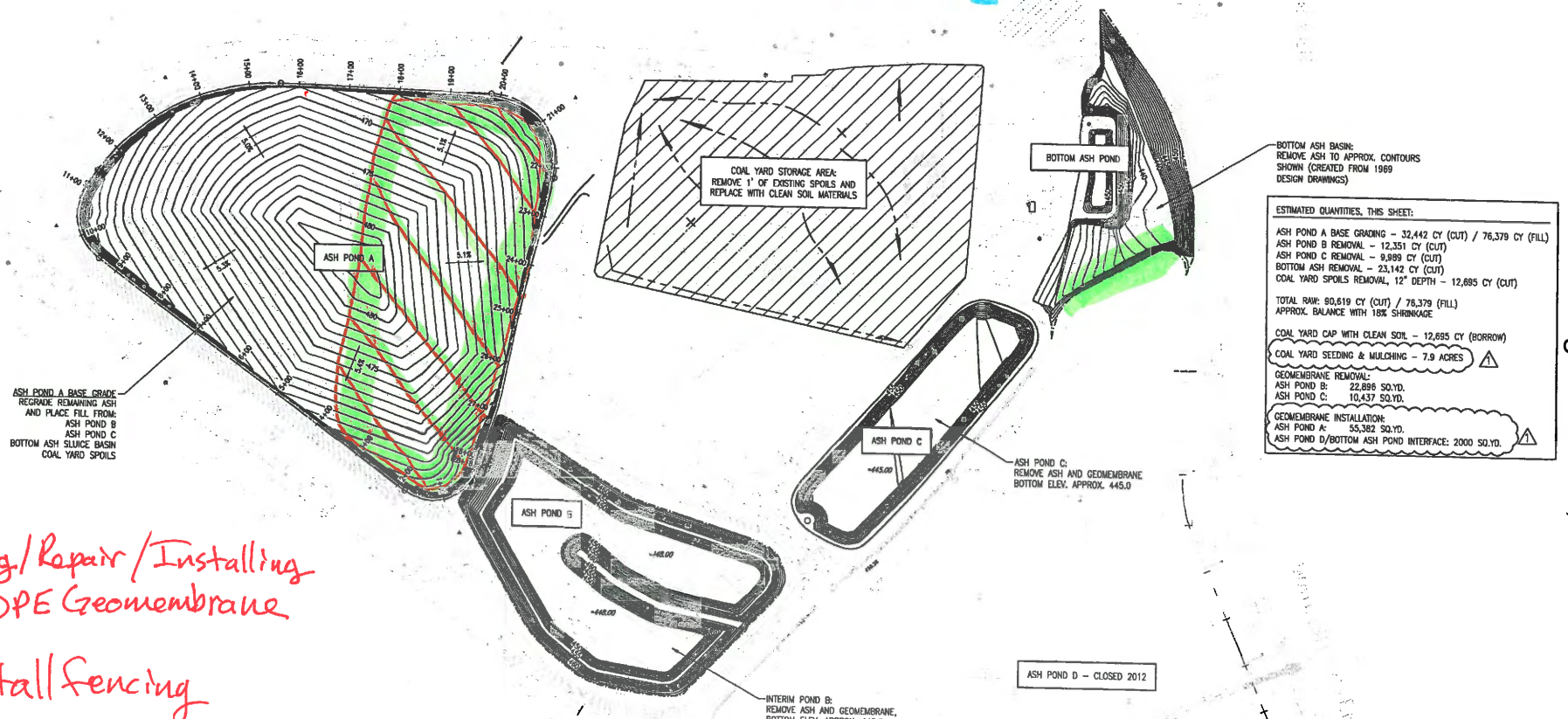
WB Koester:

Installed gate in fence north of Ash Pond A for access to borrow field. Removed fencing north of the construction trailers.

National Lining Systems:

Installed, repaired, and tested liner on Ash Pond A. Repaired and tested liner on the Ash Pond D slope. See field notes for additional information.

11/9/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 80,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES 1
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. 1

Testing/Repair/Installing HDPE Geomembrane

Uninstall fencing

Install Gate

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

Electronic Filing: Received, Clerk's Office 09/28/2020

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR	DRAFTING DRF'N	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10-30-2014	JKP1	–	DSH1	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04-07-2014	JKP1	–	DSH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. –

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/10/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart:1700 Travel: 0.00 Total: 10.50

AM Conditions: Clear
AM Temperature: 49 F
PM Conditions: Clear
PM Temperature: 58 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 excavator
Personnel: **WB Koester:** 5 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

Jessie Hahn 11/10/15
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/13/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/10/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

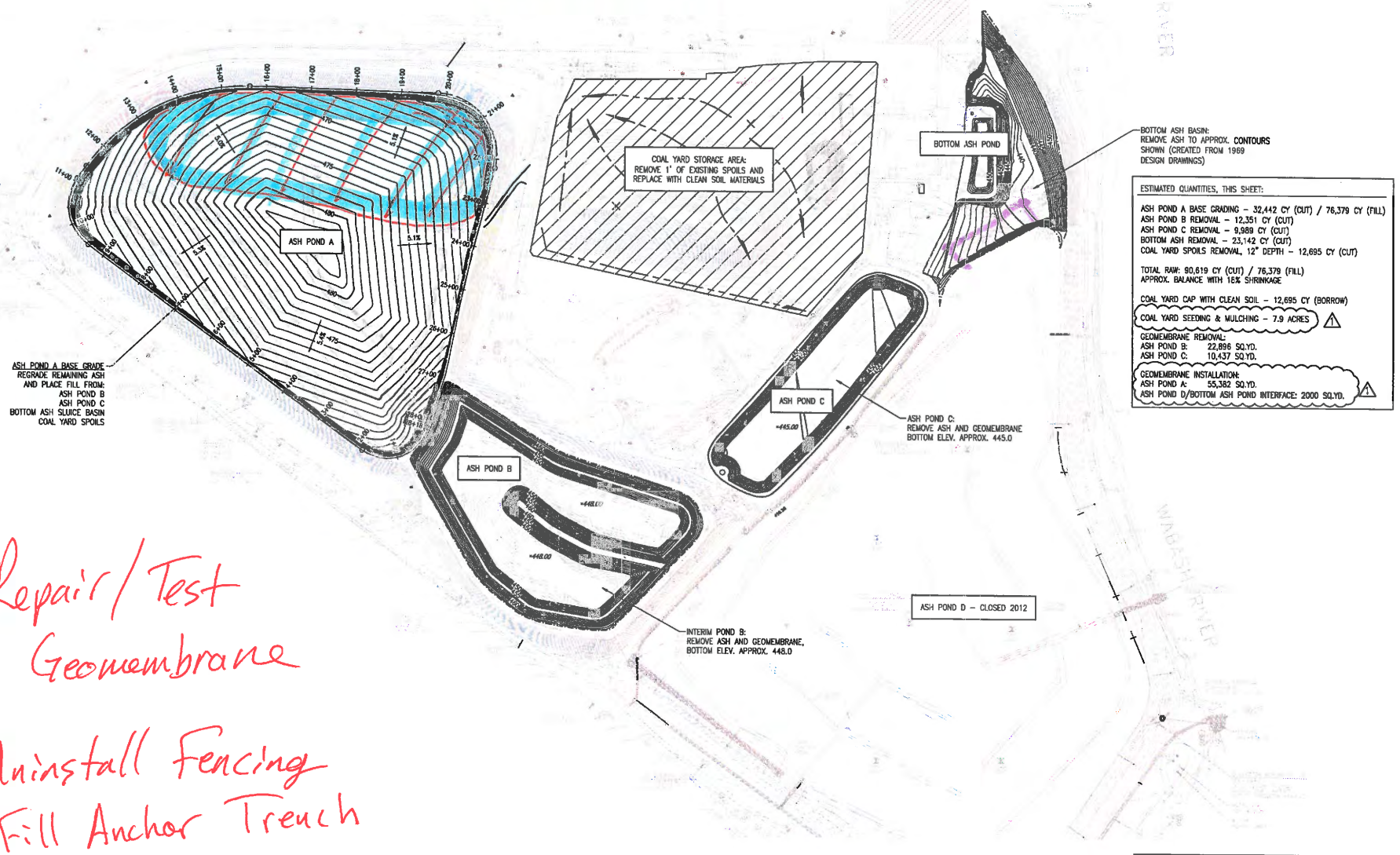
WB Koester:

Filled geomembrane anchor trench at the Bottom Ash Pond. Removed fencing north of the construction trailers.

National Lining Systems:

Repaired and tested liner on Ash Pond A. See field notes for additional information.

11/10/15



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 15% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠

Repair / Test Geomembrane

Uninstall Fencing

Fill Anchor Trench

1 CLEAN CLOSURE PLAN
004
100 0 100 200

-N-

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV.	ENGR. APPROVAL AMEREN	ENGR. APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – WITH DISCRETION
1	04.07.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren Missouri

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/11/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart:1700 Travel: 0.00 Total: 10.50

AM Conditions: Clear, windy
AM Temperature: 49 F
PM Conditions: Cloudy, windy
PM Temperature: 55 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 excavator
Personnel: **WB Koester:** 4 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

Jessie Hahn 11/11/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/13/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/11/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Filled geomembrane anchor trench at select locations around Ash Pond A.

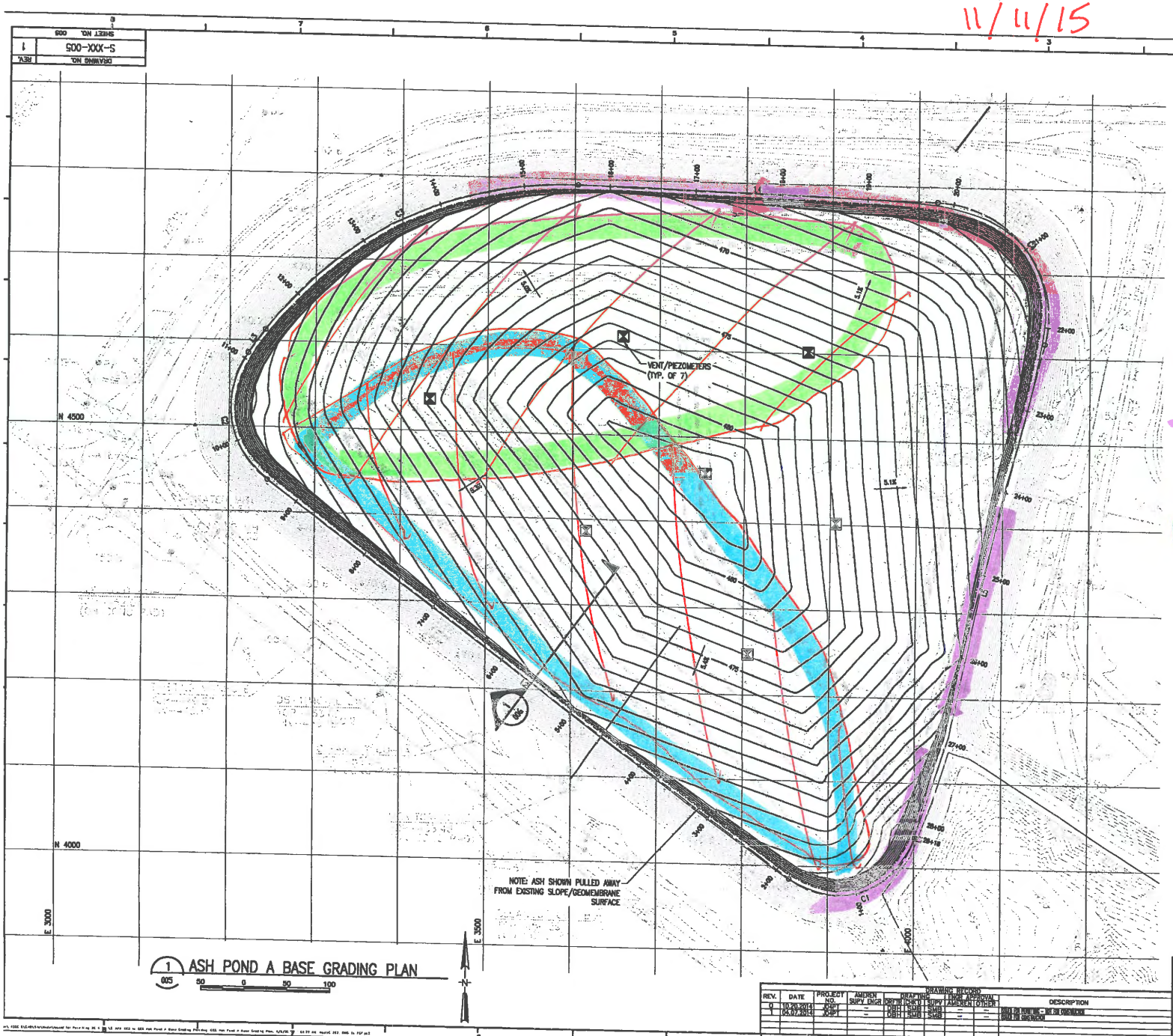
National Lining Systems:

Repaired and tested liner on Ash Pond A. See field notes for additional information.

Other:

The weekly progress meeting was held at 0900. See the meeting minutes for additional information.

11/11/15



NOTES:

1. THIS PLAN SHOWS APPROXIMATE GRADES FOR FINAL ASH BASE. GRADING PLAN SHOWN INCLUDES MATERIAL FROM THE COAL YARD, ASH POND B, ASH POND C, AND BOTTOM ASH POND. CLEAN CLOSURE GRADING CONTOURS FOR THESE FACILITIES ARE SHOWN ON SHEET 004.
2. SEE CQA PLAN FOR CLEAN CLOSURE APPROVAL GUIDELINES.
3. GEOMEMBRANE IN PONDS B AND C SHALL BE DISPOSED OF OFF SITE IN LICENSED LANDFILL.

Fill Anchor Trench
Repairs
Vacuum Box Testing

1 ASH POND A BASE GRADING PLAN
005 SCALE: 1" = 50'

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING CHK'D	DRAFTING DSN'D	ENGR APPROVAL SUPV.	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10/30/2014	JOBT	–	DBH	SMB	SMB	–	–	ISSUED FOR BID
1	05/07/2015	JOBT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY
THE REPRODUCTION OF THIS DRAWING/DOCUMENT CHANGES IN LIMITED RESPONSIBILITY PROJECT DELIVERY METHODS AS DESCRIBED IN ILLINOIS PUBLIC ACT 98-1039. THE ENGINEER OF RECORD IS RESPONSIBLE ONLY FOR THE SEALED DRAWINGS AND SPECIFICATIONS BEARING HIS/HER SEAL AND SIGNATURE. THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR ANY ADDITIONS OR DELETIONS TO THE SEALED DRAWINGS AND SPECIFICATIONS MADE BY ANY PERSON OTHER THAN THE ENGINEER OF RECORD OR HIS/HER DULY AUTHORIZED AGENTS OR EMPLOYEES. THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR ANY REUSE OF THE SEALED DRAWINGS AND SPECIFICATIONS WITHOUT THE ENGINEER OF RECORD'S SPECIFIC WRITTEN VERIFICATION OR ADAPTATION.

MARK UP DRAWING NO. –
REV. –
SHEET NO. –

SCALE: –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

ASH POND A BASE GRADING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-005
REV. 1
SHEET NO. 005

DRAWING NO. S-XXX-005
REV. 1
SHEET NO. 005

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Weekly Progress Meeting

Meeting Minutes

Date: 11-11-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff (phone), Tim Free

WB Koester: Chris Atkinson, Greg Head

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.

Manpower

- Man hours
  - Start of Job (4-27-15) through 11-9-15
    - Total = 11,859 hrs.
- Next week expected manpower
  - WBK = 5 total this week
    - 5-8 hrs days approx. except Chris and operator will be on site whenever the Liner crew is working.
  - National Lining – 11 this week
    - Working 7 am to 5 pm.
    - Looking to complete by end of week.

Review old minutes and action items

- Archeological study has been performed on field, waiting on report from State
- Bob needs to submit procedure for filling pond B outlet pipe with grout.
  - Submitted and Mike W. approved.

Material Issues

- No issues

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Quality Control Issues

- Liner testing and repairs is ongoing
- Soil from Bottom ash pond levee will need to be tested prior to placing on liner at Pond D tie in.

Schedule Compliance

- Liner testing/repairs ongoing. Should be complete by end of week.
- Archeological survey complete on borrow area. Waiting on results.
  - WBK installed gate to borrow area but will wait to strip topsoil.
- Existing Pond B outfall is still being utilized. Pump from BA pond to Pond B outfall. Once the BA Pond Levee is breached and turned into an outfall the pumping will stop and Pond B outfall will be plugged and abandoned. Should happen this week.
- Liner at Pond D tie in is complete. Waiting on environmental testing of Bottom Ash levee soil prior to filling on top of liner at this location.
- Chris demolished the remaining existing fence around the office trailers and parking areas.
- Brandenberg may take 2 more weeks of pumping and then 2 weeks of grouting for them to complete. Still need to keep berm in Bottom Ash pond that whole time.

Cost and Budget Control

- Mike still evaluating EWO for the excess ash and borrow soil. Hoping to have approval by next week.

Next Meeting Scheduled: November 18, 2015 at 9:00 CST

Action Items - None.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/12/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart:1700 Travel: 0.00 Total: 10.50

AM Conditions: Clear, windy
AM Temperature: 49 F
PM Conditions: Clear, windy
PM Temperature: 55 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 excavator, 1 bulldozer
Personnel: **WB Koester:** 3 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

Geotechnology, Inc. Rep. 11/12/2015 Date
Geotechnology, Inc. Engineer 11/17/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/12/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

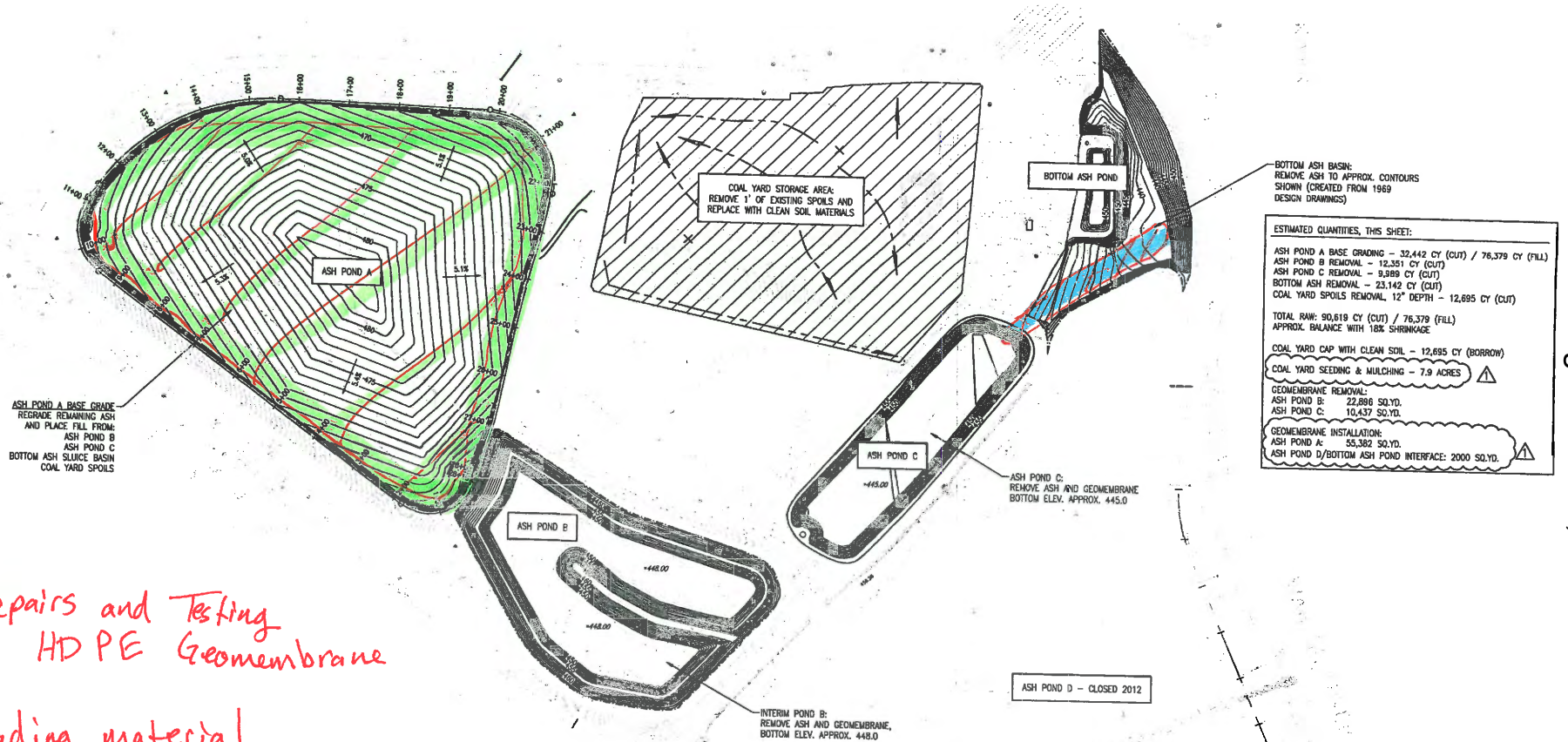
WB Koester:

Graded Bottom Ash Pond Levee material at the east end of the Bottom Ash Pond.

National Lining Systems:

Repaired and tested liner on Ash Pond A. See field notes for additional information.

11/12/15



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

Repairs and Testing
HDPE Geomembrane

Grading material

1 / 004 CLEAN CLOSURE PLAN

100 0 100 200

N

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAWING RECORD DRAWING			AMEREN APPROVAL		DESCRIPTION
				DSR	CHK	SUPV	AMEREN	OTHER	
0	04/30/2014	JDHPT	–	DSR	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04/07/2014	JDHPT	–	DSR	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

SCALE –
DRWG. NO. –
DRWG. SIZE 24"X36"
SGS CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/13/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart:1500 Travel: 3.00 Total: 11.50

AM Conditions: Clear
AM Temperature: 45 F
PM Conditions: Clear, windy
PM Temperature: 60 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, National Lining Systems, Brandenberg
Equipment: **WB Koester:** 1 bulldozer
Personnel: **WB Koester:** 4 employees; **NLS:** 11 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Bottom Ash Pond. See attached location drawing for more information.

11/13/15
Geotechnology, Inc. Rep. Date

11/17/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/13/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Graded Bottom Ash Pond levee material at the east end of the Bottom Ash Pond.

Installed safety signage under power lines in anticipation of access to the borrow field north of site.

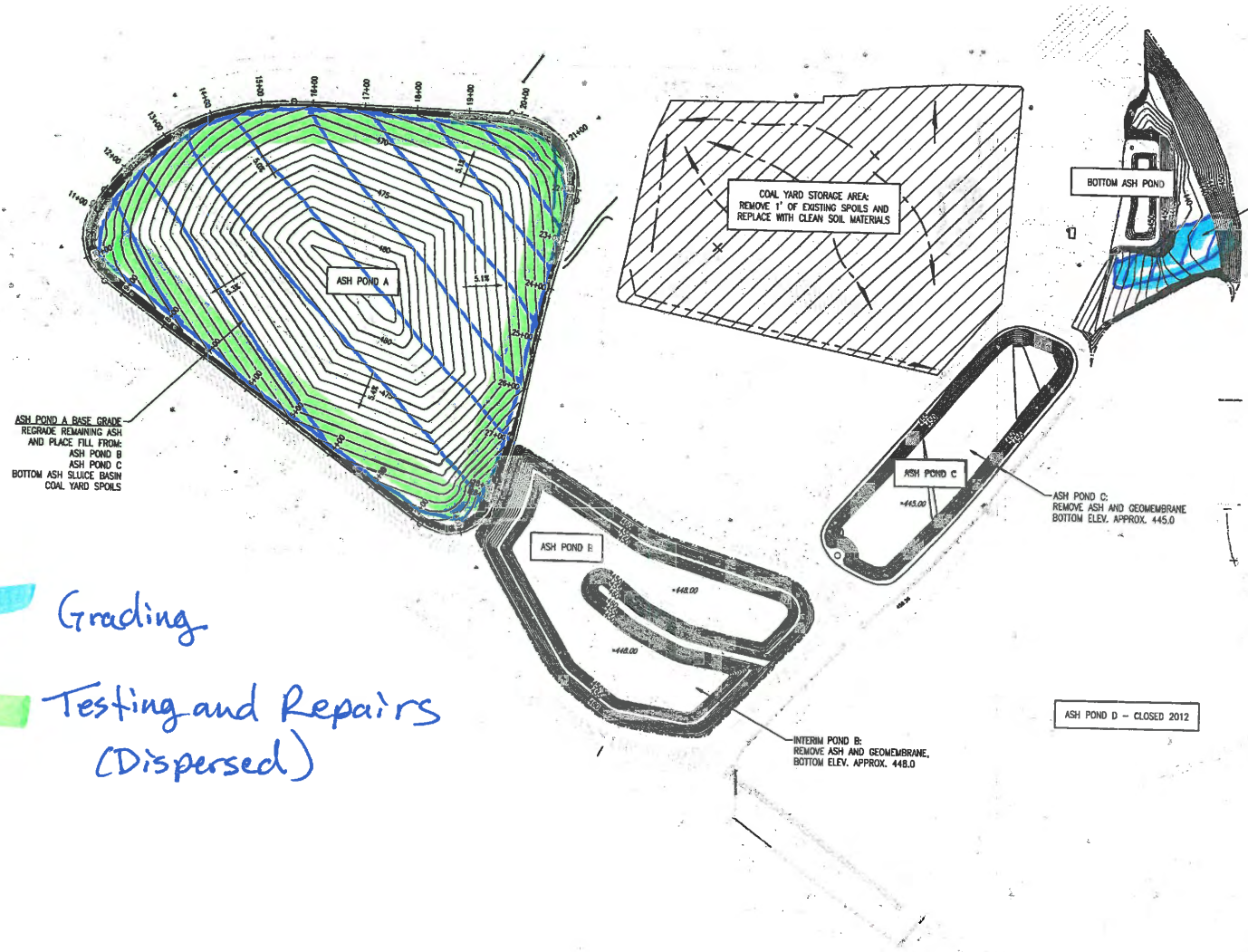
Spread additional straw on seeded ground where it had been displaced by high winds.

National Lining Systems:

Repaired and tested liner on Ash Pond A. Spark tested the seven piezometer boots on Ash Pond A. See field notes for additional information.

Electronic Filing: Received, Clerk's Office 09/28/2020

11/13/15



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES 1

GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.

GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. 1

Grading

Testing and Repairs (Dispersed)

1 CLEAN CLOSURE PLAN
004

100 0 100 200

-N-

NOTICE OF LIMITED RESPONSIBILITY

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	ENGR APPROVAL SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10.20.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

MARK UP DRAWING NO. – REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

Ameren MISSOURI

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

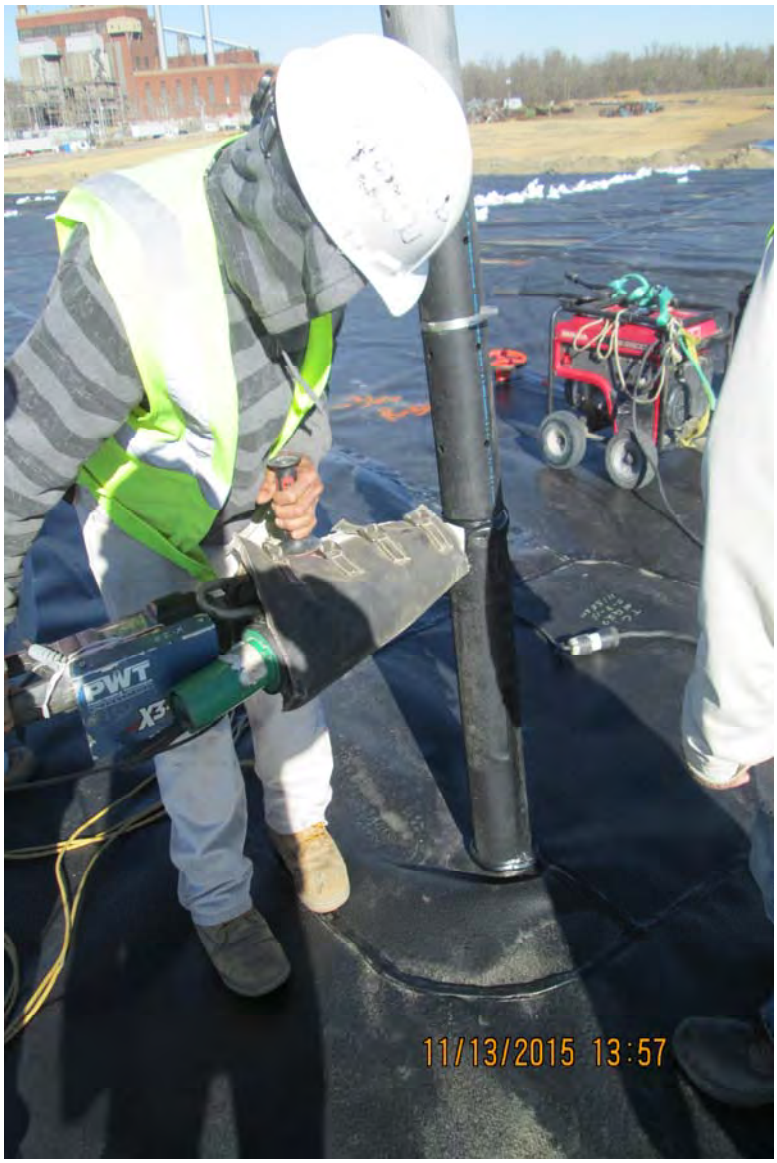
PHOTOGRAPH LOG



Photograph 1 - View of excavator removing fencing around the parking area on site, looking north.



Photograph 2 - View of bulldozer grading material in the Bottom Ash Pond.



Photograph 3 - View of extrusion welding boots on a vent pipe in ash Pond A with a wire in place for spark testing.



Photograph 4 - View of Ash Pond A from the north corner, looking south.



Photograph 5 - View of Ash Pond A from the southwest corner, looking northeast.



Photograph 6 - View of Ash Pond A from the southeast corner, looking northwest.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: November 25, 2015

SUBJECT: Weekly Summary Report for November 16, 2015 to November 21, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 25 to 48°F, and temperature highs ranged from 49 to 65°F.

Work was not performed on November 17 or November 18 due to rainy conditions.

Construction Activities

Ash Pond D protective cover material was placed over exposed Ash Pond D HDPE geomembrane. Bottom Ash Pond levee material was placed as protective cover over the HDPE geomembrane at the Ash Pond D Slope.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B and 1 Komatsu PC 350 LC), 3 haul trucks (John Deere 400Ds), 2 bulldozers (Caterpillar D6N LGPs with GPS), 1 water truck (Caterpillar 623B), 1 skidsteer.

WB Koester had 4-7 employees working on site: 1 laborer, 1 mechanic, and 2-5 equipment operators.

Electronic Filing: Received, Clerk's Office 09/28/2020

Meetings

The weekly progress meeting was held on Wednesday, November 18, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Soil from the Bottom Ash Pond levee was used as protective cover for the HDPE geomembrane at the Ash Pond D Slope.

Testing/Sampling

Jessie Hahn (Geotechnology, Inc.) obtained CQA conformation samples before placement of borrow field soil began due to concern about the sand content of the soil.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/16/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0900 Depart:1400 Travel: 3.00 Total: 8.00

AM Conditions: Cloudy, light rain
AM Temperature: 48 F
PM Conditions: Cloudy, rain
PM Temperature: 52 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester, Brandenberg
Equipment: **WB Koester:** 1 bulldozer, 1 excavator
Personnel: **WB Koester:** 4 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond C, Bottom Ash Pond. See attached location drawing for more information.

Jessie Hahn 11/16/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/16/15
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/16/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

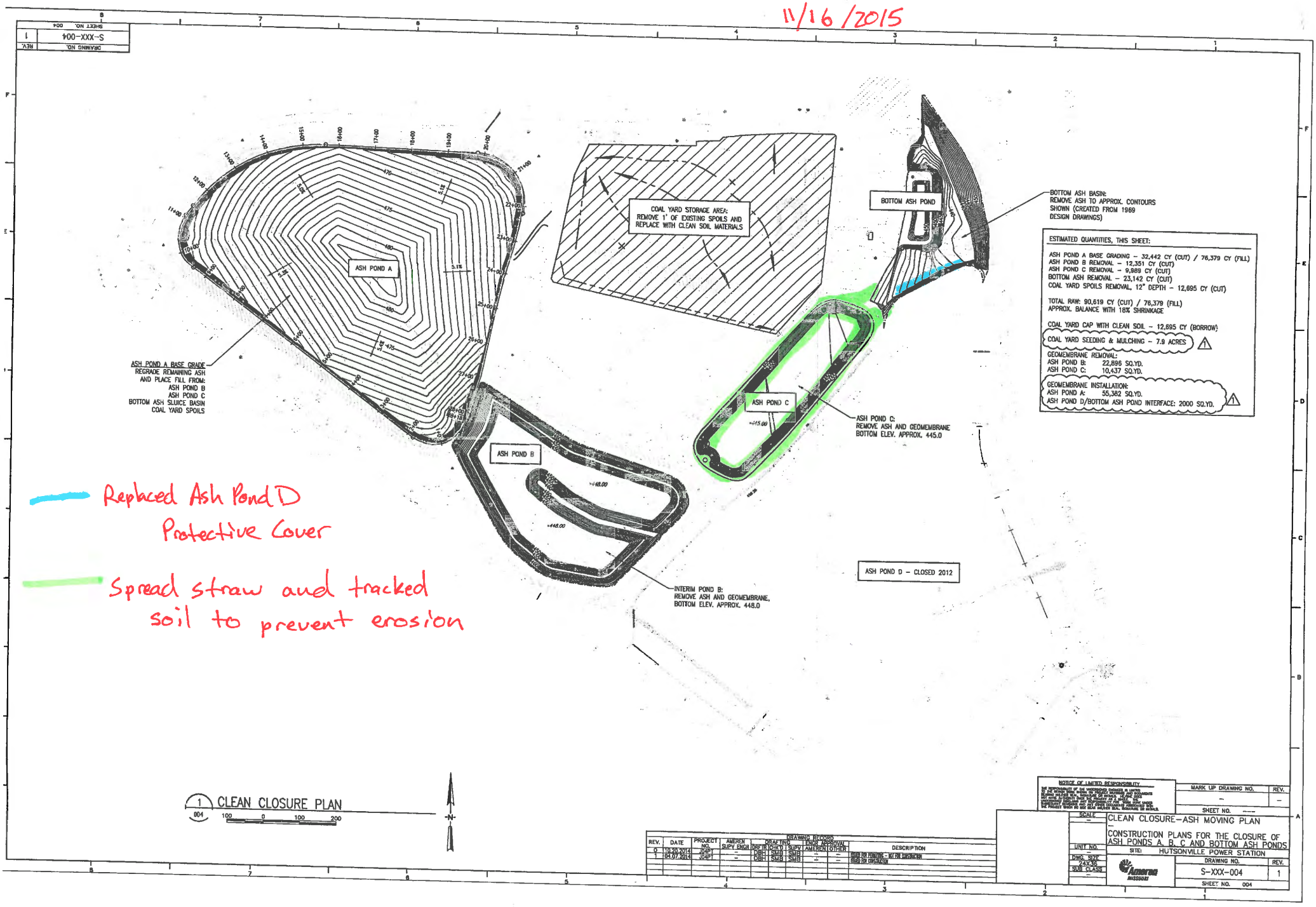
Ongoing demolition of buildings.

WB Koester:

Replaced previously removed protective cover onto Ash Pond D liner material.

Spread additional straw on seeded ground in Ash Pond C where it had been displaced by wind and tracked seeded ground to reduce erosion by the rain.

11/16/2015



Replaced Ash Pond D Protective Cover

Spread straw and tracked soil to prevent erosion

1 CLEAN CLOSURE PLAN
004
100 0 100 200

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRF'R	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
0	10-20-2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	J04PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. – REV. –
SHEET NO. ---
SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
Ameren MISSOURI
DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/17/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: - Depart: - Travel: 0.00 Total: -

AM Conditions: Cloudy, rain
AM Temperature: 48 F
PM Conditions: Cloudy, rain
PM Temperature: 62 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** -
Personnel: **WB Koester:** -
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Rain day. No work performed on site.

Jessie Hahn 11/17/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/17/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/17/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Rain day. Work was not performed on site.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/18/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0615 Depart: 1315 Travel: 0.00 Total: 7.00

AM Conditions: Cloudy, rain
AM Temperature: 61 F
PM Conditions: Cloudy, rain
PM Temperature: 63 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** -
Personnel: **WB Koester:** -
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Rain day. No work performed on site.

Jessie Hahn 11/18/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/18/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/18/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Rain day. Work not performed on site.

Other:

The weekly progress meeting was held at 0900. See the meeting minutes for additional information.

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 11-18-15

Attendees:

Ameren: Don Shaver, Ken Beckman (phone), Mike Wagstaff (phone), Tim Free

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Chris to make sure to wash and scrape the parking lot each Friday and as necessary.

Manpower

- Man hours
  - Start of Job (4-27-15) through 11-16-15
    - Total = 12,466 hrs.
- Next week expected manpower
  - WBK = depending on weather, 2 to 12 total

Review old minutes and action items

- Archeological study has been performed on field, ok to proceed with borrow in field
- Update on EWO's – on VP desk waiting on approvals, should be approved in couple of days.
- Mike to send Bob SWPPP manual

Material Issues

- No issues

Quality Control Issues

- Liner testing and repairs is done

- Soil from Bottom ash pond levee is being tested. Waiting on results prior to placing on liner at Pond D tie in.

Schedule Compliance

- Liner at Pond D tie in is complete. Waiting on environmental testing of Bottom Ash levee soil prior to filling on top of liner at this location.
- 3" of rain this week, waiting on it to dry prior to hauling Borrow
- Erosion in pond C around box culverts. Needs to be repaired. Don to send Mike W. pictures to determine if we should add additional rip rap.
- Brandenberg pumping until week of Dec. 7th. Still need to keep berm in Bottom Ash pond that whole time.
- Seeding/blanket placement will be in Spring. Permanent fence install will be in Spring after Brandenberg finished with building demo.
- Discussion on how far to go with cover soil this year. Bob to revise schedule to show anticipated production, working Saturdays, Sundays, and day after Thanksgiving and don't take into account any rain days.
- Bob to submit a cost to work premium time days.

Cost and Budget Control

- Waiting on EWO approval.

Next Meeting Scheduled: November 25, 2015 at 9:00 CST

Action Items -

- Don to send Mike pictures of Erosion at Pond C box culverts.
- Bob to send Mike revised schedule showing working Saturdays, Sundays and day after thanksgiving.
- Bob to send Mike cost to work premium times.

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/19/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0615 Depart: 1500 Travel: 0.00 Total: 8.75

AM Conditions: Clear
AM Temperature: 46 F
PM Conditions: Clear
PM Temperature: 51 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 2 tractors with scraper boxes, 2 haul trucks, 1 skidsteer.
Personnel: **WB Koester:** 7 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Jessie Hahn 11/19/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/23/2015
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/19/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Constructed road to borrow field. Scraped topsoil off of the borrow field with two tractors with scraper boxes.

At 0900, Chris Atkinson (WB Koester) dug an observation pit in the borrow field and expressed concern to Jessie Hahn (Geotechnology) about the sand content, which appeared to be higher than it was in the prequalification sample for the borrow source. Hahn consulted with Anna Saindon (Geotechnology) via phone, who requested that samples be shipped to her for observation and analysis to visually assess if they would meet the specification. After additional sampling at other locations in the field, five samples were shipped overnight to Saindon.

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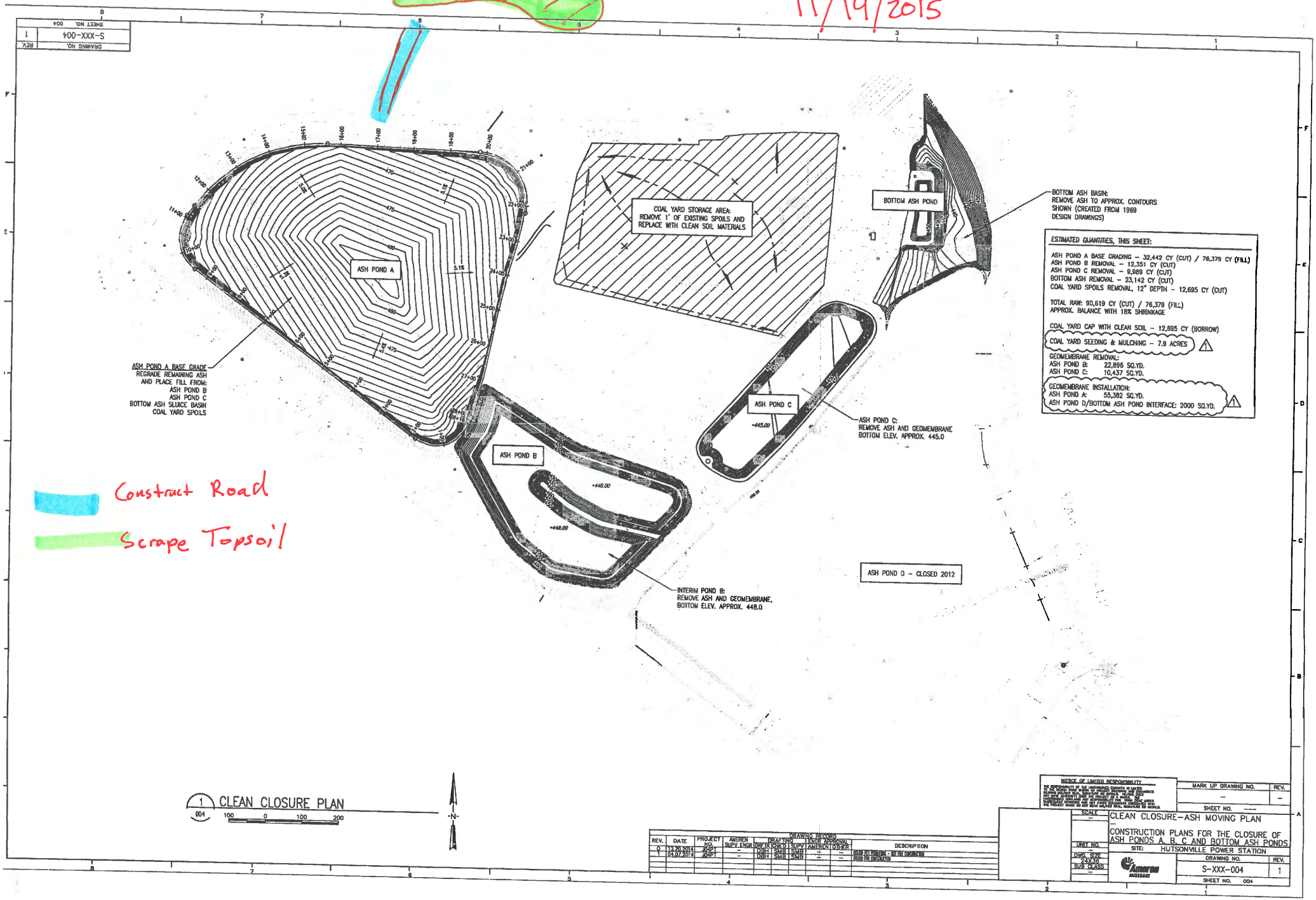
11/19/2015



ESTIMATED QUANTITIES, THIS SHEET:

ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)

TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE

COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES ⚠1
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD. ⚠1

1 CLEAN CLOSURE PLAN
004
100 0 100 200

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING			MINOR APPROVAL		DESCRIPTION
				DSR / IK	DSR'D	SUPV	AMEREN	OTHER	
0	12.20.2014	204PT	–	DBH	SMB	SMB	–	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	204PT	–	DBH	SMB	SMB	–	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY
THE RESPONSIBILITY OF THE UNDERSIGNED EXPIRES AT THE END OF THE CALENDAR YEAR SHOWN IN THE LICENSE RENEWAL DATE UNLESS HEREBY EXTENDED BY THE UNDERSIGNED. THE UNDERSIGNED ASSUMES NO RESPONSIBILITY FOR ANY CHANGES MADE TO THESE PLANS AND SPECIFICATIONS BY OTHERS WITHOUT THE WRITTEN CONSENT OF THE UNDERSIGNED. THE UNDERSIGNED ASSUMES NO RESPONSIBILITY FOR ANY CHANGES MADE TO THESE PLANS AND SPECIFICATIONS BY OTHERS WITHOUT THE WRITTEN CONSENT OF THE UNDERSIGNED. THE UNDERSIGNED ASSUMES NO RESPONSIBILITY FOR ANY CHANGES MADE TO THESE PLANS AND SPECIFICATIONS BY OTHERS WITHOUT THE WRITTEN CONSENT OF THE UNDERSIGNED. THE UNDERSIGNED ASSUMES NO RESPONSIBILITY FOR ANY CHANGES MADE TO THESE PLANS AND SPECIFICATIONS BY OTHERS WITHOUT THE WRITTEN CONSENT OF THE UNDERSIGNED.

MARK UP DRAWING NO. – REV. –
SHEET NO. ----

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
–
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004 REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/20/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn / Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0615 Depart: 1600 Travel: 0.00 Total: 9.45

AM Conditions: Clear AM Temperature: 27 F
PM Conditions: Partly Cloudy PM Temperature: 59 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 2 haul trucks, 1 skidsteer.
Personnel: **WB Koester:** 7 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Bottom Ash Pond. See attached location drawing for more information.

11-23-15
Geotechnology, Inc. Rep. Date

11/23/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/20/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

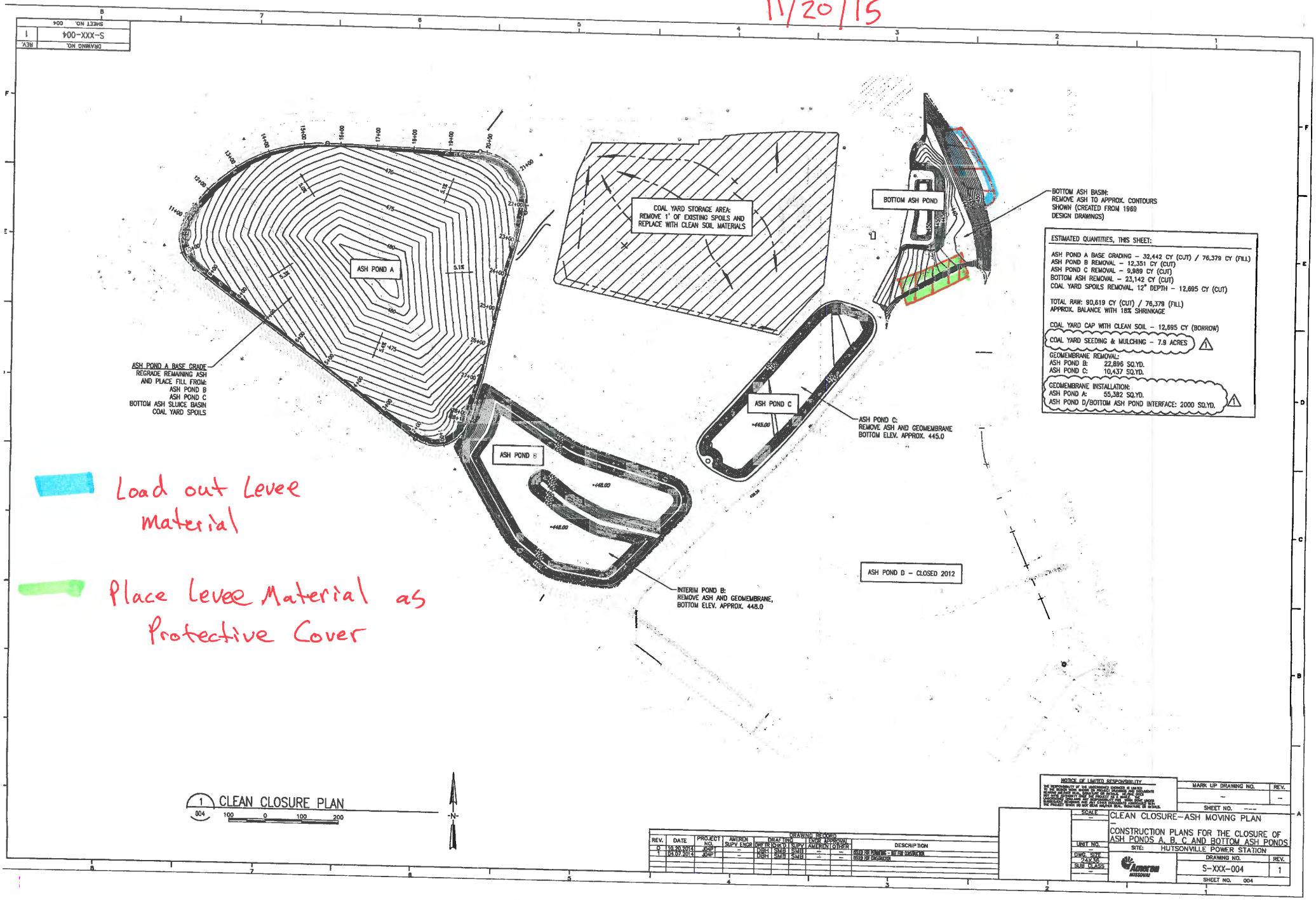
Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Placed levee material from the Bottom Ash Pond as protective cover on the Ash Pond D slope.

11/20/15



Load out Levee Material

Place Levee Material as Protective Cover

1 CLEAN CLOSURE PLAN
004
100 0 100 200

N

REV.	DATE	PROJECT NO.	AMEREN SUPV. ENGR.	DRAFTING DRFTR	CHK'D	AMEREN SUPV	OTHER	DESCRIPTION
0	10.20.2014	JKHP1	–	DSH	SMB	SMB	–	ISSUED FOR PERMITTING – NOT FOR CONSTRUCTION
1	04.07.2014	JKHP1	–	DSH	SMB	SMB	–	ISSUED FOR CONSTRUCTION

NOTICE OF LIMITED RESPONSIBILITY

MARK UP DRAWING NO. –
REV. –
SHEET NO. ---

SCALE –
UNIT NO. –
DWG. SIZE 24X36
SUB CLASS –

CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

DRAWING NO. S-XXX-004
REV. 1
SHEET NO. 004

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of tracking the slopes of Ash Pond C in preparation for anticipated rain, looking south.



Photograph 2 - View of placing straw over areas where it had been blown away by winds, looking southeast.

Photographs taken by Jessie Hahn of Geotechnology, Inc. November 16-21, 2015.



Photograph 3 - View of Ash Pond D protective cover material replaced over Ash Pond D HDPE geomembrane, looking northeast.



Photograph 4 - View of borrow field road construction north of Ash Pond A, looking southwest.

Photographs taken by Jessie Hahn of Geotechnology, Inc. November 16-21, 2015.



Photograph 5 - View of borrow field road construction, looking northwest.



Photograph 6 - View of culverts installed under the ditch crossing on the borrow field road, looking west.



Photograph 7 - View of scraping topsoil at the borrow field, looking north.



Photograph 8 - View of loading out Bottom Ash Pond levee material for use as protective cover, looking north.



Photograph 9 - View of placing and grading protective cover on the Ash Pond D slope, looking northeast.



Photograph 10 - View of completed protective cover on the Ash Pond D slope, looking southwest.

Photographs taken by Jessie Hahn of Geotechnology, Inc. November 16-21, 2015.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: December 1, 2015

SUBJECT: Weekly Summary Report for November 23, 2015 to November 28, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 25 to 34°F, and temperature highs ranged from 50 to 58°F.

Work was performed on November 23 through November 25. November 26 (Thanksgiving) was a holiday and work was not performed. Work was not performed November 27 or November 28 due to rainy and wet conditions.

Construction Activities

Material from the borrow field was placed on Ash Pond A and graded.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Komatsu PC 350 LC), 3 haul trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 water truck (Caterpillar 623B), 1 tractor with roller/scraper box, 2 tractors with scraper boxes, and 1 skidsteer.

WB Koester had 6-10 employees working on site: 1-2 laborers, 1 mechanic, and 4-7 equipment operators.

Electronic Filing: Received, Clerk's Office 09/28/2020

Meetings

The weekly progress meeting was held on Wednesday, November 25, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Protective cover soil from the borrow field was placed on Ash Pond A.

Testing/Sampling

Jessie Hahn (Geotechnology) collected a prequalification sample from a potential topsoil borrow source and Construction Quality Assurance samples of protective cover from the Bottom Ash Pond Levee and the borrow field.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/23/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0600 Depart: 1500 Travel: 3.00 Total: 12.00

AM Conditions: Clear
AM Temperature: 30 F
PM Conditions: Clear
PM Temperature: 47 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 1 bulldozer, 3 haul trucks, 1 skidsteer
Personnel: **WB Koester:** 6 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Protective cover soil from the Bottom Ash Pond levee and the borrow field
Deliveries:
Testing: CQA protective cover samples were collected from the Bottom Ash Pond Levee and the borrow field.

CONSTRUCTION SITE LOCATIONS:

Bottom Ash Pond, Ash Pond A, and the borrow field. See the attached location drawing for additional information.

Jessie Hahn 11/23/2015
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 11/25/2015
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/23/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

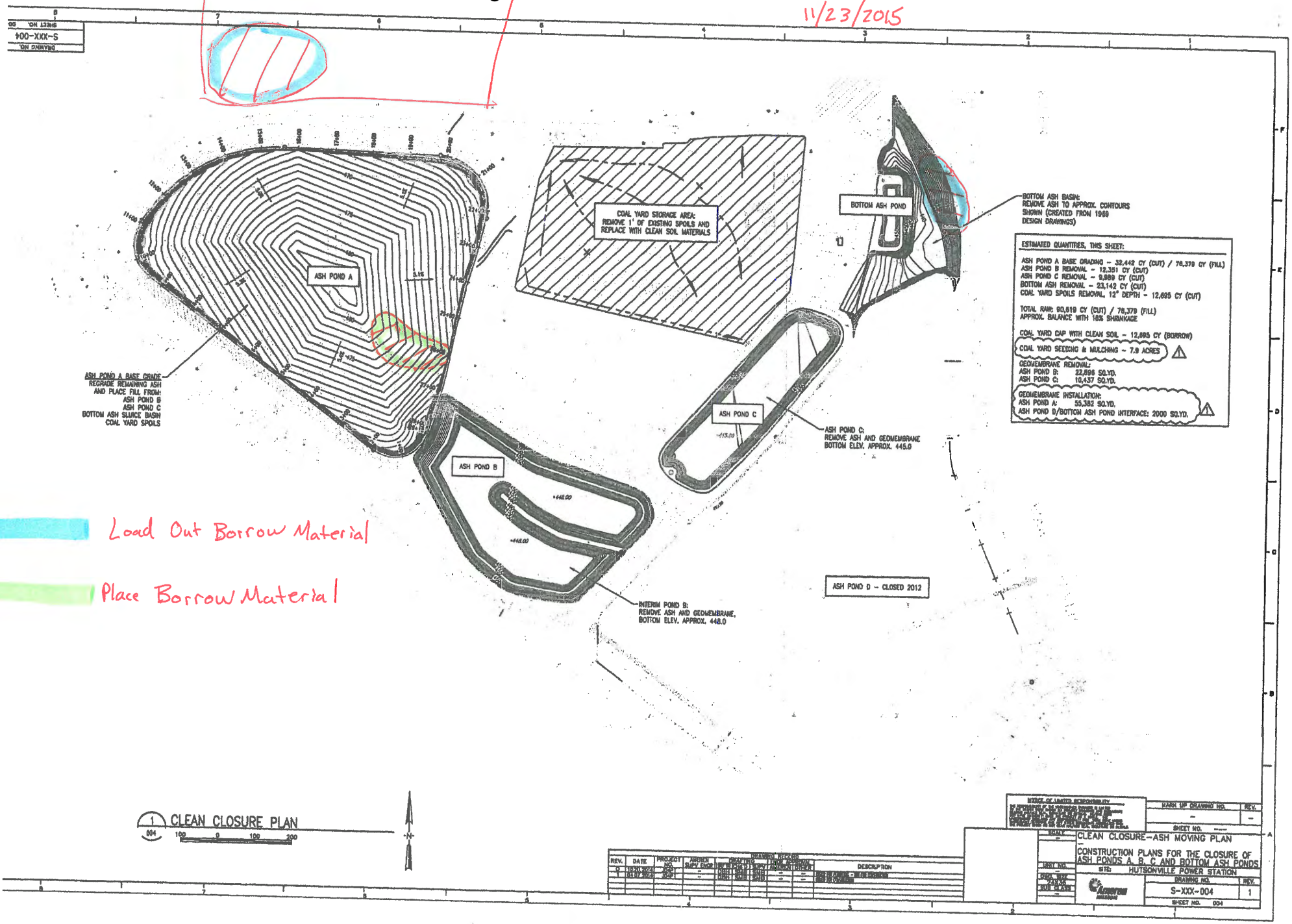
Ongoing demolition of buildings.

WB Koester:

Placed levee material from the Bottom Ash Pond as protective cover on Ash Pond A. One excavator loaded out Bottom Ash Pond levee material. Two haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

At 0900, Mike Wagstaff (Ameren) communicated approval to use the borrow field material on Ash Pond A as protective cover. Koester then began placing material from the borrow field on Ash Pond A as protective cover. One excavator loaded out borrow field material. Three haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

11/23/2015


ASH POND A
ASH POND B
ASH POND C
COAL YARD STORAGE AREA:
REMOVE 1' OF EXISTING SPOILS AND
REPLACE WITH CLEAN SOIL MATERIALS
BOTTOM ASH POND
ASH POND D – CLOSED 2012
ASH POND A BASE GRADE
REGRADE REMAINING ASH
AND PLACE FILL FROM:
ASH POND B
ASH POND C
BOTTOM ASH SLUICE BASIN
COAL YARD SPOILS
ASH POND C:
REMOVE ASH AND GEOMEMBRANE
BOTTOM ELEV. APPROX. 445.0
INTERIM POND B:
REMOVE ASH AND GEOMEMBRANE,
BOTTOM ELEV. APPROX. 448.0
BOTTOM ASH BASIN:
REMOVE ASH TO APPROX. CONTOURS
SHOWN (CREATED FROM 1969
DESIGN DRAWINGS)
ESTIMATED QUANTITIES, THIS SHEET:
ASH POND A BASE GRADING – 32,442 CY (CUT) / 76,379 CY (FILL)
ASH POND B REMOVAL – 12,351 CY (CUT)
ASH POND C REMOVAL – 9,989 CY (CUT)
BOTTOM ASH REMOVAL – 23,142 CY (CUT)
COAL YARD SPOILS REMOVAL, 12" DEPTH – 12,695 CY (CUT)
TOTAL RAW: 90,619 CY (CUT) / 76,379 (FILL)
APPROX. BALANCE WITH 18% SHRINKAGE
COAL YARD CAP WITH CLEAN SOIL – 12,695 CY (BORROW)
COAL YARD SEEDING & MULCHING – 7.9 ACRES
GEOMEMBRANE REMOVAL:
ASH POND B: 22,896 SQ.YD.
ASH POND C: 10,437 SQ.YD.
GEOMEMBRANE INSTALLATION:
ASH POND A: 55,382 SQ.YD.
ASH POND D/BOTTOM ASH POND INTERFACE: 2000 SQ.YD.
Load Out Borrow Material
Place Borrow Material
1 CLEAN CLOSURE PLAN
804
100 0 100 200
CLEAN CLOSURE–ASH MOVING PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF
ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
S-XXX-004
1

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/24/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0600 Depart: 1700 Travel: 0.00 Total: 10.50

AM Conditions: Clear
AM Temperature: 37 F
PM Conditions: Clear
PM Temperature: 54 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 3 haul trucks, 1 skidsteer
Personnel: **WB Koester:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Protective cover soil from the borrow field
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A and the borrow field. See the attached location drawing for additional information.

Geotechnology, Inc. Rep. 11/24/2015 Date

Geotechnology, Inc. Engineer 11/25/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/24/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

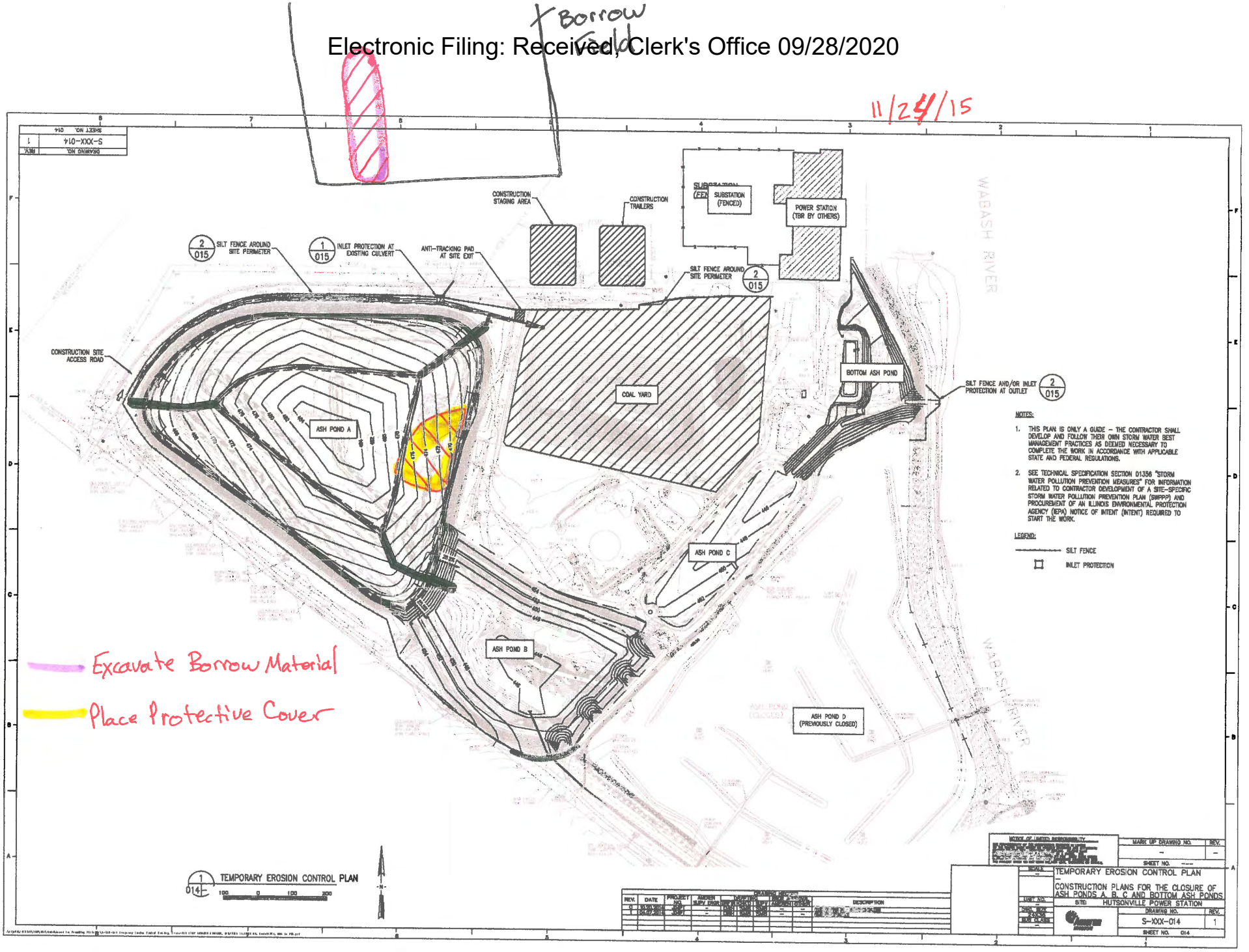
WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover. One excavator loaded out borrow field material. Three haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field.

One tractor with roller/scraper box flattened and compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads.


Borrow Field
11/24/15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TBR BY OTHERS)
2/015 SILT FENCE AROUND SITE PERIMETER
1/015 INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
SILT FENCE AROUND SITE PERIMETER 2/015
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET 2/015
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
WABASH RIVER
NOTES:
1. THIS PLAN IS ONLY A GUIDE – THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (INTENT) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Excavate Borrow Material
Place Protective Cover
1/014 TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-014
SHEET NO. 014

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/25/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0600 Depart: 1630 Travel: 3.00 Total: 13.00

AM Conditions: Clear
AM Temperature: 42 F
PM Conditions: Clear
PM Temperature: 57 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 3 haul trucks, 1 skidsteer
Personnel: **WB Koester:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Protective cover soil from the borrow field
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A and the borrow field. See the attached location drawing for additional information.

Geotechnology, Inc. Rep. 11/25/2015 Date
Geotechnology, Inc. Engineer 11/25/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/25/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover. One excavator loaded out borrow field material. Three haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

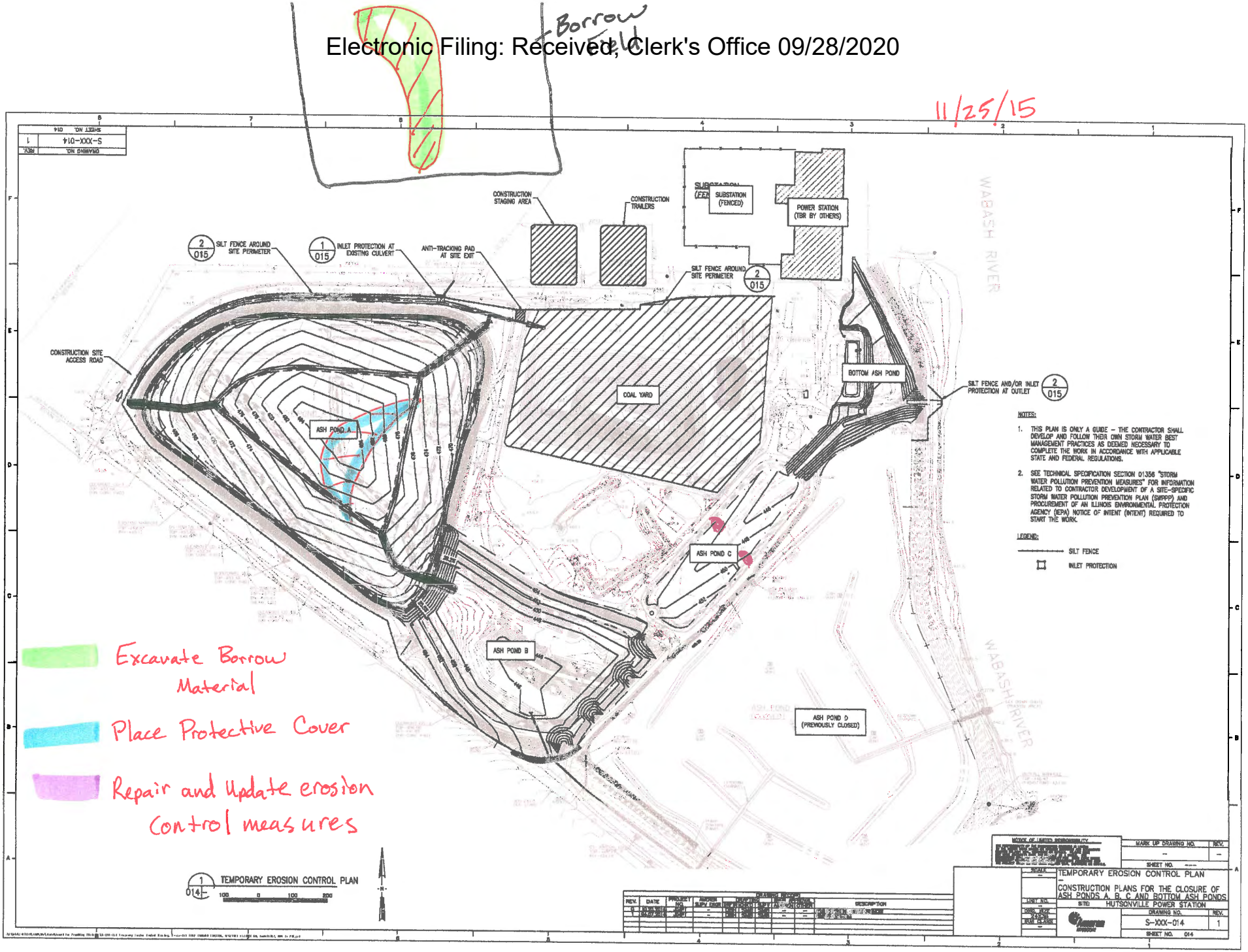
One bulldozer cleared topsoil (the top 6 inches) off of the borrow field.

One tractor with roller/scraper box flattened and compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads throughout the day.

In the morning at approximately 1030, one skidsteer placed rip rap at the concrete box culverts on the east and west levees of Ash Pond C to prevent further erosion.

At 1600, hauling of material from the borrow pit ceased and erosion control measures were taken in anticipation of rain. Erosion control activities included an excavator digging a drainage sump for the borrow field haul road and two bulldozers and a tractor with a roller/scraper box shaping the material on Ash Pond A.


Borrow Field
11/25/15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TSR BY OTHERS)
2/015 SILT FENCE AROUND SITE PERIMETER
1/015 INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
SILT FENCE AROUND SITE PERIMETER 2/015
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET 2/015
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
WABASH RIVER
NOTES:
1. THIS PLAN IS ONLY A GUIDE – THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (NOI) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Excavate Borrow Material
Place Protective Cover
Repair and Update erosion Control measures
1/014 TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
HUTSONVILLE POWER STATION
S-XXX-014
SHEET NO. 014

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Weekly Progress Meeting

Meeting Minutes

Date: 11-25-15

Attendees:

Ameren: Don Shaver, Tim Free

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn

Topics:

Safety/Housekeeping

- No issues
- Tim had stand down meeting with crew to discuss hauling/digging near the overhead power lines in borrow field.
- Also discussed leaving cone of dirt 15' diameter around each pole in field.
- Borrrow hauling puts some soil on the plant roads. Chris is scraping it multiple times during day and will broom/wash it at end of day.

Manpower

- Man hours
  - Start of Job (4-27-15) through 11-23-15
    - Total = 12,700 hrs.
- Next week expected manpower
  - WBK = 10 this week, as many as 13 next week.

Review old minutes and action items

- Update on EWO's – Have email approval from Mike. Still waiting on Ameren official Change order paperwork.
- Bob submitted updated schedule and cost info to Mike regarding premium time for working weekends and holidays.
- Don sent pictures of washout around box culverts in Pond C after last rain. Bob to submit cost to widen the rip rap around the box culverts to around 40' wide, add more geotextile (anchor it in at top) and add more rip rap.

Material Issues

- No issues

Quality Control Issues

- No issues

Schedule Compliance

- Erosion in pond C around box culverts. Needs to be repaired. Chris will try and beef it up with rip rap today ahead of rains later in week.
- Brandenberg pumping until week of Dec. 7th. Still need to keep berm in Bottom Ash pond that whole time.
- Seeding/blanket placement will be in Spring. Permanent fence install will be in Spring after Brandenberg finished with building demo.
- Hauling borrow soil to top of Pond A and placing in a 3' layer. Excavator and three trucks for now while we are starting. 2-4 more days of hauling we will add in Tractor and pans to bump up the production. Also will look into adding another excavator and more trucks although congestion of traffic on haul roads and top may limit.
- Next week will work on the ditch north of Pond A and possibly start pushing the Pond A berms across.
- Chris thinks that the topsoil haul trucks from Quality Lime will have trouble with the ramps and turning around at the top. Looking into having them deliver and stockpile topsoil in laydown yard and then haul up with Artic trucks when we have an area ready.
- Forecast for Friday is 100% chance of rain (1" to 4") with high chance of rain Saturday Sunday and Monday as well. Decided in meeting to not work Friday. Chris will monitor site and contact Don is it looks like we can go Saturday and or Sunday and Don will contact Geotechnology. If we get a lot of rain Friday it may not dry out enough to allow productive and safe hauling on Saturday or Sunday. Chris will observe and update Don.

Cost and Budget Control

- Waiting on EWO official paperwork.

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Next Meeting Scheduled: December 2, 2015 at 9:00 CST

Action Items -

- Bob to submit price to expand the riprap protection at the box culverts in Pond C.
- Chris to update Don on Friday about working on Saturday or Sunday.

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PHOTOGRAPH LOG



Photograph 1 - View of Bottom Ash Pond levee excavation for use as protective cover, looking north.



Photograph 2 - View of protective cover placement on Ash Pond A, looking west.



Photograph 3 - View of protective cover placement on Ash Pond A, looking west.



Photograph 4 - View of protective cover placement on Ash Pond A, looking west.

Photographs taken by Jessie Hahn of Geotechnology, Inc. November 23-25, 2015.



Photograph 5 - View of excavating borrow field material for use as protective cover, looking northeast.



Photograph 6 - View of borrow field haul road, looking northwest.



Photograph 7 - View of tractor improving the haul road on Ash Pond A, looking west.



Photograph 8 - View of placing additional rip rap at the west Ash Pond C box culvert, looking north.

Photographs taken by Jessie Hahn of Geotechnology, Inc. November 23-25, 2015.



Photograph 9 - View of placing and grading protective cover on Ash Pond A, looking west.



Photograph 10 - View of excavating a drainage sump for the haul road in anticipation of rain.

Photographs taken by Jessie Hahn of Geotechnology, Inc. November 23-25, 2015.



Photograph 11 ⮝ - View of tractor improving the haul road on Ash Pond A, looking south.



Photograph 12 ⮝ - View of protective cover on Ash Pond A, looking west.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: December 10, 2015

SUBJECT: Weekly Summary Report for November 30, 2015 to December 5, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 27 to 35°F, and temperature highs ranged from 42 to 47°F.

Construction Activities

On Monday, the borrow field haul road was dewatered by digging drainage trenches and pumping water.

Protective cover was transported via haul truck from the borrow field to Ash Pond A. Haul trucks moved on the horseshoe-shaped haul road (maximum 3 foot thickness) on Ash Pond A. The material was placed by haul trucks near the center of Ash Pond A and pushed to the edges by a low-pressure bulldozer. The Ash Pond A haul road was maintained by a tractor with a scraper/roller box.

An excavator folded Ash Pond A levee material with the protective cover placement along the east levee of Ash Pond A.

On Wednesday, steel pipe was installed under the haul road ramp of the borrow field and an associated ditch was excavated to protect the telecommunications line.

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Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 5 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 Tractor (Case 9370) with smooth drum roller (CS-433E), 1 skidsteer (Caterpillar 274B3), 1 water truck (Caterpillar 623B) (unused), 2 Tractors (Case 435, Cast stx480) (unused) with scraper boxes (Reynolds).

WB Koester had 10-16 employees working on site: 1-2 laborers, 1 mechanic, and 8-13 equipment operators.

Meetings

The weekly progress meeting was held on Wednesday, December 2, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Protective cover from the borrow field located northeast of Ash Pond A.

Testing/Sampling

Jessie Hahn and Seth Lamble (Geotechnology) obtained a CQA prequalification sample of Ash Pond A levee material for placement as a protective cover.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 11/30/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0745 Depart: 1430 Travel: 3.00 Total: 9.25

AM Conditions: Overcast
AM Temperature: 42 F
PM Conditions: Overcast
PM Temperature: 46 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 1 skid steer
Personnel: **WB Koester:** 5 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from haul road servicing the borrow field.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Trenching haul road for borrow field to allow dewatering.

Geotechnology, Inc. Rep. 11-30-15 Date

Geotechnology, Inc. Engineer 12/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 11/30/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

One excavator trenched borrow field haul road.

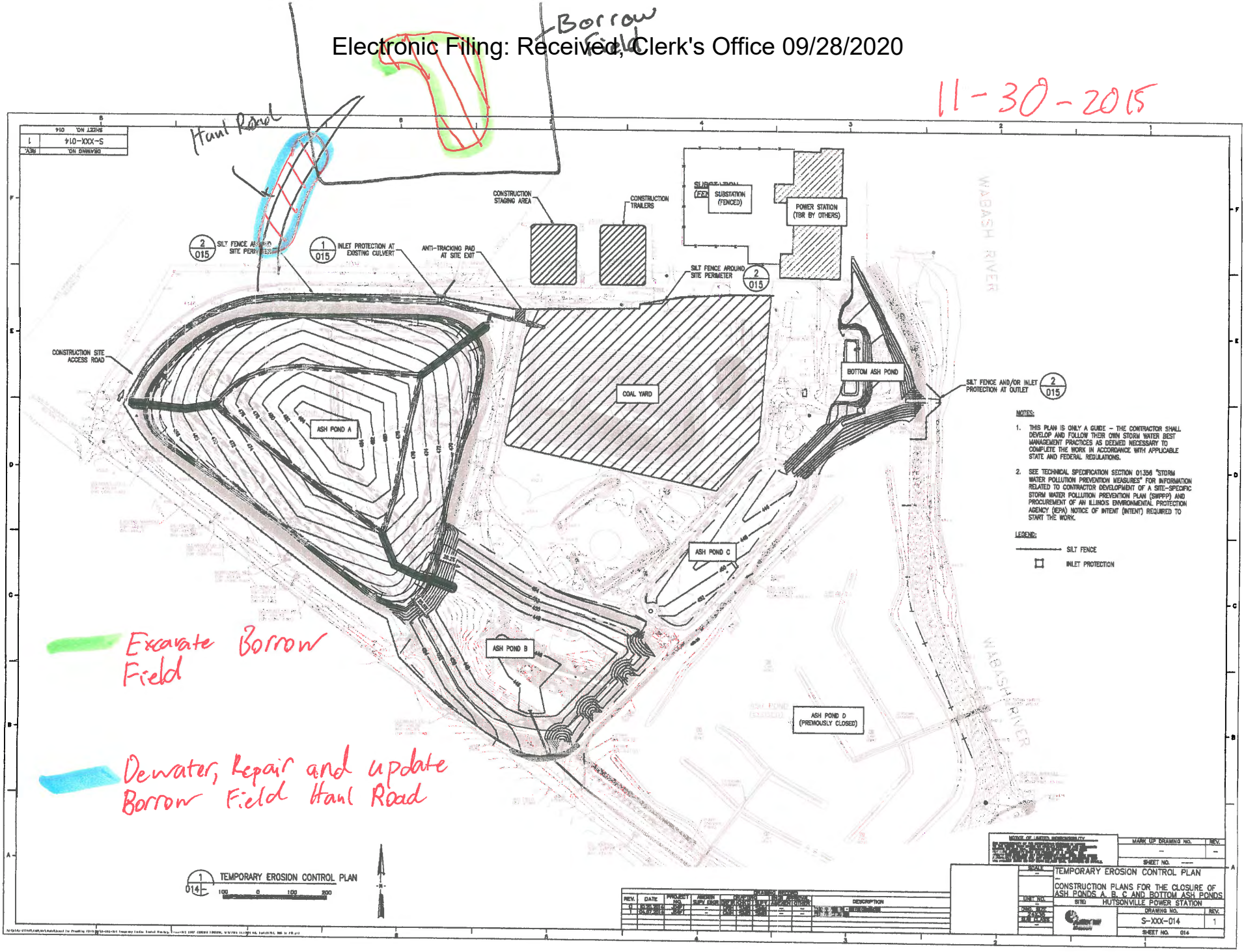
One bulldozer graded borrow field haul road.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field.

One skidsteer cleaned the roads throughout the day.

At 1600, trenching, clearing and grading of the haul road and borrow field ceased and the site was prepared for anticipated rain.

11-30-2015


Haul Road
Borrow Field
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TBR BY OTHERS)
SILT FENCE AROUND SITE PERIMETER
2/015
1/015 INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
WABASH RIVER
NOTES:
1. THIS PLAN IS ONLY A GUIDE – THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (INTENT) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Excavate Borrow Field
Dewater, Repair and update Borrow Field Haul Road
1/014 TEMPORARY EROSION CONTROL PLAN
100 0 100 200
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
HUTSONVILLE POWER STATION
S-XXX-014
SHEET NO. 014

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/01/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0615 Depart: 1615 Travel: 0.00 Total: 9.50

AM Conditions: Overcast
AM Temperature: 42 F
PM Conditions: Partly Cloudy
PM Temperature: 47 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 1 skid steer, 3 haul trucks, 1 tractor with roller/scraper box
Personnel: **WB Koester:** 10 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road.

Geotechnology, Inc. Rep. 12-1-15 Date

Geotechnology, Inc. Engineer 12/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/01/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover. One excavator loaded out borrow field material. Three haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads throughout the day.

At 1600, hauling of material from the borrow pit ceased and the site was prepared for end of work day.

Electronic Filing: Received, Clerk's Office 09/28/2020

Borrow field

12/01/2015



Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/02/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.50

AM Conditions: Overcast
AM Temperature: 34 F
PM Conditions: Overcast
PM Temperature: 38 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 2 excavator, 2 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box
Personnel: **WB Koester:** 14 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road.

Geotechnology, Inc. Rep. 12-2-15 Date

Geotechnology, Inc. Engineer 12/2/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/02/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover. Two excavators loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads throughout the day.

At 0900 hauling and excavating work ceased to allow internet provide to repair and protect site internet connection that was placed under the ramp for the borrow field haul road, repair work ended at 1200 and protective cover was hauled for placement.

The weekly progress meeting was held at 0930. See the meeting minutes for additional information.

At 1600, hauling of material from the borrow pit ceased and the site was prepared for end of work day.

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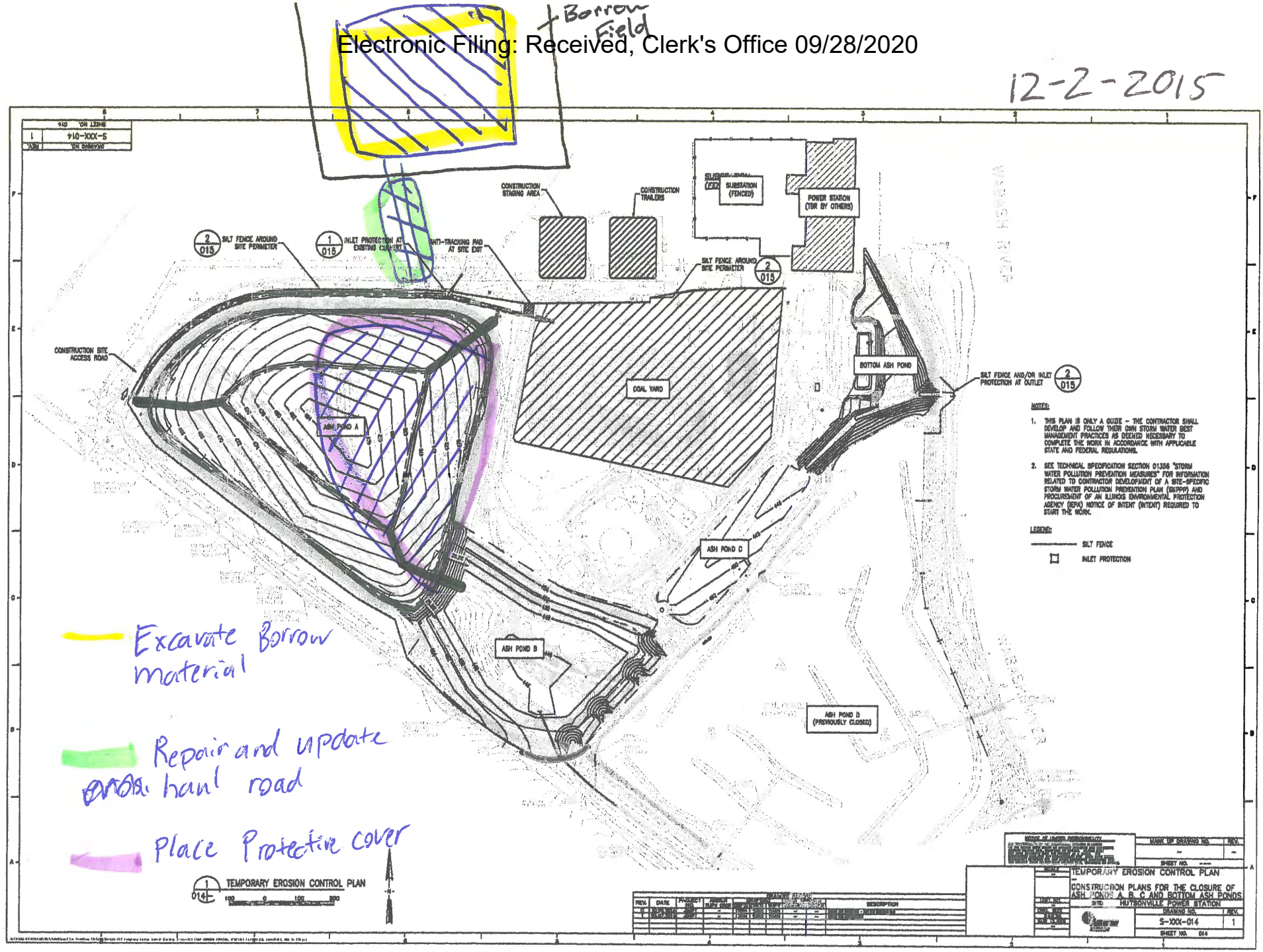
12-2-2015



Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 12-2-15

Attendees:

Ameren: Don Shaver, Tim Free, Mike Wagstaff

WB Koester: Chris Atkinson

Geotechnology, Inc.: Jessie Hahn, Anna Saindon, Seth

Topics:

Safety/Housekeeping

- No issues
- Borrrow hauling puts some soil on the plant roads. Chris is scraping it multiple times during day and will broom/wash it at end of day.

Manpower

- Man hours
  - Start of Job (4-27-15) through 11-30-15
    - Total = 12,976 hrs.
- Next week expected manpower
  - WBK = 13 next week.

Review old minutes and action items

- None recorded

Material Issues

- No issues

Quality Control Issues

- No issues

Schedule Compliance

- Brandenberg pumping until week of Dec. 7th. Still need to keep berm in Bottom Ash pond that whole time. Will have to dry before grading can take place.

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- Seeding/blanket placement will be in Spring. Permanent fence install will be in Spring after Brandenberg finished with building demo.
- Hauling borrow soil to top of Pond A and placing in a 3' layer.
- Chris thinks that the topsoil haul trucks from Quality Lime will have trouble with the ramps and turning around at the top. Looking into having them deliver and stockpile topsoil in laydown yard and then haul up with Artic trucks when we have an area ready.
- Will haul Saturday and Sunday this week.

Cost and Budget Control

- n/a

Next Meeting Scheduled: December 9, 2015 at 9:00 CST

Action Items -

- Chris to update Don about working on Saturday or Sunday.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/03/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0645 Depart: 1630 Travel: 0.00 Total: 9.25

AM Conditions: Clear
AM Temperature: 27 F
PM Conditions: Partly Sunny
PM Temperature: 37 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 2 excavator, 2 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box
Personnel: **WB Koester:** 16 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road.

Geotechnology, Inc. Rep. 12-3-15 Date

Geotechnology, Inc. Engineer 12/7/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/03/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover. Two excavators loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

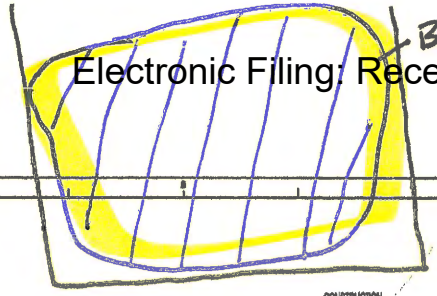
One bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

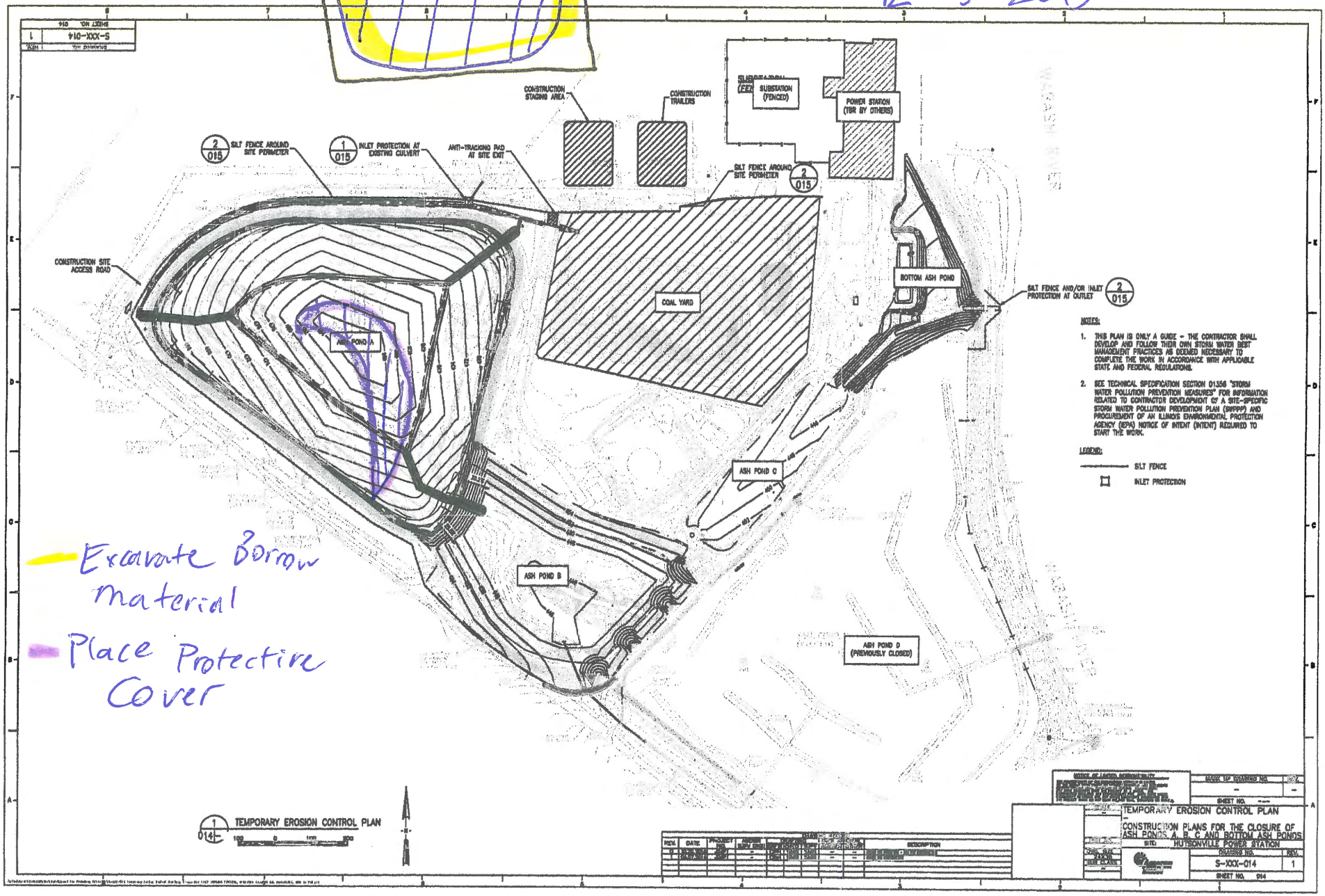
One skidsteer cleaned the roads throughout the day.

At 1615, hauling of material from the borrow pit ceased and the site was prepared for end of work day.

Electronic Filing: Received, Clerk's Office 09/28/2020



12-3-2015



Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/04/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.50

AM Conditions: Dense Fog
AM Temperature: 28 F
PM Conditions: Light Fog
PM Temperature: 37 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 2 excavator, 2 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box
Personnel: **WB Koester:** 16 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road.

Geotechnology, Inc. Rep. — Date: 12-4-15
Geotechnology, Inc. Engineer — Date: 12/7/2015

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/04/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover. Two excavators loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. Two bulldozers graded material placed at Ash Pond A.

At 1000 one bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

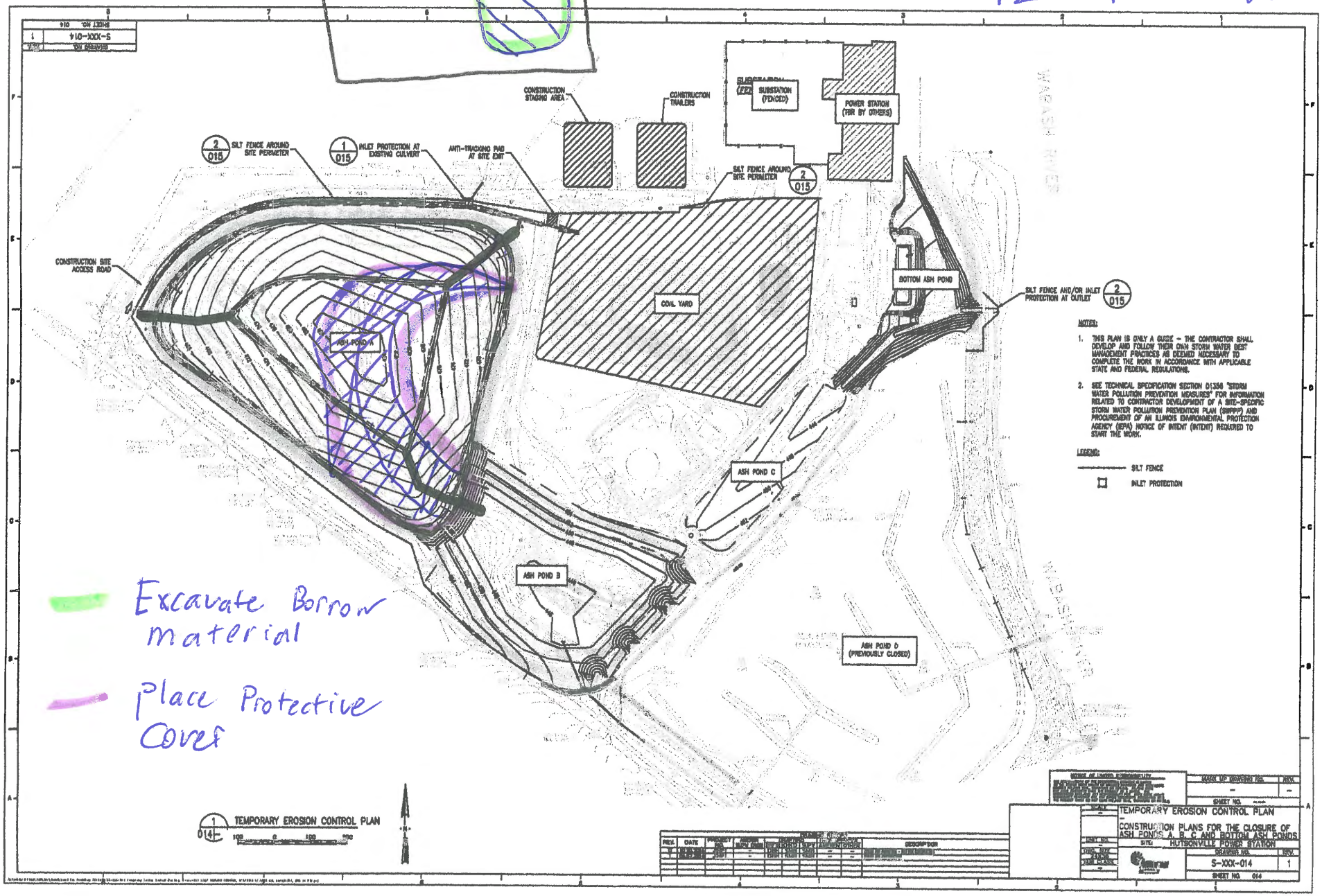
At 1300 bulldozer traveled to Ash Pond A Landfill and graded material placed at Ash Pond A.

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads throughout the day.

At 1615, hauling of material from the borrow pit ceased and the site was prepared for end of work day.

12-4-2015


Borrow Field
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TBR BY OTHERS)
2/015 SILT FENCE AROUND SITE PERIMETER
1/015 INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
SILT FENCE AROUND SITE PERIMETER 2/015
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET 2/015
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
NOTES:
1. THIS PLAN IS ONLY A GUIDE – THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (INTENT) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Excavate Borrow material
Place Protective Covers
1/014 TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
SITE: HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-014
REV. 1
SHEET NO. 014

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/05/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0645 Depart: 1630 Travel: 0.00 Total: 9.25

AM Conditions: Dense Fog
AM Temperature: 28 F
PM Conditions: Cloudy
PM Temperature: 35 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 2 excavator, 2 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box
Personnel: **WB Koester:** 14 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road.

Geotechnology, Inc. Rep. 12-5-15 Date
Geotechnology, Inc. Engineer 12/7/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/05/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Technicians onsite to prepare equipment for ongoing demolition.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

One excavator loaded out borrow field material. Five haul trucks transported the material to Ash Pond A.

Two bulldozers graded material placed at Ash Pond A. One excavator folded levee material with protective cover, beginning on northwest corner of Ash Pond A.

At 0900 one bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

At 1200 bulldozer traveled to Ash Pond A Landfill and graded material placed at Ash Pond A.

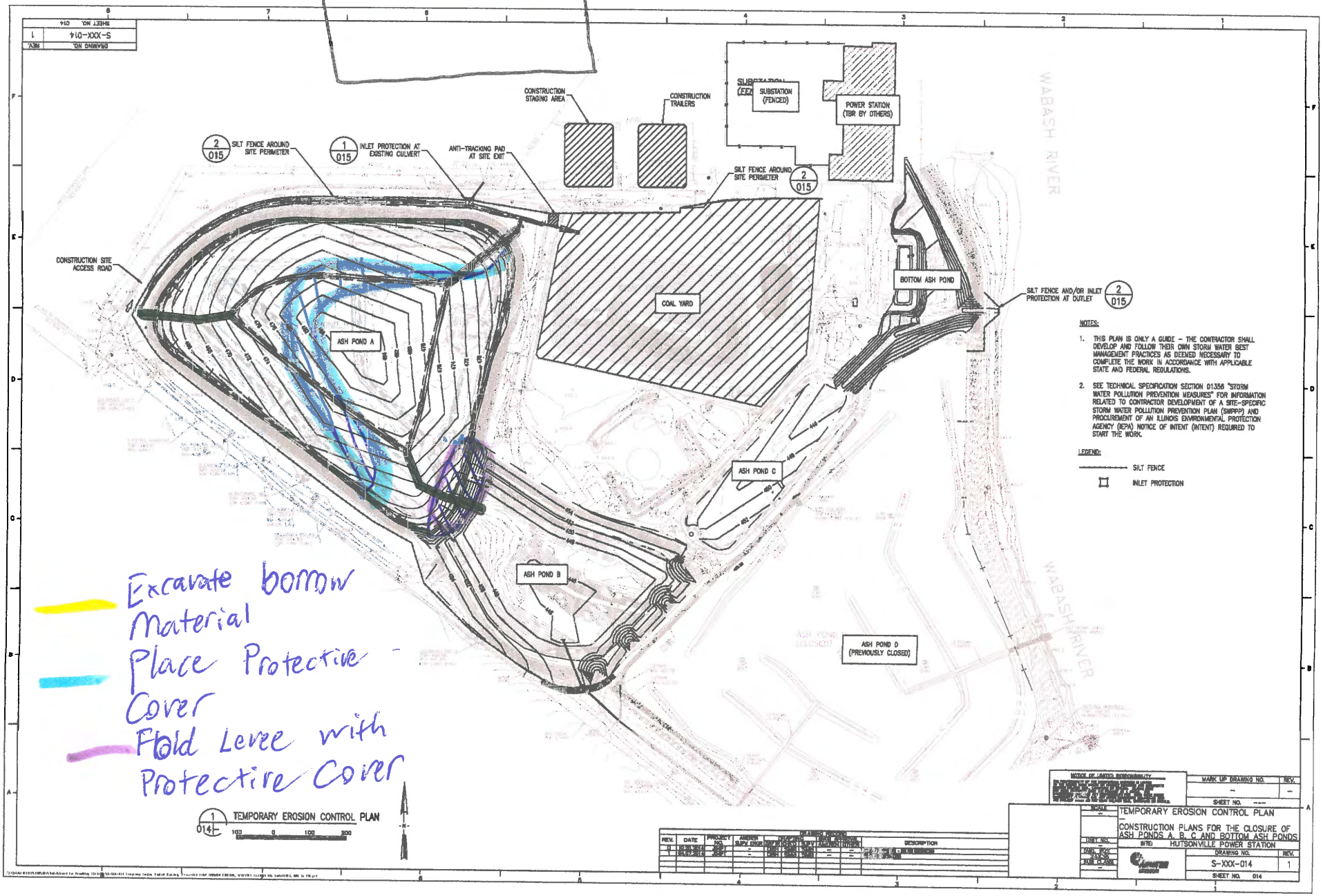
One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads and graded borrow field throughout the day.

At 1600, hauling of material from the borrow pit ceased and the site was prepared for end of work day.

Borrow Field

12-5-2015



Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of borrow field haul road, looking northwest.



Photograph 2 - View of Ash Pond A with haul road and protective cover in place, looking northwest.

Photographs taken by Seth Lamble of Geotechnology, Inc. November 29 to December 5, 2015.



Photograph 3 - View of borrow field, looking east.



Photograph 4 - View of borrow field excavation, looking west.



Photograph 5 - View of haul road from borrow field, looking west.



Photograph 6 - View of the protective cover placement, looking east.



Photograph 7 - View from top of Ash Pond A landfill, looking east.



Photograph 8 - View of paved haul road cleaning, looking east.



Photograph 9 - View of borrow field, looking northeast.



Photograph 10 - View of west ramp for Ash Pond A, looking southeast.



Photograph 11 - View of Ash Pond A protective cover placement, looking east.



Photograph 12 - View of Ash Pond A sandbag removal prior to protective cover placement, looking southeast.



Photograph 13 - View of borrow field, looking west.



Photograph 14 - View of haul road ramp soil removal after repair of internet cable, looking southwest.



Photograph 15 - View of Ash Pond A protective soil placement, looking east.



Photograph 16 - View of Ash Pond A haul road maintenance, looking northeast.



Photograph 17 - View of Ash Pond A protective cover placement, looking west.



Photograph 18 - View of Ash Pond A protective cover placement, looking west.



Photograph 19 - View of Ash Pond A sandbag removal process, looking southwest.



Photograph 20 - View of borrow field, looking northeast.



Photograph 21 - View of haul road repair and maintenance, looking northeast.



Photograph 22 - View of borrow field, looking west.



Photograph 23 - View of Ash Pond A protective cover placement, looking north.



Photograph 24 - View of borrow field, looking east.



Photograph 25 - View of Ash Pond A protective cover placement, looking south.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: December 17, 2015

SUBJECT: Weekly Summary Report for December 6, 2015 to December 12, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 23 to 56°F, and temperature highs ranged from 43 to 70°F.

Construction Activities

Protective cover was transported via haul truck from the borrow field to Ash Pond A. Haul trucks moved on the horseshoe-shaped haul road (minimum 3 foot thickness) on Ash Pond A. The material was placed by haul trucks near the center of Ash Pond A and pushed to the edges by two low-pressure bulldozers. The Ash Pond A haul road was maintained by a tractor with a scraper/roller box and a bulldozer.

An excavator folded Ash Pond A levee material with the protective cover placement along the north and east levees of Ash Pond A.

On December 12, no material was hauled from the borrow field. Material was removed from the north Ash Pond A ramp and placed on Ash Pond A.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 5 dump trucks (John Deere 400D), 3 bulldozers (Caterpillar D6N LGP, 2 with GPS), 1 Tractor (Case 9370) with roller/scraper box (CS-433E), 1 skidsteer (Caterpillar 274B3), 1 water truck (Caterpillar 623B) (unused), 2 Tractors (Case 435, Cast stx480) (unused) with scraper boxes (Reynolds).

WB Koester had 6-15 employees working on site: 1-2 laborers, 1 mechanic, and 4-12 equipment operators.

Meetings

The weekly progress meeting was held on Wednesday, December 9, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Protective cover from the borrow field located northeast of Ash Pond A.

Testing/Sampling

Testing and sampling were not performed on site this week.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/06/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.50

AM Conditions: Clear
AM Temperature: 24 F
PM Conditions: Cloudy
PM Temperature: 51 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 2 excavator, 2 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box
Personnel: **WB Koester:** 14 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road.

Geotechnology, Inc. Rep. 12-6-15 Date

Geotechnology, Inc. Engineer 12/6/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/06/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Brandenburg did not work this day.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

One excavator loaded out borrow field material. Five haul trucks transported the material to Ash Pond A.

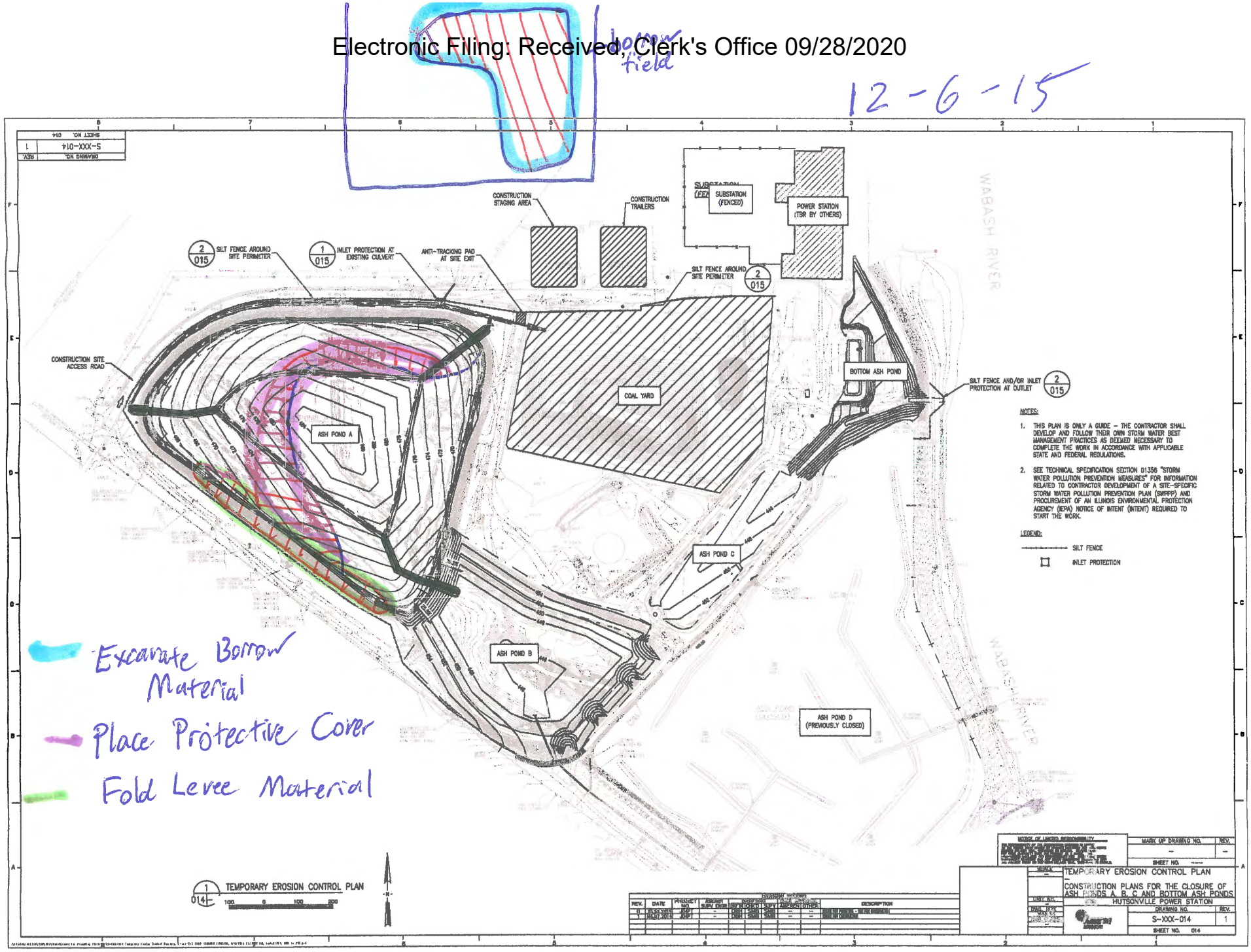
One bulldozer graded material placed at Ash Pond A. One excavator folded levee material with protective cover, beginning on the south levee of Ash Pond A.

At 1200 one excavator traveled to borrow field to load out borrow field material.

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads and graded borrow field throughout the day.

At 1600, hauling of material from the borrow pit ceased and the site was prepared for end of work day.


borrow field
12-6-15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TBR BY OTHERS)
2/015 SILT FENCE AROUND SITE PERIMETER
1/015 INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
SILT FENCE AROUND SITE PERIMETER 2/015
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET 2/015
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
WABASH RIVER
NOTES:
1. THIS PLAN IS ONLY A GUIDE – THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (INTENT) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Excavate Borrow Material
Place Protective Cover
Fold Levee Material
1/014 TEMPORARY EROSION CONTROL PLAN
100 0 100 200
N
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
HUTSONVILLE POWER STATION
DRAWING NO. S-XXX-014
REV. 1
SHEET NO. 014

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/07/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren

Representative: Seth Lamble
Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 11.5

AM Conditions: Cloudy AM Temperature: 39 F

PM Conditions: Cloudy PM Temperature: 42 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 2 excavator, 2 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box

Personnel: **WB Koester:** 14 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road. See attached location map for additional information.

Geotechnology, Inc. Rep. 12/07/15 Date

Geotechnology, Inc. Engineer 12/8/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/07/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Brandenburg demolition to the building.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

One excavator loaded out borrow field material. Five haul trucks transported the material to Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

One bulldozer graded material placed at Ash Pond A.

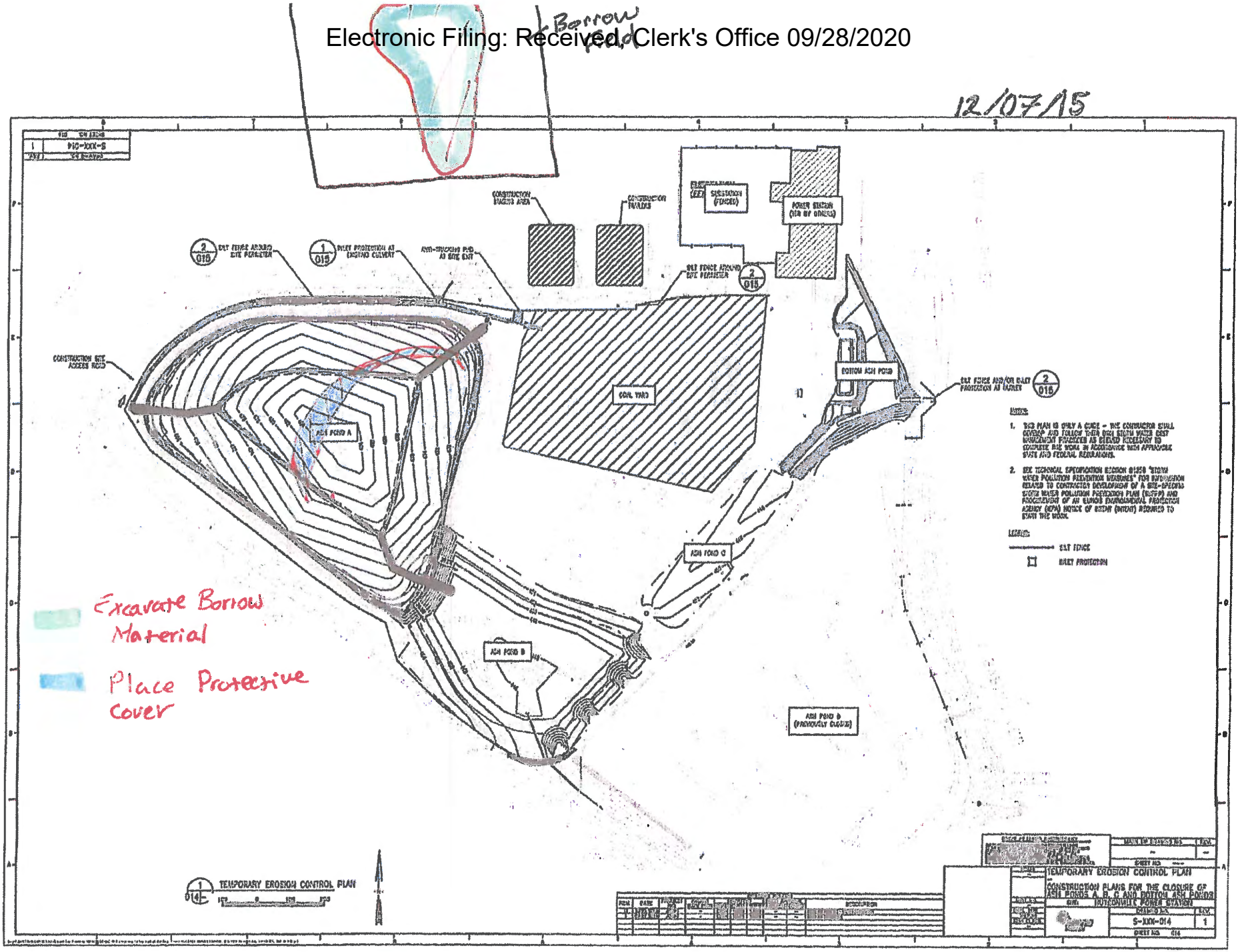
One excavator folded levee material with protective cover, beginning on northwest corner of Ash Pond A.

At 0900 two bulldozers graded material placed at Ash Pond A

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads and graded borrow field throughout the day.

At 1615, hauling of material from the borrow pit ceased and the site was prepared for end of work day.


Borrow Pond
12/07/15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (SEE BY OTHERS)
SILT FENCE AROUND SITE PERIMETER
RIPRAP PROTECTION AT EXISTING CULVERT
ASH-STOCKING ROAD AT SITE EXIT
CONSTRUCTION SITE ACCESS ROAD
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR RIPRAP PROTECTION AS NEEDED
ASH POND A
ASH POND C
ASH POND B
ASH POND B (PREVIOUSLY CLOSED)
NOTES:
1. THIS PLAN IS ONLY A GUIDE - THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN SOUND WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (NOI) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
RIPRAP PROTECTION
Excavate Borrow Material
Place Protective Cover
1 TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH POND
INTERCONNECTIVE POWER STATION
S-XXX-014
SHEET NO. 014

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/08/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.5

AM Conditions: Cloudy
AM Temperature: 36 F

PM Conditions: Cloudy
PM Temperature: 56 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 2 excavator, 3 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box

Personnel: **WB Koester:** 14 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road. See attached location map for additional information.

12/08/15
Geotechnology, Inc. Rep. Date

12/8/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/08/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of the building.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

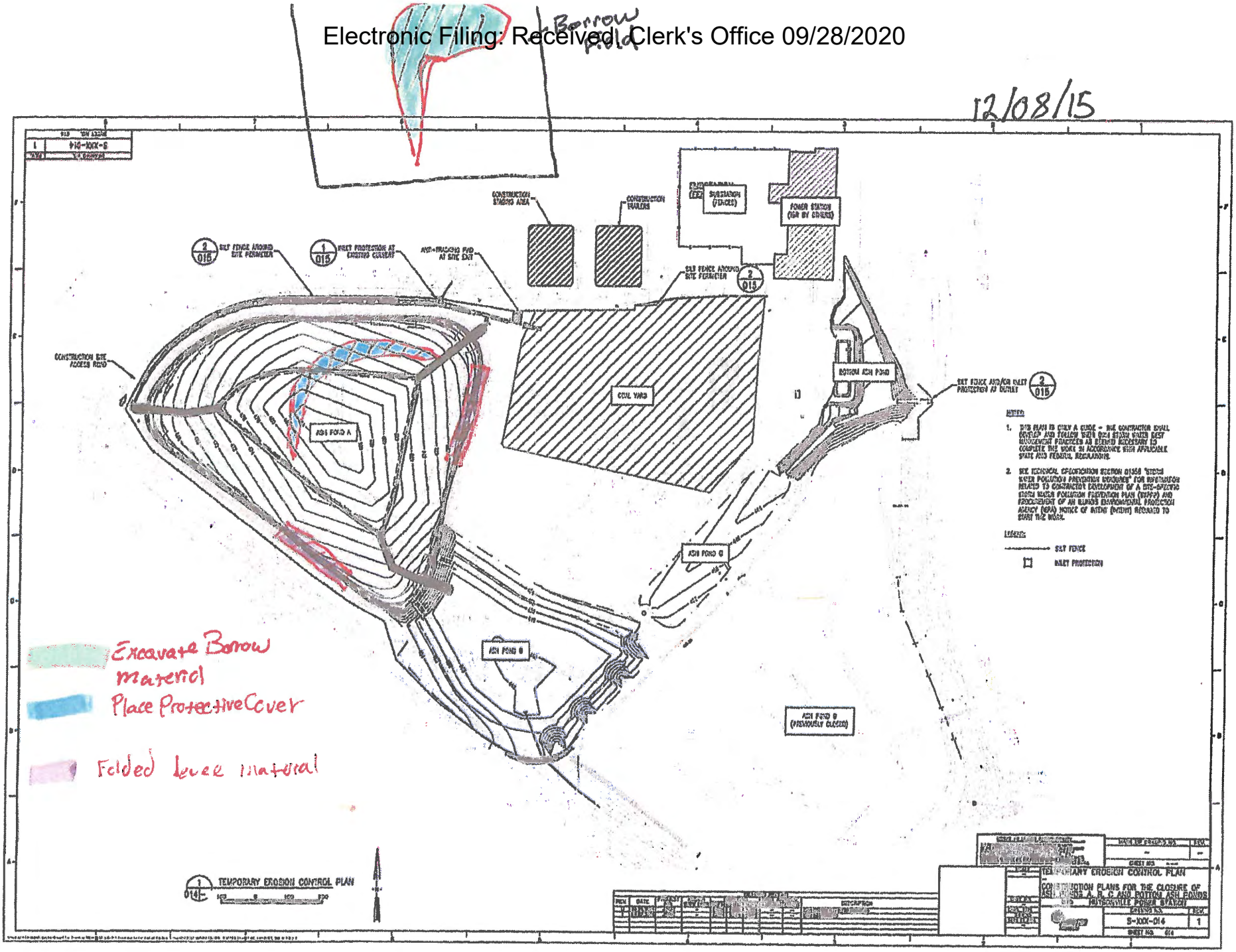
One excavator loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. Two bulldozers graded material placed at Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) from the borrow field and cleaned and maintained the borrow field haul road.

One excavator folded levee material with protective cover, beginning on North/ Northeast corner and then the South boundary of Ash Pond A.

One tractor with roller/scraper box flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A. One bulldozer assisted the tractor beginning at 0930.
One skidsteer cleaned the roads and graded the borrow field throughout the day.

At 1615, hauling of material from the borrow pit ceased and the site was prepared for the end of the work day.


Borrow Area
12/08/15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (TYP.OF2)
POWER STATION (NOT BY OTHERS)
SILT FENCE AROUND SITE PERIMETER
INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
SILT FENCE AROUND SITE PERIMETER
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET
ASH POND C
ASH POND B
ASH POND B (PREVIOUSLY CLOSED)
NOTES:
1. THIS PLAN IS ONLY A GUIDE - THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS REQUIRED ACCESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION PROGRAM" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (NOI) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Excavate Borrow Material
Place Protective Cover
Folded Levee Material
TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH POND A, B, C AND BOTTOM ASH PONDS
S-XXX-014
SHEET NO. 014

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/09/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0615 Depart: 1630 Travel: 0.00 Total: 9.75

AM Conditions: Cloudy
AM Temperature: 47 F

PM Conditions: Cloudy
PM Temperature: 56 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 2 excavator, 3 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box

Personnel: **WB Koester:** 15 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A, and the Haul Road. See attached location map for additional information.

Carl Bard 12/09/15
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 12/11/2015
Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/09/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Brandenburg demolition to the building.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

One excavator loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. Two bulldozers graded material placed at Ash Pond A.

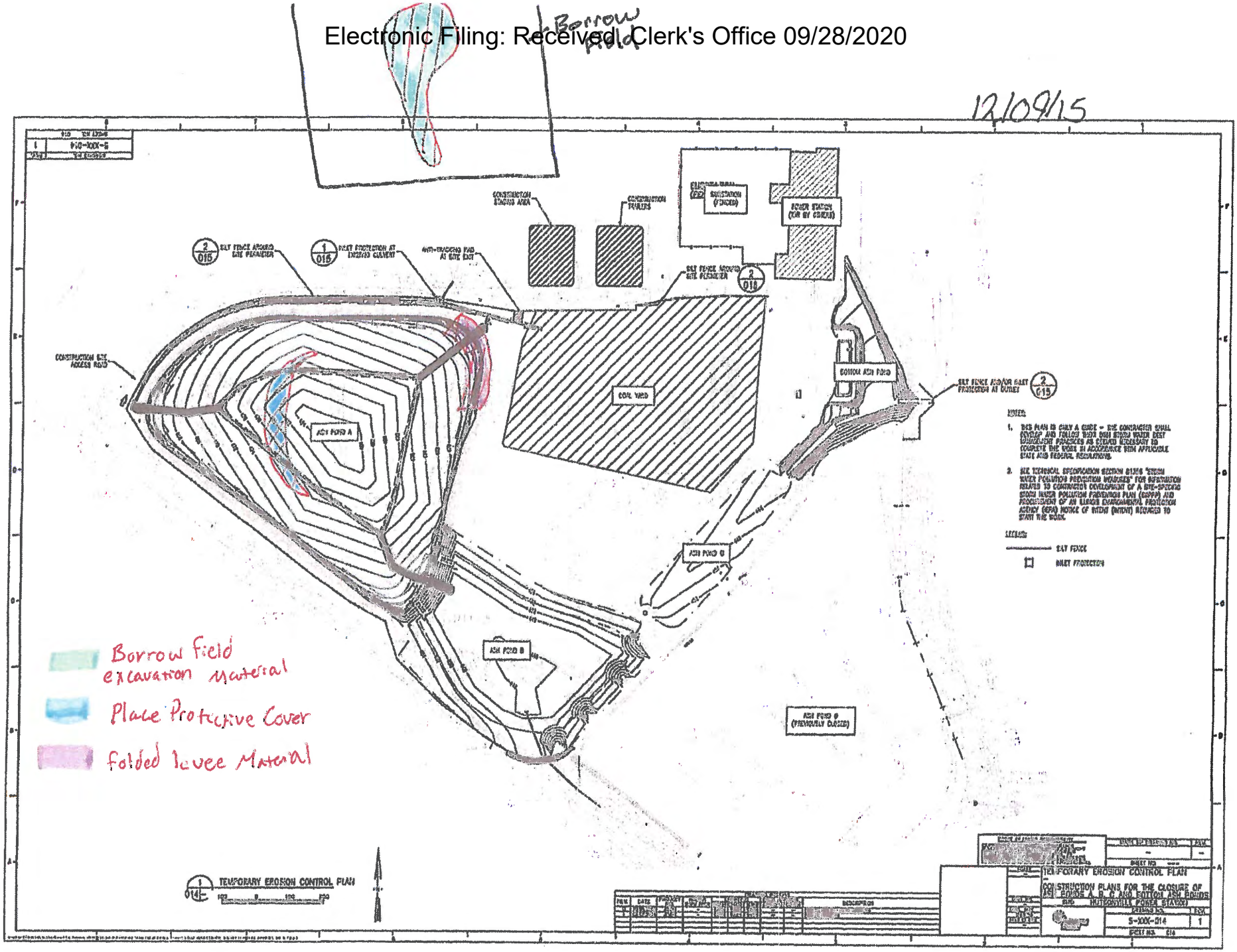
One excavator folded levee material with protective cover at the north corner levee of Ash Pond A.

One tractor with roller/scraper box and one bulldozer flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads and graded the borrow field throughout the day.

The weekly progress meeting was held at 0900. See the meeting minutes for additional information.

At 1620, hauling of material from the borrow pit ceased and the site was prepared for end of work day.


Borrow Field
12/09/15
CONSTRUCTION ENTRANCE ACCESS ROAD
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TO BE CLOSED)
SILT FENCE AROUND SITE PERIMETER
INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
SILT FENCE AROUND SITE PERIMETER
COAL YARD
ASH POND A
ASH POND B
ASH POND C
BOTTOM ASH POND
ASH POND D (PREVIOUSLY CLOSED)
SILT FENCE AROUND INLET PROTECTION AT OUTLET
NOTES:
1. THIS PLAN IS ONLY A GUIDE - THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS NEEDED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01355 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCESSMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (EPA) NOTICE OF INTENT (NOI) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Borrow field excavation material
Place Protective Cover
folded levee Material
1 TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
HUTSONVILLE POWER STATION
S-XXX-014
1

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Weekly Progress Meeting

Meeting Minutes

Date: 12-9-15

Attendees:

Ameren: Don Shaver, Tim Free, Mike Wagstaff, Ken Beckman

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Jessie Hahn, Cassie

Topics:

Safety/Housekeeping

- No issues
- Borrrow hauling puts some soil on the plant roads. Chris is scraping it multiple times during day. Need to try and wash it at end of day.
- Chris to make sure to discuss with crew in morning the congestion in the trailer parking area. Need to slow down as there are more pedestrians.

Manpower

- Man hours
  - Start of Job (4-27-15) through 12-7-15
    - Total = 13,900 hrs.
- Next week expected manpower
  - WBK = 15 next week.
  - Rain Expected Sunday/Monday this week so likely only work Saturday this week.

Review old minutes and action items

- Geotechnology expects to get the topsoil testing results back by next Monday.

Material Issues

- No issues

Quality Control Issues

- No issues

Schedule Compliance

- Brandenberg pumping until end of year (flowable fill application) Still need to keep berm in Bottom Ash pond that whole time. Will have to dry before grading can take place (likely to take place in Spring)
- Seeding/blanket placement will be in Spring. Permanent fence install will be in Spring after Brandenberg finished with building demo.
- Hauling borrow soil to top of Pond A and placing in a 3' layer. Should be close to having all borrow to the top of Pond A by Friday/Saturday this week. Will then start shaping into 2.5' layer with dozers. Will also shape the diversion berms/downchutes.
- Chris thinks that the topsoil haul trucks from Quality Lime will have trouble with the ramps and turning around at the top. Looking into having them deliver and stockpile topsoil in laydown yard and then haul up with Artic trucks when we have an area ready. Currently waiting on approval from Geotechnology to give Quality Lime authorization to begin to build haul road to their topsoil area. Currently topsoil area is very wet and may be difficult to access. We will see what the rain this weekend does. Hope to be able to stockpile topsoil Thursday/Friday next week.
- Need approx. 2000 cy of topsoil in stockpile before we start hauling to top. Estimated to take 6 days to get it to the top.

Cost and Budget Control

- n/a

Next Meeting Scheduled: December 16, 2015 at 9:00 CST

Action Items -

- Chris to update Don about working on Saturday or Sunday.
- Bob to update schedule to show topsoil placement separated and bottom ash pond grading in spring.

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/10/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.50

AM Conditions: Foggy AM Temperature: 41 F

PM Conditions: Cloudy PM Temperature: 57 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 2 excavator, 3 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box

Personnel: **WB Koester:** 15 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road. See attached location map for additional information.

12/10/15
Geotechnology, Inc. Rep. Date

12/11/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/10/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of the power plant.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

One excavator loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) from the borrow field and cleaned and maintained haul road for borrow field.

One excavator folded levee material with protective cover on the north levee of Ash Pond A.

One tractor with roller/scraper box and one bulldozer flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads and graded the borrow field throughout the day.

At 1615, hauling of material from the borrow pit ceased and the site was prepared for end of work day.

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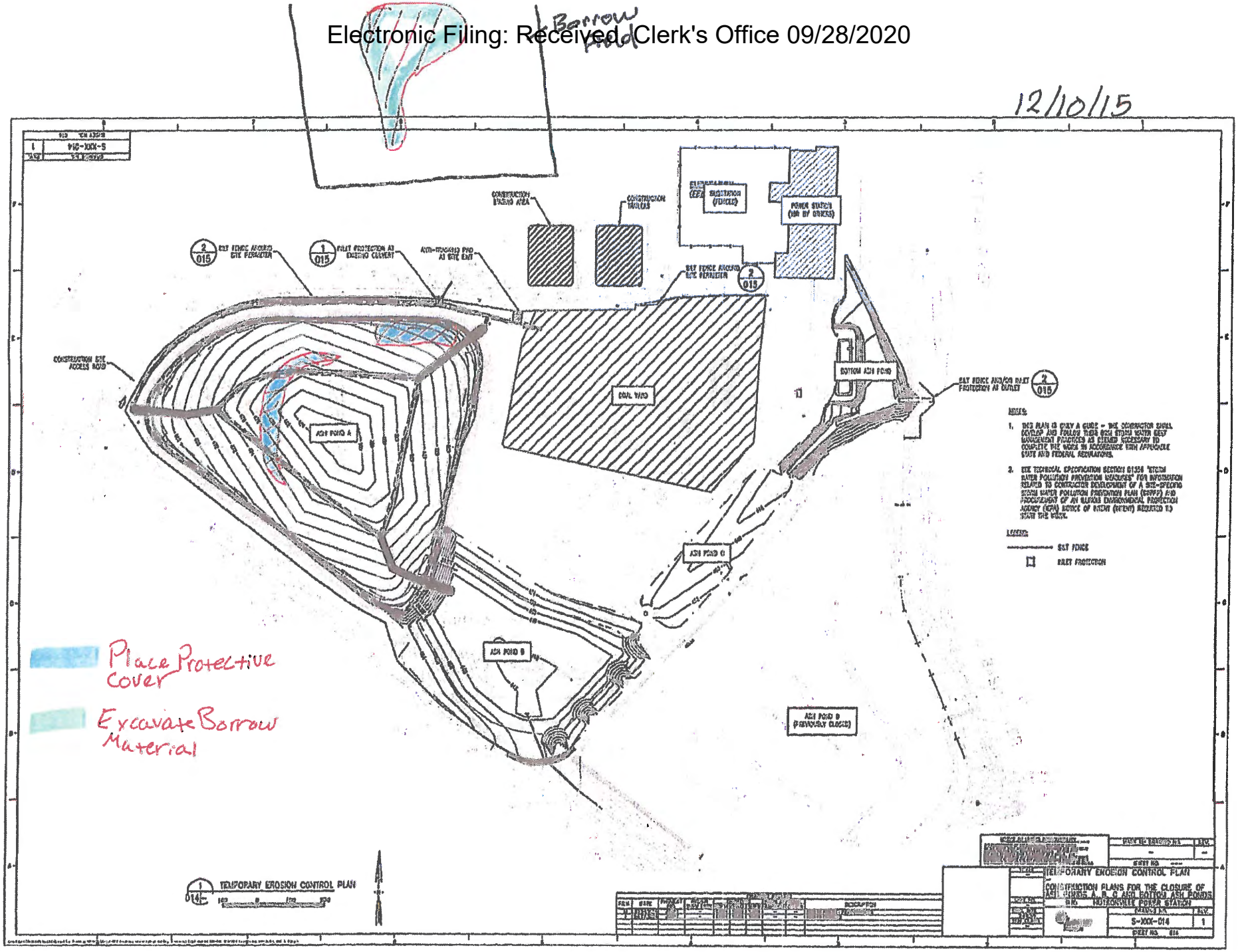


GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/11/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1615 Travel: 0.00 Total: 9.25

AM Conditions: Foggy
AM Temperature: 41 F

PM Conditions: Cloudy
PM Temperature: 60 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 2 excavator, 3 bulldozers, 1 skid steer, 5 haul trucks, 1 tractor with roller/scraper box

Personnel: **WB Koester:** 15 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from borrow field for Ash Pond A.

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road. See attached location map for additional information.

Geotechnology, Inc. Rep. 12/11/15 Date

Geotechnology, Inc. Engineer 12/11/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/11/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of the power plant.

WB Koester:

Placed material from the borrow field on Ash Pond A as protective cover.

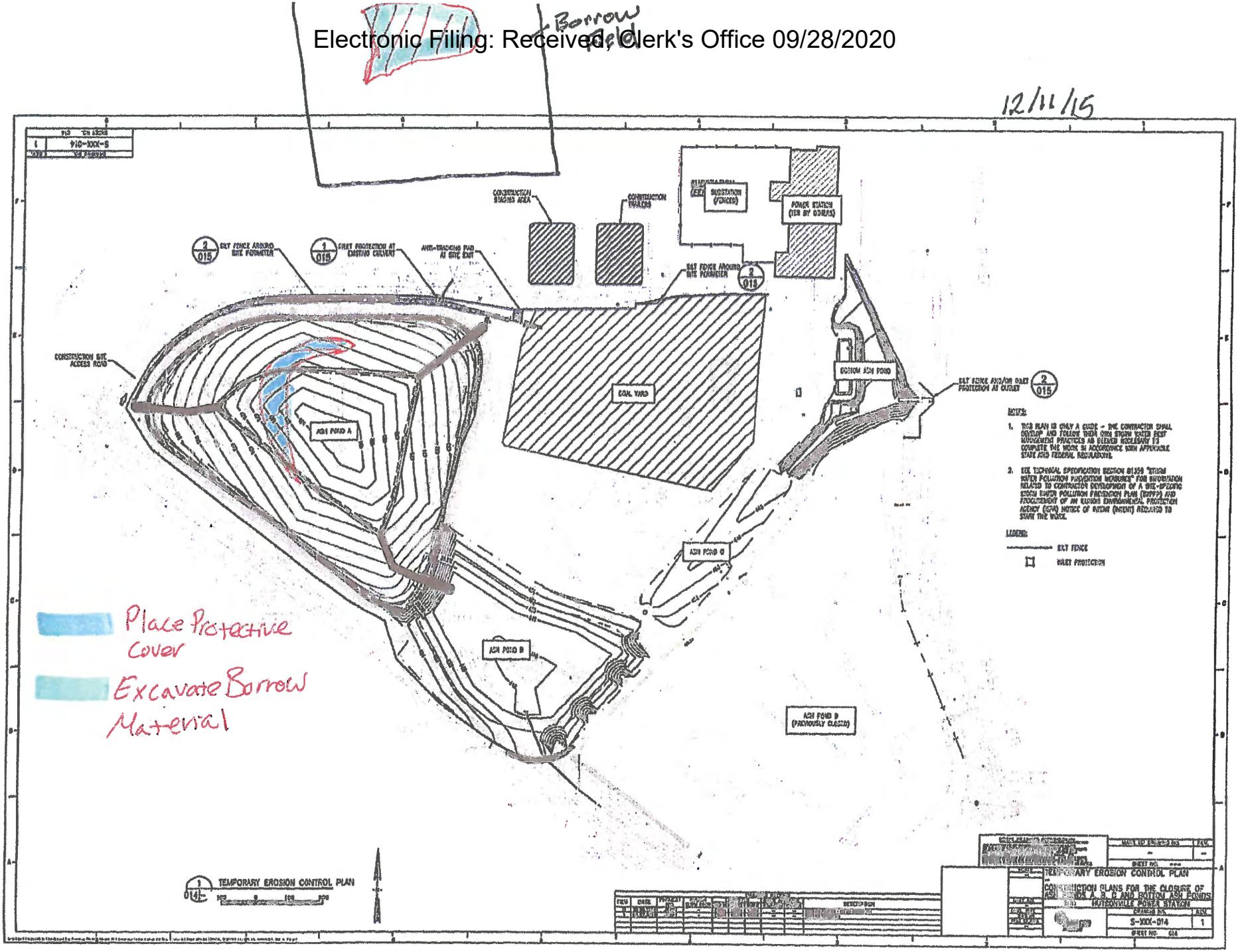
Two excavators loaded out borrow field material. Five haul trucks transported the material to Ash Pond A. One bulldozer graded material placed at Ash Pond A.

One bulldozer cleared topsoil (the top 6 inches) off of the borrow field and cleaned and maintained haul road for borrow field.

One tractor with roller/scraper box and one bulldozer flattened/compacted the ramps and horseshoe-shaped haul road built across the east side of Ash Pond A.

One skidsteer cleaned the roads and graded the borrow field throughout the day.

At 1600, hauling of material from the borrow pit ceased and the site was prepared for the end of the workday.


Borrow Field
12/11/15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (138KV/69KV)
POWER STATION (SEE BY OTHERS)
SILT FENCE AROUND SITE PERIMETER
2/015
1/015
SILT PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR BALE PROTECTION AT OUTLET
ASH POND C
ASH POND B
ASH POND B (PREVIOUSLY CLOSED)
NOTES:
1. THIS PLAN IS ONLY A GUIDE - THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01529 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (NOI) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
BALE PROTECTION
Place Protective Cover
Excavate Borrow Material
1/014 TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
HUTSONVILLE POWER STATION
S-XXX-014
1

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/12/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.5

AM Conditions: Cloudy AM Temperature: 60 F

PM Conditions: Cloudy PM Temperature: 67 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester

Equipment: **WB Koester:** 2 excavator, 3 bulldozers only 2 used, 1 skid steer, 5 haul trucks on site 1 used, 1 tractor with roller/scraper box not used

Personnel: **WB Koester:** 6 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Cover soil from the north ramp on Ash Pond A.

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road. See attached location map for additional information.

Geotechnology, Inc. Rep. 12/12/15 Date

Geotechnology, Inc. Engineer 12/14/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/12/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

WB Koester:

Two bulldozers graded protective cover on Ash Pond A.

Two excavators folded levee material with protective cover at the north and east levees of Ash Pond A.

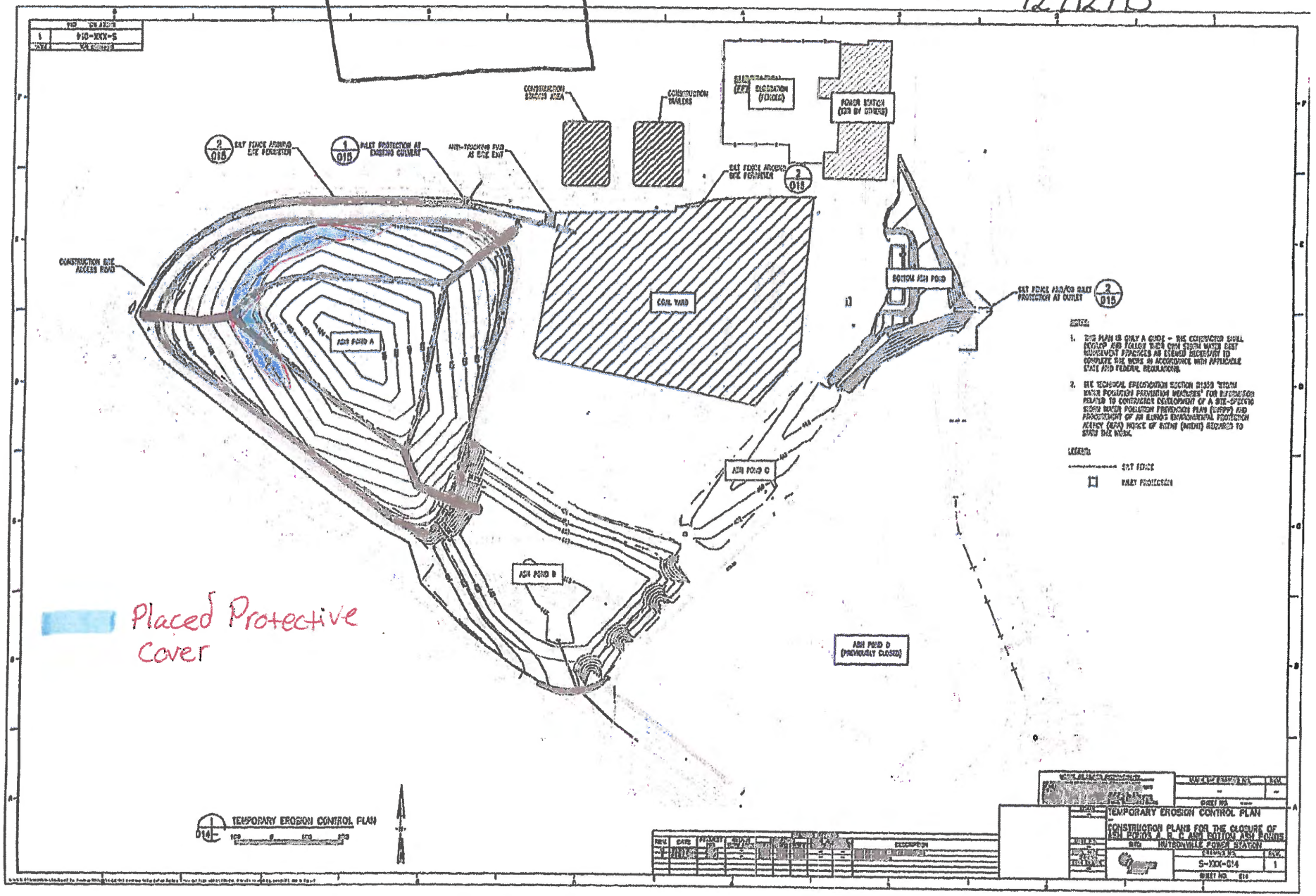
In the afternoon, one excavator loaded out material from the north ramp. One haul truck transported the material to Ash Pond A.

One skidsteer cleaned the roads and graded the borrow field throughout the day.

At 1620, hauling of material from the north ramp ceased and the site was prepared for end of work day.

Borrow Area

12/12/15



Placed Protective Cover

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PHOTOGRAPH LOG



Photograph 1 - View of protective cover loadout at the borrow field, looking east.



Photograph 2 - View of Ash Pond A protective cover placement, looking south.

Photographs taken by Seth Lamble and Cassandra Baresel of Geotechnology, Inc. December 6-12, 2015.



Photograph 3 - View of topsoil removal at the borrow field, looking northeast.



Photograph 4 - View of ramp maintenance at Ash Pond A, looking northwest.



Photograph 5 - View of Ash Pond A levee material placement, looking west.



Photograph 6 - View of Ash Pond A protective cover placement, looking southeast.



Photograph 7 - View of Ash Pond A levee material placement and incorporation, looking west.



Photograph 8 - View of Ash Pond A north ramp material loadout, looking west.

Photographs taken by Seth Lamble and Cassandra Baresel of Geotechnology, Inc. December 6-12, 2015.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: December 28, 2015

SUBJECT: Weekly Summary Report for December 13, 2015 to December 18, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Temperature (^{O}F) lows ranged from 27 to 58°F, and temperature highs ranged from 33 to 68°F.

Construction Activities

Material was moved from the Ash Pond A north ramp to the Ash Pond A cap for use as protective cover. Material from the Ash Pond A levees was folded with material already present on the cap as supplementary protective cover. The protective cover material on Ash Pond A was graded and shaped.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 5 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 Tractor (Case 9370) with smooth drum roller (CS-433E) (unused), 1 skidsteer (Caterpillar 274B3), 1 water truck (Caterpillar 623B) (unused), 2 Tractors (Case 435, Case stx480) with scraper boxes (Reynolds).

WB Koester had 4-5 employees working on site: 1-2 laborer and 3 equipment operators.

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Meetings

The weekly progress meeting was held on Wednesday, December 16, 2015. Refer to the meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Protective cover from the borrow field located northeast of Ash Pond A.

Testing/Sampling

Material from the Ash Pond A levees was sampled by Cassandra Baresel of Geotechnology on December 15, 2015.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/13/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.5

AM Conditions: Cloudy
AM Temperature: 60 F

PM Conditions: Cloudy; light rain stopping shortly after 1400.
PM Temperature: 63 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: WB Koester
Equipment: **WB Koester:** 2 excavator, 2 bulldozers
Personnel: **WB Koester:** 4 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Ash Pond A north ramp material.
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Borrow Field, Ash Pond A and Haul Road. See attached location map for additional information.

12/13/15
Geotechnology, Inc. Rep. Date

12/16/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/13/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

WB Koester:

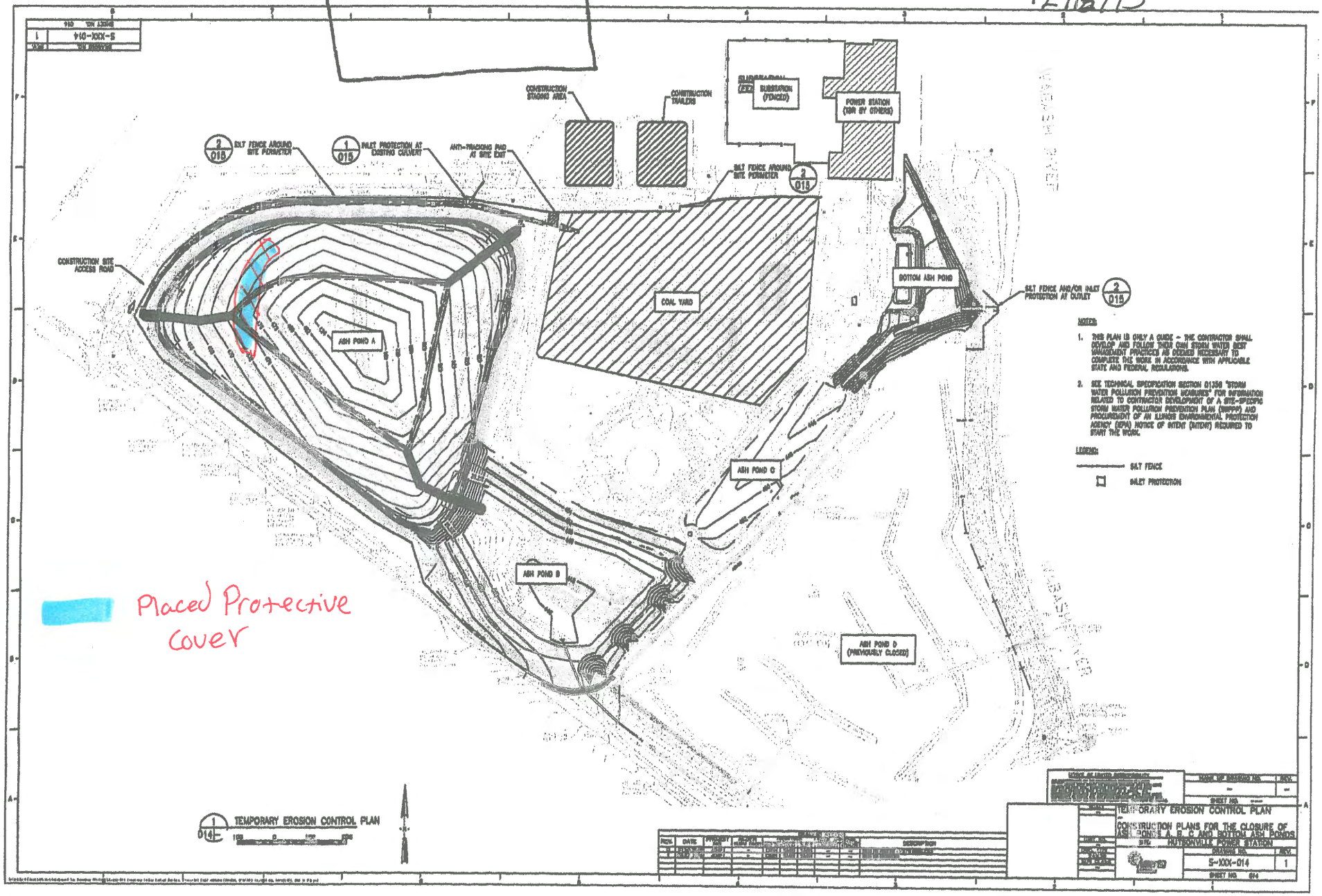
Two bulldozers graded material placed at Ash Pond A and spread protective cover to the west and northwest.

Two excavators folded levee material with protective cover on the north, northeast, and northwest levees of Ash Pond A.

At 1615 the site was prepared for the end of the workday.

Borrow Field

12/12/15



Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/14/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 0730 Travel: 0.00 Total: 1

AM Conditions: Rainy
AM Temperature: 44 F

PM Conditions: Rainy
PM Temperature: 52 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:**
Personnel: **WB Koester:** 4 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 12/16/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/14/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Demolition to the building.

WB Koester:

Rained out for the day.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/15/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.5

AM Conditions: Cloudy AM Temperature: 41 F

PM Conditions: Cloudy PM Temperature: 46 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 1 excavator, 2 bulldozers

Personnel: **WB Koester:** 5 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:

Deliveries:

Testing: Cassandra Barasel (Geotechnology) collected a sample of the Ash Pond A levee material for CQA Conformation Testing as protective cover.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location map for additional information.

12/15/15
Geotechnology, Inc. Rep. Date

12/16/15
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/15/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Demolition of building.

WB Koester:

Work proceeded in wet soil conditions.

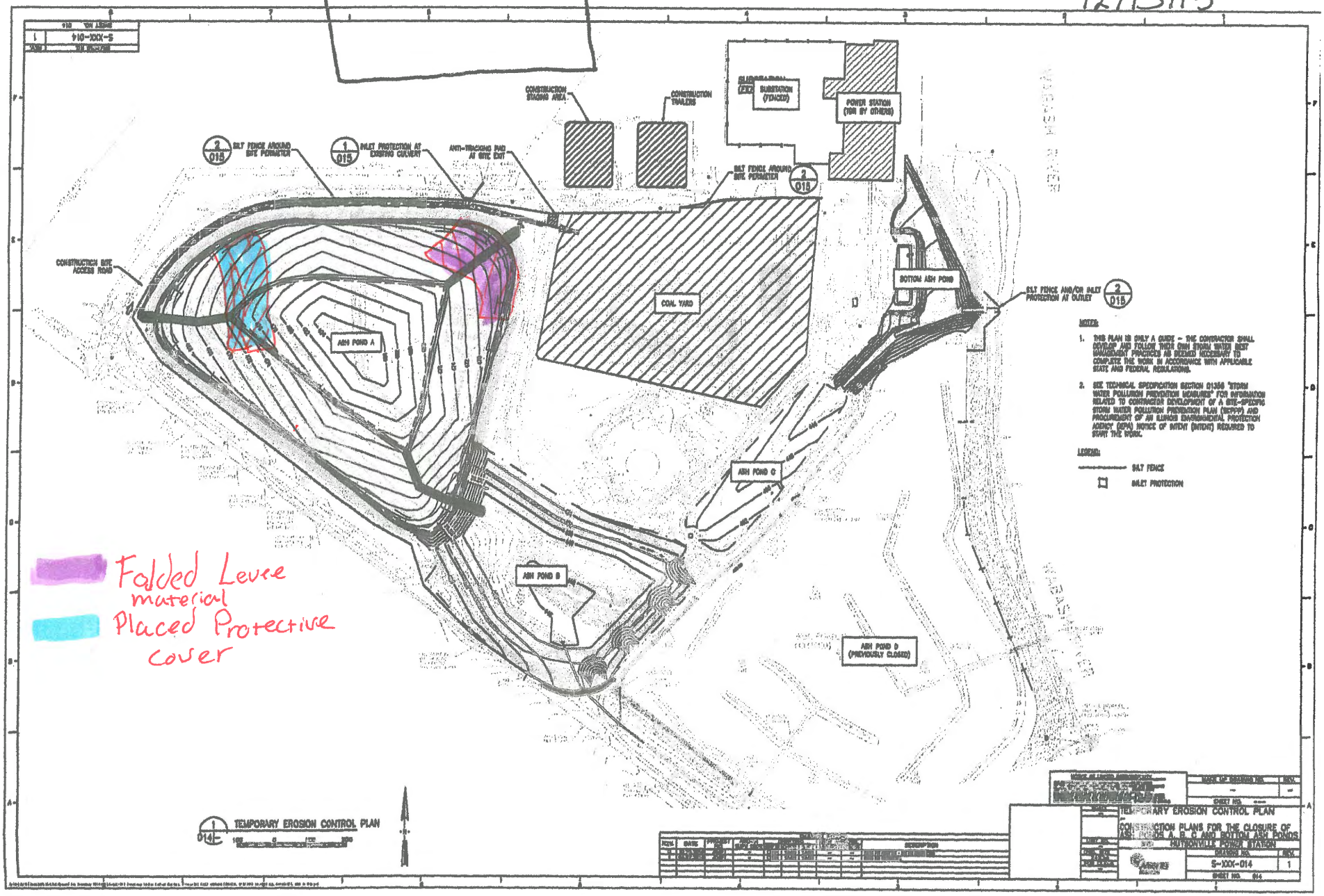
Two bulldozer graded and shaped material on at Ash Pond A and spread protective cover to the west and northwest. One excavator moved levee material with protective cover on the northwest levee of Ash Pond A.

In the morning and early afternoon part of the crew cleaned equipment.

At 1615, the site was prepared for the end of the day.

+ Borrow Field

12/15/15



GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/16/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Cassandra Baresel
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.5) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 9.5

AM Conditions: Cloudy with a few rain showers
AM Temperature: 38 F

PM Conditions: Cloudy
PM Temperature: 55 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 1 excavator, 2 bulldozers

Personnel: **WB Koester:** 5 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location map for additional information

Geotechnology, Inc. Rep. 12/16/15 Date

Geotechnology, Inc. Engineer 12/18/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/16/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Demolition of building.

WB Koester:

Work proceeded in wet soil conditions.

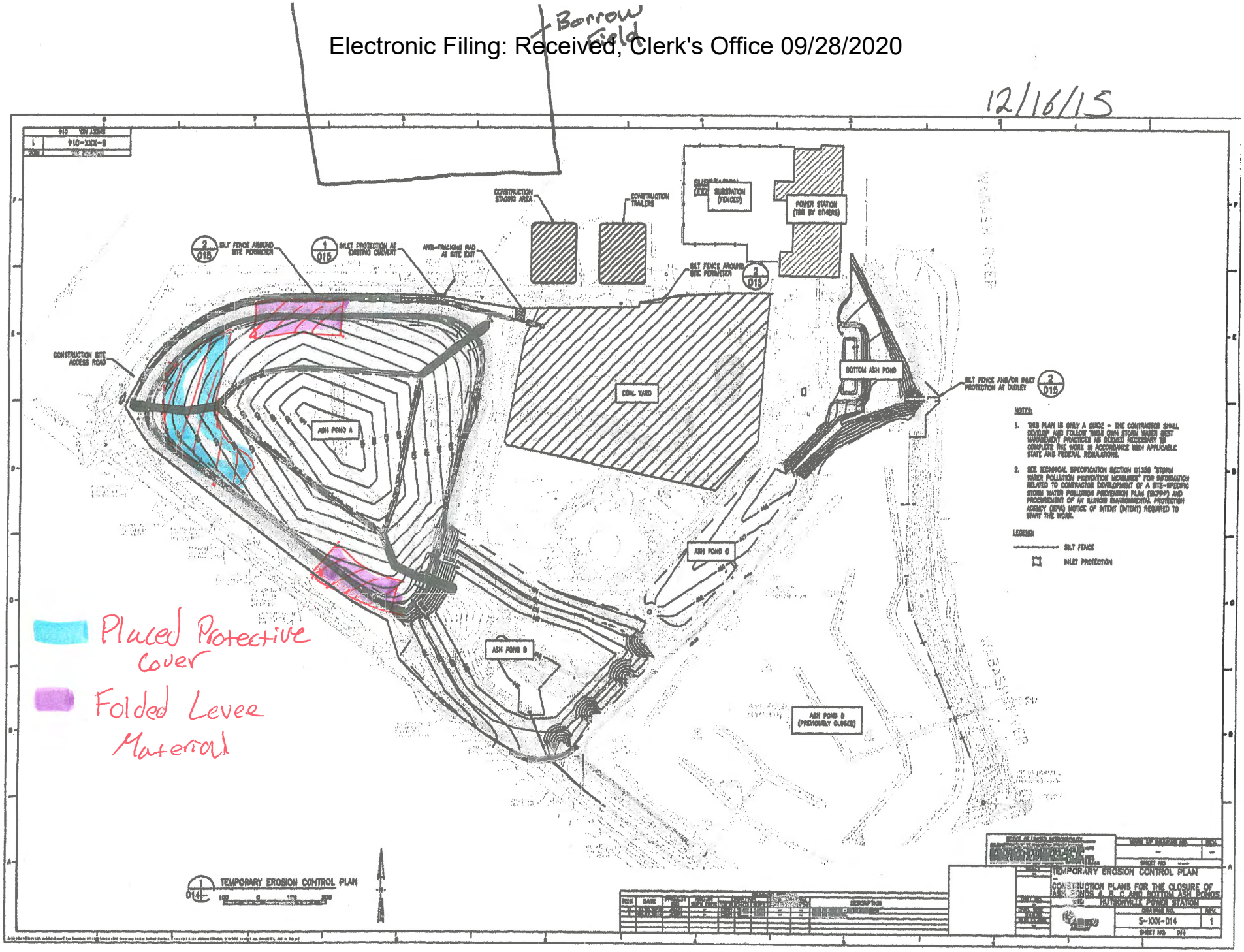
Two bulldozer graded and shaped material on Ash Pond A and spread protective cover to the west and southwest. One excavator moved levee material as protective cover on the northwest and south levees of Ash Pond A.

In the morning and early afternoon part of the crew cleaned equipment.

At 1615, the site was prepared for the end of the day.

Other:

The weekly coordination meeting was held on site at 0900. See the meeting minutes for additional information.


Borrow Field
12/16/15
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (TBR BY OTHERS)
SILT FENCE AROUND SITE PERIMETER
INLET PROTECTION AT EXISTING CULVERT
ANTI-TRACKING PAD AT SITE EXIT
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
NOTES:
1. THIS PLAN IS ONLY A GUIDE - THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (NOINT) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Placed Protective Cover
Folded Levee Material
TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
S-XXX-014

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 12-16-15

Attendees:

Ameren: Don Shaver, Mike Wagstaff, Ken Beckman

WB Koester: Chris Atkinson, Bob Fisher

Geotechnology, Inc.: Cassie, Anna

Topics:

Safety/Housekeeping

- No issues
- Chris to keep scraping and washing the roads.
- Don says they added reflectors to the main gate to help with visibility during foggy weather.
- 5 random drug screens were performed and all were compliant.
- Wait until spring to repair the road cuts. Don says it is fine for now and ok to wait until spring.

Manpower

- Man hours
  - Start of Job (4-27-15) through 12-14-15
    - Total = 14,580 hrs.
- Next week expected manpower
  - WBK = 5 next week.
  - No Saturday or Sunday work this week. Monday – Thursday next week. Plan on demobilizing until spring next Wednesday.

Review old minutes and action items

- Topsoil from quarry was approved this week.

Material Issues

- No issues

Quality Control Issues

- Topsoil from quarry was approved this week.

Schedule Compliance

- Chris will continue shaping the Pond A borrow material and reclaiming the borrow area. Plans on working rest of this week (not Saturday or Sunday) and Monday through Wednesday of next week.
- Brandenberg pumping until end of year (flowable fill application) Still need to keep berm in Bottom Ash pond that whole time. Will have to dry before grading can take place (likely to take place in Spring) Chris will likely come to the site over the winter to dewater the bottom ash pond after Brandenberg is complete with the bottom ash pond.
- Topsoil placement/Seeding/blanket placement will be in Spring. Permanent fence install will be in Spring after Brandenberg finished with building demo.
- Bob will update Ameren and Geotechnology on the anticipated date of spring startup. May try and deliver and stockpile topsoil prior to the hauling crews showing up. Depends on the weather in the spring.
- Other items for the spring: finish the downchutes/rip rap on pond A, finish the ditch north of pond A, place the aggregate on the roads, fix the road cuts with concrete, finish the piezometers, finish grade the bottom ash pond, closure of the Pond B outlet with flowable fill.

Cost and Budget Control

- Bob to submit invoice for December (including the two days of Sunday work) and submit an estimate of 2016 costs.
- Geotechnology to submit estimate of 2015 and 2016 cost.

Next Meeting Scheduled: December 23, 2015 at 9:00 CST

Action Items -

- Bob to submit invoice for December (including the two days of Sunday work) and submit an estimate of 2016 costs.
- Geotechnology to submit estimate of 2015 and 2016 cost.

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/17/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0615 Depart: 1630 Travel: 0.00 Total: 10.15

AM Conditions: Cloudy
AM Temperature: 30 F

PM Conditions: Cloudy
PM Temperature: 31 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester

Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 2 tractors with pans

Personnel: **WB Koester:** 5 employees

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location drawing for additional information.

Geotechnology, Inc. Rep. 12/17/15 Date

Geotechnology, Inc. Engineer 12/18/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/17/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Demolition of building.

WB Koester:

Two bulldozers graded material on at Ash Pond A and spread protective cover toward the southwest levee. One excavator moved levee material as protective cover on the south levee of Ash Pond A.

At 1000 the one excavator loaded material from the north ramp as protective cover into the two tractors with pans. The two tractors transported the north ramp material to the crest of Ash Pond A as protective cover. The two bulldozers graded the material into place.

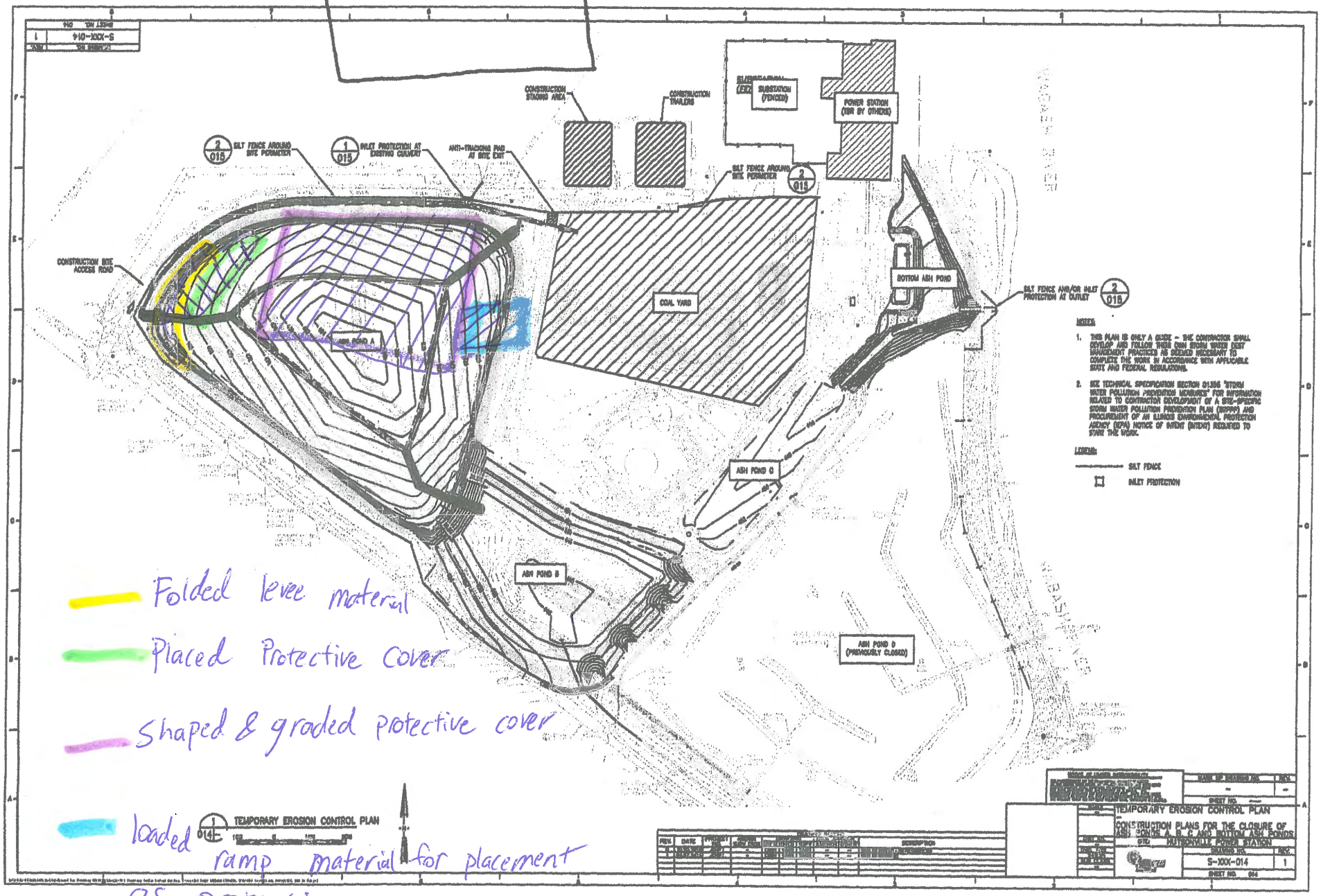
At 1300 two bulldozers shaped Ash Pond A moving west and northwest from the crest.

In the morning and early afternoon part of the crew cleaned equipment.

At 1620 the site was prepared for the end of the day.

+ Borrow Field

12-17-15



Folded levee material

Placed Protective Cover

Shaped & graded protective cover

loaded ramp material for placement as protective cover

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/18/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.0) Lunch

Arrive: 0630 Depart: 1615 Travel: 0.00 Total: 09.75

AM Conditions: Sunny
AM Temperature: 29 F
PM Conditions: Partly Cloudy
PM Temperature: 37 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg, WB Koester
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 2 tractors with pans
Personnel: **WB Koester:** 5 employees
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A. See attached location drawing for additional information.

Geotechnology, Inc. Rep. 12/18/15 Date
Geotechnology, Inc. Engineer 12/18/2015 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/18/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Demolition of building.

WB Koester:

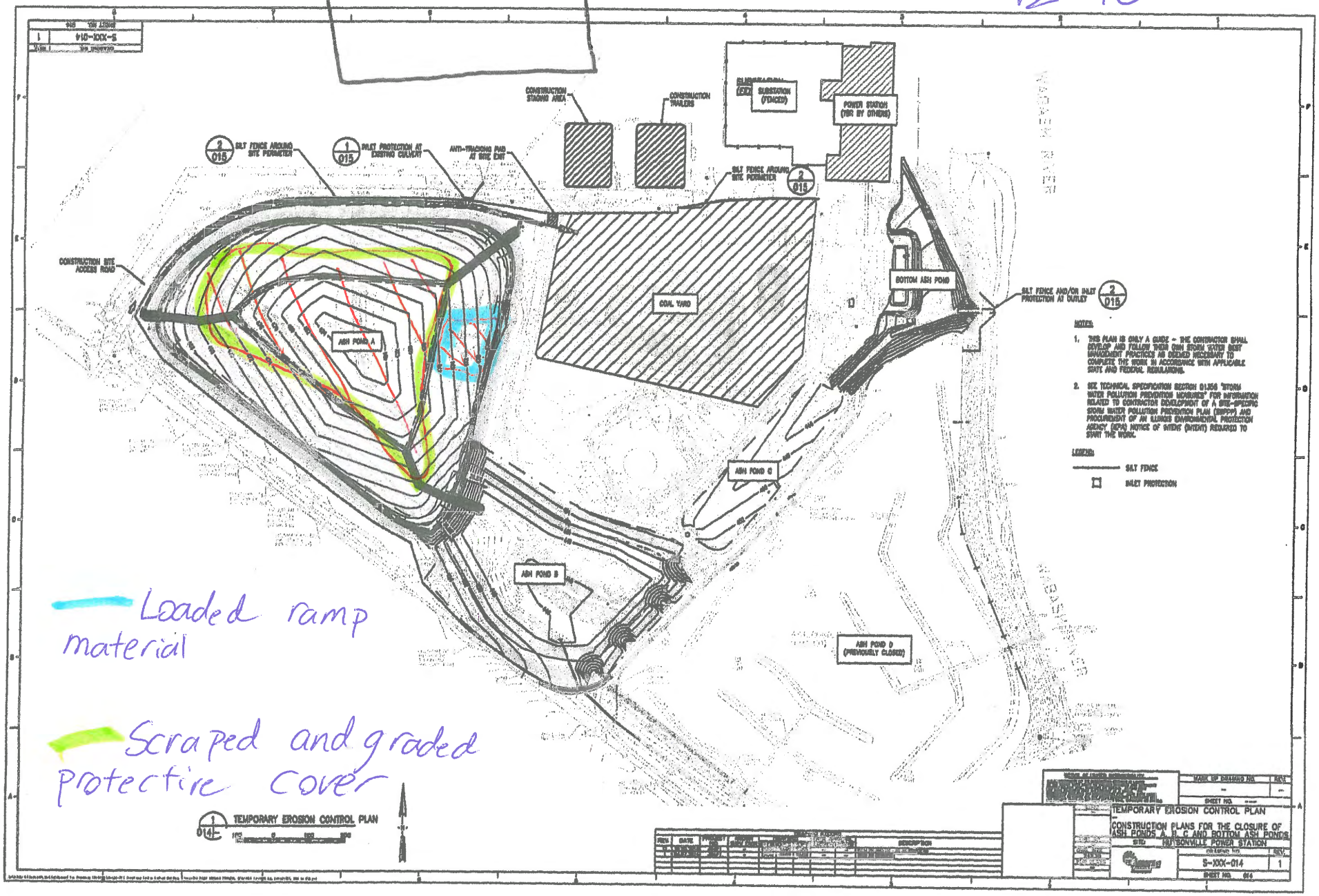
One excavator loaded out material from the north ramp for use as protective cover. Two tractors transported the north ramp material to the crest of Ash Pond A. Two bulldozers graded the material into place.

At 1000 the excavator ceased loading material. The two bulldozers and two tractors with pans graded and shaped the protective cover.

In the morning and early afternoon part of the crew cleaned equipment.

At 1605 the site was prepared for end of the day.

12-18-15


Borrow Field
CONSTRUCTION STAGING AREA
CONSTRUCTION TRAILERS
SUBSTATION (FENCED)
POWER STATION (NOT BY OTHERS)
SILT FENCE AROUND SITE PERIMETER
INLET PROTECTION AT EXISTING CATCH BASIN
ANTI-TRACKING PAD AT SITE EXIT
CONSTRUCTION SITE ACCESS ROAD
ASH POND A
COAL YARD
BOTTOM ASH POND
SILT FENCE AND/OR INLET PROTECTION AT OUTLET
ASH POND C
ASH POND B
ASH POND D (PREVIOUSLY CLOSED)
NOTES:
1. THIS PLAN IS ONLY A GUIDE - THE CONTRACTOR SHALL DEVELOP AND FOLLOW THEIR OWN STORM WATER BEST MANAGEMENT PRACTICES AS DEEMED NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
2. SEE TECHNICAL SPECIFICATION SECTION 01356 "STORM WATER POLLUTION PREVENTION MEASURES" FOR INFORMATION RELATED TO CONTRACTOR DEVELOPMENT OF A SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND PROCUREMENT OF AN ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) NOTICE OF INTENT (NOI) REQUIRED TO START THE WORK.
LEGEND:
SILT FENCE
INLET PROTECTION
Loaded ramp material
Scraped and graded protective cover
TEMPORARY EROSION CONTROL PLAN
TEMPORARY EROSION CONTROL PLAN
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH PONDS A, B, C AND BOTTOM ASH PONDS
S-XXX-014
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PHOTOGRAPH LOG



Photograph 1 - View of excavator on Ash Pond A levee folding levee material with protective cover, looking west.



Photograph 2 - View of folding and grading Ash Pond A levee material on Ash Pond A, looking west.

Photographs taken by Seth Lamble and Cassandra Baresel of Geotechnology, Inc. December 13-19, 2015.



Photograph 3 - View of Ash Pond A north ramp removal for placement as protective cover, looking south.



Photograph 4 - View of bulldozer grading Ash Pond A, looking south.



Photograph 5 - View of Ash Pond A protective cover maintenance, looking southwest.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: December 28, 2015

SUBJECT: Weekly Summary Report for December 21, 2015 to December 25, 2015

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy. Work was performed on December 22, 2015, which had a high of 55°F and a low of 41°F

Construction Activities

Work was not performed December 21, 2015 due to wet conditions.

The site was winterized and erosion control structures improved on December 22, 2015.

Site work ceased December 22, 2015 until the spring. WB Koester and Geotechnology demobilized.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 1 dump truck (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds) (unused).

WB Koester had 5 employees working on site: 2 laborers, 1 mechanic, and 2 equipment operators.

Meetings

Project meetings were not held this week.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Additional materials were not used this week.

Testing/Sampling

Testing and sampling did not occur on site this week.

Signature of CQA Officer



Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/21/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.50) Lunch

Arrive: 0630 Depart: 0300 Travel: 0.00 Total: 08.00

AM Conditions: Cloudy, rain
AM Temperature: 57 F
PM Conditions: Overcast
PM Temperature: 54 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** -
Personnel: **WB Koester:** -
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Rain day. No work performed on site.

12/21/15
Geotechnology, Inc. Rep. Date

12/21/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/21/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Rain day. Construction work was not performed on site.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 12/22/2015

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Seth Lamble

TIME AND WEATHER CONDITIONS:

(-0.00) Lunch

Arrive: 0600 Depart: 1315 Travel: 03.00 Total: 10.15

AM Conditions: Overcast
AM Temperature: 42 F

PM Conditions: Overcast
PM Temperature: 54 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 2 excavators, 2 bulldozers (not used), 3 tractors with pans (not used), 1 haul truck (not used), 1 backhoe/loader

Personnel: **WB Koester:** 5

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Construction Vehicle Lot. See attached location drawing for additional information.

12/22/15
Geotechnology, Inc. Rep. Date

12/22/2015
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 12/22/2015

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

One excavator dewatered and repaired the storm water drain near the northeast corner of Ash Pond A

One backhoe cleaned the road throughout the day.

Winterized equipment; prepared for work cessation until March 2016.

At 1100 work ceased and the site was prepared for the end of the work day.

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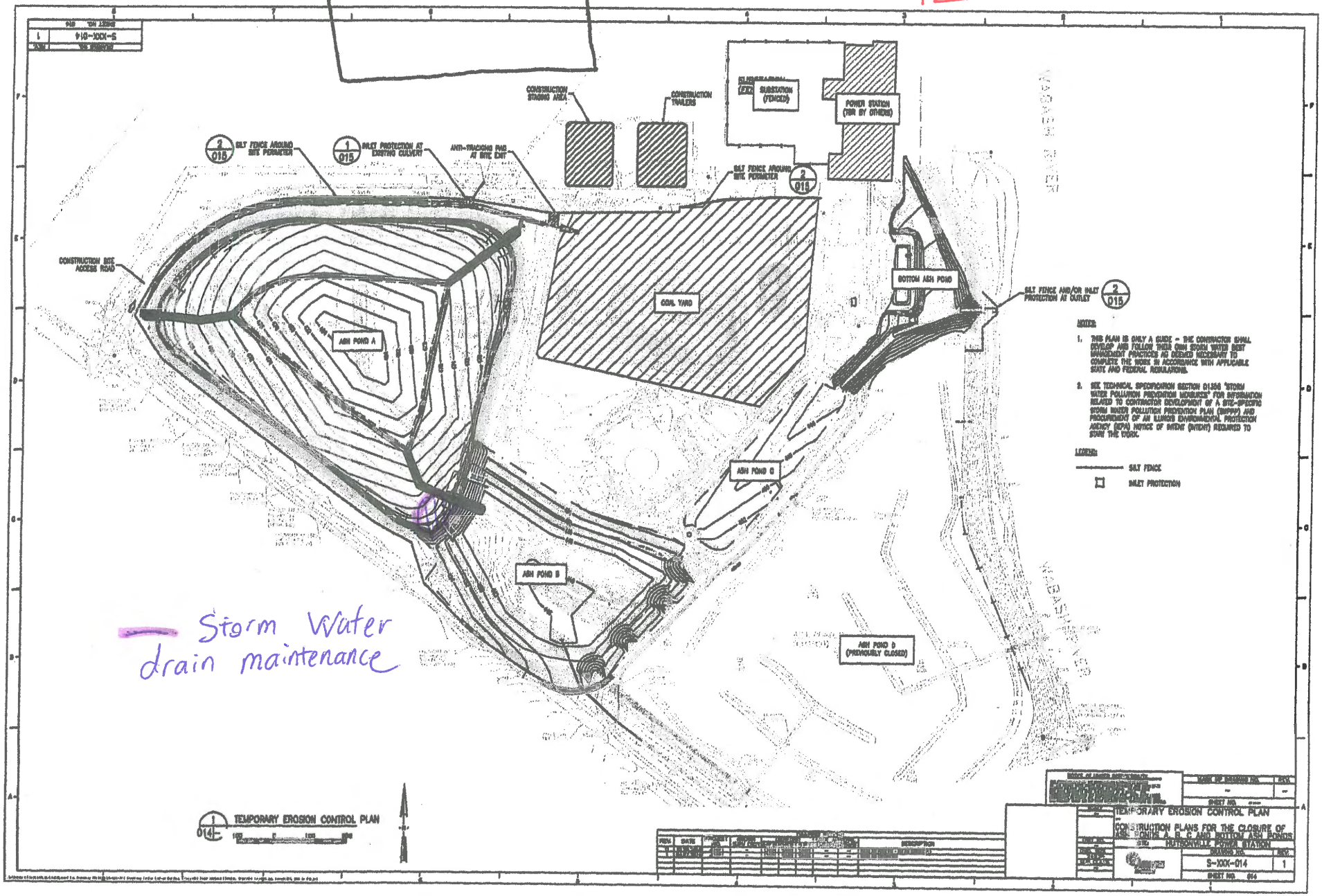
+ Borrow Field

12-22-2015



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PHOTOGRAPH LOG



Photograph 1 - View of WB Koester demobilization, looking north.



Photograph 2 - View of Ash Pond A stormwater drain preparation, looking west.



Photograph 3 - View of Ash Pond A stormwater drain preparation, looking east.



Photograph 4 - View of WB Koester road maintenance, looking northeast.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: April 14, 2016

SUBJECT: Weekly Summary Report for April 4, 2016 to April 8, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site. The time covered in this weekly summary is April 6, 2016 to April 8, 2016, which is the period of time when Geotechnology had a representative on site.

Weather

The weather was generally cloudy with intermittent periods of rain. Work was not performed on Thursday, April 7, 2016 due to rain. Morning temperatures ranged from 35 F to 48 F. Afternoon temperatures ranged from 37 F to 47 F.

Construction Activities

Work was not performed April 7, 2016 due to rain.

Borrow material was transported for use as soil cover on Ash Pond A on April 6 and April 8, 2016.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds) (unused).

WB Koester had 5-6 employees working on site: 1 mechanic and 4-5 equipment operators.

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Meetings

The project coordination meeting was held on Wednesday, April 6, 2016. See the attached meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Borrow field soil was placed on Ash Pond A.

Vegetative cover soil was transported and stockpiled on site from Quality Lime Service on April 5 and April 6, 2016.

Testing/Sampling

Testing and sampling did not occur on site this week.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

printed on recycled paper

DAILY REPORTS

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/06/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-0.25) Lunch

Arrive: 0700 Depart: 1500 Travel: 0.00 Total: 07.75

AM Conditions: Cloudy, intermittent rain, 35-40 mph S wind
AM Temperature: 48 F
PM Conditions: Cloudy, intermittent rain, 35-40 mph SSW wind
PM Temperature: 47 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** - 400D-qty.2 (only 1 used), Komatsu-PC350LC-qty.1, Caterpillar 416-C-qty.1, Caterpillar D6R-LGP-qty.2, 3 tractors with pans (unused)
Personnel: **WB Koester:** - 5 personnel (including on-site mechanic)
Visitors: none

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Borrow material as cover on ash pond A.
Deliveries: Approximately 1700 tons topsoil from off-site. Source is a soybean field.
Testing: None – observation only.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A

Geotechnology, Inc. Rep. 04/06/2016 Date
Geotechnology, Inc. Engineer 4/11/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/06/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Graded borrow field access and side slopes of Ash Pond A. Topsoil was stockpiled between coal yard and Ash Pond B. Started adding borrow material as cover ~1000. Added 10" cover material to complete three foot thick "roadway" across top of Ash Pond A from ramp to fill areas on Ash Pond A. Continued until rain-out at 1445. Ramps and roadways were graded periodically to prevent rutting.

Weekly progress meeting at 0900. Off-site members were not able to call in, so meeting was held with on-site personnel only.

Note: Directions provided relative to magnetic north and not plant north.

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Weekly Progress Meeting

Meeting Minutes

Date: 4-6-16

Attendees:

Ameren: Don,

WB Koester: Chris

Geotechnology, Inc.: Jon

Topics:

Safety/Housekeeping

- Brandenberg will have 10-12 steel hauling trucks throughout the days so will need to keep an eye on traffic, especially when 10-15 topsoil trucks begin delivering topsoil

Manpower

- Man hours
  - Start of Job (4-27-15) through 4-4-16
    - Total = 14,850 hrs.
- Next week expected manpower
  - WBK = 4 operators, 1 laborer, 1 superintendent (6 total)
  - Plan on working 5-10 hr days.
  - No Saturday or Sunday work. May use Saturday as a rain makeup day if all feel it is necessary.

Review old minutes and action items

- n/a

Material Issues

- n/a

Quality Control Issues

- n/a

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Schedule Compliance

- This week will get site in order (erosion control repairs, prep borrow area, prep topsoil stockpile area, prep Pond A). Started hauling topsoil in from off site. Total of approximately 2000 tons stockpiled yesterday. May start hauling borrow to Pond A to form the terraces today.
- Brandenberg pumping into Bottom ash pond until around April 8th. After that WBK should be able to dewater and grade the Bottom Ash pond.
- Other items for the spring: finish the downchutes/rip rap on pond A, finish the ditch north of pond A, place the aggregate on the roads, fix the road cuts with concrete, finish the piezometers, closure of the Pond B outlet with flowable fill (this may have already been done, Bob will check with Chris to make sure).
- Topo prior to topsoil placement was decided not to be necessary. Topo after topsoil placement is sufficient.
- Brandenberg will be working on site and in the way of the permanent fence until around the first week in June. WBK should plan on holding off on the permanent fence installation until then.

Cost and Budget Control

- n/a

Next Meeting Scheduled: April 13 at 9:00 CST

Action Items -

- n/a

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/07/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: John Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0615 Depart: 0645 Travel: 0.00 Total:0.5

AM Conditions: Cloudy, intermittent rain, 10 mph W wind
AM Temperature: 42 F

PM Conditions:
PM Temperature: NA

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** - 400D-qty.2, Komatsu-PC350LC-qty.1, Caterpillar 416-C-qty.1, Caterpillar D6R-LGP-qty.2 (none used – Rain day)

Personnel: **WB Koester:** - 0 personnel (including on-site mechanic)

Visitors: none

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A

Geotechnology, Inc. Rep. 04/07/2016 Date

Geotechnology, Inc. Engineer 4/11/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/07/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

No work performed due to rain.

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/08/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-0.25) Lunch

Arrive: 0615 Depart: 16:15 Travel: 3.50 Total: 12.25

AM Conditions: Cloudy, intermittent rain, 35-40 mph SW wind
AM Temperature: 35 F
PM Conditions: Cloudy, intermittent rain, 35-40 mph W wind
PM Temperature: 37 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** - 400D-qty.2 (2 used), Komatsu-PC350LC-qty.1, Caterpillar 416-C-qty.1, Caterpillar D6R-LGP-qty.2, 3 tractors with pans (1 used)
Personnel: **WB Koester:** - 6 personnel (including on-site mechanic)
Visitors: none

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Borrow material as cover on ash pond A.
Deliveries: 0 tons topsoil from off-site.
Testing: NA – observation only.

CONSTRUCTION SITE LOCATIONS:

Ash Pond A

04/08/2016
Geotechnology, Inc. Rep. Date

4/11/16
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT 04/08/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Cover soils placed on Ash Pond A starting at 0640. Placed 10" of cover soil to make three foot thick roadway on top of Ash Pond A to the fill area. Ramps, roadways, and fill areas graded periodically to prevent rutting.

Note: Directions relative to true north map orientation.

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PHOTOGRAPH LOG



Photograph 1 - View of grading the northwest slope of Ash Pond A, looking west.



Photograph 2 - View of the Bottom Ash Pond, looking north.



Photograph 3 - View of Ash Pond A, looking south.



Photograph 4 - View of Ash Pond A, looking southwest.



Photograph 5 - View of Ash Pond A, looking northwest.



Photograph 6 - View of the haul road to and from the borrow area.

Photographs taken by Jon Truesdale of Geotechnology, Inc. April 3-9, 2016.



Photograph 7 - View of Ash Pond B, looking east.



Photograph 8 - View of topsoil staging in the southern portion of the coal yard.

Photographs taken by Jon Truesdale of Geotechnology, Inc. April 3-9, 2016.



Photograph 9 - View of Ash Pond A grading.



Photograph 10 - View of hauling road across Ash Pond A.



Photograph 11 - View of cover soil placement on Ash Pond A, looking southwest.



Photograph 12 - View of cover soil placement on Ash Pond A, looking southeast.



Photograph 13 - View of the cover soil on Ash Pond A, looking east.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: April 19, 2016

SUBJECT: Weekly Summary Report for April 11, 2016 to April 15, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy with intermittent periods of rain. Work was not performed on Monday, April 11, 2016 due to rain. Morning temperatures ranged from 37 F to 40 F and afternoon temperatures ranged from 56 F to 67 F.

Construction Activities

Work was not performed April 11, 2016 due to rain. Borrow material was transported for use as soil cover on Ash Pond A on April 12 through April 15, 2016. Protective cover was transported to the site by Quality Lime Service on April 15, 2016.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 2 excavators (1 Caterpillar 320B, 1 Caterpillar 308E), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds), and one broom.

WB Koester had 4-5 employees working on site: 1 mechanic and 3-4 equipment operators.

Meetings

The project coordination meeting was held on Wednesday, April 13, 2016. See the attached meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Borrow field soil was placed on Ash Pond A.

Topsoil was transported and stockpiled on site from Quality Lime Service on April 15, 2016.

Testing/Sampling

Jessie Hahn of Geotechnology collected one conformation sample of topsoil sourced from Quality Lime Service on April 14, 2016.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/11/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.00) Lunch

Arrive: 0630 Depart: 0715 Travel: 0.00 Total: 00.75

AM Conditions: Overcast, rain
AM Temperature: 37 F
PM Conditions: Overcast, rain
PM Temperature: 56 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** -
Personnel: **WB Koester:** -
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Rain day. No work performed on site.

Geotechnology, Inc. Rep. 4/11/2016 Date

Geotechnology, Inc. Engineer 4/11/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/11/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

Rain day. Construction work was not performed on site.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/12/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.00) Lunch

Arrive: 0630 Depart: 1430 Travel: 0.00 Total: 8.00

AM Conditions: Clear
AM Temperature: 37 F

PM Conditions: Clear
PM Temperature: 54 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** 1 excavator, 2 bulldozers, 1 haul truck
Personnel: **WB Koester:** 4 operators, 1 mechanic
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries: One small bulldozer and one broom delivered to site in the morning.
Testing:

CONSTRUCTION SITE LOCATIONS:

Haul Road/Borrow Field, Ash Pond A, Sand stockpile/tank excavation.

Geotechnology, Inc. Rep. — Date: 4/12/2016
Geotechnology, Inc. Engineer — Date: 4/12/2016

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/12/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

In the morning, one excavator and one pump dewatered the haul road. One bulldozer assisted in dewatering the haul road and the borrow field.

One broom was delivered to site and cleaned the roads.

Two bulldozers tracked the top of Ash Pond A to promote drying of material.

In the afternoon, one excavator loaded stockpiled sandy material into a haul truck. The haul truck transported the material to an excavation left from the removal of contaminated soils.

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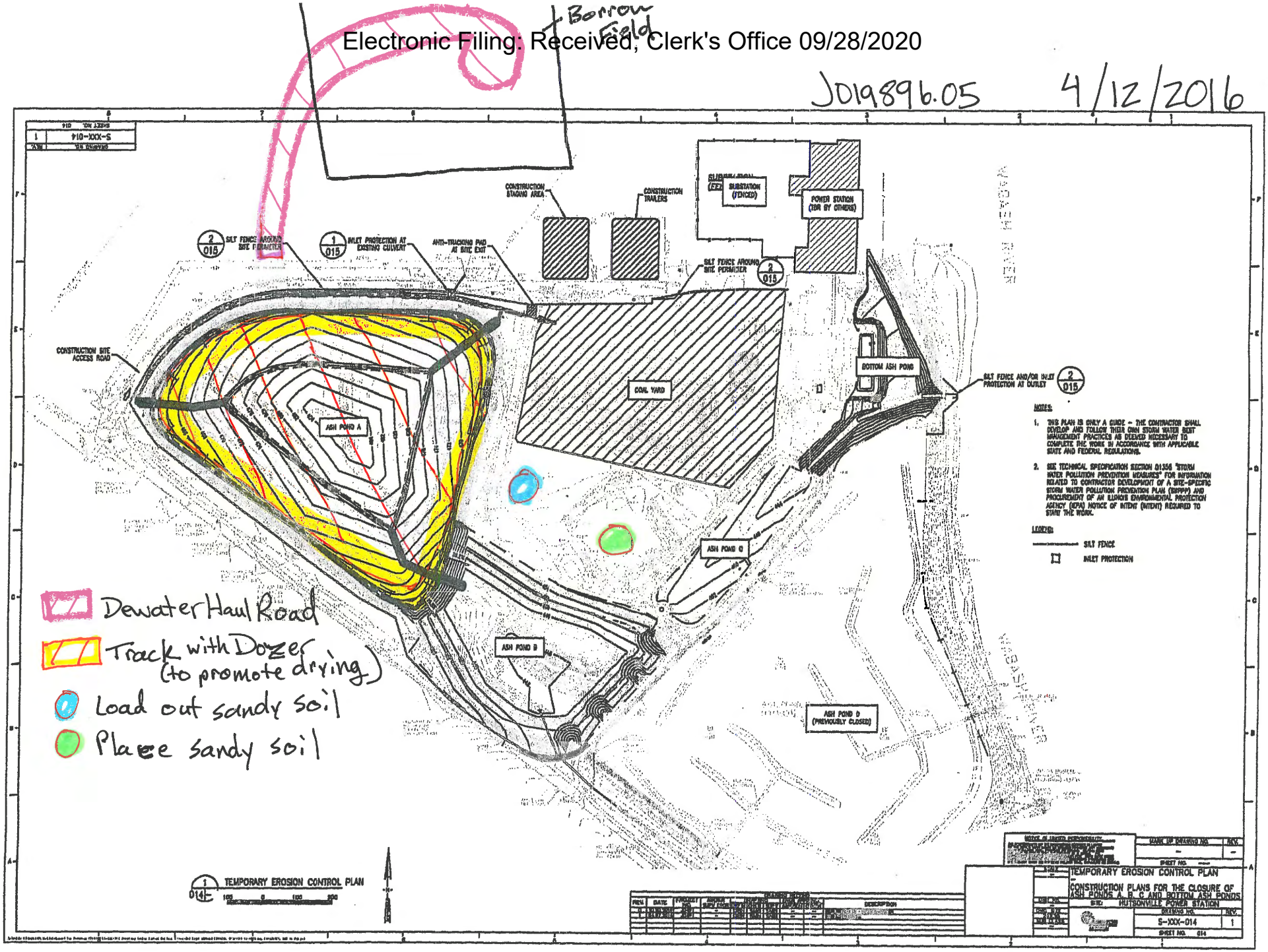
J019896.05 4/12/2016



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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/13/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jessie Hahn
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-0.00) Lunch

Arrive: 0630 Depart: 1630 Travel: 0.00 Total: 10.00

AM Conditions: Clear
AM Temperature: 37 F

PM Conditions: Clear
PM Temperature: 59 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 excavator, 1 bulldozer, 2 haul trucks

Personnel: **WB Koester:** 4 operators

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:

Deliveries:

Testing:

CONSTRUCTION SITE LOCATIONS:

Haul Road/Borrow Field and Ash Pond A.

Geotechnology, Inc. Rep. — 4/13/2016 Date

Geotechnology, Inc. Engineer — 4/13/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/13/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

One excavator loaded out materials from the borrow field. Two haul trucks transported borrow field material to Ash Pond A. One bulldozer spread and graded material on Ash Pond A.

At various times throughout the day, the bulldozer scraped and maintained the haul road to the borrow field and on Ash Pond A.

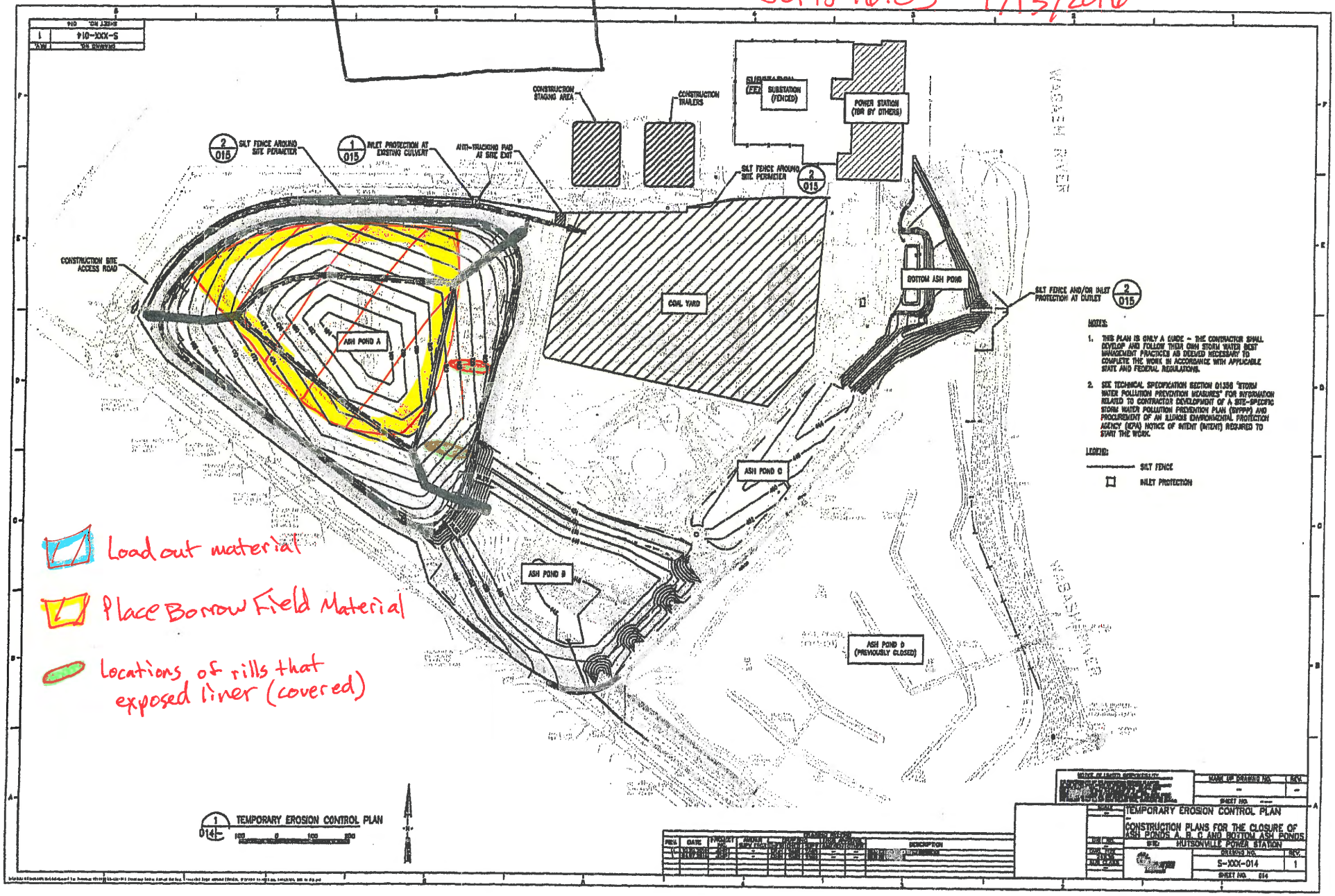
The project coordination meeting was held at 0900 in the Ameren trailer. See the meeting minutes for additional details.

At 1015, Jessie Hahn (Geotechnology) observed two locations where erosion rills had exposed the HDPE geomembrane on Ash Pond A. Hahn told Chris Atkinson (WB Koester) about the locations. Atkinson, operating a bulldozer, placed soil in the rills to cover the exposed geomembrane by 1045.

At 1530, transport of borrow field soil ceased. One backhoe scraped the roads and one broom cleaned the roads. The bulldozer continued to maintain and scrape the haul road on Ash Pond A.

Borrow Field

J019896.05 4/13/2016



Load out material

Place Borrow Field Material

Locations of rills that exposed liner (covered)

50'968h100

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 4-13-16

Attendees:

Ameren: Don, Mike

WB Koester: Chris, Bob

Geotechnology, Inc.: Anna, Jessie

Topics:

Safety/Housekeeping

- Brandenberg will have 10-12 steel hauling trucks throughout the days so will need to keep an eye on traffic, especially when 10-15 topsoil trucks are delivering topsoil
- WBK has broom on site and will sweep roads when needed. Brandenberg has also been running water truck to help control dust.

Manpower

- Man hours
  - Start of Job (4-27-15) through 4-11-16
    - Total = 15,007 hrs.
- Next week expected manpower
  - WBK = 4 operators, 1 laborer, 1 superintendent (6 total)
  - Plan on working 5-10 hr days.
  - No Saturday or Sunday work. Brandenberg is working this Saturday if we feel like we need to.

Review old minutes and action items

- n/a

Material Issues

- n/a

Quality Control Issues

- National Lining Systems sent email with missing QC data requested by Geotechnology, Inc. Bob to forward after meeting.

Schedule Compliance

- Started hauling topsoil in from off site. Total of approximately 3,200 tons stockpiled. Started hauling borrow to Pond A to form the terraces last week. Will continue starting again today.
- Due to river being up, Brandenberg pumping into Bottom ash pond until around April 25th. After that WBK should be able to dewater and grade the Bottom Ash pond.
- Downchutes/rip rap on pond A will likely start next week. May need to widen Pond C rip rap as it is still eroding around the rip rap.
- Placing topsoil on Pond A may start next week.
- Continue to fix erosion around ponds B and C, plan is to seed B and C when we seed pond A.
- Other items to be done: finish the ditch north of pond A, place the aggregate on the roads, fix the road cuts with concrete, finish the piezometers, closure of the Pond B outlet with flowable fill.
- Topo prior to topsoil placement was decided not to be necessary. Topo after topsoil placement is sufficient.
- Brandenberg will be working on site and in the way of the permanent fence until around the first week in June. WBK should plan on holding off on the permanent fence installation until then.
- Don will work on a preliminary punch list to see if there are any items we need to add to future schedules.

Cost and Budget Control

- n/a

Next Meeting Scheduled: April 20 at 9:00 CST

Action Items -

- Bob to send National Lining Systems email to Anna and Mike
- Don to prepare preliminary punch list and Bob to put those items on schedule.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/14/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-0.00) Lunch

Arrive: 0630 Depart: 1545 Travel: 3.50 Total: 12.75

AM Conditions: Clear
AM Temperature: 40 F

PM Conditions: Clear
PM Temperature: 67 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** 1 excavator, 1 bulldozer, 2 haul trucks, 1 tractor with pan.
Personnel: **WB Koester:** 4 operators, 1 mechanic
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used:
Deliveries:
Testing:

CONSTRUCTION SITE LOCATIONS:

Haul Road/Borrow Field and Ash Pond A.

Geotechnology, Inc. Rep. 4/14/2016 Date

Geotechnology, Inc. Engineer 4/14/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/14/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

One excavator loaded out materials from the borrow field. One haul truck and one tractor with a pan transported borrow field material to Ash Pond A. One bulldozer spread and graded material on Ash Pond A. The mechanic repaired the second haul truck.

At various times throughout the day, the bulldozer scraped and maintained the haul road to the borrow field and on Ash Pond A.

At 1530, transport of borrow field soil to Ash Pond A ceased. One backhoe scraped the roads and one broom cleaned the roads.

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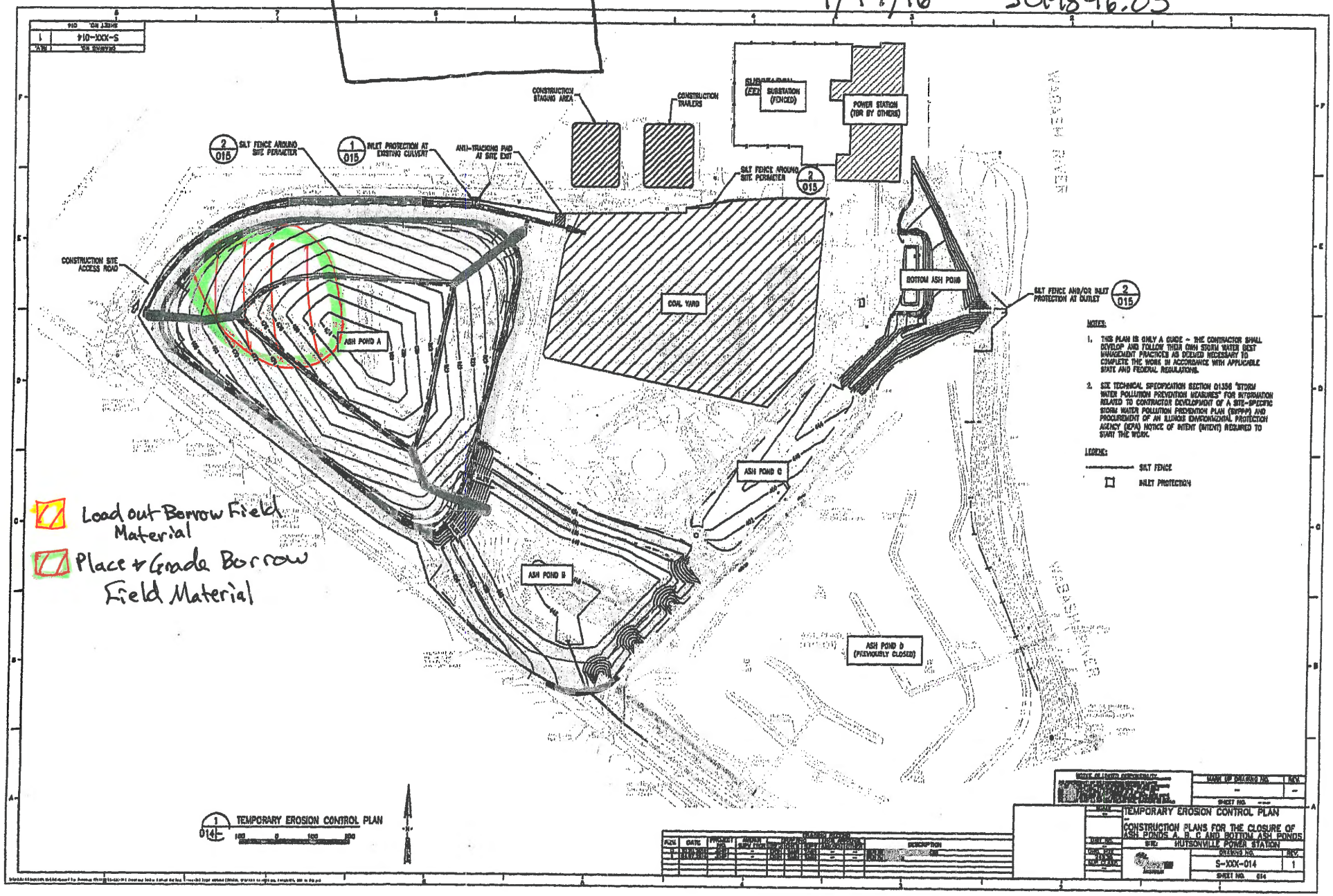
+ Borrow Field

4/14/16 J019896.05



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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/15/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Stephen Graham

TIME AND WEATHER CONDITIONS:

(-0.00) Lunch

Arrive: 0630 Depart: 1600 Travel: 3.50 Total: 13.00

AM Conditions: Clear
AM Temperature: 50 F

PM Conditions: Clear
PM Temperature: 70 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** 1 excavator, 1 bulldozer, 1 haul truck, 1 tractor with pan.
Personnel: **WB Koester:** 3 operators, 1 mechanic
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Clay liner material transported between borrow to Ash Pond A north East cover.
Deliveries: Several top soil trucks were delivered and stockpiled at base of Ash Pond A.
Testing: Observations were made.

CONSTRUCTION SITE LOCATIONS:

Haul Road/Borrow Field and Ash Pond A.

4/15/16
Geotechnology, Inc. Rep. Date

4/15/2016
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/15/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

One excavator loaded out materials from the borrow field. One haul truck transported borrow field material to Ash Pond A. One bulldozer spread and graded material on Ash Pond A. The mechanic repaired the second haul truck.

At various times throughout the day, the bulldozer maintained the haul road to the borrow field and on Ash Pond A.

At 1530, transport of borrow field soil to Ash Pond A ceased. One backhoe scraped the roads and one broom cleaned the roads.

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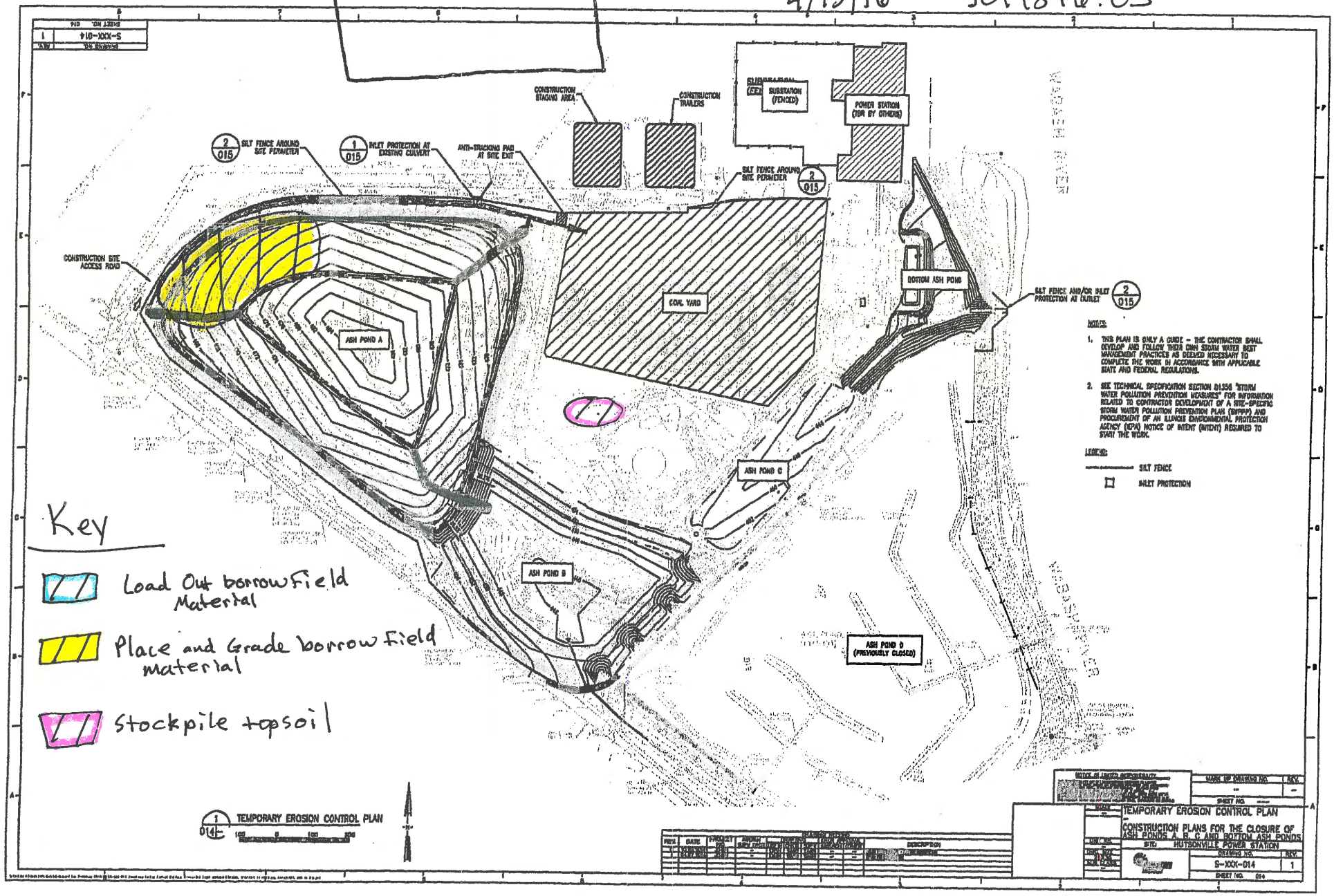
+ Borrow Field

4/15/16 J019896.05



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PHOTOGRAPH LOG



Photograph 1 - View of dewatering the haul road to the borrow field on April 12, 2016, looking northeast.



Photograph 2 - View of material excavation from the borrow field for placement on Ash Pond A, looking northeast.

Photographs taken by Jessie Hahn of Geotechnology, Inc. April 11-15, 2016.



Photograph 3 - View of material placement on Ash Pond A, looking north.



Photograph 4 - View of sandy soil for use as backfill for removed soil at the former fuel tank location, looking east.

Photographs taken by Jessie Hahn of Geotechnology, Inc. April 11-15, 2016.



Photograph 5 - View of sandy soil placement as backfill for removed soil at the former fuel tank location, looking south.



Photograph 6 - View of typical exposed liner at a rill on Ash Pond A, Looking west. (Observed at two locations.)



Photograph 7 - View of placement of soil in rills to cover exposed liner on Ash Pond A, looking north.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: April 26, 2016

SUBJECT: Weekly Summary Report for April 18, 2016 to April 22, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy with intermittent periods of rain. Work was not performed on April 21-22 due to rain. Morning temperatures ranged from 50 F to 52 F and afternoon temperatures ranged from 70 F to 80 F.

Construction Activities

Erosion repairs were performed on April 18. The borrow field was graded April 18-19. Borrow soil was transported to Ash Pond A on April 19. Vegetative cover was transported to the site by Quality Lime Service on April 18-20. Vegetative cover was placed on Ash Pond A on April 20. Work was not performed April 21-22 due to rain.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 1 excavator (Komatsu), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds), and one broom.

WB Koester had 7 employees working on site: 1 mechanic, 1 laborer, and 5 equipment operators.

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Meetings

The project coordination meeting was held on Wednesday, April 20, 2016. See the attached meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Borrow field soil was placed on Ash Pond A.

Topsoil was transported and stockpiled on site from Quality Lime Service. Topsoil from the stockpile was placed on Ash Pond A.

Testing/Sampling

Testing and sampling were not performed this week.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/18/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-0.25) Lunch

Arrive: 0630 Depart: 1630 Travel: 0 Total: 9.75

AM Conditions: Clear
AM Temperature: 51 F

PM Conditions: Clear
PM Temperature: 80 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 Komatsu Excavator – 3 Tractors with Pans (not used), 1 Back-hoe, 1 D5C Bulldozer, 1 Sweeper, 2 – D6R bulldozers, 2 trucks (not used)

Personnel: **WB Koester:** 5 operators, 1 laborer, 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: General use soil (for repair of washed out slopes on ash ponds B and C)

Deliveries: Topsoil trucks were delivered and stockpiled at base of Ash Pond A (S end of coal yard).

Testing: None – observation only

CONSTRUCTION SITE LOCATIONS:

Borrow field and Ash Pond A. Side slopes of Ash Ponds B and C.

Geotechnology, Inc. Rep. 4/25/16 Date

Geotechnology, Inc. Engineer 4/26/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/18/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

1 Komatsu excavator and 1 CAT D6R - LGP grading borrow area.

1 Sweeper running periodically along access roads.

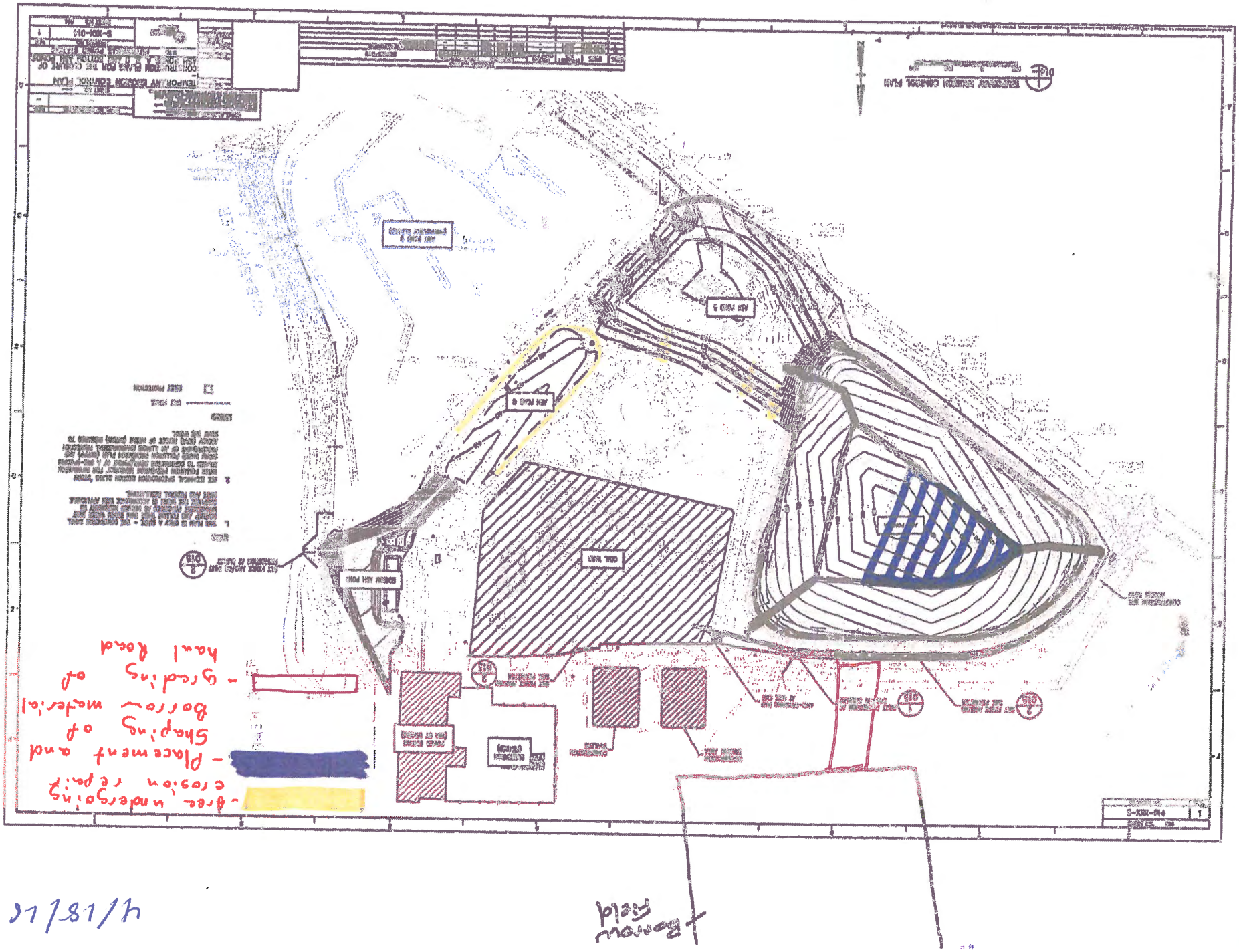
1 CAT D5C staging topsoil.

1 CAT D6R LPG grading Ash Pond A surface.

1 416-C backhoe repairing washed out areas along side-slopes of Ash Pond B and C.

Notes: Approximately 15 trucks hauling topsoil to the site.

J019896,05



4/18/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/19/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-0.25) Lunch

Arrive: 0630 Depart: 1630 Travel: 0 Total: 9.75

AM Conditions: Partly Cloudy AM Temperature: 50 F

PM Conditions: Partly Cloudy PM Temperature: 75 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC

Equipment: **WB Koester:** 1 Komatsu excavator – 3 tractors with pans (not used), 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B Wheel Tractor-scraper

Personnel: **WB Koester:** 5 operators, 1 laborer, 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Borrow area soil for additional cover on top of ash pond A.

Deliveries: Topsoil trucks delivered and stockpiled at South end of coal yard.

Testing: None – observation only.

CONSTRUCTION SITE LOCATIONS:

Borrow field and Ash Pond A. Side slopes of Ash Pond B. South end of coal yard. South end of Ash Pond A.

Geotechnology, Inc. Rep. 4/25/16 Date

Geotechnology, Inc. Engineer 4/26/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/19/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

PSC:

Work at aboveground storage tank (decommissioning).

WB Koester:

1-Komatsu excavator loading borrow material.

2-500D truck for transfer of soils to top of Ash Pond A.

1-CAT D6R - LGP grading borrow area.

1-Sweeper running periodically along access roads.

1-CAT D5C staging topsoil.

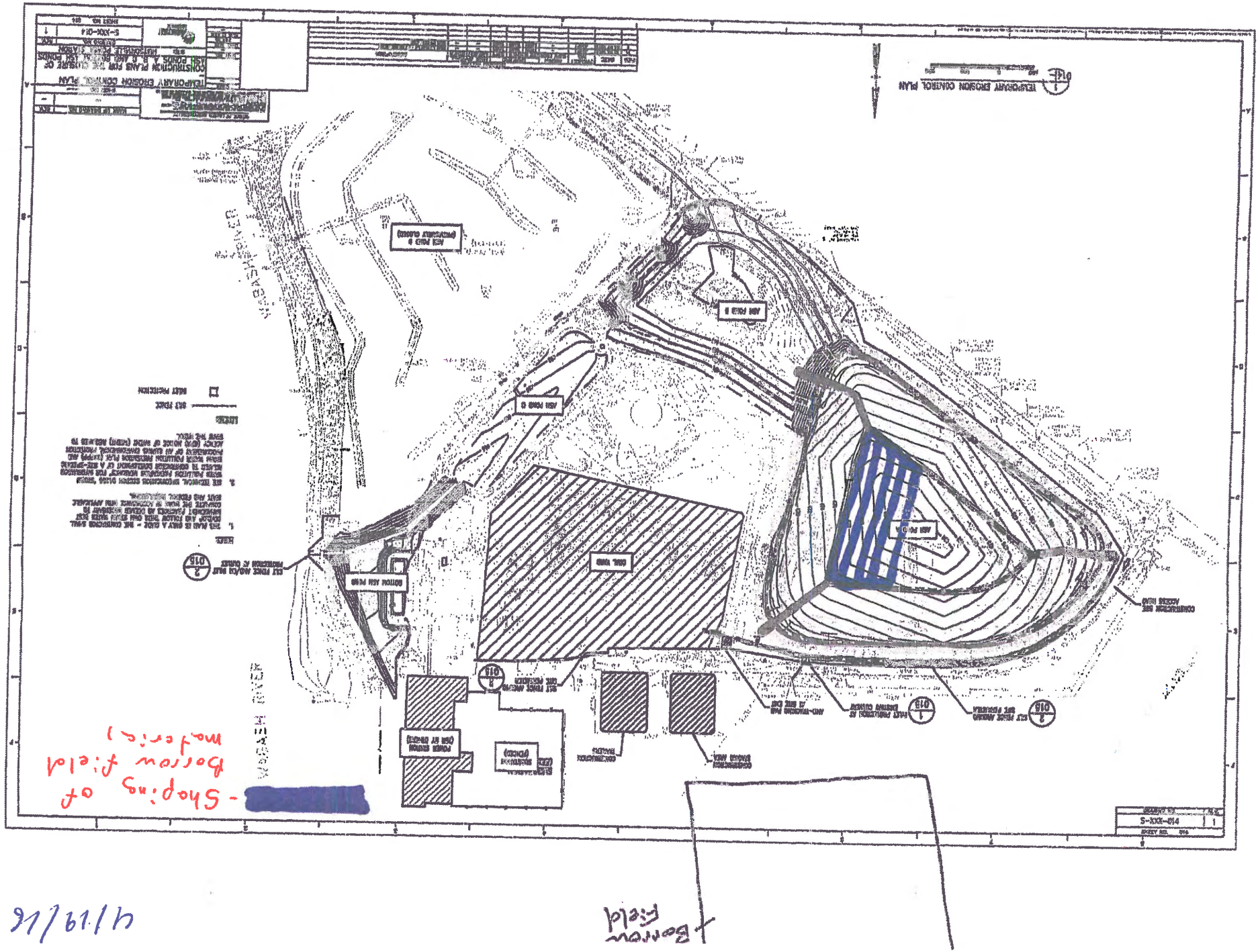
1-CAT D6R LPG grading Ash Pond A surface.

1-416C scraping access roadway surface as part of dust control in afternoon.

1-CAT 623B wheel tractor-scraper with water tank for last hour of day.

Notes: Approximately 1000 c.y. topsoil hauled to the site.

0014896,05



GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/20/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-0.25) Lunch

Arrive: 0630 Depart: 1630 Travel: 0 Total: 9.75

AM Conditions: Overcast
AM Temperature: 52 F
PM Conditions: Overcast
PM Temperature: 70 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC
Equipment: **WB Koester:** 1 excavator (not used) – 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks (none used), 1 CAT 623B.
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Topsoil for cover on top of Ash Pond A.
Deliveries: Topsoil trucks delivered and stockpiled at South end of coal yard.
Testing: None – observation only.

CONSTRUCTION SITE LOCATIONS:

Borrow field, borrow field access road, and Ash Pond A. South end of coal yard.

Geotechnology, Inc. Rep. 4/25/16 Date
Geotechnology, Inc. Engineer 4/26/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/20/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

PSC:

Work at aboveground storage tank (decommissioning).

WB Koester:

1-CAT D6R - LGP grading borrow area access road.

1-Sweeper running periodically along access roads.

1-CAT D5C staging topsoil.

1-CAT D6R LPG grading Ash Pond A surface.

1-416C used for miscellaneous items.

1-CAT 623B wheel tractor-scraper with water tank for dust control.

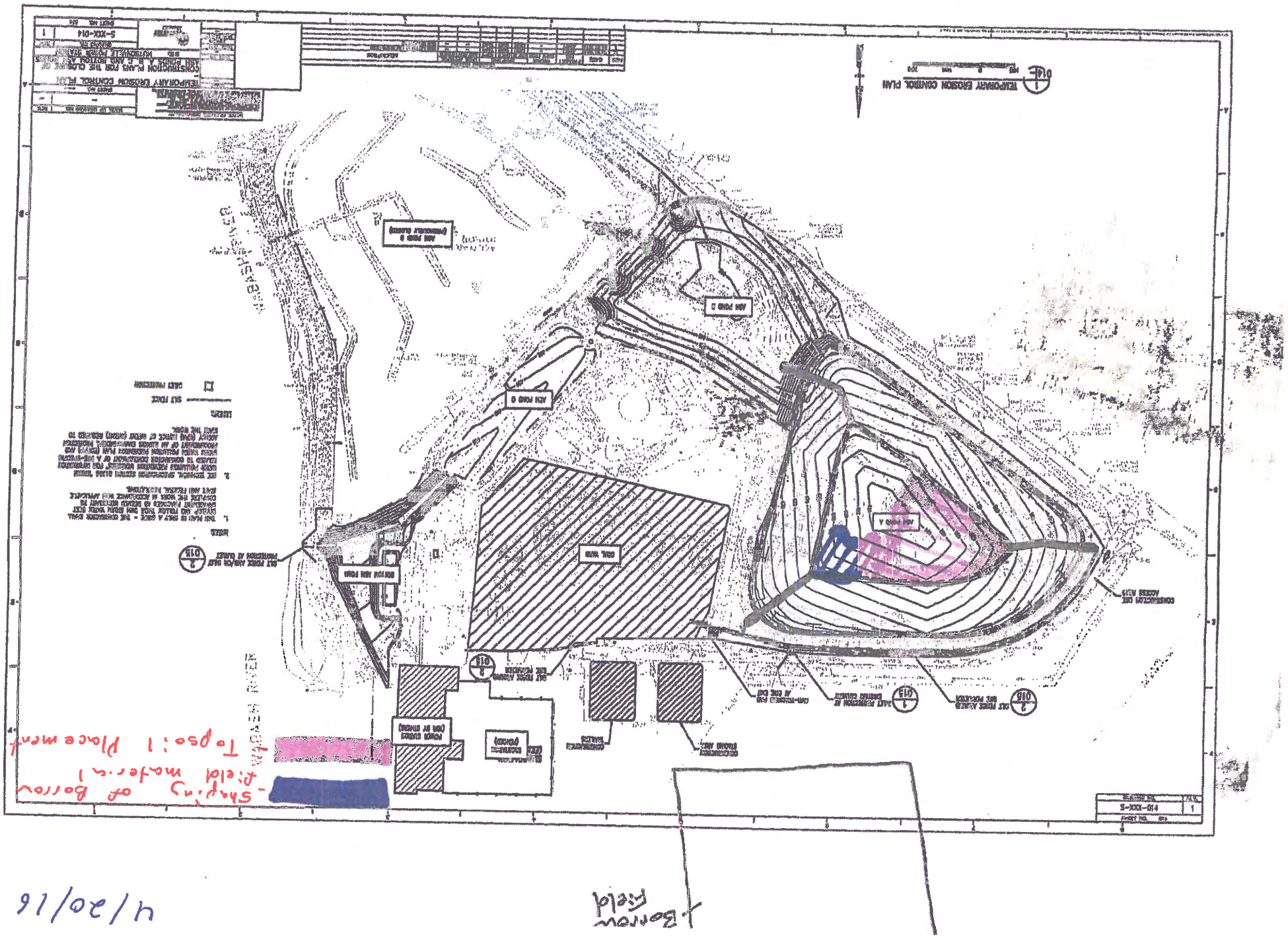
2-tractors with elevating pans transferring topsoil to Ash Pond A.

1-tractor with rollerblade grading placed topsoil on Ash Pond A.

The weekly progress meeting was held on site at 0900. See the attached meeting minutes for additional information.

Notes: Approximately 1100 c.y. topsoil hauled to the site.

0014896,05


TEMPORARY EROSION CONTROL PLAN
WABASH RIVER
Topso: 1 Placement
Shaping of Borrow Field material
Borrow Field
4/20/16

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 4-20-16

Attendees:

Ameren: Don, Mike

WB Koester: Chris, Bob

Geotechnology, Inc.: Anna, John

Topics:

Safety/Housekeeping

- No accidents/near misses to report.
- Brandenberg will have 15 concrete trucks, 10-12 steel hauling trucks throughout the days so will need to keep an eye on traffic, especially when 12-15 topsoil trucks are delivering topsoil
- WBK has broom on site and will sweep roads when needed. WBK and Brandenberg have also been running water truck to help control dust.

Manpower

- Man hours
  - Start of Job (4-27-15) through 4-18-16
    - Total = 15,335 hrs.
- Next week expected manpower
  - WBK = 4 operators, 1 laborer, 1 superintendent (6 total)
  - Plan on working 5-10 hr days.
  - No Saturday or Sunday work.

Review old minutes and action items

- Jessie took topsoil sample on Friday, results likely in next Monday
- Don sent preliminary punch list to WBK.

Material Issues

- n/a

Quality Control Issues

- n/a

Schedule Compliance

- Continue to stockpile topsoil. Will start hauling topsoil to Pond A this week.
- Finished hauling out of borrow pit so have started reclaiming and regrading borrow pit.
- Repairing silt fence around sites.
- Mike asked Chris to regrade south end of coal yard where it is ponding water. Also said that the diversion channels on top of Pond A can be field fit to a certain extent to ensure water does not pond on Pond A.
- Due to river being up, Brandenberg pumping into Bottom ash pond until around May 2. After that WBK should be able to dewater and grade the Bottom Ash pond.
- Downchutes/rip rap on pond A will likely start this week. May need to widen Pond C rip rap as it is still eroding around the rip rap.
- Continue to fix erosion around ponds B and C, plan is to seed B and C when we seed pond A.
- Other items to be done: finish the ditch north of pond A, place the aggregate on the roads, fix the road cuts with concrete, finish the piezometers, closure of the Pond B outlet with flowable fill.
- Topo prior to topsoil placement was decided not to be necessary. Topo after topsoil placement is sufficient.
- Brandenberg will be working on site and in the way of the permanent fence until around the first week in June. WBK should plan on holding off on the permanent fence installation until then.

Cost and Budget Control

- n/a

Next Meeting Scheduled: April 27 at 9:00 CST

Action Items -

- N/A

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/21/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Jon Truesdale
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1030 Travel: 0 Total: 4

AM Conditions: Overcast
AM Temperature: 52 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B. (rain day-none used)
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

None – rain day

Geotechnology, Inc. Rep. 4/25/16 Date

Geotechnology, Inc. Engineer 4/26/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/21/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

PSC:

Work at aboveground storage tank (decommissioning).

WB Koester:

No equipment used – rain day

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/22/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1030 Travel: 0 Total: 4

AM Conditions: Overcast
AM Temperature: 52 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B. (rain day-none used)
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

None – rain day

Geotechnology, Inc. Rep. 4/25/16 Date

Geotechnology, Inc. Engineer 4/26/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/22/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

PSC:

Work at aboveground storage tank (decommissioning).

WB Koester:

No equipment used – rain day

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of roadway being swept on the east side of Ash Pond A, looking northeast.



Photograph 2 - View of topsoil staging activities on the southern portion of the coal yard, looking north.



Photograph 3 - View of borrow area condition on April 18, 2016, looking northeast.



Photograph 4 - View of erosion repairs at Ash Pond C, looking north-northeast.

Photographs taken by Jon Truesdale of Geotechnology, Inc. April 18-22, 2016.



Photograph 5 - View of the borrow field from the southeast.



Photograph 6 - View of hauling of topsoil to place on Ash Pond A, looking north.



Photograph 7 - View of surface shaping prior to placement of topsoil in the southern portion of Ash Pond A, looking south.



Photograph 8 - View of tractor with elevating pan conducting soil moving activities at the topsoil staging location, looking north.



Photograph 9 - View from the top of Ash Pond A of regrading activities associated with the borrow field haul road, looking northwest.



Photograph 10 - View of surface shaping of the northern portion of Ash Pond A prior to placement of topsoil, looking north-northwest.



Photograph 11 - View of soil for erosion repair at Ash Pond C, looking east-northeast.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: May 4, 2016

SUBJECT: Weekly Summary Report for April 25, 2016 to April 29, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy on days when work was performed. Work was not performed on April 27-29 due to rain and wet conditions. Morning temperatures ranged from 57 F to 63 F and afternoon temperatures ranged from 79 F to 80 F.

Construction Activities

The borrow field was graded April 25-26. Vegetative cover was transported to the site by Quality Lime Service on April 25. Vegetative cover was placed on Ash Pond A on April 25-26. Initial excavation of outfalls was performed on the Ash Pond A levee on April 26. Work was not performed April 27-29 due to rain and wet conditions.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 1 excavator (Komatsu), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds), and one broom.

WB Koester had 7 employees working on site: 1 mechanic, 1 laborer, and 5 equipment operators.

Geotechnology had one representative on site on April 25-27. Anna Saindon, Geotechnology's CQA officer, visited the site on April 29. Geotechnology did not have representatives on site on April 28 due to the wet conditions.

Meetings

The project coordination meeting was held on Wednesday, April 27, 2016. See the attached meeting minutes for additional information.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Topsoil was transported and stockpiled on site from Quality Lime Service. Topsoil from the stockpile was placed on Ash Pond A.

Testing/Sampling

Cassandra Baresel of Geotechnology collected one sample of vegetative cover soil from the soil from Quality Lime Service stockpiled on site.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/25/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1830 Travel: 0 Total: 10

AM Conditions: Cloudy
AM Temperature: 58 F
PM Conditions: Sunny
PM Temperature: 79 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B.
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: TOPSOIL
Deliveries: TOPSOIL
Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Borrow Field

Geotechnology, Inc. Rep. 4/25/16 Date
Geotechnology, Inc. Engineer 4/27/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/25/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

PSC:

Work at aboveground storage tank (decommissioning).

WB Koester:

Topsoil was brought in from off site. Tractors with pans hauled the soil onto Ash Pond A. One bulldozer graded the material on Ash Pond A. A tractor with a scraper was used to maintain the haul road.

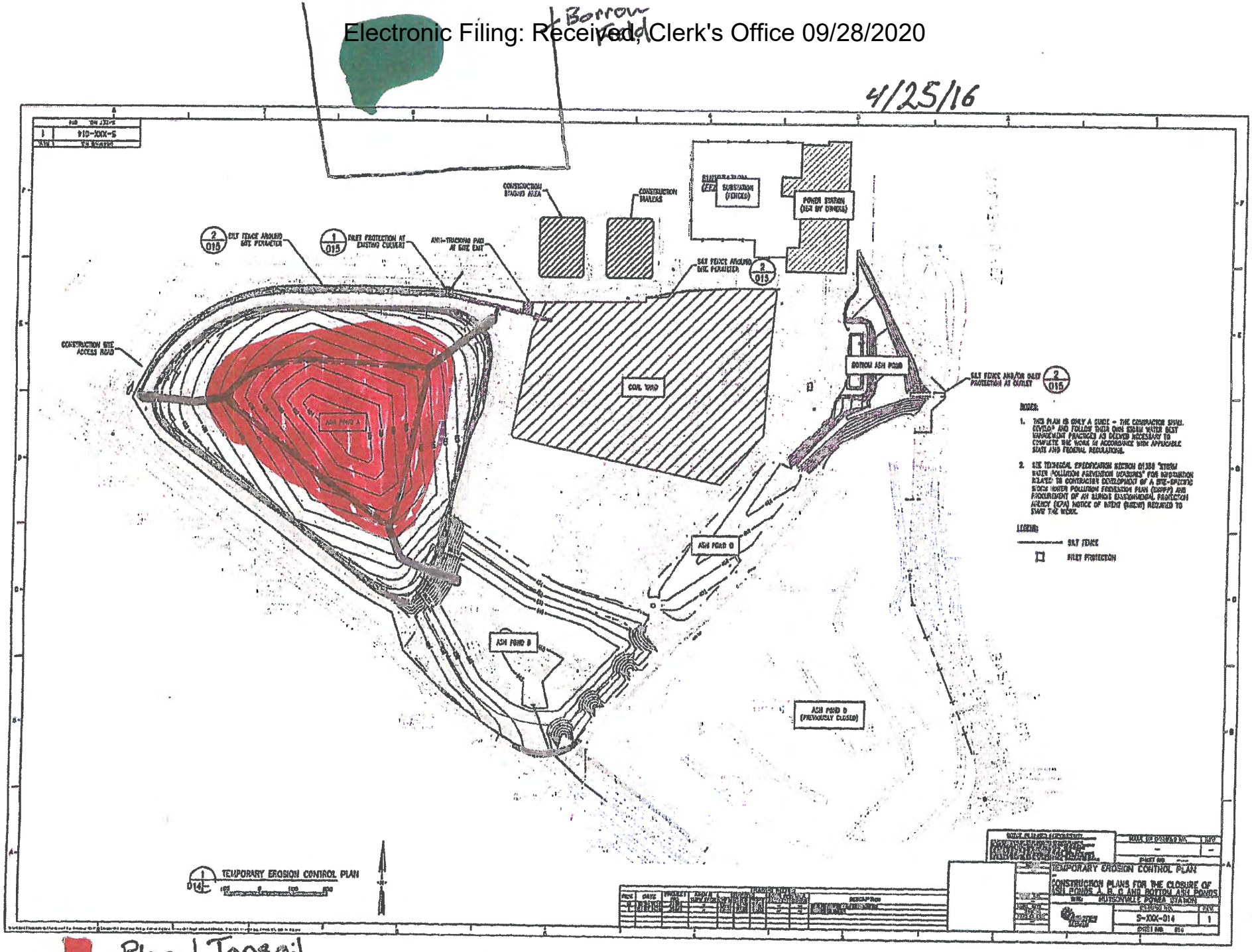
One bulldozer shaped the borrow field.

One sweeper cleaned the roads.

All equipment was off Ash Pond A and the borrow field by 1825 and the site was prepped for the end of the day.

Borrow Fld

4/25/16



Placed Topsoil

Shaping of Borrow Field

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/26/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1830 Travel: 0 Total: 10

AM Conditions: Cloudy
AM Temperature: 63 F
PM Conditions: Overcast
PM Temperature: 80 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg;
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B.
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: TOPSOIL
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A, Borrow Field

Geotechnology, Inc. Rep. 4/26/16 Date

Geotechnology, Inc. Engineer 4/27/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/26/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

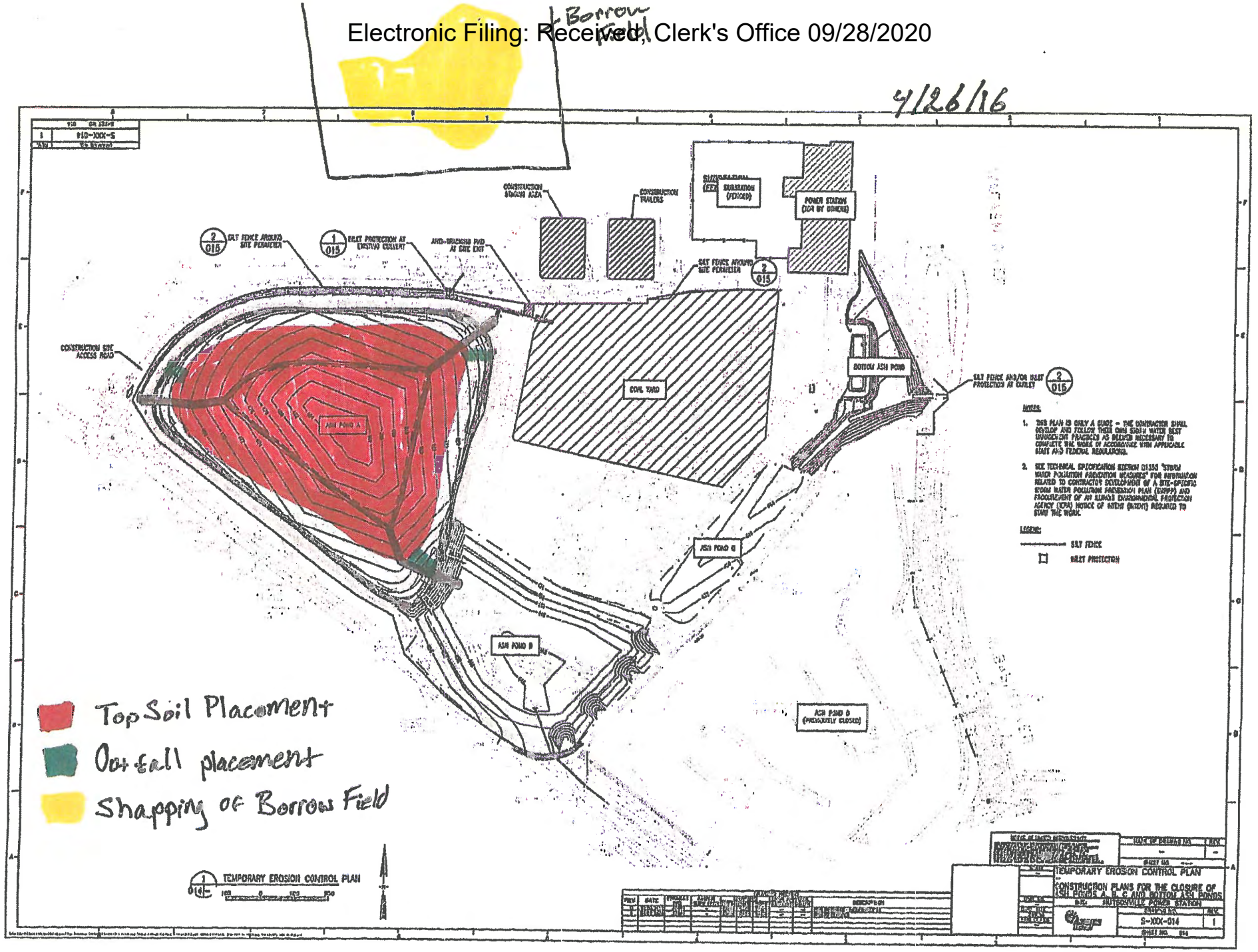
WB Koester:

Tractors with pans hauled topsoil onto Ash Pond A from the stock pile. One bulldozer spread the material on Ash Pond A. A tractor with a scraper was used to maintain the haul road.

One bulldozer and one tractor with a scraper box shaped the borrow field.

All equipment was off Ash Pond A and the borrow field by 1820 and the site was prepped for the end of the day.

4/26/16



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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 04/27/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Cassandra Baresel

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1230 Travel: 0 Total: 6

AM Conditions: Rainy
AM Temperature: 57 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg;
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B. (rain day-none used)
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None
Deliveries: None
Testing: Casandra Baresel (Geotechnology) collected one sample of vegetative cover soil from the stockpile on site.

CONSTRUCTION SITE LOCATIONS:

None – rain day

Geotechnology, Inc. Rep. 4/28/16 Date

Geotechnology, Inc. Engineer 4/28/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 04/27/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

No equipment used – rain day

The weekly progress meeting was held on site at 1000. Refer to the meeting minutes for additional information.

One soil sample was collected from the stockpiled vegetative cover soil from Quality Lime Service on site by Cassandra Baresel of Geotechnology.

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 4-27-16

Attendees:

Ameren: Don, Mike

WB Koester: Bob

Geotechnology, Inc.: Anna, Cassie

Topics:

Safety/Housekeeping

- No accidents/near misses to report.
- Brandenberg will have 15 concrete trucks, 10-12 steel hauling trucks throughout the days so will need to keep an eye on traffic, especially when 12-15 topsoil trucks are delivering topsoil
- WBK has broom on site and will sweep roads when needed. WBK and Brandenberg have also been running water truck to help control dust.

Manpower

- Man hours
  - Start of Job (4-27-15) through 4-25-16
    - Total = 15,578 hrs.
- Next week expected manpower
  - WBK = 4 operators, 1 laborer, 1 superintendent (6 total)
    - May downsize slightly when topsoil is finished.
  - Plan on working 5-10 hr days.
  - No Saturday or Sunday work.

Review old minutes and action items

- Jessie took topsoil sample on Friday, results show high on Boron, Cassie to grab sample to run TCLP on sample.

Material Issues

- n/a

Quality Control Issues

- n/a

Schedule Compliance

- Finished stockpiling topsoil for now. Started hauling to Pond A from stockpile. Mid next week (weather permitting) should have all topsoil hauled to Pond A and terraces shaped. May need more topsoil delivered if we are short.
- Finished hauling out of borrow pit so have started reclaiming and regrading borrow pit.
- Mike asked Chris to regrade south end of coal yard where it is ponding water. Also said that the diversion channels on top of Pond A can be field fit to a certain extent to ensure water does not pond on Pond A.
- Due to river being up, Brandenberg pumping into Bottom ash pond until around May 2. After that WBK should be able to dewater and grade the Bottom Ash pond.
- Excavation of Downchutes/rip rap on pond A started this week. Need to place rip rap next week. May need to widen Pond C rip rap as it is still eroding around the rip rap.
- Continue to fix erosion around ponds B and C, plan is to seed B and C when we seed pond A.
- Other items to be done: finish the ditch north of pond A, place the aggregate on the roads, fix the road cuts with concrete, finish the piezometers, closure of the Pond B outlet with flowable fill.
- Topo prior to topsoil placement was decided not to be necessary. Topo after topsoil placement is sufficient. Need to topo prior to seeding. Maybe 2nd or 3rd week in May.
- Brandenberg will be working on site and in the way of the permanent fence until around the first week in June. WBK should plan on holding off on the permanent fence installation until then.

Cost and Budget Control

- n/a

Next Meeting Scheduled: May 4 at 10:00 CST

Action Items -

- Cassie to grab another sample of topsoil to run TCLP test
- Anna to give Massman a heads up that we may need Pond A topo done around 2nd or 3rd week in May prior to seeding.
- Bob to check with Chris to see if we will do any more work on Pond A this week.

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PHOTOGRAPH LOG



Photograph 1 - View of topsoil grading on Ash Pond A, looking north.



Photograph 2 - View of topsoil placement on Ash Pond A, looking southwest.



Photograph 3 - View of topsoil delivery, looking east.



Photograph 4 - View of topsoil stockpile maintenance, looking east.



Photograph 5 - View of reclamation activities in the borrow field, looking northeast.



Photograph 6 - View of reclamation activities in the borrow field, looking southeast.

Photographs taken by Cassandra Baresel of Geotechnology, Inc. April 25-27, 2016.



Photograph 7 - View of stormwater outfall construction on Ash Pond A, looking south.

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: May 10, 2016

SUBJECT: Weekly Summary Report for May 2, 2016 to May 7, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally overcast on May 3-5 and clear on May 6-7. Work was not performed on May 4 due to rain. Morning temperatures ranged from 50 F to 58 F and afternoon temperatures ranged from 62 F to 65 F.

Construction Activities

The culvert cuts in the access road were repaved on May 3. Concrete was placed in the upstream end of the former Ash Pond B outfall pipe. The borrow field was graded May 6-7. Vegetative cover on Ash Pond A was graded May 3 and 5-7 and placed May 6-7. Various storm water drainage grading was performed each day. Work was not performed May 4 due to rain and wet conditions.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 1 excavator (Komatsu), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds), and one broom.

WB Koester had 4-7 employees working on site: 1 mechanic, 0-1 laborer, and 3-5 equipment operators.

Geotechnology had one representative on site on May 3-7. Geotechnology did not have representatives on site on May 2 due to the wet conditions.

Meetings

The project coordination meeting was not held on May 4, 2016 only involved on-site personnel. Meeting minutes are attached.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Topsoil from the stockpile was placed on Ash Pond A.

Testing/Sampling

Testing and sampling were not performed during the subject time period.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/03/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0615 Depart: 1430 Travel: 0 Total: 8.25

AM Conditions: Partly Cloudy AM Temperature: 55 F

PM Conditions: Partly Cloudy PM Temperature: 65 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 1 water truck 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 4 operators; 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Southeast Corner of Ash Pond B (overflow pipe), North access road, east access road (drainage crossings).

5/3/16
Geotechnology, Inc. Rep. Date

5/3/2016
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/03/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

2 D6R LGP bulldozers used to dry/shape surface of Ash Pond A in morning. 1 bulldozer used to grade southern area of the coal yard that was retaining surface water.

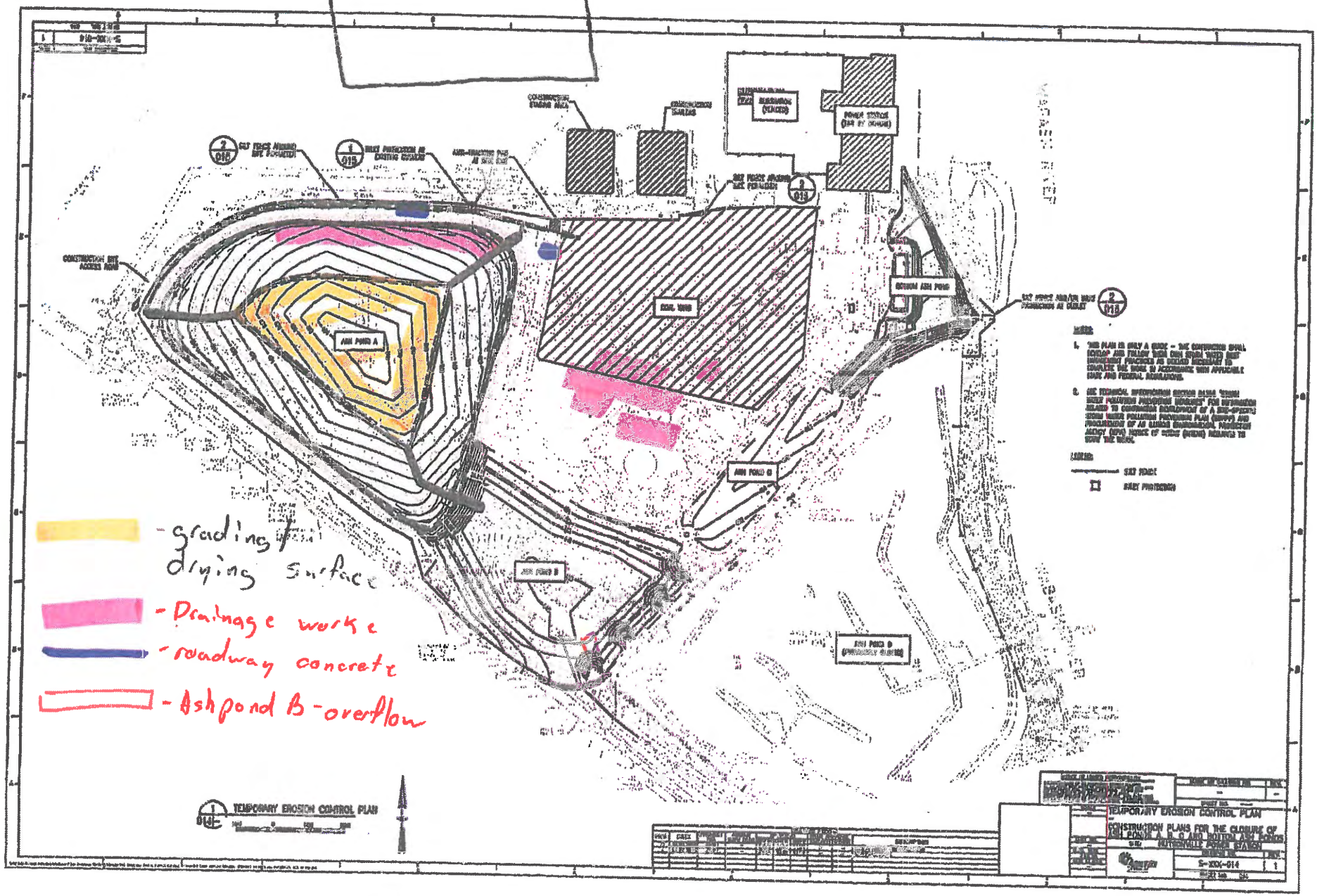
1 Komatsu Excavator used to move materials for overflow pipe closure in SE corner of Ash Pond B (1/2 day). Also prepared roadway drainage cut on northwest side of Ash Pond A (1/2 day). Material loaded onto John Deere truck and spread in gravel lot (same material).

1 CAT 416C Back-hoe used to move soils for overflow pipe closure in SE corner of Ash Pond B. Prepared roadway drainage crossing between north corner of Ash Pond A and coal yard, and southern half of access road culvert crossing for concrete. Concrete poured and finished in afternoon at both locations. Concrete placed in overflow pipe in Ash Pond B.

Electronic Filing: Received, Clerk's Office 09/28/2020

Borrow Field

5/3/16



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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/04/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1030 Travel: 0 Total: 4

AM Conditions: Rainy
AM Temperature: 50 F
PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg;
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C bulldozer, 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B. (rain day-none used)
Personnel: **WB Koester:** 5 operators; 1 mechanic, 1 laborer
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

None – rain day

Geotechnology, Inc. Rep. 5/4/16 Date
Geotechnology, Inc. Engineer 5/4/2016 Date

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/04/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

No equipment used – rain day

Weekly progress meeting at 1000. (See attached meeting minutes.)

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 5-4-16

Attendees:

Ameren: Don

WB Koester: None.

Geotechnology, Inc.: John

Topics:

Safety/Housekeeping

- N/A

Manpower

- Man hours
  - Start of Job (4-27-15) through 5-2-16
    - Total = 15,685 hrs.
- Next week expected manpower
  - WBK = 4 operators, 1 laborer, 1 superintendent (6 total)
    - May downsize slightly when topsoil is finished.
  - Plan on working 5-10 hr days.
  - May work Saturday, weather permitting

Review old minutes and action items

- n/a

Material Issues

- n/a

Quality Control Issues

- n/a

Schedule Compliance

- Due to river being up, Brandenberg pumping into Bottom ash pond until around May 9. After that WBK should be able to dewater and grade the Bottom Ash pond.
- Brandenberg will be working on site and in the way of the permanent fence until around the first week in June. WBK should plan on holding off on the permanent fence installation until then.

Cost and Budget Control

- n/a

Next Meeting Scheduled: May 11 at 10:00 CST

Action Items -

- n/a

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/05/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0615 Depart: 1530 Travel: 0 Total: 9.25

AM Conditions: Overcast AM Temperature: 55 F

PM Conditions: Overcast PM Temperature: 62 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg; PSC

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 1 water truck 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 3 operators; 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A surface, drainage channels/slope of Ash pond A

Geotechnology, Inc. Rep. 5/5/16 Date

Geotechnology, Inc. Engineer 5/5/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/05/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

1 D6R LGP bulldozers used to dry/shape surface of Ash Pond A.

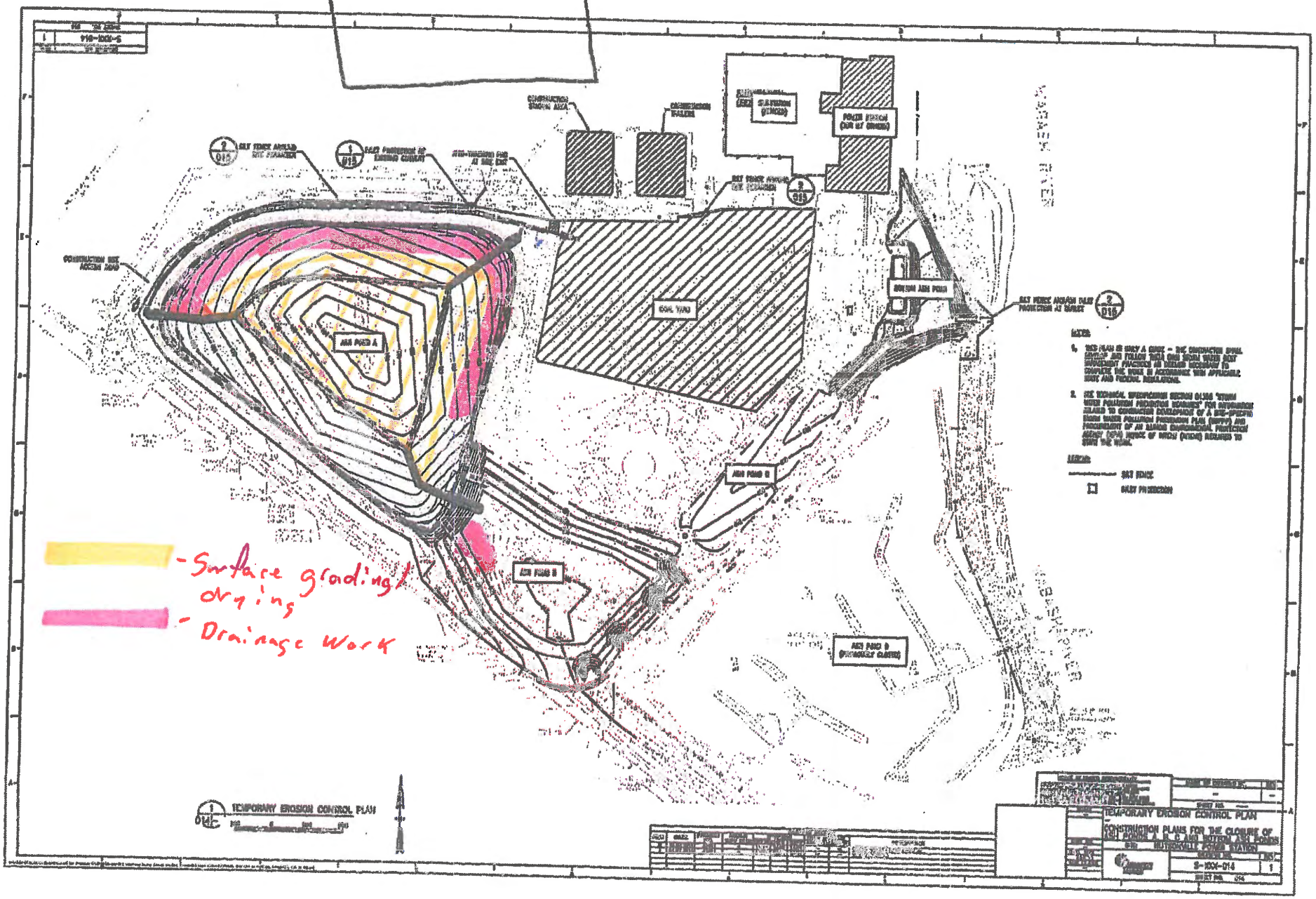
1 Komatsu Excavator used shape drainage channels on north, east, and southwest sides of Ash Pond A.

1 John Deere truck used to haul excess materials from drainage shaping to "general use" stockpile, and to ramp to Ash Pond A.

1 CAT 416C Back-hoe used to place road plates and periodically scrape roadway clean.

Borrow Field

5/5/16



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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/06/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0615 Depart: 1530 Travel: 0 Total: 9.25

AM Conditions: Clear
AM Temperature: 55 F

PM Conditions: Clear
PM Temperature: 65 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 1 water truck 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 3 operators; 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A surface, drainage channels/slope of Ash pond A, Borrow field.

Geotechnology, Inc. Rep. 5/6/16 Date

Geotechnology, Inc. Engineer 5/6/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/06/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

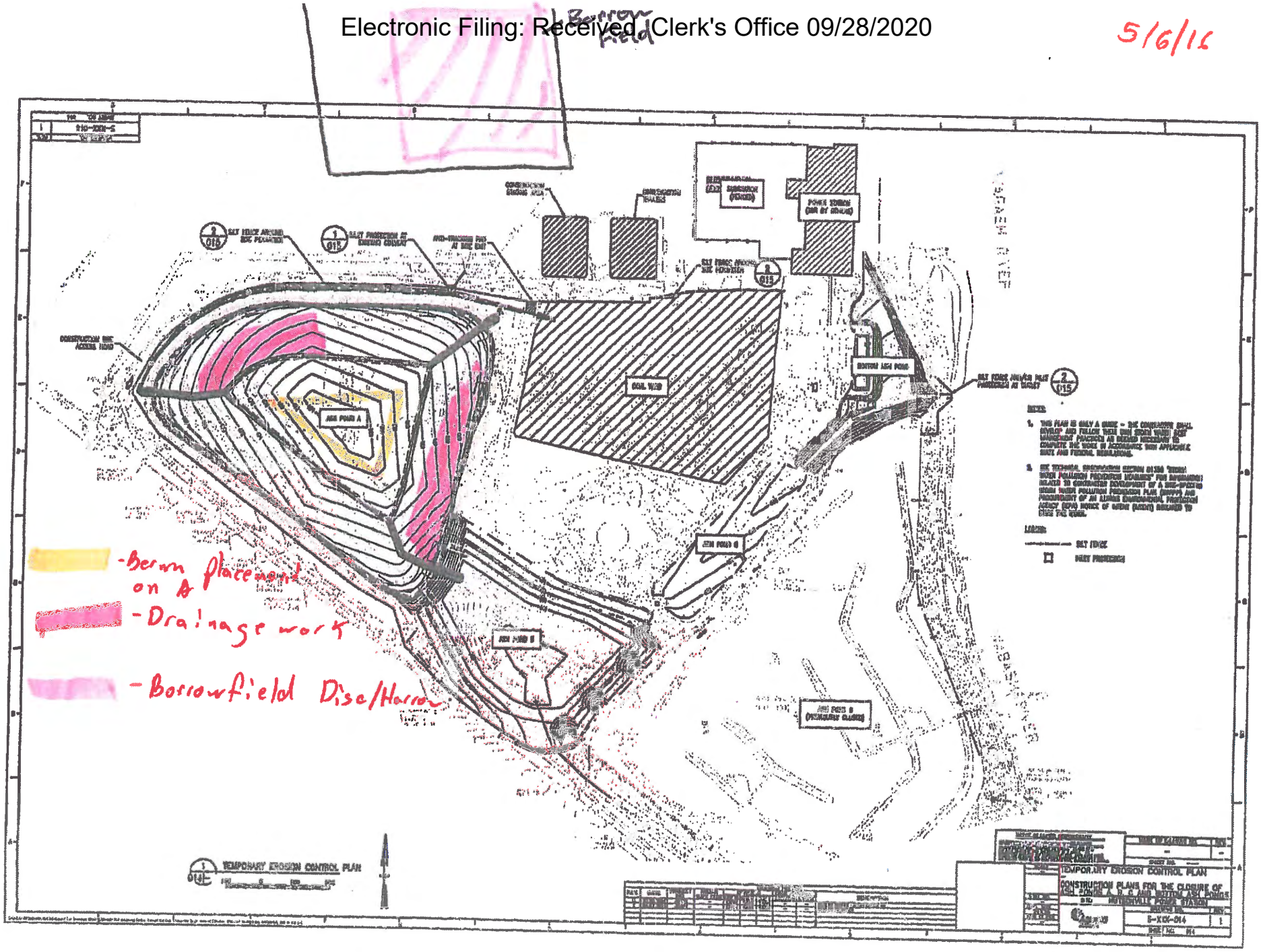
1 D6R LGP bulldozers used to shape berms on Ash Pond A.

1 D6R LGP bulldozers used to shape drainage slopes on Ash Pond A.

1 tractor with elevating pan placing topsoil for berm placement on Ash Pond A.

1 Tractor utilizing disc-harrow in borrow field to facilitate drying prior to shaping.

5/6/16



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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/07/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0600 Depart: 1030 Travel: 3.5 Total: 8

AM Conditions: Clear
AM Temperature: 58 F
PM Conditions: Partly Cloudy
PM Temperature: 65 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg
Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 1 water truck 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use
Personnel: **WB Koester:** 3 operators; 1 mechanic
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A surface, drainage channels/slope of Ash pond A, Borrow field.

Geotechnology, Inc. Rep. 5/7/16 Date
Geotechnology, Inc. Engineer 5/9/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/07/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

1 D6R LGP bulldozer used to shape berms and drainage on Ash Pond A.

1 D6R LGP bulldozer grading borrow area.

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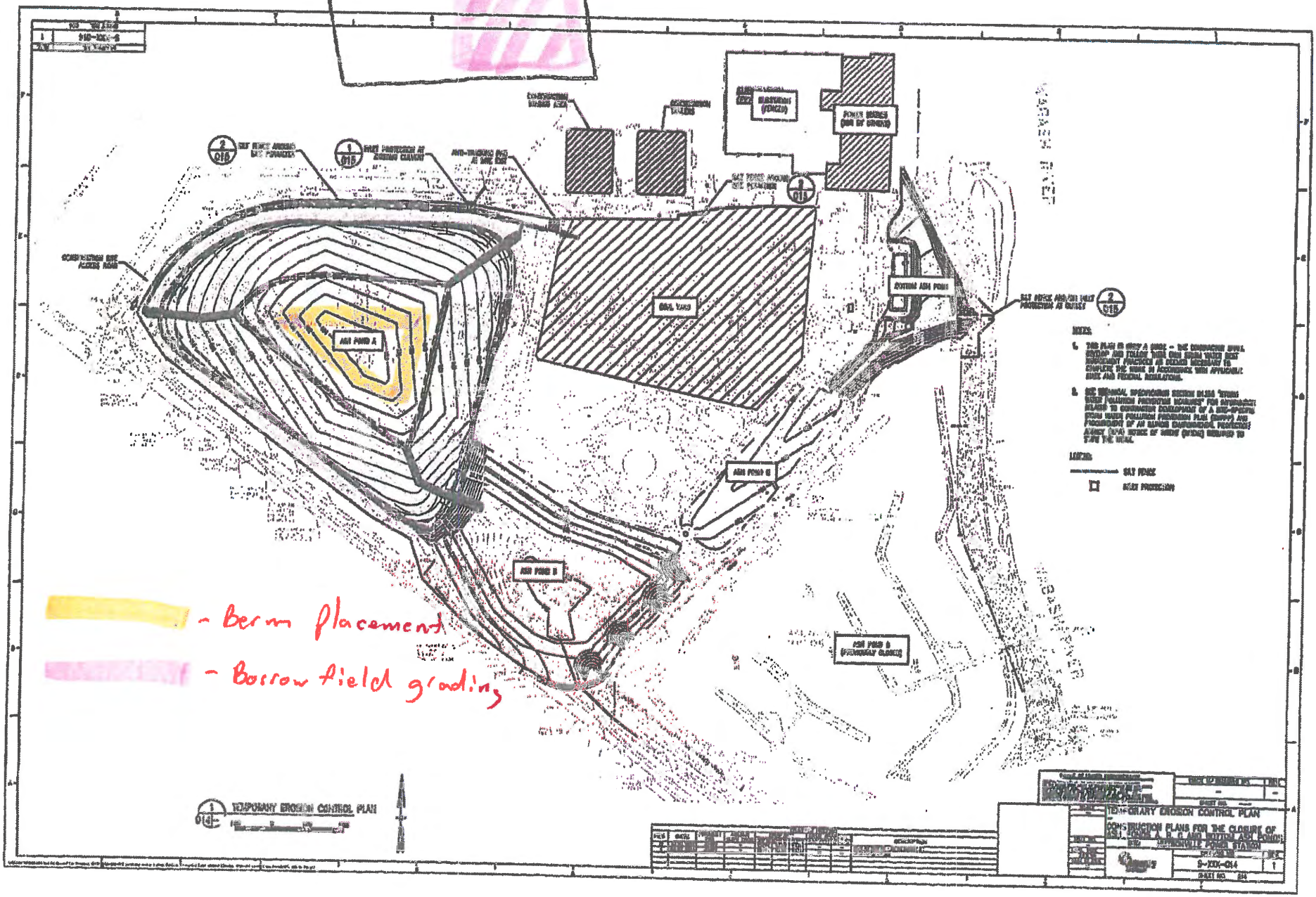
Borrow Field

5-7-16



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PHOTOGRAPH LOG



Photograph 1 - View of the drainage channel on the north side of Ash Pond A, looking west.



Photograph 2 - View of the coal yard, looking east.

Photographs taken by Jon Truesdale of Geotechnology, Inc. May 2-7, 2016.



Photograph 3 - View of Ash Pond B preparation for concrete plug.



Photograph 4 - View of grading/drying soils on the south side of Ash Pond A, looking southwest.



Photograph 5 - View of grading/drying soils on the east slope of Ash Pond A, looking southwest.



Photograph 6 - View of roadway surface, prepared for concrete replacement on the northeast side of Ash Pond A.



Photograph 7 - View of coal yard grading, looking southeast.



Photograph 8 - View of the roadway surface, prepared for concrete replacement on the north side of Ash Pond A, looking south.



Photograph 9 - View of finished concrete on the north side of Ash Pond A, looking southwest.



Photograph 10 - View of finished concrete on the northeast side of Ash Pond A, looking southwest.

Photographs taken by Jon Truesdale of Geotechnology, Inc. May 2-7, 2016.



Photograph 11 - View of drainage grading on the north side of Ash Pond A, looking south.



Photograph 12 - View of drainage grading on the southwest side of Ash Pond A, looking northeast.



Photograph 13 - View of the north side of Ash Pond A, looking west.



Photograph 14 - View of the east side of Ash Pond A, looking south.



Photograph 15 - View of tractor with pan moving soil to Ash Pond A for berm placement, looking north.



Photograph 16 - View of typical berm as placed on Ash Pond A surface, looking south.



Photograph 17 - View of the borrow area grading, looking east.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: June 1, 2016

SUBJECT: Weekly Summary Report for May 9, 2016 to May 20, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the activities at the referenced site.

Weather

The weather was overcast and raining on May 9 and rained out the week of May 9-13, 2016. The weather was generally cloudy from May 18-20, and began raining on May 20. Morning temperatures ranged from 45 F to 58 F and afternoon temperatures ranged from 60 F to 70 F.

Construction Activities

Vegetative cover on Ash Pond A was dried on May 18 and placed on May 19-20. Washouts on Ash Pond A, B, and C were regraded. Geotextile and rip-rap was widened at the east outfall structure of Ash Pond C. Precast concrete collars were placed around the piezometers on Ash Pond A and filled with gravel.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 1 excavator (Komatsu), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds), and one broom.

WB Koester had 4-6 employees working on site: 1 mechanic and 3-5 equipment operators.

Geotechnology had one representative on site on May 9 and May 18-20. Geotechnology did not have representatives on site on May 10-13 or May 16-17 due to the wet conditions.

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Meetings

The project coordination meeting was held on May 18, 2016. Meeting minutes are attached.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Topsoil from the stockpile was placed on Ash Pond A. Concrete rings and gravel were used around piezometers on Ash Pond A. Rip-rap was used along the stormwater down drains on Ash Pond A.

Testing/Sampling

Testing and sampling were not performed during the referenced time period.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/09/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jessie Hahn

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0600 Depart: 0700 Travel: 3.5 Total: 4.5

AM Conditions: Overcast, Raining
AM Temperature: 58 F

PM Conditions:
PM Temperature:

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 1 water truck 1 sweeper, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 3 operators; 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

None – Rain Day.

Geotechnology, Inc. Rep. 5/9/16 Date

Geotechnology, Inc. Engineer 5/10/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/09/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings.

WB Koester:

None – Rain Day.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/18/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Representative: Elizabeth Rabbitt
Project Number: J019896.05
Project Client: Ameren

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0630 Depart: 1500 Travel: 0 Total: 8.5

AM Conditions: Cloudy
AM Temperature: 53 F
PM Conditions: Partly cloudy
PM Temperature: 65 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg;
Equipment: **WB Koester:** 1 excavator, 1 back-hoe, 1 D6R dozer, 1 dump truck
Personnel: **WB Koester:** 3 operators; 1 mechanic
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: 1 load rip rap from stockpile along main road by job trailers
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

Used a dozer to track over previously placed fill material on Ash Pond A to help as a drying aid.
Re-graded washout gullies of Ash Ponds B and C. Worked on east Ash Pond C outfall.

5/18/16
Geotechnology, Inc. Rep. Date

5/18/2016
Geotechnology, Inc. Engineer Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/18/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings. Using large magnet to remove metal from soil in demolished area near east edge of coal yard near north end of Ash Pond C.

WB Koester:

Dozer tracking contour fill on top of Ash Pond A to help dry the soil in preparation for top soil placement tomorrow. Not much sun, light winds, and cool conditions are making for a slow drying process. No membrane exposures found when arrived on site.

Dozer re-graded Ash Pond B and C slope washout gullies.

Widened geofabric and rip rap at east outfall structure of Ash Pond C.

Geotechnology:

Attended site safety talk with Don Shaver and 9am construction meeting.

Site photos taken walking counter clockwise around site from job trailer area. Included silt fences in need of repair and areas that have been repaired. Also, areas where rip rap has been placed in one down chute at N corner of Ash Pond A. The other two at W and SE corners have been excavated, but geofabric and rip rap have not been placed. Some washouts of slopes observed in Ash Ponds B and C. Also, observed washout of rip rap of outfall at the Wabash River east of the Bottom Ash Pond exposing geofabric.

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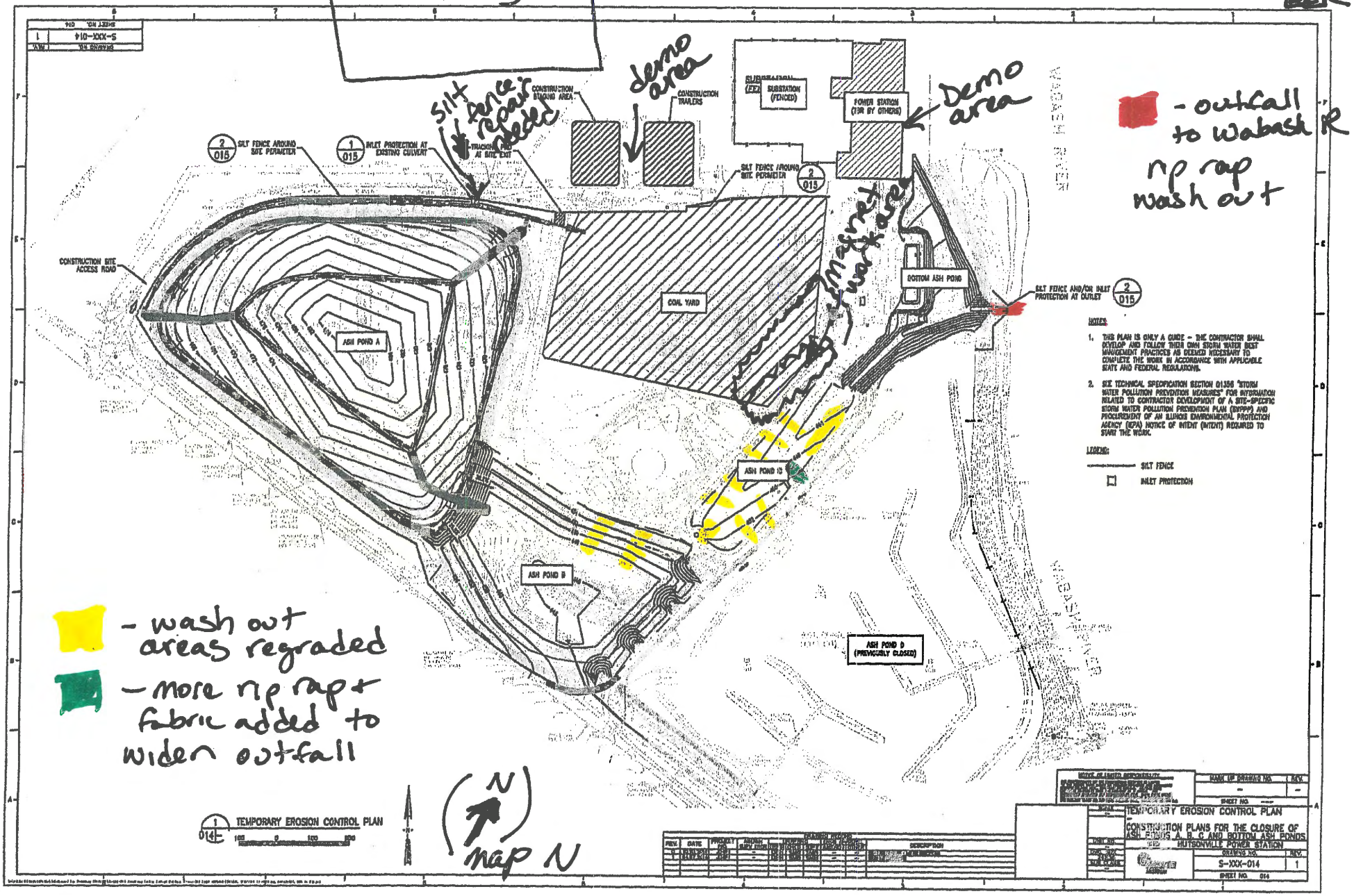
Hutsonville Ash Pond
5/18/16

EER



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Weekly Progress Meeting

Meeting Minutes

Date: 5-18-16

Attendees:

Ameren: Don, Mike

WB Koester: Chris

Geotechnology, Inc.: Anna, Elizabeth

Topics:

Safety/Housekeeping

- No accidents or near misses to report.

Manpower

- Man hours
  - Start of Job (4-27-15) through 5-17-16
    - Total = 15,967 hrs.
- Next week expected manpower
  - WBK = 3 operators, 1 mechanic, 1 superintendent (5 total)
    - May downsize slightly when topsoil is finished.
  - Plan on working 5-10 hr days.

Review old minutes and action items

- Chris repaired silt fence and silt buildup. Will be updating erosion inspection forms.

Material Issues

- n/a

Quality Control Issues

- n/a

Schedule Compliance

- Chris will put the manhole sections over each piezometer this week if dry enough.
- Chris will also try and finish placing the rip rap at the downchutes this week.
- Topsoil delivered and stockpiled on site. Will get on Pond A this week and try and dry it out enough to place topsoil
- Brandenberg done with major pumping into Bottom ash pond but may still need to pump collected groundwater and rain water. Discussing constructing a ditch to the outfall so they don't have to use as much hose/pipe and not adding more water to the Bottom ash pons.
- Brandenberg will be working on site and in the way of the permanent fence until around the last week in June. WBK should plan on holding off on the permanent fence installation until then.

Cost and Budget Control

- Bob submitted invoice to Mike.

Next Meeting Scheduled: May 25 at 9:00 CST

Action Items -

- Chris to update erosion inspection reports.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/19/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Elizabeth Rabbitt

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0600 Depart: 1700 Travel: 0 Total: 11.00

AM Conditions: Sunny AM Temperature: 45 F

PM Conditions: Sunny PM Temperature: 70 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg;

Equipment: **WB Koester:** 1 back-hoe, 2 D6R dozer, 2 tractors with pan, 1 tractor with disc, then blade
1 excavator

Personnel: **WB Koester:** 5 operators; 1 mechanic

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Contour material from stockpile

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Hauled contour material to Ash Pond A. Pumped water from Bottom Ash Pond.
Set precast concrete collars around piezometers on Ash Pond A.

Elizabeth Rabbitt 5/19/16
Geotechnology, Inc. Rep. Date

Geotechnology, Inc. Engineer 5/19/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/19/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition of buildings. Using large magnet to remove metal from soil in demolished area near E edge of coal yard near north end of Ash Pond C.

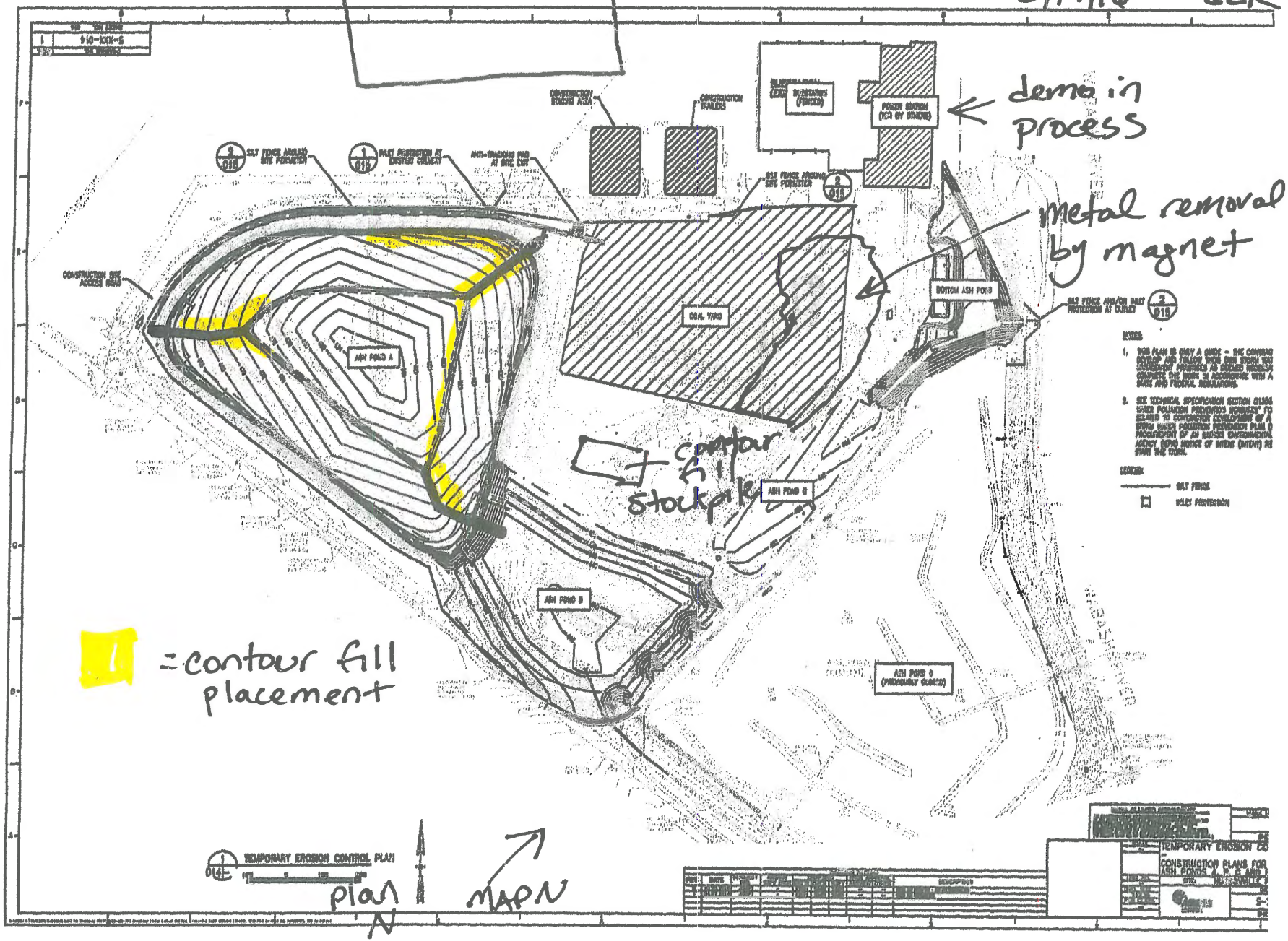
WB Koester:

Hauling contour fill material to NE edge and drainage berms on top of Ash Pond A. Grading in with a dozer with onboard GPS for elevations (was told it is being graded .1" high). Disced the top for help with drying. Dressed up north borrow site. Pumping water to Wabash River outfall from Bottom Ash Pond.

Contour stockpile gone by 2:30 pm. Still need about 200 cyd to complete Ash Pond A to grade. Set concrete collars around piezometers with geofabric underneath.

Hutsonville Ash Pond

5/19/16 EER



Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/20/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Elizabeth Rabbitt

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0600 Depart: 1500 Travel: 3.00 Total: 12.00

AM Conditions: Cloudy
AM Temperature: 50 F

PM Conditions: Light rain
PM Temperature: 60 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg;
Equipment: **WB Koester:** 2 D6R dozer, 1 tractor with pan, 1 excavator
Personnel: **WB Koester:** 4 operators; 1 mechanic
Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: Topsoil hauled in from Marshall, ¾" clean rock
Deliveries: None
Testing: None

CONSTRUCTION SITE LOCATIONS:

Hauled topsoil material to Ash Pond A. Pumped water from Bottom Ash Pond.
¾ " clean rock placed inside concrete collars around piezometers.

Geotechnology, Inc. Rep. 5/20/16 Date

Geotechnology, Inc. Engineer 5/20/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/20/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

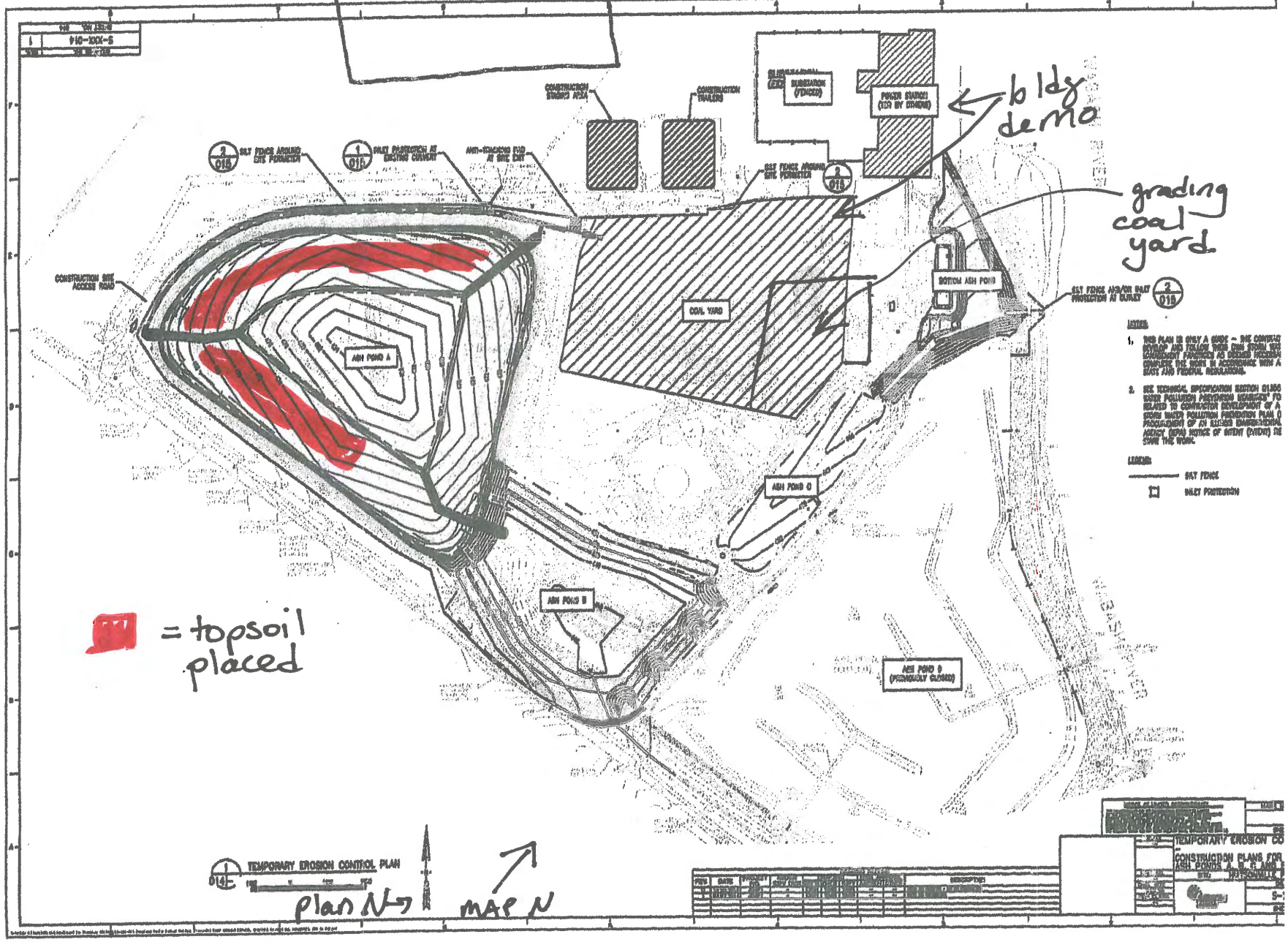
Brandenburg:

Ongoing demolition of buildings. Using large magnet to remove metal from soil in demolished area near east edge of coal yard near north end of Ash Pond C.

WB Koester:

Using dozer to grade out east end of coal yard. Hauling topsoil and grading berms on Ash Pond A. Straightened piezometers and placed one foot of ¾" clean rock inside of concrete collars. Shut down earlier than planned due to rain making for slick conditions.

Holsonville Ash Pond
5/20/19 ELK



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PHOTOGRAPH LOG



Photograph 1 - View of drainage at the north corner of Ash Pond A, looking southwest.



Photograph 2 - View of a silt fence around the culvert on the south side of the north access road, looking southeast.

Photographs taken by Elizabeth Rabbitt of Geotechnology, Inc. May 18-21, 2016.



Photograph 3 - View of drainage at the southwest corner of Ash Pond A, looking east-northeast.



Photograph 4 - View of Ash Pond B and erosion on the southwestern slope, looking north.



Photograph 5 - View of Ash Pond B and erosion on the northern slope, looking north-northeast.

Photographs taken by Elizabeth Rabbitt of Geotechnology, Inc. May 18-21, 2016.



Photograph 6 - View of Bottom Ash Pond, looking north.



Photograph 7 - View of Bottom Ash Pond drainage, looking northeast.

Photographs taken by Elizabeth Rabbitt of Geotechnology, Inc. May 18-21, 2016.



Photograph 8 - View of Ash Pond B, looking south.



Photograph 9 - View of Ash Pond B, looking north-northwest.



Photograph 10 - View of Ash Pond B, looking west.



Photograph 11 - View of Ash Pond B after erosion repair, looking south.

Photographs taken by Elizabeth Rabbitt of Geotechnology, Inc. May 18-21, 2016.



Photograph 12 - View of typical Ash Pond A vent well, prior to placement of protective barrier.



Photograph 13 - View of typical Ash Pond A vent well during placement of protective barrier.



Photograph 14 - View of typical Ash Pond A vent well, following protective barrier placement.



Photograph 15 - View of medial berm on the south side of Ash Pond A.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

M E M O R A N D U M

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

DATE: June 1, 2016

SUBJECT: Weekly Summary Report for May 23, 2016 to May 27, 2016

PROJECT: Hutsonville Ash Pond A Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.05

The following is a weekly summary of the activities at the referenced site.

Weather

The weather was generally clear from May 23-25. Morning temperatures was approximately 65 F and afternoon temperatures ranged from 78 F to 80 F.

Construction Activities

Vegetative cover on Ash Pond A was placed and graded on May 23-25. Stormwater control structures were graded on Ash Pond A.

Equipment and Personnel On-Site

WB Koester had the following equipment on site: 1 excavator (Komatsu), 2 dump trucks (John Deere 400D), 2 bulldozers (Caterpillar D6N LGP with GPS), 1 backhoe (Caterpillar), 1 water truck (Caterpillar 623B) (unused), 3 Tractors (Case 435, Case STX480, Case 9370) with scraper boxes (Reynolds), and one broom.

WB Koester had 3-4 operators working on site.

Geotechnology had one representative on site on from May 23-25. Geotechnology did not have representatives on site on May 26-27 due to CQA not being required during that time.

Meetings

The project coordination meeting was held on May 25, 2016. Meeting minutes are attached.

Photographs

A photograph log with selected photographs obtained this week is attached.

Materials

Topsoil from the stockpile was placed on Ash Pond A.

Testing/Sampling

Testing and sampling were not performed during the referenced time period.

Signature of CQA Officer

Anna Saindon, P.E., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

GEOTECHNOLOGY Inc.
FROM THE GROUND UP

DAILY REPORT

DATE: 05/23/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0645 Depart: 1600 Travel: Total: 9.25

AM Conditions: Clear AM Temperature: 65 F

PM Conditions: Clear PM Temperature: 80 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 3 operators

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A surface, drainage channels/slope of Ash pond A. Bottom Ash Pond.

Geotechnology, Inc. Rep. 5/23/2016 Date

Geotechnology, Inc. Engineer 5/24/2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/23/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition.

WB Koester:

1 D6R LGP bulldozers used to shape berms and drainage on Ash Pond A.

1 tractor with pan placing additional topsoil on as needed basis on Ash Pond A.

1 excavator assisting in Bottom Ash Pond to facilitate drainage.

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5/23/2016



Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/24/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0545 Depart: 1600 Travel: Total: 10.25

AM Conditions: Clear
AM Temperature: 65 F

PM Conditions: Clear, windy
PM Temperature: 78 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 3 operators

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A surface, drainage channels/slope of Ash pond A.

Geotechnology, Inc. Rep. 5/24/2016 Date

Geotechnology, Inc. Engineer 5/24/16 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/24/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition.

WB Koester:

1 D6R LGP bulldozers used to shape berms (north and southwest corners) and drainage (southwest corner) on Ash Pond A.

2 tractors with pan placing additional topsoil (only six loads) on as needed basis on Ash Pond A.

1 excavator shaping surface drainage at Ash pond A corners and placement of rip-rap at southwest corner of Ash Pond A.

2 trucks for hailing rip-rap for drainage placement at Southwest corner of Ash Pond A..

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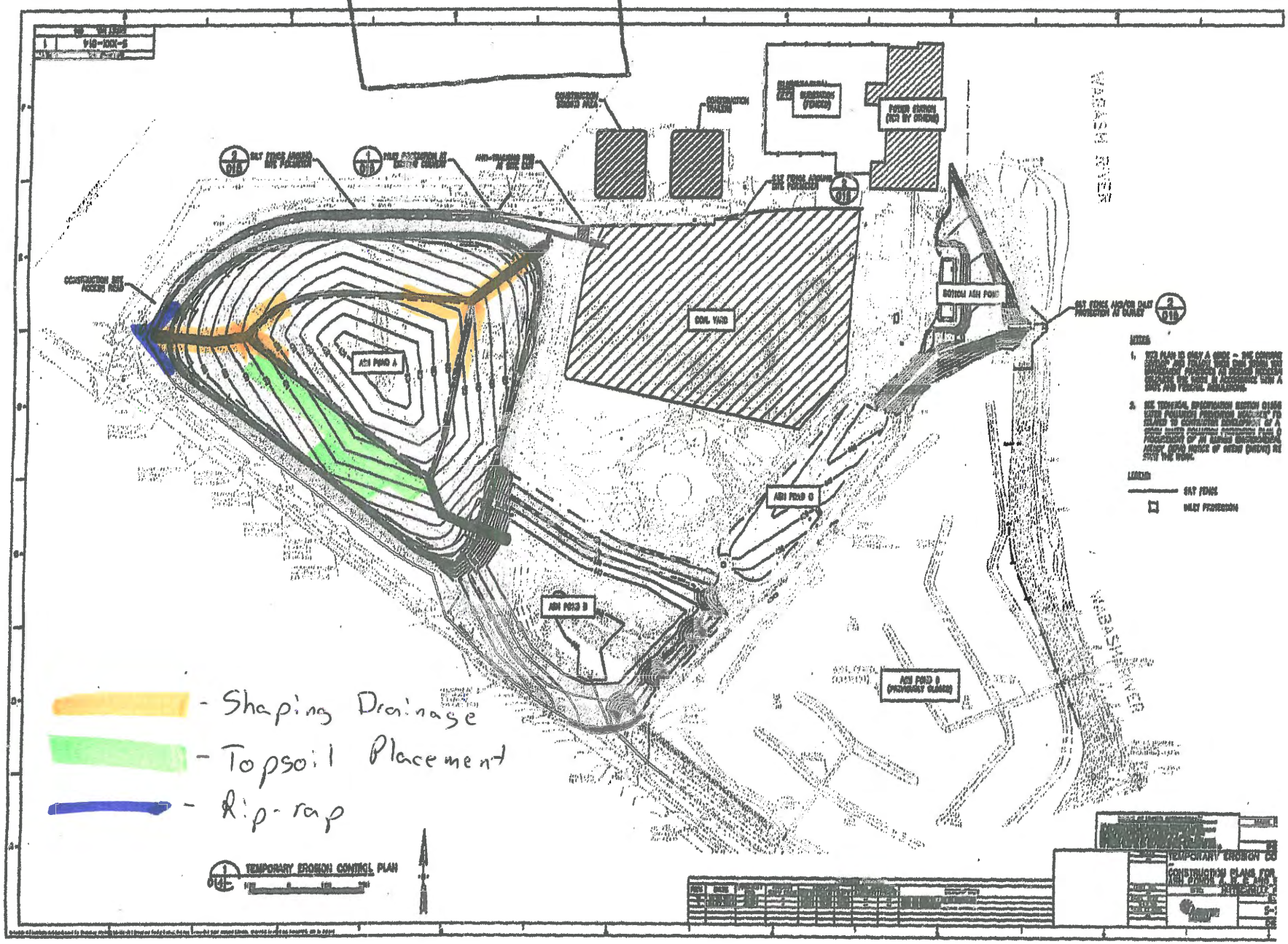
5/24/2016



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GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT

DATE: 05/25/2016

GENERAL INFORMATION:

Project Name: Hutsonville Ash Pond Closures
Project Number: J019896.05
Project Client: Ameren
Representative: Jon Truesdale

TIME AND WEATHER CONDITIONS:

(-) Lunch

Arrive: 0545 Depart: 1800 Travel: 3.75 Total: 16

AM Conditions: Clear
AM Temperature: 65 F

PM Conditions: Clear, windy
PM Temperature: 78 F

CONTRACTORS, EQUIPMENT, AND PERSONNEL:

Contractors: Brandenberg

Equipment: **WB Koester:** 1 excavator, 3 tractors with pans/rollerblade, 1 back-hoe, 1 D5C, 2 – D6R bulldozers, 2 trucks, 1 CAT 623B,*See site activities for use

Personnel: **WB Koester:** 4 operators

Visitors:

MATERIALS USED, DELIVERIES, AND TESTING:

Materials Used: None

Deliveries: None

Testing: None

CONSTRUCTION SITE LOCATIONS:

Ash Pond A surface, drainage channels/slope of Ash pond A.

Geotechnology, Inc. Rep. 5/25/2016 Date

Geotechnology, Inc. Engineer 5-25-2016 Date

GEOTECHNOLOGY INC
FROM THE GROUND UP

DAILY REPORT DATE: 05/25/2016

SITE ACTIVITIES, OBSERVATIONS, CONTACTS, AND ADDITIONAL NOTES:

Brandenburg:

Ongoing demolition.

WB Koester:

1 D6R LGP bulldozer used to shape drainage and additional placed topsoil on Ash Pond A.

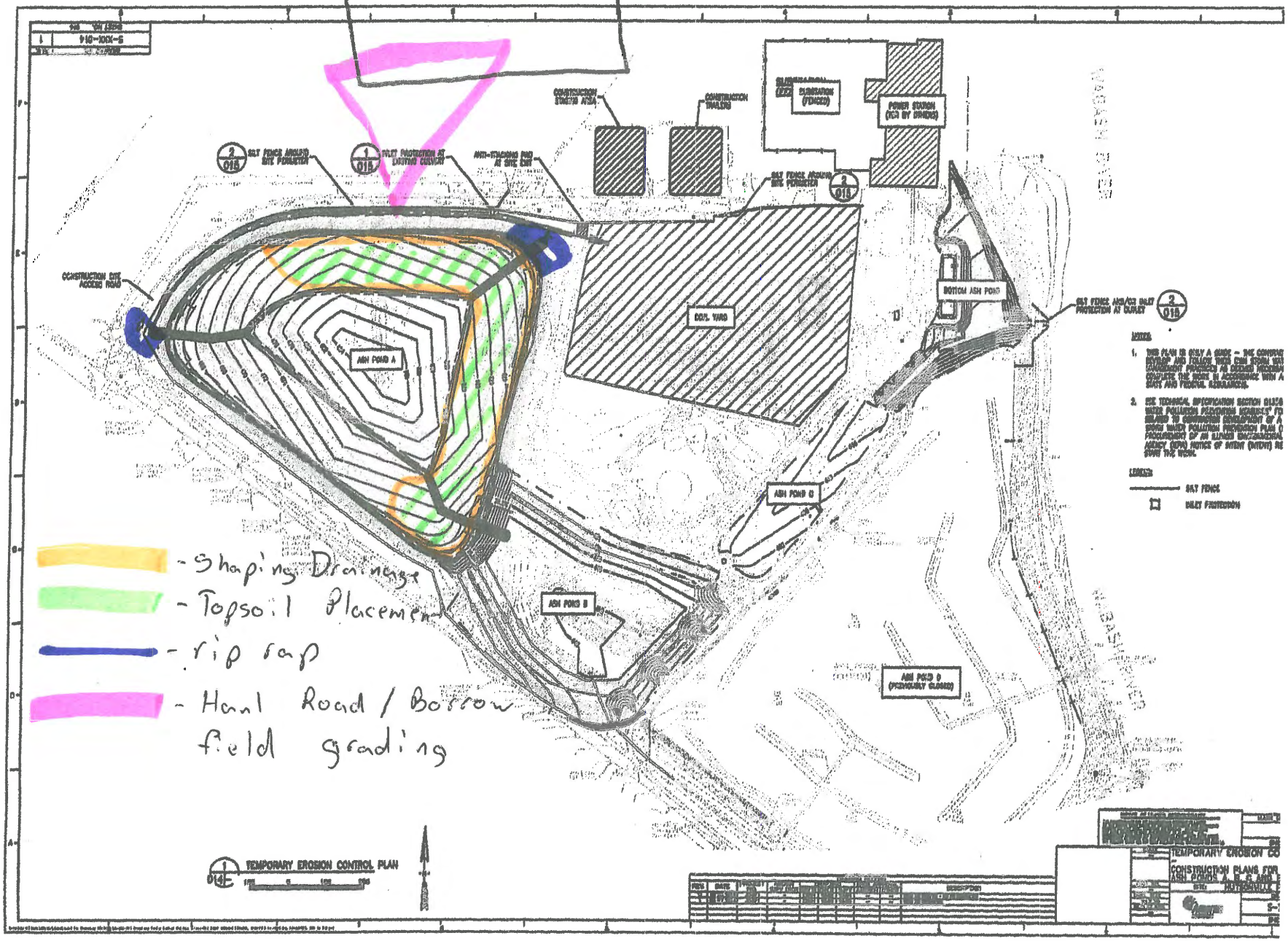
1 D6R LGP bulldozer used to grade borrow area, haul road, and northern portion of coal yard.

2 tractors with pans placing additional topsoil on Ash Pond A.

1 excavator shaping surface drainage at Ash pond A corners and placement of rip-rap at corners of Ash Pond A.

2 trucks for hauling rip-rap for drainage placement at southwest corner of Ash Pond A.

5/25/2016


Field
- Shaping Drainage
- Topsoil Placement
- rip rap
- Haul Road / Borrow field grading
ASH POND A
ASH POND B
ASH POND C
ASH POND D (PREVIOUSLY CLOSED)
BOTTOM ASH POND
DOL. YARD
CONSTRUCTION SITE ACCESS ROAD
SILT FENCE
SILT PROTECTION
TEMPORARY EROSION CONTROL PLAN

Electronic Filing: Received, Clerk's Office 09/28/2020

Weekly Progress Meeting

Meeting Minutes

Date: 5-25-16

Attendees:

Ameren: Don, Mike

WB Koester: Chris, Bob

Geotechnology, Inc.: Anna, John

Topics:

Safety/Housekeeping

- No accidents or near misses to report.

Manpower

- Man hours
  - Start of Job (4-27-15) through 5-24-16
    - Total = 16,219 hrs.
- Next week expected manpower
  - WBK = 3 operators, 1 superintendent (4 total)
  - Plan on working 5-10 hr days.
  - Monday May 30th is holiday. No work.

Review old minutes and action items

- Chris working on catching the erosion inspection forms back up.
- Anna says Massman on schedule to topo Pond A May 31st.

Material Issues

- n/a

Quality Control Issues

- n/a

Schedule Compliance

- Piezometers completed.
- Rip rap at the downchutes, outfall at river should be completed this week
- Topsoil delivery and placement on Pond A should be done this week in preparation for Massman surveying on Tuesday.
- Massman to survey the liner portion of Pond A as well as the down chutes and the lower berms to the toe.
- Roll off box will be on site today and Chris will proceed with the general clean up of the work site areas.
- Brandenberg done with major pumping into Bottom ash pond. WB Koester pumped pond down but the 3-4' of silt is very soft. Chris will the end berm down to grade and see if the silt will dewater. Mike and Anna say that the silt will need to be compacted to around 80-85% and then seeded. May take a while for sun and wind to dry material out enough to reach compaction needed.
- Brandenberg will be working on site and in the way of the permanent fence until around the last week in June. WBK should plan on holding off on the permanent fence installation until then.
- Don has been updating As built drawings.
- Another contractor will be on site next Tuesday to begin well abandonment.

Cost and Budget Control

- n/a

Next Meeting Scheduled: June 1 at 9:00 CST

Action Items -

- Chris to finish updating erosion inspection reports.

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - View of rip-rap and geofabric placement at southwest corner of Ash Pond A, looking east-northeast.



Photograph 2 - View of placed rip-rap and geofabric at the southwest corner of Ash Pond A, looking east.



Photograph 3 - View of rip-rap and geofabric placement at the northern corner of Ash Pond A, looking west.



Photograph 4 - View of surface grading of eastern portion of coal yard, looking east.

Photographs taken by Jon Truesdale of Geotechnology, Inc. May 23-25, 2016.



Photograph 5 - View of excavator assisting with drainage work in Bottom Ash Pond, looking north.



Photograph 6 - View shaping of surface drainage in the southwestern portion of Ash Pond A, looking southwest.



Photograph 7 - View placement of additional topsoil on the southern portion of Ash Pond A, looking southeast.

APPENDIX B

CQA CERTIFICATIONS

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Base Grade of Ash Pond A (prior to placement of geomembrane).

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

WB Koester

3. NEW SEQUENTIAL WORK TO BEGIN:

Placement of Geomembrane.

By CQA Officer-in-Absentia: (if applicable) _____ (Signature) **Date:** 10/30/2015

By CQA Officer: _____ (Signature) **Date:** 10/30/2015

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

40 mil HDPE Geomembrane installed in anchor trenches on Ash Pond A.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

National Lining Systems

3. NEW SEQUENTIAL WORK TO BEGIN:

Backfilling of anchor trenches

By CQA Officer-in-Absentia: (if applicable) _____ (Signature) **Date:** 11/4/2015

By CQA Officer: _____ (Signature) **Date:** 11/4/2015

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

40mil HDPE Geomembrane (prior to placement of protective cover) on Ash Pond A

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

National Lining Systems

3. NEW SEQUENTIAL WORK TO BEGIN:

Placement of Protective Cover

By CQA Officer-in-Absentia: (if applicable) Jessie Hahn (Signature) **Date:** 11/13/2015

By CQA Officer: (Signature) **Date:** 11/13/2015

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Placement of Protective Cover on Ash Pond A.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

W.B. Koester

3. NEW SEQUENTIAL WORK TO BEGIN:

Surface Water Control Features

By CQA Officer-in-Absentia: _____ (Signature) **Date:** _____
(if applicable)

By CQA Officer: _____ (Signature) **Date:** 6/6/2016

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Construction of Surface Water Control Features on Ash Pond A

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

W. B. Koester

3. NEW SEQUENTIAL WORK TO BEGIN:

Vegtation

By CQA Officer-in-Absentia: (if applicable) _____ (Signature) **Date:** _____

By CQA Officer: _____ (Signature) **Date:** 6/6/2016

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Base Grade of the Ash Pond D slope (prior to placement of geomembrane).

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

WB Koester

3. NEW SEQUENTIAL WORK TO BEGIN:

Placement of Geomembrane.

By CQA Officer-in-Absentia: _____ (Signature) **Date:** 11/4/2015
(if applicable)

By CQA Officer: _____ (Signature) **Date:** 11/4/2015

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

40 mil HDPE Geomembrane on the Ash Pond D slope
(prior to placement of protective cover)

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

National Lining Systems

3. NEW SEQUENTIAL WORK TO BEGIN:

Placement of Protective Cover

By CQA Officer-in-Absentia: _____ (Signature) **Date:** 11/9/2015
(if applicable)

By CQA Officer: _____ (Signature) **Date:** 11/9/2015

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

40 mil HDPE Geomembrane installed in anchor trenches on Ash Pond D slope.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

National Lining Systems

3. NEW SEQUENTIAL WORK TO BEGIN:

Backfilling of anchor trenches

By CQA Officer-in-Absentia: _____ (Signature) **Date:** 11/9/2015
(if applicable)

By CQA Officer: _____ (Signature) **Date:** 11/9/2015

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work. CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Placement of Protective Cover on the Ash Pond D slope

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

WB Koester

3. NEW SEQUENTIAL WORK TO BEGIN:

By CQA Officer-in-Absentia: _____ (Signature) **Date:** 11/23/2015
(if applicable)

By CQA Officer: _____ (Signature) **Date:** 11/23/2015

Distribution: Original To: Document Controller Copies To: _____

APPENDIX C

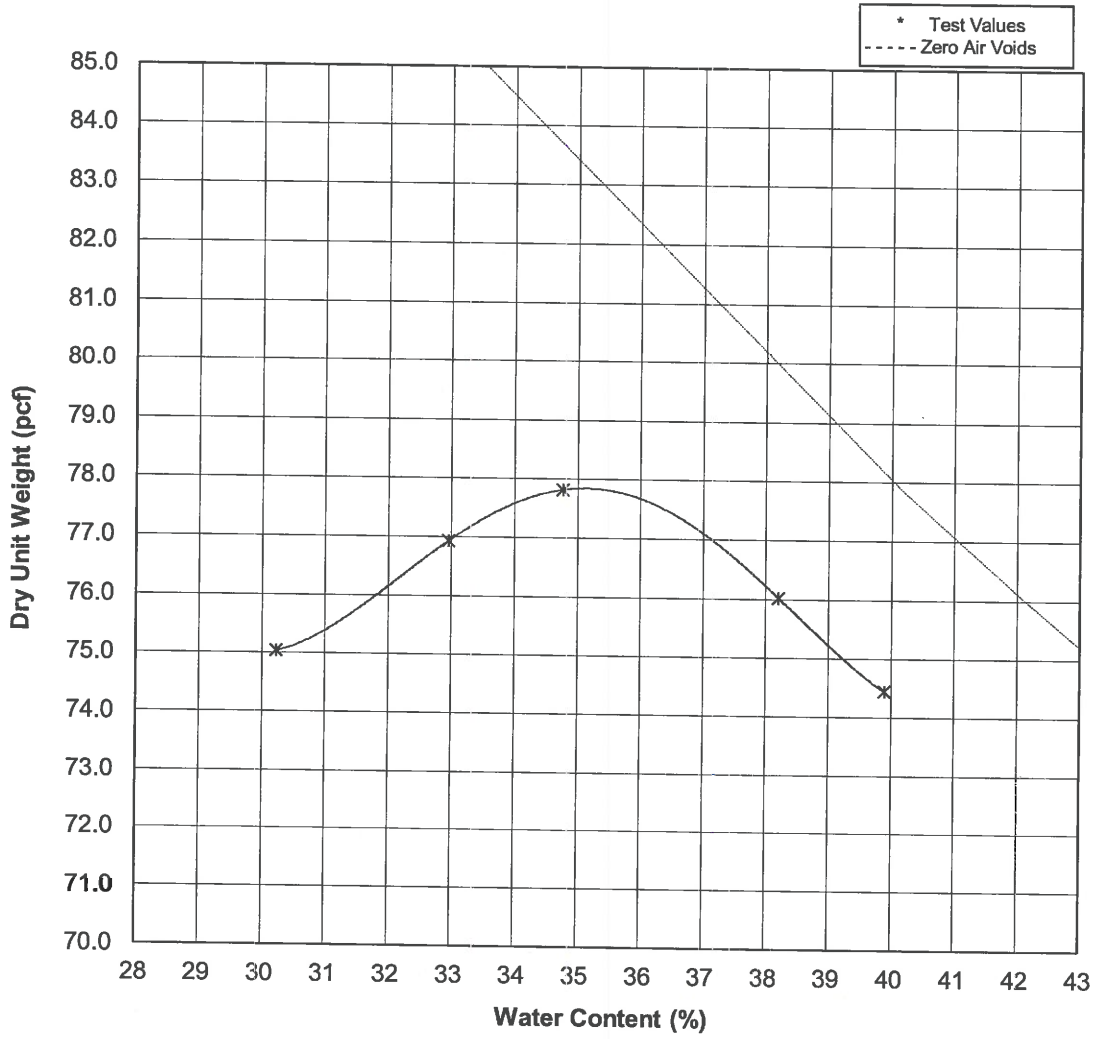
MATERIALS TESTING

11816 Lackland Road, Suite 150
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond ABC CQA
Client: Ameren Missouri
Sample Source: Pond A (South)
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.05
Test Date:	09/03/15
Proctor No.:	ASH-1
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Fly Ash

Sample Properties	
Moisture Content	–
Liquid Limit	–
Plastic Limit	–
Plasticity Index	–
Specific Gravity:	2.500 Actual
Classification	–

Test Results:	
Maximum Dry Unit Weight (pcf):	77.8
Optimum Water Content (%):	35.1
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	–
Optimum Water Content (%):	–

Tested By: ZRB
Date: 09/03/15

Input By: ZRB
Date: 09/04/15

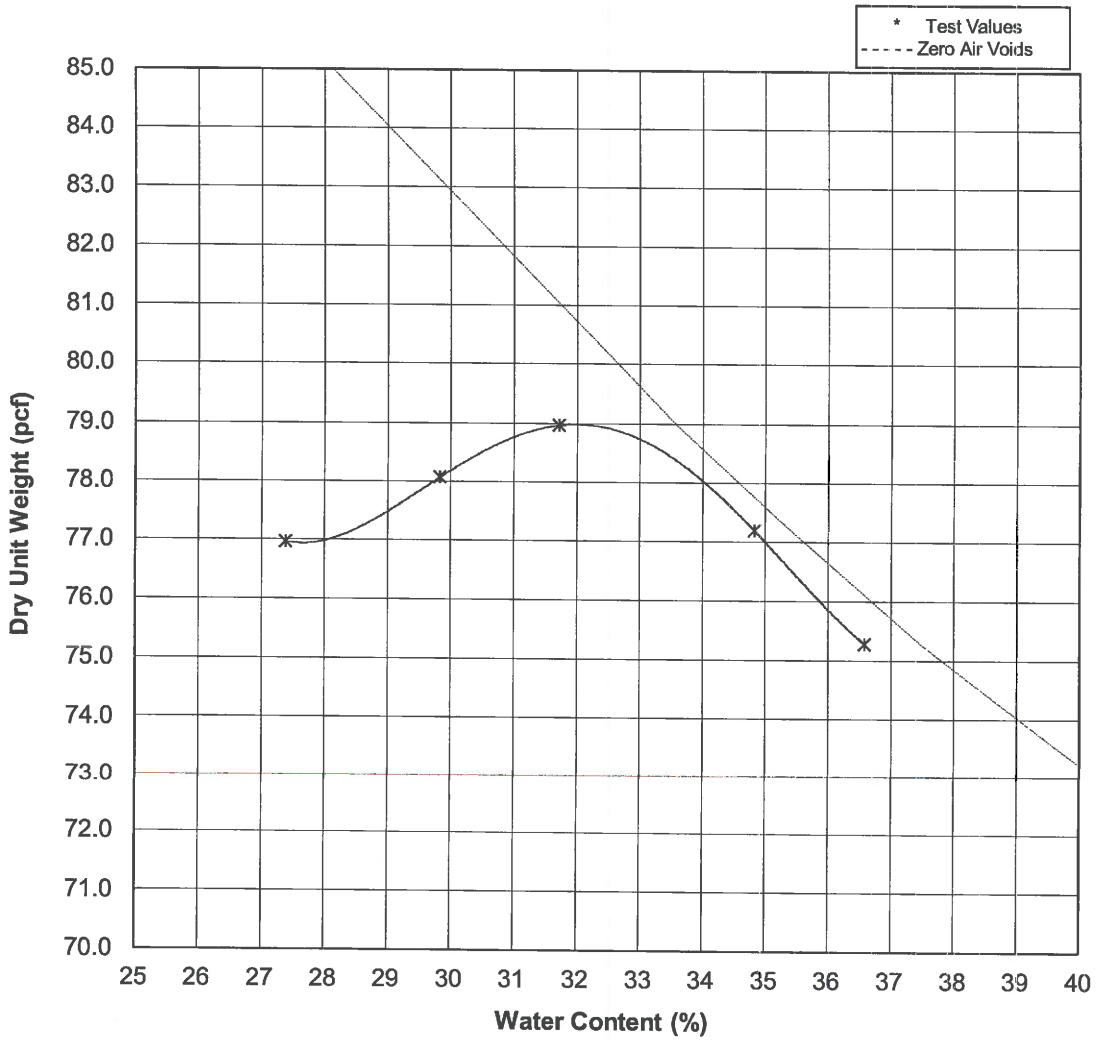
Checked By: DTC
Date: 09/03/15

11816 Lackland Road, Suite 150
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond ABC CQA
Client: Ameren Missouri
Sample Source: Pond A (West)
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.05
Test Date:	09/03/15
Proctor No.:	ASH-2
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Fly Ash

Sample Properties	
Moisture Content	–
Liquid Limit	–
Plastic Limit	–
Plasticity Index	–
Specific Gravity:	2.200 Actual
Classification	–

Test Results:	
Maximum Dry Unit Weight (pcf):	79.0
Optimum Water Content (%):	32.0
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	–
Optimum Water Content (%):	–

Tested By: ZRB
Date: 09/03/15

Input By: ZRB
Date: 09/04/15

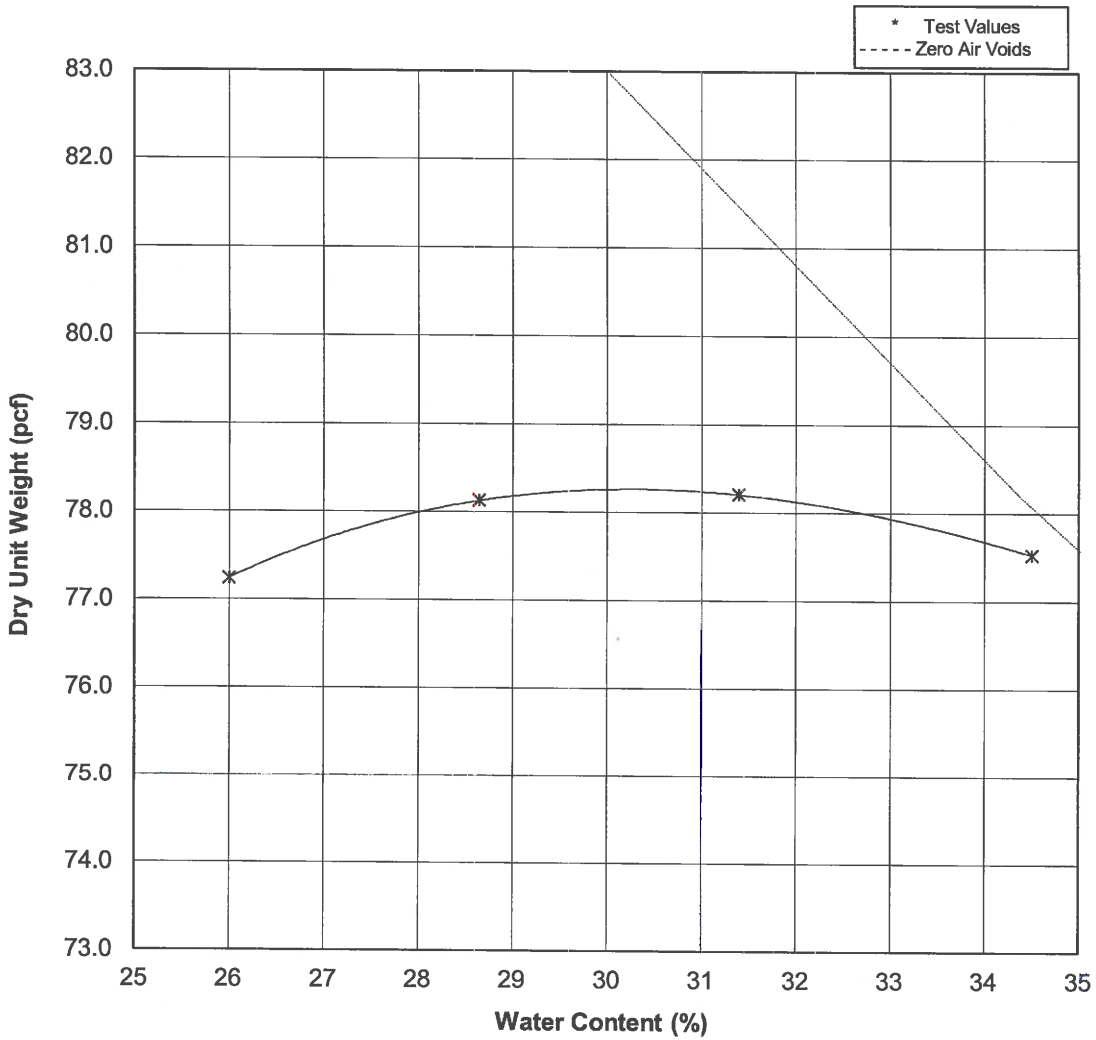
Checked By: DTC
Date: 09/04/15

11816 Lackland Road, Suite 150
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond ABC CQA
Client: Ameren Missouri
Sample Source: Pond A (Northeast Corner)
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.05
Test Date:	09/11/15
Proctor No.:	ASH-3
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Fly Ash

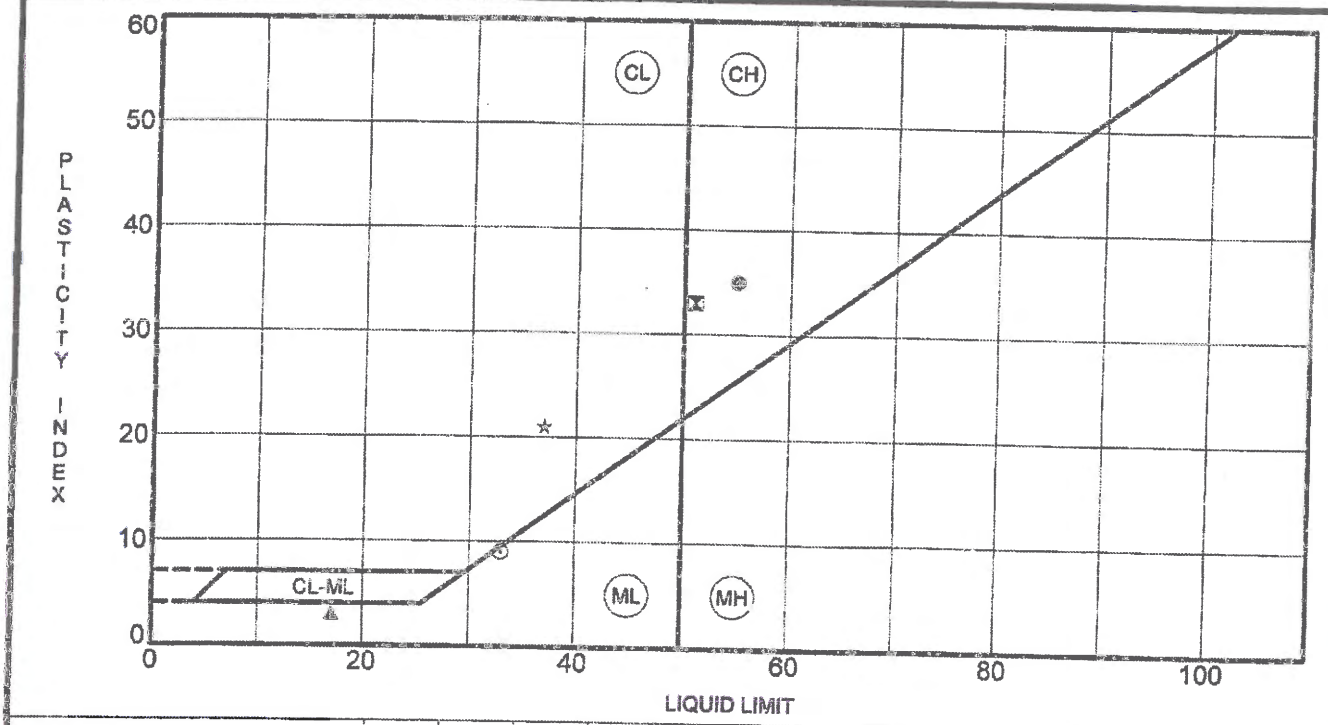
Sample Properties	
Moisture Content	–
Liquid Limit	–
Plastic Limit	–
Plasticity Index	–
Specific Gravity:	2.200 Actual
Classification	–

Test Results:	
Maximum Dry Unit Weight (pcf):	78.3
Optimum Water Content (%):	30.5
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	–
Optimum Water Content (%):	–

Tested By: ZRB
Date: 09/11/15

Input By: ZRB
Date: 09/14/15

Checked By: DTC
Date: 09/14/15



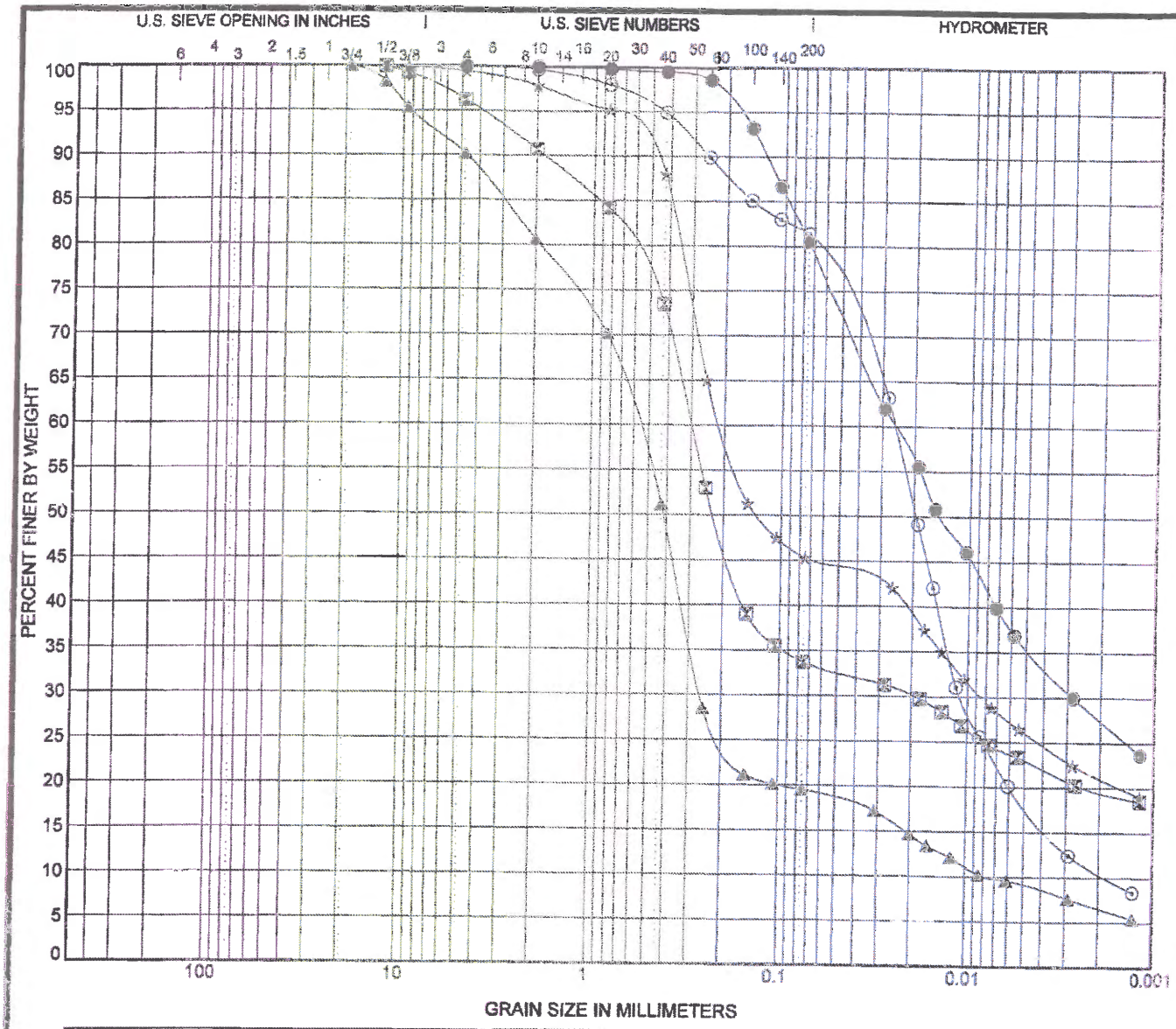
	Sample Identification	LL	PL	PI	Fines	Sample Description
●	BAPL2	55	20	35	81	FAT CLAY with SAND(CH)
⊠	BF-4	51	18	33	34	CLAYEY SAND(SC)
▲	BF-6	17	14	3	20	SILTY SAND(SM)
★	BF-9	37	16	21	45	CLAYEY SAND(SC)
⊙	QLTS1	33	24	9	81	SILT with SAND(ML)

GEOTECHNOLOGY INC
FROM THE GROUND UP

ATTERBERG LIMITS RESULTS

Hutsonville
J019896.05

US_ATTERBERG_LIMITS_J019896.05 - HUTSONVILLE.GPJ_00.CLONE ME.GPJ 12/8/15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	Sample Description	LL	PL	PI	Cc	Cu
BAPL2	FAT CLAY with SAND(CH)	55	20	35		
BF-4	CLAYEY SAND(SC)	51	18	33		
BF-6	SILTY SAND(SM)	17	14	3	15.17	77.08
BF-9	CLAYEY SAND(SC)	37	16	21		
QLTS1	SILT with SAND(ML)	33	24	9	2.57	14.34

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
BAPL2	4.75	0.03	0		0.0	19.5	45.0	35.5
BF-4	12.5	0.3	0.02		3.8	62.5	10.8	22.9
BF-6	19	0.53	0.26	0.01	9.8	70.7	10.4	9.1
BF-9	9.5	0.21	0.01		0.6	54.1	19.3	26.0
QLTS1	4.75	0.03	0.01	0	0.0	18.6	63.3	18.1

GEOTECHNOLOGY INC
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Hutsonville
J019896.05

US_GRAIN_SIZE_J019896.05 - HUTSONVILLE.GPJ_00 CLONE ME.GPJ_12/8/15

pH TESTS (ASTM D 4972 or AASHTO T-289)

GEOTECHNOLOGY INC
FROM THE GROUND UP

DATE	PROJECT NAME	PROJECT NO.
December 3, 2015	Hutsonville	J019896.05

General Test Information: pH Meter: Accumet 13-620-109 or _____
Distilled Water: required pH=5.5 to 7.5 Measured value: 7.12
Soil/Water Ratio: 1:1

Boring No.	Sample No.	Depth (ft)	Visual Identification (Color, Group Name & Symbol)	Soil : Water Ratio (g/g) or (g/mL)	pH of Solution (Meter/ Paper)[1]	Tare No. Air Drying	Jar Number	Type
BAPL2				1:01	7.88	14	103	x Water Calcium
QLTS1				1:01	7.01	24	K	x Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium

[1]pH by Meter is Method A; pH by Paper is Method B

Tested By: EG
Date: 12/03/15

Calculated By: AB
Date: 12/08/15

Checked By: EG
Date: 12/08/15

pH TESTS (ASTM D 4972 or AASHTO T-289)

GEOTECHNOLOGY INC
FROM THE GROUND UP

DATE	PROJECT NAME	PROJECT NO.
November 24, 2015	Hutsonville	J019896.05

General Test Information: pH Meter: Accumet 13-620-109 or _____
Distilled Water: required pH=5.5 to 7.5 Measured value: 6.75
Soil/Water Ratio: 1:1

Boring No.	Sample No.	Depth (ft)	Visual Identification (Color, Group Name & Symbol)	Soil : Water Ratio (g/g) or (g/mL)	pH of Solution (Meter/ Paper)[1]	Tare No. Air Drying	Jar Number	Type
BF-4				01:01	7.04	15	106	[x] Water [ ] Calcium
BF-6				01:01	5.92	25	99	[x] Water [ ] Calcium
BF-9				01:01	6.59	16	2A	[x] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
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					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium
					----------			[ ] Water [ ] Calcium

[1]pH by Meter is Method A; pH by Paper is Method B

Tested By: EG
Date: 11/24/15

Calculated By: AB
Date: 11/25/15

Checked By: AB
Date: 11/25/15

pH TESTS (ASTM D 4972 or AASHTO T-289)

GEOTECHNOLOGY INC
FROM THE GROUND UP

DATE	PROJECT NAME	PROJECT NO.
November 24, 2015	Hutsonville	J019896.05

General Test Information: pH Meter: Accumet 13-620-109 or _____
Distilled Water: required pH=5.5 to 7.5 Measured value: 6.75
Soil/Water Ratio: 1:1

Boring No.	Sample No.	Depth (ft)	Visual Identification (Color, Group Name & Symbol)	Soil : Water Ratio (g/g) or (g/mL)	pH of Solution (Meter/ Paper)[1]	Tare No. Air Drying	Jar Number	Type
Borrow Field 1				01:01	5.83	18	102	x Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium
								Water / Calcium

[1]pH by Meter is Method A; pH by Paper is Method B

Tested By: EG Date: 11/24/15

Calculated By: AB Date: 11/25/15

Checked By: AB Date: 11/25/15

Electronic Filing: Received, Clerk's Office 09/28/2020

pH TESTS (ASTM D 4972 or AASHTO T-289)

GEOTECHNOLOGY INC
FROM THE GROUND UP

DATE	PROJECT NAME Hutsonville	PROJECT NO. J019896.05

General Test Information: pH Meter: Accumet 13-620-109 or _____
Distilled Water: required pH=5.5 to 7.5 Measured value: 6.48
Soil/Water Ratio: 1:1

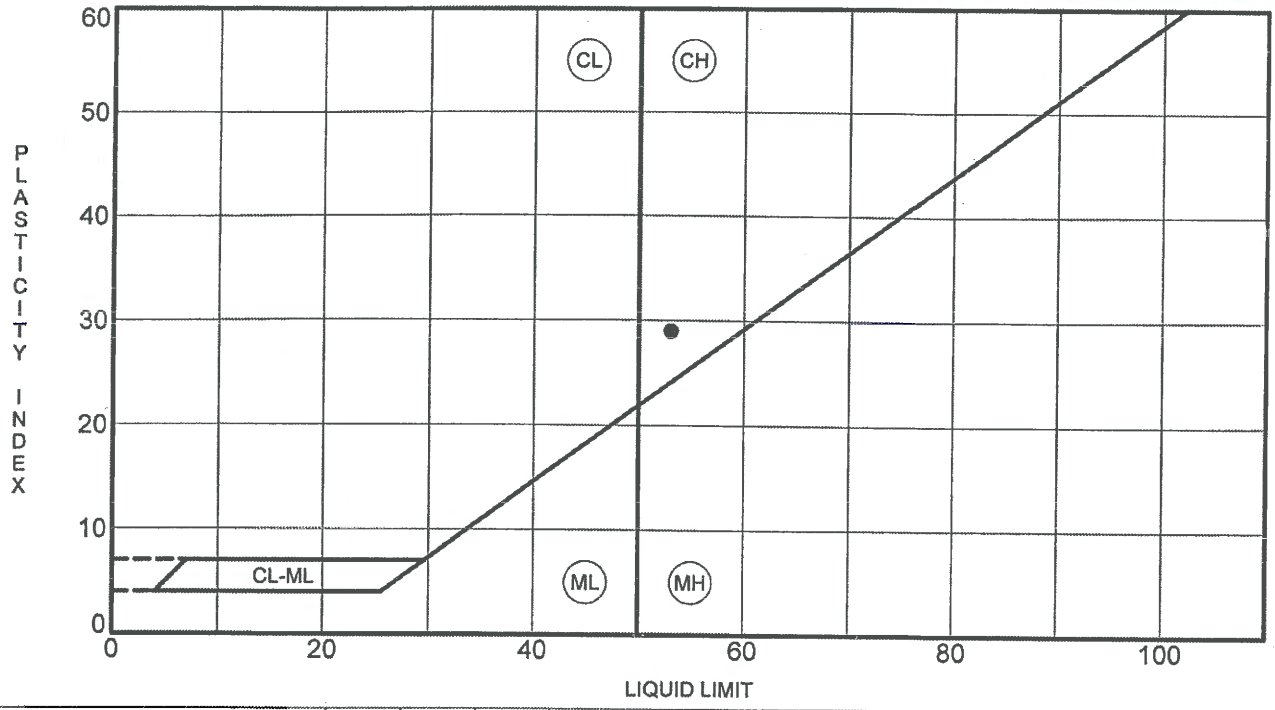
Boring No.	Sample No.	Depth (ft)	Visual Identification (Color, Group Name & Symbol)	Soil : Water Ratio (g/g) or (g/mL)	pH of Solution (Meter/ Paper)[1]	Tare No. Air Drying	Jar Number	Type
Quality Lime Co. 1				01:01	7.90	15	G	x Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium

[1]pH by Meter is Method A; pH by Paper is Method B

Tested By: EG
Date: 09/15/15

Calculated By: AB
Date: 09/23/15

Checked By: AB
Date: 09/23/15



	Sample Identification	LL	PL	PI	Fines	Sample Description
●	**Bottom Ash Pond Levee**	**53**	**24**	**29**	**90**	**FAT CLAY(CH)**

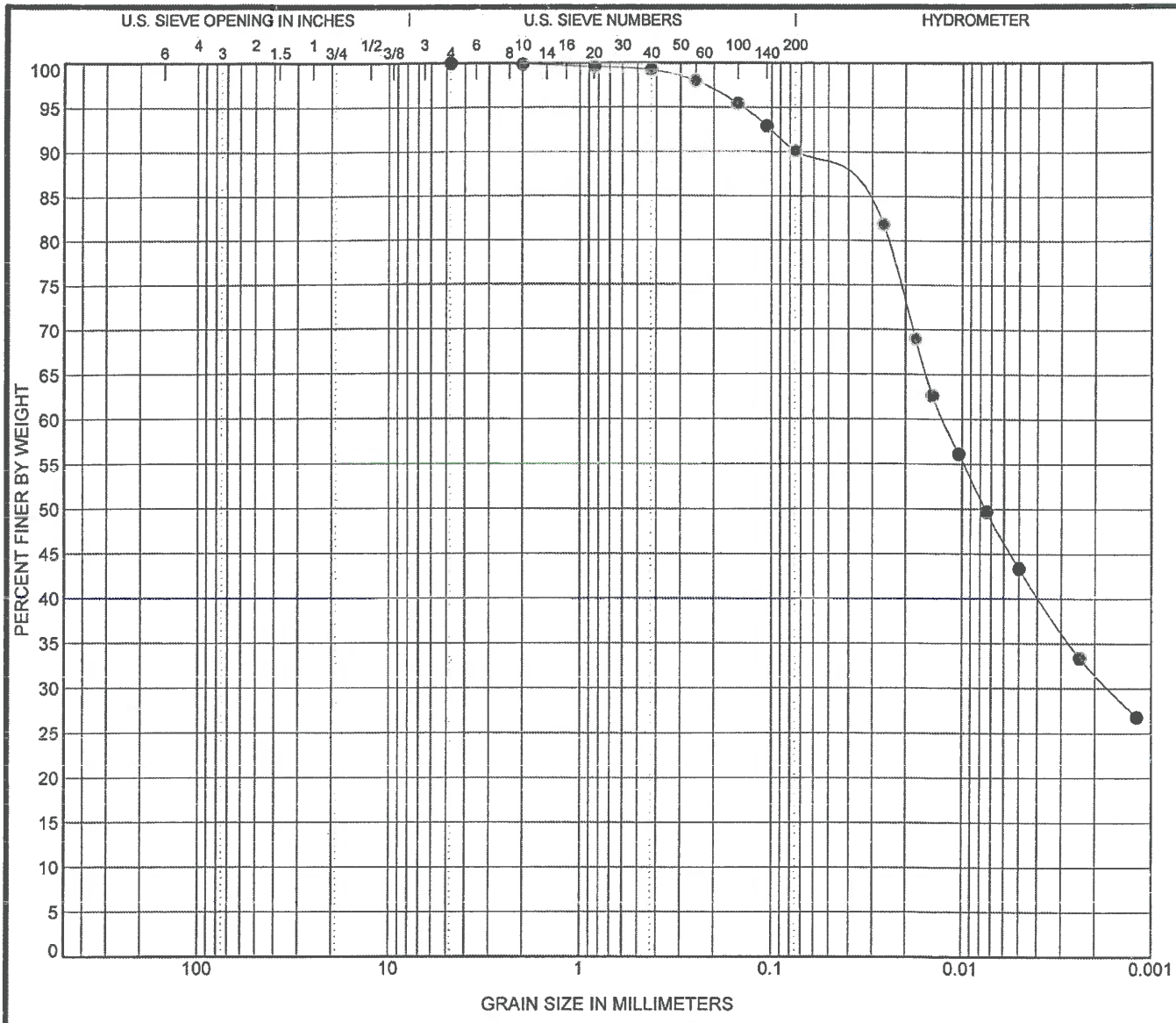
US ATTERBERG LIMITS J019896.05 - HUTSONVILLE.GPJ 00 CLONE ME.GPJ 11/18/15

GEOTECHNOLOGY INC
FROM THE GROUND UP

ATTERBERG LIMITS RESULTS

Hutsonville

J019896.05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification	Sample Description	LL	PL	PI	Cc	Cu
●	Bottom Ash Pond Levee	FAT CLAY(CH)	53	24	29		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	Bottom Ash Pond Levee	4.75	0.01	0		0.0	9.9	46.7	43.4

GEOTECHNOLOGY INC
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Hutsonville

J019896.05

US GRAIN SIZE J019896.05 - HUTSONVILLE.GPJ 00 CLONE ME.GPJ 11/18/15

pH TESTS (ASTM D 4972 or AASHTO T-289)

GEOTECHNOLOGY INC
FROM THE GROUND UP

DATE	PROJECT NAME	PROJECT NO.
November 18, 2015	Hutsonville	J019896.05

General Test Information: pH Meter: Accumet 13-620-109 or _____
Distilled Water: required pH=5.5 to 7.5 Measured value: 6.01
Soil/Water Ratio: 1:1

Boring No.	Sample No.	Depth (ft)	Visual Identification (Color, Group Name & Symbol)	Soil : Water Ratio (g/g) or (g/mL)	pH of Solution (Meter/ Paper)[1]	Tare No. Air Drying	Jar Number	Type
Bottom Ash Pond Levee				1:01	7.79	8	2B	x Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium
								Water Calcium

[1] pH by Meter is Method A; pH by Paper is Method B

Tested By: AB Date: 11/18/15

Calculated By: AB Date: 11/18/15

Checked By: AB Date: 11/18/15

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

July 27, 2015

Vince Epps
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville Bottom Ash **WorkOrder:** 15071241

Dear Vince Epps:

TEKLAB, INC received 1 sample on 7/22/2015 3:06:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15071241
Client Project: Hutsonville Bottom Ash
Report Date: 27-Jul-15

This reporting package includes the following:

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Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15071241

Client Project: Hutsonville Bottom Ash **Report Date:** 27-Jul-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville Bottom Ash

Work Order: 15071241
Report Date: 27-Jul-15

Cooler Receipt Temp: 31.02 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	9/30/2015	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2015	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2015	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2015	Collinsville
Oklahoma	ODEQ	9978		8/31/2015	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15071241

Client Project: Hutsonville Bottom Ash **Report Date:** 27-Jul-15

Lab ID: 15071241-001 **Client Sample ID:** Bottom Ash Comp.

Matrix: SOLID **Collection Date:** 07/22/2015 11:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	07/23/2015 18:50	110828
Barium	NELAP	0.0500		**0.145**	mg/L	1	07/23/2015 18:50	110828
Cadmium	NELAP	0.0200	J	**0.0070**	mg/L	1	07/23/2015 18:50	110828
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	07/23/2015 18:50	110828
Lead	NELAP	0.400		**< 0.400**	mg/L	1	07/23/2015 18:50	110828
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	07/23/2015 18:50	110828
Silver	NELAP	0.100		**< 0.100**	mg/L	1	07/23/2015 18:50	110828
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	07/24/2015 11:55	110829

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15071241

Client Project: Hutsonville Bottom Ash **Report Date:** 27-Jul-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 110828 **SampType:** MBLK Units **mg/L**

SampID: MBLK-110828

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	07/23/2015
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	07/23/2015
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	07/23/2015
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	07/23/2015
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	07/23/2015
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	07/23/2015
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	07/23/2015

Batch 110828 **SampType:** LCS Units **mg/L**

SampID: LCS-110828

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.8**	20.00	0	99.0	85	115	07/23/2015
Barium	0.500		**20.1**	20.00	0	100.4	85	115	07/23/2015
Cadmium	0.0200		**0.489**	0.5000	0	97.8	85	115	07/23/2015
Chromium	0.100		**2.00**	2.000	0	99.8	85	115	07/23/2015
Lead	0.400		**4.94**	5.000	0	98.9	85	115	07/23/2015
Selenium	0.500		**19.6**	20.00	0	98.0	85	115	07/23/2015
Silver	0.100		**0.473**	0.5000	0	94.6	85	115	07/23/2015

Batch 110828 **SampType:** MS Units **mg/L**

SampID: 15071168-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.6**	20.00	0	98.2	75	125	07/23/2015
Barium	0.500		**20.1**	20.00	0.09700	100.1	75	125	07/23/2015
Cadmium	0.0200		**0.496**	0.5000	0.005000	98.2	75	125	07/23/2015
Chromium	0.100		**3.92**	2.000	1.994	96.4	75	125	07/23/2015
Lead	0.400		**4.94**	5.000	0	98.7	75	125	07/23/2015
Selenium	0.500		**19.4**	20.00	0	97.0	75	125	07/23/2015
Silver	0.100		**0.472**	0.5000	0	94.4	75	125	07/23/2015

Batch 110828 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 15071168-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**20.2**	20.00	0	101.1	19.64	2.91	07/23/2015
Barium	0.500		**20.5**	20.00	0.09700	101.8	20.11	1.73	07/23/2015
Cadmium	0.0200		**0.504**	0.5000	0.005000	99.8	0.4960	1.60	07/23/2015
Chromium	0.100		**4.00**	2.000	1.994	100.6	3.921	2.12	07/23/2015
Lead	0.400		**5.05**	5.000	0	100.9	4.935	2.24	07/23/2015
Selenium	0.500		**20.1**	20.00	0	100.4	19.39	3.50	07/23/2015
Silver	0.100		**0.486**	0.5000	0	97.2	0.4720	2.92	07/23/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15071241

Client Project: Hutsonville Bottom Ash **Report Date:** 27-Jul-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 110828 **SampType:** MS Units **mg/L**
SampID: 15071200-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.1**	20.00	0	95.4	75	125	07/23/2015
Barium	0.500		**20.5**	20.00	0.8000	98.4	75	125	07/23/2015
Cadmium	0.0200		**0.477**	0.5000	0	95.4	75	125	07/23/2015
Chromium	0.100		**2.69**	2.000	0.7720	96.0	75	125	07/23/2015
Lead	0.400		**4.84**	5.000	0	96.7	75	125	07/23/2015
Selenium	0.500		**18.8**	20.00	0	93.9	75	125	07/23/2015
Silver	0.100		**0.462**	0.5000	0	92.4	75	125	07/23/2015

Batch 110828 **SampType:** MS Units **mg/L**
SampID: 15071241-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.9**	20.00	0	99.6	75	125	07/23/2015
Barium	0.500		**20.6**	20.00	0.1450	102.3	75	125	07/23/2015
Cadmium	0.0200		**0.499**	0.5000	0.007000	98.4	75	125	07/23/2015
Chromium	0.100		**2.00**	2.000	0	100.2	75	125	07/23/2015
Lead	0.400		**5.02**	5.000	0	100.3	75	125	07/23/2015
Selenium	0.500		**19.6**	20.00	0	97.9	75	125	07/23/2015
Silver	0.100		**0.480**	0.5000	0	96.0	75	125	07/23/2015

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 110829 **SampType:** MBLK Units **mg/L**
SampID: MBLK-110829

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	07/24/2015

Batch 110829 **SampType:** LCS Units **mg/L**
SampID: LCS-110829

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00518**	0.00500	0	103.6	85	115	07/24/2015

Batch 110829 **SampType:** MS Units **mg/L**
SampID: 15071168-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00512**	0.00500	0	102.3	75	125	07/24/2015

Batch 110829 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15071168-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00507**	0.00500	0	101.5	0.005117	0.83	07/24/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15071241

Client Project: Hutsonville Bottom Ash **Report Date:** 27-Jul-15

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 110829 **SampType:** MS Units **mg/L**

SampID: 15071200-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00506**	0.00500	0	101.2	75	125	07/24/2015

Batch 110829 **SampType:** MS Units **mg/L**

SampID: 15071241-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00519**	0.00500	0	103.8	75	125	07/24/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville Bottom Ash

Work Order: 15071241
Report Date: 27-Jul-15

Carrier: Vince Epps

Received By: MAK

Completed by: M. Kaminski
On: 22-Jul-15
Mary Anne Kaminski

Reviewed by: Elizabeth A. Hurley
On: 22-Jul-15
Elizabeth A. Hurley

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☐	No ☐	Not Present ☑	Temp °C	31.02
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

Electronic Filing: Received, Clerk's Office 09/28/2020

CHAIN OF CUSTODY

pg. 1 of 1 Work Order # 1507124

TEKLAB, INC. 5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618) 344-1004 ~ Fax: (618) 344-1005

Client: Geotechnology
Address: 11816 Lackland Rd.
City / State / Zip: St. Louis, MO
Contact: Vince Epps Phone: 314-997-7440
E-Mail: V_epps@geotechnology.com Fax:

Samples on: ☐ Ice ☐ Blue Ice ☑ No Ice 3.0 °C
Preserved in: ☐ Lab ☐ Field **FOR LAB USE ONLY**
Lab Notes:

Comments:

- Are these samples known to be involved in litigation? If yes, a surcharge will apply. ☐ Yes ☒ No
- Are these samples known to be hazardous? ☐ Yes ☒ No
- Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in comment section. ☐ Yes ☒ No

Project Name / Number: Hutsonville Bottom Ash
Sample Collector's Name: Vince Epps

Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other_____ ☐ 3 Day (50% Surcharge)
Billing Instructions: P.O.

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO_3	NaOH	H_2SO_4	HCL	MeOH	$NaHSO_4$	Other	MATRIX: Water	Drinking Water	Soil	Sludge	Sp. Waste	INDICATE ANALYSIS REQUESTED: RCRA 8 Metals TCLP
1507124	Bottom Ash Comp.	7/22/15 1100	X										X			X

Relinquished By	Date / Time	Received By	Date / Time
[signature]	7/22/15 1506	[signature]	7/22/15 15:04

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse side, and that he/she has the authority to sign on behalf of client.

WHITE – LAB YELLOW – SAMPLER'S COPY

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

September 16, 2015

Jessie Hahn
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (573) 270-1313
FAX: (314) 997-2067

RE: J019896.05 Hutsonville **WorkOrder:** 15090606

Dear Jessie Hahn:

TEKLAB, INC received 1 sample on 9/10/2015 3:20:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15090606
Client Project: J019896.05 Hutsonville
Report Date: 16-Sep-15

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	4
Laboratory Results	5
Quality Control Results	6
Receiving Check List	12
Chain of Custody	Appended

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
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NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.05 Hutsonville

Work Order: 15090606
Report Date: 16-Sep-15

Cooler Receipt Temp: 7.22 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road	3920 Pintail Dr	8421 Nieman Road	5445 Horseshoe Lake Road
	Collinsville, IL 62234-7425	Springfield, IL 62711-9415	Lenexa, KS 66214	Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	9/30/2015	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

Lab ID: 15090606-001 **Client Sample ID:** Quality Lime Co 1

Matrix: SOLID **Collection Date:** 09/10/2015 13:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**11.5**	%	1	09/10/2015 19:13	R209111
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride		56	J	**29**	mg/Kg-dry	1	09/15/2015 1:05	112290
SW-846 1010								
Ignitability, Closed Cup	NELAP	60		**>200**	°F	1	09/11/2015 15:26	R209138
SW-846 9036 (TOTAL)								
Sulfate		112	JS	**78**	mg/Kg-dry	1	09/15/2015 1:05	112289
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.0250		**< 0.0250**	mg/L	1	09/15/2015 10:02	112284
Barium	NELAP	0.0050		**0.159**	mg/L	1	09/15/2015 10:02	112284
Cadmium	NELAP	0.0020		**< 0.0020**	mg/L	1	09/15/2015 10:02	112284
Chromium	NELAP	0.0100		**< 0.0100**	mg/L	1	09/15/2015 10:02	112284
Lead	NELAP	0.0070		**< 0.0070**	mg/L	1	09/15/2015 10:02	112284
Selenium	NELAP	0.0500		**< 0.0500**	mg/L	1	09/15/2015 10:02	112284
Silver	NELAP	0.0100		**< 0.0100**	mg/L	1	09/15/2015 10:02	112284
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	09/11/2015 12:36	112285
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.89		**7.55**	mg/Kg-dry	1	09/15/2015 19:39	112294
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.6		**ND**	µg/Kg-dry	1	09/11/2015 12:22	112295
Ethylbenzene	NELAP	2.8		**ND**	µg/Kg-dry	1	09/11/2015 12:22	112295
Toluene	NELAP	2.8		**ND**	µg/Kg-dry	1	09/11/2015 12:22	112295
Xylenes, Total	NELAP	2.8		**ND**	µg/Kg-dry	1	09/11/2015 12:22	112295
Surr: 1,2-Dichloroethane-d4		72.2-131		**97.5**	%REC	1	09/11/2015 12:22	112295
Surr: 4-Bromofluorobenzene		82.1-116		**89.6**	%REC	1	09/11/2015 12:22	112295
Surr: Dibromofluoromethane		77.7-120		**101.4**	%REC	1	09/11/2015 12:22	112295
Surr: Toluene-d8		86-116		**94.4**	%REC	1	09/11/2015 12:22	112295

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

EPA SW846 3550C, 5035A, ASTM D2974

Batch R209111 **SampType:** LCS Units **%**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	09/10/2015

Batch R209111 **SampType:** LCSQC Units **%**

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	09/10/2015

Batch R209111 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15090385-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**13.4**				13.02	2.88	09/10/2015

Batch R209111 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15090422-007A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**17.0**				17.99	5.48	09/10/2015

Batch R209111 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15090492-010A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**15.0**				15.25	1.45	09/10/2015

Batch R209111 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15090492-014A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**17.3**				17.80	3.08	09/10/2015

Batch R209111 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15090492-020A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**19.6**				18.00	8.41	09/10/2015

STANDARD METHODS 4500-CL E (TOTAL)

Batch 112290 **SampType:** MBLK Units **mg/Kg**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						09/14/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

STANDARD METHODS 4500-CL E (TOTAL)

Batch 112290 **SampType:** MBLK Units **mg/Kg**

SampID: MBLK 150913

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50	J	**17**						09/15/2015

Batch 112290 **SampType:** LCS Units **mg/Kg**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20.00	0	101.2	90	110	09/14/2015

Batch 112290 **SampType:** MS Units **mg/Kg-dry**

SampID: 15090606-001BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	56		**226**	223.1	29.45	88.3	85	115	09/15/2015

Batch 112290 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **15**

SampID: 15090606-001BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	56		**238**	223.1	29.45	93.6	226.5	5.09	09/15/2015

SW-846 1010

Batch R209138 **SampType:** LCS Units **°F**

SampID: LCS-R209138

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ignitability, Closed Cup	60		**81**	81.00	0	100.0	97	103	09/11/2015

Batch R209138 **SampType:** DUP Units **°F** RPD Limit **5**

SampID: LCS-R209138DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Closed Cup	60		**81**				81.00	0.00	09/11/2015

SW-846 9036 (TOTAL)

Batch 112289 **SampType:** MBLK Units **mg/Kg**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						09/14/2015

Batch 112289 **SampType:** MBLK Units **mg/Kg**

SampID: MBLK 150913

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100		**< 100**						09/15/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

SW-846 9036 (TOTAL)

Batch 112289 **SampType:** LCS Units **mg/Kg**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20.00	0	98.4	90	110	09/14/2015

Batch 112289 **SampType:** MS Units **mg/Kg-dry**
SampID: 15090606-001BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	112	S	**155**	111.6	77.64	69.7	85	115	09/15/2015

Batch 112289 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**
SampID: 15090606-001BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	112	S	**157**	111.6	77.64	70.9	155.4	0.86	09/15/2015

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 112284 **SampType:** MBLK Units **mg/L**
SampID: MBLK-112284

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.0250		**< 0.0250**	0.02500	0	0	-100	100	09/15/2015
Barium	0.0500		**< 0.0500**	0.05000	0	0	-100	100	09/15/2015
Cadmium	0.0020		**< 0.0020**	0.00200(	0	0	-100	100	09/15/2015
Chromium	0.0100		**< 0.0100**	0.01000	0	0	-100	100	09/15/2015
Lead	0.0400		**< 0.0400**	0.04000	0	0	-100	100	09/15/2015
Selenium	0.0500		**< 0.0500**	0.05000	0	0	-100	100	09/15/2015
Silver	0.0100		**< 0.0100**	0.01000	0	0	-100	100	09/15/2015

Batch 112284 **SampType:** LCS Units **mg/L**
SampID: LCS-112284

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.0250		**2.28**	2.000	0	114.1	85	115	09/15/2015
Barium	0.0500		**2.04**	2.000	0	102.2	85	115	09/15/2015
Cadmium	0.0020		**0.0510**	0.05000	0	102.0	85	115	09/15/2015
Chromium	0.0100		**0.212**	0.2000	0	105.9	85	115	09/15/2015
Lead	0.0400		**0.520**	0.5000	0	103.9	85	115	09/15/2015
Selenium	0.0500		**2.22**	2.000	0	111.0	85	115	09/15/2015
Silver	0.0100		**0.0530**	0.05000	0	106.0	85	115	09/15/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 112284 **SampType:** MS Units **mg/L**

SampID: 15090606-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.0250		**2.25**	2.000	0	112.5	75	125	09/15/2015
Barium	0.0500		**2.18**	2.000	0.1586	101.2	75	125	09/15/2015
Cadmium	0.0020		**0.0509**	0.05000	0	101.8	75	125	09/15/2015
Chromium	0.0100		**0.211**	0.2000	0	105.5	75	125	09/15/2015
Lead	0.0400		**0.518**	0.5000	0	103.5	75	125	09/15/2015
Selenium	0.0500		**2.22**	2.000	0	110.9	75	125	09/15/2015
Silver	0.0100		**0.0528**	0.05000	0	105.6	75	125	09/15/2015

Batch 112284 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 15090606-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.0250		**2.31**	2.000	0	115.4	2.250	2.54	09/15/2015
Barium	0.0500		**2.24**	2.000	0.1586	104.2	2.182	2.71	09/15/2015
Cadmium	0.0020		**0.0516**	0.05000	0	103.2	0.05090	1.37	09/15/2015
Chromium	0.0100		**0.215**	0.2000	0	107.6	0.2110	1.97	09/15/2015
Lead	0.0400		**0.522**	0.5000	0	104.3	0.5176	0.75	09/15/2015
Selenium	0.0500		**2.26**	2.000	0	113.0	2.218	1.88	09/15/2015
Silver	0.0100		**0.0545**	0.05000	0	109.0	0.05280	3.17	09/15/2015

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 112285 **SampType:** MBLK Units **mg/L**

SampID: MBLK-112285

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	09/11/2015

Batch 112285 **SampType:** LCS Units **mg/L**

SampID: LCS-112285

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00515**	0.00500	0	103.0	85	115	09/11/2015

Batch 112285 **SampType:** MS Units **mg/L**

SampID: 15090606-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00514**	0.00500	0	102.8	75	125	09/11/2015

Batch 112285 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 15090606-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00499**	0.00500	0	99.7	0.005138	3.00	09/11/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

SW-846 3050B, 6010B, METALS BY ICP

Batch 112294 **SampType:** MBLK Units **mg/Kg-dry**

SampID: MBLK-112294

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.000	0	0	-100	100	09/15/2015

Batch 112294 **SampType:** LCS Units **mg/Kg-dry**

SampID: LCS-112294

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**48.2**	50.00	0	96.5	85	115	09/15/2015

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 112295 **SampType:** MBLK Units **µg/Kg**

SampID: MBLK-Y150911A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						09/11/2015
Ethylbenzene	5.0		**ND**						09/11/2015
Toluene	5.0		**ND**						09/11/2015
Xylenes, Total	5.0	J	**1.1**						09/11/2015
Surr: 1,2-Dichloroethane-d4			**44.4**	50.00		88.9	72.2	131	09/11/2015
Surr: 4-Bromofluorobenzene			**45.3**	50.00		90.6	82.1	116	09/11/2015
Surr: Dibromofluoromethane			**48.6**	50.00		97.2	77.7	120	09/11/2015
Surr: Toluene-d8			**47.5**	50.00		95.0	86	116	09/11/2015

Batch 112295 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-Y150911A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**44.8**	50.00	0	89.5	45.93	2.56	09/11/2015
Ethylbenzene	5.0		**47.0**	50.00	0	94.0	45.51	3.18	09/11/2015
Toluene	5.0		**47.5**	50.00	0	94.9	46.08	2.97	09/11/2015
Xylenes, Total	5.0		**142**	150.0	0	94.5	138.3	2.46	09/11/2015
Surr: 1,2-Dichloroethane-d4			**44.0**	50.00		88.1			09/11/2015
Surr: 4-Bromofluorobenzene			**43.8**	50.00		87.6			09/11/2015
Surr: Dibromofluoromethane			**50.3**	50.00		100.7			09/11/2015
Surr: Toluene-d8			**45.6**	50.00		91.2			09/11/2015

Batch 112295 **SampType:** LCS Units **µg/Kg**

SampID: LCS-Y150911A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**45.9**	50.00	0	91.9	80.8	117	09/11/2015
Ethylbenzene	5.0		**45.5**	50.00	0	91.0	84.8	116	09/11/2015
Toluene	5.0		**46.1**	50.00	0	92.2	81.3	113	09/11/2015
Xylenes, Total	5.0		**138**	150.0	0	92.2	85.3	118	09/11/2015
Surr: 1,2-Dichloroethane-d4			**46.0**	50.00		92.0	72.2	131	09/11/2015
Surr: 4-Bromofluorobenzene			**45.7**	50.00		91.5	82.1	116	09/11/2015
Surr: Dibromofluoromethane			**52.3**	50.00		104.5	77.7	120	09/11/2015
Surr: Toluene-d8			**45.2**	50.00		90.4	86	116	09/11/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15090606

Client Project: J019896.05 Hutsonville **Report Date:** 16-Sep-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 112295 **SampType:** LCSGD Units **%REC** RPD Limit **0**

SampID: LCSGD-Y150911A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**45.1**	50.00		90.3			09/11/2015
Surr: 4-Bromofluorobenzene			**46.0**	50.00		92.0			09/11/2015
Surr: Dibromofluoromethane			**50.4**	50.00		100.8			09/11/2015
Surr: Toluene-d8			**48.2**	50.00		96.3			09/11/2015

Batch 112295 **SampType:** LCSG Units **%REC**

SampID: LCSG-Y150911A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**45.3**	50.00		90.6	72.2	131	09/11/2015
Surr: 4-Bromofluorobenzene			**45.1**	50.00		90.3	82.1	116	09/11/2015
Surr: Dibromofluoromethane			**50.1**	50.00		100.2	77.7	120	09/11/2015
Surr: Toluene-d8			**46.6**	50.00		93.1	86	116	09/11/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.05 Hutsonville

Work Order: 15090606
Report Date: 16-Sep-15

Carrier: Tim Mathis

Received By: KF

Completed by: Emily E. Pohlman
On: 10-Sep-15

Reviewed by: Elizabeth A. Hurley
On: 10-Sep-15

Pages to follow: Chain of custody 1 Extra pages included 1

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	7.22
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

15090606

CHAIN OF CUSTODY

pg. 1 of 1 Work Order # 41887

TEKLAB, INC. 5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618) 344-1004 ~ Fax: (618) 344-1005

Client: Geotechnology
Address: 11816 Lackland Road, Suite 150
City / State / Zip: St. Louis, MO 63146
Contact: Jessie Hahn Phone: 573-270-1313
E-Mail: j_hahn@geotechnology.com Fax: 314-997-2067

Samples on: ☒ Ice ☐ Blue Ice ☐ No Ice 7.22 °C
Preserved in: ☐ Lab ☐ Field FOR LAB USE ONLY
Lab Notes:

Comments: Sample obtained by client
See attached sheet for testing Details

- Are these samples known to be involved in litigation? If yes, a surcharge will apply. ☐ Yes ☒ No
- Are these samples known to be hazardous? ☐ Yes ☒ No
- Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in comment section. ☐ Yes ☐ No

Project Name / Number: J019896.05 Hutsonville
Sample Collector's Name: Jessie Hahn

Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other_____ ☐ 3 Day (50% Surcharge)
Billing Instructions:

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO_3	NaOH	H_2SO_4	HCL	MeOH	$NaHSO_4$	Other	Water	Drinking Water	Soil	Sludge	Sp. Waste	RCRA Metals as TCLP	CCW Ions	BTEX	Flash Point									
15090606 W1	Quality Lime Co 1	9/10/15 1300	3							3			X			X	X	X	X									

Courier

Relinquished By	Date / Time	Received By	Date / Time
[signature]	9-10-15 1520	[signature] Kalyn Jeedle	9-10-15 1440 9/10/15 1520

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse side, and that he/she has the authority to sign on behalf of client.

WHITE – LAB YELLOW – SAMPLER'S COPY

Electronic Filing: Received, Clerk's Office 09/28/2020

Table A-1. Material Testing and Frequency

Property/Test Method	Requirement/ Specification	Frequency	Responsibility
PREQUALIFICATION TESTING 3-FT. SOIL/FINAL COVER			
X Atterberg Limits - ASTM D 4318	USCS Soil Classification (Note 1)	One Test per Borrow Source	Contractor
X Grain Size Analysis - ASTM D 422	USCS Soil Classification (Note 1)		
RCRA Metals (as TCLP): SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Silver, Selenium SW 846 7478 - Mercury	Below the Class I Groundwater Standards at Title 35 Illinois Administrative Code [IAC] 620.410(a)		
CCW Ions (as total concentrations): SW 846 6010B – Boron SW 846 M4500-CLE – Chloride SW 846 9036- Sulfate	Below the Class I Groundwater Standards at 35 IAC 620.410(a)		
BETX Constituents: SW 846 8260B - Benzene, Ethylbenzene, Toluene, Xylene	Below the Class I Groundwater Standards at 35 IAC 620.410(c)		
X pH - SW 846 9045C	Within the Class I Groundwater Standard range at 35 IAC 620.410(d)		
Flash Point (Pensky-Martens Closed Cup) - SW 846 1010	Ignitability characteristic as defined in 35 IAC721.121		

Note 1 - Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL-ML, or as approved by the CQA Officer. Satisfactory soil shall further be free of rock or gravel (larger than 0.75 inches in any dimension), debris, waste, frozen materials, vegetation, and other deleterious matter.

To be done by Teklab

A-1, Final Cover

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

September 24, 2015

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville J019896.05 **WorkOrder:** 15091079

Dear Anna Saindon:

TEKLAB, INC received 1 sample on 9/18/2015 3:35:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15091079
Report Date: 24-Sep-15

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	4
Laboratory Results	5
Quality Control Results	6
Receiving Check List	8
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15091079

Client Project: Hutsonville J019896.05 **Report Date:** 24-Sep-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15091079
Report Date: 24-Sep-15

Cooler Receipt Temp: 11.22 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road	3920 Pintail Dr	8421 Nieman Road	5445 Horseshoe Lake Road
	Collinsville, IL 62234-7425	Springfield, IL 62711-9415	Lenexa, KS 66214	Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	9/30/2015	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15091079

Client Project: Hutsonville J019896.05 **Report Date:** 24-Sep-15

Lab ID: 15091079-001 **Client Sample ID:** Quality Lime Co 2

Matrix: SOLID **Collection Date:** 09/18/2015 12:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**11.5**	%	1	09/23/2015 15:16	R209582
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.8		**ND**	µg/Kg-dry	1	09/22/2015 13:45	112572
Ethylbenzene	NELAP	4.1		**ND**	µg/Kg-dry	1	09/22/2015 13:45	112572
Toluene	NELAP	4.1		**ND**	µg/Kg-dry	1	09/22/2015 13:45	112572
Xylenes, Total	NELAP	4.1		**ND**	µg/Kg-dry	1	09/22/2015 13:45	112572
Surr: 1,2-Dichloroethane-d4		72.2-131		**102.6**	%REC	1	09/22/2015 13:45	112572
Surr: 4-Bromofluorobenzene		82.1-116		**89.2**	%REC	1	09/22/2015 13:45	112572
Surr: Dibromofluoromethane		77.7-120		**105.1**	%REC	1	09/22/2015 13:45	112572
Surr: Toluene-d8		86-116		**90.1**	%REC	1	09/22/2015 13:45	112572

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15091079

Client Project: Hutsonville J019896.05 **Report Date:** 24-Sep-15

EPA SW846 3550C, 5035A, ASTM D2974

Batch R209582 **SampType:** LCS Units **%**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	09/23/2015

Batch R209582 **SampType:** LCSQC Units **%**

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	09/23/2015

Batch R209582 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15091166-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**29.3**				29.46	0.54	09/23/2015

Batch R209582 **SampType:** DUP Units **%** RPD Limit **15**

SampID: 15091314-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**26.8**				26.73	0.19	09/23/2015

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 112572 **SampType:** MBLK Units **µg/Kg**

SampID: MBLK-A150922A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						09/22/2015
Ethylbenzene	5.0		**ND**						09/22/2015
Toluene	5.0		**ND**						09/22/2015
Xylenes, Total	5.0		**ND**						09/22/2015
Surr: 1,2-Dichloroethane-d4			**47.9**	50.00		95.8	72.2	131	09/22/2015
Surr: 4-Bromofluorobenzene			**45.3**	50.00		90.7	82.1	116	09/22/2015
Surr: Dibromofluoromethane			**52.3**	50.00		104.7	77.7	120	09/22/2015
Surr: Toluene-d8			**45.5**	50.00		90.9	86	116	09/22/2015

Batch 112572 **SampType:** LCS Units **µg/Kg**

SampID: LCS-A150922A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**51.0**	50.00	0	102.0	80.8	117	09/22/2015
Ethylbenzene	5.0		**44.3**	50.00	0	88.7	84.8	116	09/22/2015
Toluene	5.0		**46.1**	50.00	0	92.2	81.3	113	09/22/2015
Xylenes, Total	5.0		**138**	150.0	0	91.7	85.3	118	09/22/2015
Surr: 1,2-Dichloroethane-d4			**46.1**	50.00		92.2	72.2	131	09/22/2015
Surr: 4-Bromofluorobenzene			**45.3**	50.00		90.5	82.1	116	09/22/2015
Surr: Dibromofluoromethane			**52.4**	50.00		104.7	77.7	120	09/22/2015
Surr: Toluene-d8			**46.1**	50.00		92.3	86	116	09/22/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15091079

Client Project: Hutsonville J019896.05 **Report Date:** 24-Sep-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 112572 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-A150922A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**53.1**	50.00	0	106.2	50.98	4.07	09/22/2015
Ethylbenzene	5.0		**45.8**	50.00	0	91.5	44.34	3.13	09/22/2015
Toluene	5.0		**47.1**	50.00	0	94.1	46.11	2.04	09/22/2015
Xylenes, Total	5.0		**141**	150.0	0	93.8	137.6	2.24	09/22/2015
Surr: 1,2-Dichloroethane-d4			**46.6**	50.00		93.2			09/22/2015
Surr: 4-Bromofluorobenzene			**44.5**	50.00		88.9			09/22/2015
Surr: Dibromofluoromethane			**52.4**	50.00		104.7			09/22/2015
Surr: Toluene-d8			**45.7**	50.00		91.3			09/22/2015

Batch 112572 **SampType:** LCSG Units **%REC**

SampID: LCSG-A150922A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**47.6**	50.00		95.3	72.2	131	09/22/2015
Surr: 4-Bromofluorobenzene			**45.8**	50.00		91.7	82.1	116	09/22/2015
Surr: Dibromofluoromethane			**52.7**	50.00		105.5	77.7	120	09/22/2015
Surr: Toluene-d8			**46.0**	50.00		92.0	86	116	09/22/2015

Batch 112572 **SampType:** LCSGD Units **%REC** RPD Limit **0**

SampID: LCSGD-A150922A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**47.1**	50.00		94.3			09/22/2015
Surr: 4-Bromofluorobenzene			**45.8**	50.00		91.7			09/22/2015
Surr: Dibromofluoromethane			**52.8**	50.00		105.6			09/22/2015
Surr: Toluene-d8			**45.9**	50.00		91.8			09/22/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15091079
Report Date: 24-Sep-15

Carrier: Jessie Hahn

Received By: KF

Completed by: Emily E. Pohlman
On: 18-Sep-15

Reviewed by: Elizabeth A. Hurley
On: 18-Sep-15

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	11.22
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☐	No ☑			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

No unpreserved container was received for moisture correction. Per Anna Saindon, use the percent moisture result from 15090606-001 for moisture correction on this sample. EEP 9/18/15

Electronic Filing: Received, Clerk's Office 09/28/2020

15091079

CHAIN OF CUSTODY

pg. 1 of 1 Work Order # 42009

TEKLAB, INC. 5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618) 344-1004 ~ Fax: (618) 344-1005

Client: Geotechnology
Address: 11816 Lackland Road, Suite 150
City / State / Zip: St. Louis, MO 63146
Contact: Anna Saindon Phone: (314) 997-7440
E-Mail: a_saindon@geotechnology.com Fax: (314) 997-2067

Samples on: ☒ Ice ☐ Blue Ice ☐ No Ice 11.22 °C
Preserved in: ☐ Lab ☐ Field FOR LAB USE ONLY
Lab Notes: Per Anna Saindon, use point from 15091066 ESP 9/18/15
Comments:

- Are these samples known to be involved in litigation? If yes, a surcharge will apply. ☐ Yes ☒ No
- Are these samples known to be hazardous? ☐ Yes ☒ No
- Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in comment section. ☐ Yes ☒ No

Project Name / Number: Hutsonville J019896.05
Sample Collector's Name: Jessie Hahn
Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other_____ ☐ 3 Day (50% Surcharge)
Billing Instructions:

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO_3	NaOH	H_2SO_4	HCL	MeOH	$NaHSO_4$	Other	MATRIX: Water	Drinking Water	Soil	Sludge	Sp. Waste	INDICATE ANALYSIS REQUESTED: BTEX
15091079	QualityLimeCo 2	9/18/2015 1230								3			3			X

Relinquished By	Date / Time	Received By	Date / Time
Jessie Hahn	9/18/15 1535	Kathy Jacobs	9/18/15 1535

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse side, and that he/she has the authority to sign on behalf of client.

WHITE – LAB YELLOW – SAMPLER'S COPY KF 9/18

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

November 16, 2015

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville J019896.05 **WorkOrder:** 15110660

Dear Anna Saindon:

TEKLAB, INC received 1 sample on 11/11/2015 2:39:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15110660
Client Project: Hutsonville J019896.05
Report Date: 16-Nov-15

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	4
Laboratory Results	5
Quality Control Results	6
Receiving Check List	12
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15110660

Client Project: Hutsonville J019896.05 **Report Date:** 16-Nov-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15110660
Report Date: 16-Nov-15

Cooler Receipt Temp: 16.02 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2016	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15110660

Client Project: Hutsonville J019896.05 **Report Date:** 16-Nov-15

Lab ID: 15110660-001 **Client Sample ID:** Bottom Ash Pond Levee

Matrix: SOLID **Collection Date:** 11/11/2015 10:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		**>200**	°F	1	11/12/2015 11:36	R211517
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**19.2**	%	1	11/13/2015 16:49	R211626
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride		61	JSR	**24**	mg/Kg-dry	1	11/12/2015 21:29	114180
MSD and RPD did not recover within control limits. Result verified by reanalysis at dilution.								
SW-846 9036 (TOTAL)								
Sulfate		122	S	**149**	mg/Kg-dry	1	11/12/2015 21:29	114179
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	11/13/2015 8:28	114093
Barium	NELAP	0.0500		**0.458**	mg/L	1	11/12/2015 14:56	114093
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	11/12/2015 14:56	114093
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	11/12/2015 14:56	114093
Lead	NELAP	0.400		**< 0.400**	mg/L	1	11/12/2015 14:56	114093
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	11/13/2015 8:28	114093
Silver	NELAP	0.100		**< 0.100**	mg/L	1	11/12/2015 14:56	114093
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	11/12/2015 12:36	114092
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	2.00		**7.21**	mg/Kg-dry	1	11/12/2015 11:48	114071
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.0		**ND**	µg/Kg-dry	1	11/12/2015 13:38	114099
Ethylbenzene	NELAP	4.9		**ND**	µg/Kg-dry	1	11/12/2015 13:38	114099
Toluene	NELAP	4.9	J	**1.3**	µg/Kg-dry	1	11/12/2015 13:38	114099
Xylenes, Total	NELAP	4.9		**ND**	µg/Kg-dry	1	11/12/2015 13:38	114099
Surr: 1,2-Dichloroethane-d4		72.2-131		**112.5**	%REC	1	11/12/2015 13:38	114099
Surr: 4-Bromofluorobenzene		82.1-116		**107.8**	%REC	1	11/12/2015 13:38	114099
Surr: Dibromofluoromethane		77.7-120		**99.8**	%REC	1	11/12/2015 13:38	114099
Surr: Toluene-d8		86-116		**105.6**	%REC	1	11/12/2015 13:38	114099

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Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 15110660

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ASTM D92

Batch R211517 **SampType:** DUP Units °F RPD Limit 5

SampID: 15110510-005BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**>200**				0	0.00	11/12/2015

EPA SW846 3550C, 5035A, ASTM D2974

Batch R211626 **SampType:** LCS Units %

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	11/13/2015

Batch R211626 **SampType:** LCSQC Units %

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	11/13/2015

Batch R211626 **SampType:** DUP Units % RPD Limit 15

SampID: 15110665-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**17.9**				18.01	0.50	11/13/2015

Batch R211626 **SampType:** DUP Units % RPD Limit 15

SampID: 15110756-004A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**10.7**				11.06	3.03	11/13/2015

Batch R211626 **SampType:** DUP Units % RPD Limit 15

SampID: 15110807-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**19.4**				21.50	10.53	11/13/2015

STANDARD METHODS 4500-CL E (TOTAL)

Batch 114180 **SampType:** MBLK Units mg/Kg

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						11/12/2015

Batch 114180 **SampType:** MBLK Units mg/Kg

SampID: MBLK 151111

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50	J	**17**						11/12/2015

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Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 15110660

Client Project: Hutsonville J019896.05 **Report Date:** 16-Nov-15

STANDARD METHODS 4500-CL E (TOTAL)

Batch 114180 **SampType:** LCS Units **mg/Kg**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**21**	20.00	0	104.2	90	110	11/12/2015

Batch 114180 **SampType:** MS Units **mg/Kg-dry**
SampID: 15110660-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	61		**244**	243.1	23.70	90.8	85	115	11/12/2015

Batch 114180 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **15**
SampID: 15110660-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	61	SR	**326**	243.1	23.70	124.3	244.4	28.56	11/12/2015

SW-846 9036 (TOTAL)

Batch 114179 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						11/12/2015
Sulfate	10		**< 10**						11/13/2015

Batch 114179 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK 151111

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100	J	**51**						11/12/2015

Batch 114179 **SampType:** LCS Units **mg/Kg**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20.00	0	96.6	90	110	11/12/2015
Sulfate	10		**19**	20.00	0	94.6	90	110	11/13/2015

Batch 114179 **SampType:** MS Units **mg/Kg-dry**
SampID: 15110660-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	122	S	**249**	121.5	148.5	82.8	85	115	11/12/2015

Batch 114179 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**
SampID: 15110660-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	122	S	**250**	121.5	148.5	83.4	249.2	0.29	11/12/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 15110660

Client Project: Hutsonville J019896.05 **Report Date:** 16-Nov-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114093 **SampType:** MBLK Units **mg/L**

SampID: MBLK-114093

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	11/12/2015
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	11/12/2015
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	11/12/2015
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	11/12/2015
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	11/12/2015
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	11/12/2015
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	11/12/2015

Batch 114093 **SampType:** LCS Units **mg/L**

SampID: LCS-114093

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**18.1**	20.00	0	90.6	85	115	11/12/2015
Barium	0.500		**18.6**	20.00	0	93.2	85	115	11/12/2015
Cadmium	0.0200		**0.455**	0.5000	0	91.0	85	115	11/12/2015
Chromium	0.100		**1.90**	2.000	0	95.2	85	115	11/12/2015
Lead	0.400		**4.61**	5.000	0	92.1	85	115	11/12/2015
Selenium	0.500		**18.4**	20.00	0	91.8	85	115	11/12/2015
Silver	0.100		**0.455**	0.5000	0	91.0	85	115	11/12/2015

Batch 114093 **SampType:** MS Units **mg/L**

SampID: 15110659-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		**4.57**	5.000	0	91.3	75	125	11/12/2015

Batch 114093 **SampType:** MS Units **mg/L**

SampID: 15110660-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**20.4**	20.00	0	101.9	75	125	11/13/2015
Barium	0.500		**19.3**	20.00	0.4580	94.4	75	125	11/12/2015
Cadmium	0.0200		**0.461**	0.5000	0	92.2	75	125	11/12/2015
Chromium	0.100		**1.94**	2.000	0	96.9	75	125	11/12/2015
Lead	0.400		**4.64**	5.000	0	92.9	75	125	11/12/2015
Selenium	0.500		**20.6**	20.00	0	102.9	75	125	11/13/2015
Silver	0.100		**0.461**	0.5000	0	92.2	75	125	11/12/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 15110660

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SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114093 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 15110660-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**20.2**	20.00	0	101.1	20.38	0.79	11/13/2015
Barium	0.500		**19.3**	20.00	0.4580	94.0	19.34	0.41	11/12/2015
Cadmium	0.0200		**0.462**	0.5000	0	92.4	0.4610	0.22	11/12/2015
Chromium	0.100		**1.94**	2.000	0	96.8	1.938	0.05	11/12/2015
Lead	0.400		**4.64**	5.000	0	92.7	4.644	0.19	11/12/2015
Selenium	0.500		**20.4**	20.00	0	102.0	20.58	0.83	11/13/2015
Silver	0.100		**0.462**	0.5000	0	92.4	0.4610	0.22	11/12/2015

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114092 **SampType:** MBLK Units **mg/L**

SampID: MBLK-114092

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	11/12/2015

Batch 114092 **SampType:** LCS Units **mg/L**

SampID: LCS-114092

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00556**	0.00500	0	111.2	85	115	11/12/2015

Batch 114092 **SampType:** MS Units **mg/L**

SampID: 15110660-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00565**	0.00500	0	113.1	75	125	11/12/2015

Batch 114092 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 15110660-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00571**	0.00500	0	114.2	0.005654	1.02	11/12/2015

SW-846 3050B, 6010B, METALS BY ICP

Batch 114071 **SampType:** MBLK Units **mg/Kg-dry**

SampID: MBLK-114071

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.000	0	0	-100	100	11/12/2015

Batch 114071 **SampType:** LCS Units **mg/Kg-dry**

SampID: LCS-114071

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**46.1**	50.00	0	92.2	85	115	11/12/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 15110660

Client Project: Hutsonville J019896.05 **Report Date:** 16-Nov-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114099 **SampType:** MBLK Units µg/Kg

SampID: MBLK-Y151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		ND						11/12/2015
Ethylbenzene	5.0		ND						11/12/2015
Toluene	5.0		ND						11/12/2015
Xylenes, Total	5.0		ND						11/12/2015
Surr: 1,2-Dichloroethane-d4			49.8	50.00		99.6	72.2	131	11/12/2015
Surr: 4-Bromofluorobenzene			51.9	50.00		103.8	82.1	116	11/12/2015
Surr: Dibromofluoromethane			48.5	50.00		96.9	77.7	120	11/12/2015
Surr: Toluene-d8			52.0	50.00		104.1	86	116	11/12/2015

Batch 114099 **SampType:** LCSD Units µg/Kg RPD Limit 40

SampID: LCSD-Y151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		48.7	50.00	0	97.5	47.87	1.80	11/12/2015
Ethylbenzene	5.0		51.8	50.00	0	103.7	52.49	1.23	11/12/2015
Toluene	5.0		51.1	50.00	0	102.1	51.41	0.68	11/12/2015
Xylenes, Total	5.0		155	150.0	0	103.6	157.5	1.37	11/12/2015
Surr: 1,2-Dichloroethane-d4			49.4	50.00		98.9			11/12/2015
Surr: 4-Bromofluorobenzene			51.9	50.00		103.8			11/12/2015
Surr: Dibromofluoromethane			50.8	50.00		101.6			11/12/2015
Surr: Toluene-d8			51.3	50.00		102.5			11/12/2015

Batch 114099 **SampType:** LCS Units µg/Kg

SampID: LCS-Y151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		47.9	50.00	0	95.7	80.8	117	11/12/2015
Ethylbenzene	5.0		52.5	50.00	0	105.0	84.8	116	11/12/2015
Toluene	5.0		51.4	50.00	0	102.8	81.3	113	11/12/2015
Xylenes, Total	5.0		158	150.0	0	105.0	85.3	118	11/12/2015
Surr: 1,2-Dichloroethane-d4			49.7	50.00		99.4	72.2	131	11/12/2015
Surr: 4-Bromofluorobenzene			51.4	50.00		102.8	82.1	116	11/12/2015
Surr: Dibromofluoromethane			51.3	50.00		102.6	77.7	120	11/12/2015
Surr: Toluene-d8			51.6	50.00		103.3	86	116	11/12/2015

Batch 114100 **SampType:** MBLK Units µg/Kg

SampID: MBLK-F151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		ND						11/12/2015
Ethylbenzene	5.0		ND						11/12/2015
Toluene	5.0		ND						11/12/2015
Xylenes, Total	5.0		ND						11/12/2015
Surr: 1,2-Dichloroethane-d4			46.9	50.00		93.8	72.2	131	11/12/2015
Surr: 4-Bromofluorobenzene			52.3	50.00		104.6	82.1	116	11/12/2015
Surr: Dibromofluoromethane			47.9	50.00		95.8	77.7	120	11/12/2015
Surr: Toluene-d8			54.1	50.00		108.1	86	116	11/12/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15110660

Client Project: Hutsonville J019896.05 **Report Date:** 16-Nov-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114100 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-F151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**48.2**	50.00	0	96.3	47.85	0.62	11/12/2015
Ethylbenzene	5.0		**53.7**	50.00	0	107.4	53.30	0.75	11/12/2015
Toluene	5.0		**52.7**	50.00	0	105.4	45.70	14.23	11/12/2015
Xylenes, Total	5.0		**164**	150.0	0	109.3	166.1	1.29	11/12/2015
Surr: 1,2-Dichloroethane-d4			**48.2**	50.00		96.3			11/12/2015
Surr: 4-Bromofluorobenzene			**49.9**	50.00		99.9			11/12/2015
Surr: Dibromofluoromethane			**49.2**	50.00		98.5			11/12/2015
Surr: Toluene-d8			**52.8**	50.00		105.5			11/12/2015

Batch 114100 **SampType:** LCS Units **µg/Kg**

SampID: LCS-F151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**47.8**	50.00	0	95.7	80.8	117	11/12/2015
Ethylbenzene	5.0		**53.3**	50.00	0	106.6	84.8	116	11/12/2015
Toluene	5.0		**45.7**	50.00	0	91.4	81.3	113	11/12/2015
Xylenes, Total	5.0		**166**	150.0	0	110.8	85.3	118	11/12/2015
Surr: 1,2-Dichloroethane-d4			**48.2**	50.00		96.4	72.2	131	11/12/2015
Surr: 4-Bromofluorobenzene			**49.0**	50.00		98.0	82.1	116	11/12/2015
Surr: Dibromofluoromethane			**49.3**	50.00		98.7	77.7	120	11/12/2015
Surr: Toluene-d8			**46.2**	50.00		92.4	86	116	11/12/2015

Batch 114100 **SampType:** LCSGD Units **%REC** RPD Limit **0**

SampID: LCSGD-F151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**47.0**	50.00		93.9			11/12/2015
Surr: 4-Bromofluorobenzene			**51.6**	50.00		103.2			11/12/2015
Surr: Dibromofluoromethane			**47.0**	50.00		93.9			11/12/2015
Surr: Toluene-d8			**54.7**	50.00		109.3			11/12/2015

Batch 114100 **SampType:** LCSG Units **%REC**

SampID: LCSG-F151112A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**47.6**	50.00		95.1	72.2	131	11/12/2015
Surr: 4-Bromofluorobenzene			**49.3**	50.00		98.5	82.1	116	11/12/2015
Surr: Dibromofluoromethane			**47.4**	50.00		94.7	77.7	120	11/12/2015
Surr: Toluene-d8			**47.3**	50.00		94.5	86	116	11/12/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15110660
Report Date: 16-Nov-15

Carrier: Employee

Completed by: Emily E. Pohlman
On: 11-Nov-15

Received By: SAH

Reviewed by: Elizabeth A. Hurley
On: 11-Nov-15

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	16.02
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

Electronic Filing: Received, Clerk's Office 09/28/2020

CHAIN OF CUSTODY

pg. ____ of ____ Work order # 15110660

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client:	Geotechnology, Inc.		
Address:	11816 Lackland Road		
City / State / Zip	St. Louis, MO 63146		
Contact:	Anna Saindon	**Phone:**	(314) 997-7440
E-Mail:	a_saindon@geotechnology.com	**Fax:**	(314) 997-2067

Samples on: [X] ICE [ ] BLUE ICE [ ] NO ICE 16.02 °C

Preserved in: [ ] LAB [ ] FIELD

FOR LAB USE ONLY

Lab Notes

Client Comments:

Are these samples known to be involved in litigation? If yes, a surcharge will apply [ ] Yes [X] No

Are these samples known to be hazardous? [ ] Yes [X] No

Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. [ ] Yes [X] No

Project Name/Number: Hutsonville J019896.05

Sample Collector's Name: Jessie Hahn

Results Requested: [ ] Standard [ ] 1-2 Day (100% Surcharge) [ ] Other ____ [X] 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	MATRIX: Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	% Moisture	Boron	BTEX	Chloride	Flash Point	Sulfate	TCLP 8 RCRA
15110660 -01	Bo Hom Ash Pond Leve	11/11/15 10:45	2				1										X	X	X	X	X	X	X

3 DAY

Relinquished By	Date/Time	Received By	Date/Time
[signature]	11/11/15 2:39	[signature]	11/11/15 1439

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 27213

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

December 03, 2015

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville J019896.06 **WorkOrder:** 15111371

Dear Anna Saindon:

TEKLAB, INC received 1 sample on 11/24/2015 9:48:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.06

Work Order: 15111371
Report Date: 03-Dec-15

This reporting package includes the following:

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Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.06

Work Order: 15111371
Report Date: 03-Dec-15

Cooler Receipt Temp: 4.62 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2016	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

Lab ID: 15111371-001 **Client Sample ID:** QLTS-1

Matrix: SOLID **Collection Date:** 11/23/2015 15:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		**>200**	°F	1	11/24/2015 14:18	R211997
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**20.0**	%	1	12/01/2015 19:21	R212169
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride	NELAP	63	J	**26**	mg/Kg-dry	1	12/02/2015 15:42	114537
SW-846 9036 (TOTAL)								
Sulfate	NELAP	126	J	**76**	mg/Kg-dry	1	12/01/2015 17:37	114538
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	11/30/2015 14:12	114455
Barium	NELAP	0.0500		**0.216**	mg/L	1	11/30/2015 14:12	114455
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	11/30/2015 14:12	114455
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 14:12	114455
Lead	NELAP	0.400		**< 0.400**	mg/L	1	11/30/2015 14:12	114455
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	11/30/2015 14:12	114455
Silver	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 14:12	114455
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	11/30/2015 13:59	114452
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.89		**4.19**	mg/Kg-dry	1	11/26/2015 1:14	114435
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.1		**ND**	µg/Kg-dry	1	11/24/2015 16:57	114424
Ethylbenzene	NELAP	5.5		**ND**	µg/Kg-dry	1	11/24/2015 16:57	114424
Toluene	NELAP	5.5		**ND**	µg/Kg-dry	1	11/24/2015 16:57	114424
Xylenes, Total	NELAP	5.5		**ND**	µg/Kg-dry	1	11/24/2015 16:57	114424
Surr: 1,2-Dichloroethane-d4		72.2-131		**116.3**	%REC	1	11/24/2015 16:57	114424
Surr: 4-Bromofluorobenzene		82.1-116		**104.2**	%REC	1	11/24/2015 16:57	114424
Surr: Dibromofluoromethane		77.7-120		**103.2**	%REC	1	11/24/2015 16:57	114424
Surr: Toluene-d8		86-116		**102.6**	%REC	1	11/24/2015 16:57	114424

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

ASTM D92

Batch R211997 **SampType:** DUP Units °F RPD Limit 5

SampID: 15111370-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**194**				192.0	1.04	11/24/2015

Batch R211997 **SampType:** DUP Units °F RPD Limit 5

SampID: 15111370-002ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**196**				196.0	0.00	11/24/2015

Batch R211997 **SampType:** DUP Units °F RPD Limit 5

SampID: 15111370-003ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**196**				190.0	3.11	11/24/2015

EPA SW846 3550C, 5035A, ASTM D2974

Batch R212169 **SampType:** LCS Units %

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	12/01/2015

Batch R212169 **SampType:** LCSQC Units %

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.1**	99.00	0	100.1	90	110	12/01/2015

STANDARD METHODS 4500-CL E (TOTAL)

Batch 114537 **SampType:** MBLK Units mg/Kg

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**3**						12/02/2015

Batch 114537 **SampType:** MBLK Units mg/Kg

SampID: MBLK 151130

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50	J	**20**						12/01/2015

Batch 114537 **SampType:** LCS Units mg/Kg

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20.00	0	100.8	90	110	12/02/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

STANDARD METHODS 4500-CL E (TOTAL)

Batch 114537 **SampType:** MS Units **mg/Kg-dry**

SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	58		**246**	230.2	28.20	94.5	85	115	12/02/2015

Batch 114537 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **15**

SampID: 15111370-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	58		**246**	230.2	28.20	94.5	245.8	0.05	12/02/2015

SW-846 9036 (TOTAL)

Batch 114538 **SampType:** MBLK Units **mg/Kg**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						12/01/2015

Batch 114538 **SampType:** MBLK Units **mg/Kg**

SampID: MBLK 151130

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100		**< 100**						12/01/2015

Batch 114538 **SampType:** LCS Units **mg/Kg**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20.00	0	101.5	90	110	12/01/2015

Batch 114538 **SampType:** MS Units **mg/Kg-dry**

SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	115	S	**151**	115.1	77.82	64.0	85	115	12/01/2015

Batch 114538 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**

SampID: 15111370-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	115	S	**148**	115.1	77.82	61.3	151.5	2.07	12/01/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114455 **SampType:** MBLK Units **mg/L**

SampID: MBLK-114455

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	11/30/2015
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	11/30/2015
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	11/30/2015
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	11/30/2015
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	11/30/2015
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	11/30/2015
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	11/30/2015

Batch 114455 **SampType:** LCS Units **mg/L**

SampID: LCS-114455

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.00	0	96.2	85	115	11/30/2015
Barium	0.500		**19.7**	20.00	0	98.3	85	115	11/30/2015
Cadmium	0.0200		**0.472**	0.5000	0	94.4	85	115	11/30/2015
Chromium	0.100		**2.04**	2.000	0	102.0	85	115	11/30/2015
Lead	0.400		**4.84**	5.000	0	96.9	85	115	11/30/2015
Selenium	0.500		**19.2**	20.00	0	95.8	85	115	11/30/2015
Silver	0.100		**0.488**	0.5000	0	97.6	85	115	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111370-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.5**	20.00	0	97.6	75	125	11/30/2015
Barium	0.500		**19.7**	20.00	0.1040	98.0	75	125	11/30/2015
Cadmium	0.0200		**0.478**	0.5000	0	95.6	75	125	11/30/2015
Chromium	0.100		**2.05**	2.000	0	102.6	75	125	11/30/2015
Lead	0.400		**4.95**	5.000	0	99.0	75	125	11/30/2015
Selenium	0.500		**19.4**	20.00	0	97.3	75	125	11/30/2015
Silver	0.100		**0.493**	0.5000	0	98.6	75	125	11/30/2015

Batch 114455 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 15111370-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**19.6**	20.00	0	98.0	19.51	0.41	11/30/2015
Barium	0.500		**20.1**	20.00	0.1040	99.8	19.71	1.81	11/30/2015
Cadmium	0.0200		**0.478**	0.5000	0	95.6	0.4780	0.00	11/30/2015
Chromium	0.100		**2.05**	2.000	0	102.5	2.053	0.15	11/30/2015
Lead	0.400		**4.94**	5.000	0	98.9	4.952	0.16	11/30/2015
Selenium	0.500		**19.5**	20.00	0	97.4	19.45	0.21	11/30/2015
Silver	0.100		**0.487**	0.5000	0	97.4	0.4930	1.22	11/30/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.4**	20.00	0	97.3	75	125	11/30/2015
Barium	0.500		**19.9**	20.00	0.1550	98.6	75	125	11/30/2015
Cadmium	0.0200		**0.480**	0.5000	0	96.0	75	125	11/30/2015
Chromium	0.100		**2.06**	2.000	0	103.0	75	125	11/30/2015
Lead	0.400		**4.91**	5.000	0	98.2	75	125	11/30/2015
Selenium	0.500		**19.4**	20.00	0	97.0	75	125	11/30/2015
Silver	0.100		**0.487**	0.5000	0	97.4	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111371-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.3**	20.00	0	96.6	75	125	11/30/2015
Barium	0.500		**19.6**	20.00	0.2160	96.9	75	125	11/30/2015
Cadmium	0.0200		**0.477**	0.5000	0	95.4	75	125	11/30/2015
Chromium	0.100		**2.06**	2.000	0	103.0	75	125	11/30/2015
Lead	0.400		**4.90**	5.000	0	98.1	75	125	11/30/2015
Selenium	0.500		**19.3**	20.00	0	96.6	75	125	11/30/2015
Silver	0.100		**0.488**	0.5000	0	97.6	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111394-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.00	0	96.0	75	125	11/30/2015
Barium	0.500		**20.6**	20.00	0.6920	99.3	75	125	11/30/2015
Cadmium	0.0200		**0.474**	0.5000	0	94.8	75	125	11/30/2015
Chromium	0.100		**2.04**	2.000	0	102.2	75	125	11/30/2015
Lead	0.400		**4.84**	5.000	0	96.9	75	125	11/30/2015
Selenium	0.500		**19.3**	20.00	0	96.5	75	125	11/30/2015
Silver	0.100		**0.480**	0.5000	0	96.0	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111445-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**20.0**	20.00	0	100.2	75	125	11/30/2015
Barium	0.500		**20.4**	20.00	0.07300	101.8	75	125	11/30/2015
Cadmium	0.0200		**0.491**	0.5000	0.005000	97.2	75	125	11/30/2015
Chromium	0.100		**2.10**	2.000	0	105.1	75	125	11/30/2015
Lead	0.400		**5.70**	5.000	0.6820	100.4	75	125	11/30/2015
Selenium	0.500		**19.7**	20.00	0	98.7	75	125	11/30/2015
Silver	0.100		**0.499**	0.5000	0	99.8	75	125	11/30/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114455 **SampType:** MS Units **mg/L**
SampID: 15111447-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.7**	20.00	0	98.6	75	125	11/30/2015
Barium	0.500		**20.4**	20.00	0.2260	101.0	75	125	11/30/2015
Cadmium	0.0200		**0.484**	0.5000	0	96.8	75	125	11/30/2015
Chromium	0.100		**2.08**	2.000	0	104.2	75	125	11/30/2015
Lead	0.400		**4.99**	5.000	0	99.8	75	125	11/30/2015
Selenium	0.500		**19.6**	20.00	0	97.8	75	125	11/30/2015
Silver	0.100		**0.496**	0.5000	0	99.2	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**
SampID: 15111464-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.5**	20.00	0	97.6	75	125	11/30/2015
Barium	0.500		**20.2**	20.00	0.2880	99.6	75	125	11/30/2015
Cadmium	0.0200		**0.478**	0.5000	0	95.6	75	125	11/30/2015
Chromium	0.100		**2.04**	2.000	0	102.2	75	125	11/30/2015
Lead	0.400		**4.91**	5.000	0	98.3	75	125	11/30/2015
Selenium	0.500		**19.5**	20.00	0	97.4	75	125	11/30/2015
Silver	0.100		**0.485**	0.5000	0	97.0	75	125	11/30/2015

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114452 **SampType:** MBLK Units **mg/L**
SampID: MBLK-114452

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	11/30/2015

Batch 114452 **SampType:** LCS Units **mg/L**
SampID: LCS-114452

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00482**	0.00500	0	96.4	85	115	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111370-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00475**	0.00500	0	95.0	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00472**	0.00500	0	94.5	75	125	11/30/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111371-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00462**	0.00500	0	92.3	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111394-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00459**	0.00500	0	91.8	75	125	11/30/2015

Batch 114452 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15111394-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00467**	0.00500	0	93.3	0.004590	1.67	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111445-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00540**	0.00500	0.0005590	96.7	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111447-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00460**	0.00500	0	92.0	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111464-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00468**	0.00500	0	93.5	75	125	11/30/2015

SW-846 3050B, 6010B, METALS BY ICP

Batch 114435 **SampType:** MBLK Units **mg/Kg-dry**
SampID: MBLK-114435

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.000	0	0	-100	100	11/25/2015

Batch 114435 **SampType:** LCS Units **mg/Kg-dry**
SampID: LCS-114435

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**49.4**	50.00	0	98.8	85	115	11/25/2015

Quality Control Results

Teklab, Inc. Environmental Laboratory
http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111371

Client Project: Hutsonville J019896.06 **Report Date:** 03-Dec-15

SW-846 3050B, 6010B, METALS BY ICP

Batch 114435 **SampType:** MS Units **mg/Kg-dry**

SampID: 15111371-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	1.89		**41.5**	47.17	4.189	79.2	75	125	11/26/2015

Batch 114435 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **20**

SampID: 15111371-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	1.89		**42.0**	47.17	4.189	80.1	41.54	1.06	11/26/2015

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114424 **SampType:** MBLK Units **µg/Kg**

SampID: MBLK-Y151124A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						11/24/2015
Ethylbenzene	5.0		**ND**						11/24/2015
Toluene	5.0		**ND**						11/24/2015
Xylenes, Total	5.0		**ND**						11/24/2015
Surr: 1,2-Dichloroethane-d4			**52.7**	50.00		105.4	72.2	131	11/24/2015
Surr: 4-Bromofluorobenzene			**50.3**	50.00		100.7	82.1	116	11/24/2015
Surr: Dibromofluoromethane			**50.3**	50.00		100.5	77.7	120	11/24/2015
Surr: Toluene-d8			**50.1**	50.00		100.2	86	116	11/24/2015

Batch 114424 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-Y151124A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**50.1**	50.00	0	100.3	50.23	0.20	11/24/2015
Ethylbenzene	5.0		**51.1**	50.00	0	102.1	50.69	0.73	11/24/2015
Toluene	5.0		**49.8**	50.00	0	99.6	49.36	0.93	11/24/2015
Xylenes, Total	5.0		**154**	150.0	0	102.3	150.3	2.11	11/24/2015
Surr: 1,2-Dichloroethane-d4			**49.8**	50.00		99.7			11/24/2015
Surr: 4-Bromofluorobenzene			**50.2**	50.00		100.4			11/24/2015
Surr: Dibromofluoromethane			**50.6**	50.00		101.2			11/24/2015
Surr: Toluene-d8			**50.4**	50.00		100.8			11/24/2015

Batch 114424 **SampType:** LCS Units **µg/Kg**

SampID: LCS-Y151124A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**50.2**	50.00	0	100.5	80.8	117	11/24/2015
Ethylbenzene	5.0		**50.7**	50.00	0	101.4	84.8	116	11/24/2015
Toluene	5.0		**49.4**	50.00	0	98.7	81.3	113	11/24/2015
Xylenes, Total	5.0		**150**	150.0	0	100.2	85.3	118	11/24/2015
Surr: 1,2-Dichloroethane-d4			**50.4**	50.00		100.8	72.2	131	11/24/2015
Surr: 4-Bromofluorobenzene			**50.0**	50.00		100.0	82.1	116	11/24/2015
Surr: Dibromofluoromethane			**51.6**	50.00		103.1	77.7	120	11/24/2015
Surr: Toluene-d8			**50.1**	50.00		100.2	86	116	11/24/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15111371
Client Project: Hutsonville J019896.06
Report Date: 03-Dec-15

Carrier: UPS
Received By: EEP

Completed by: M. Kaminski
On: 24-Nov-15
Mary Anne Kaminski

Reviewed by: Shelly A Hennessy
On: 24-Nov-15
Shelly A. Hennessy

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	4.62
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

15111371

CHAIN OF CUSTODY

pg. 1 of 1 Work order # P.O. 42370

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client:	Geotechnology, Inc.		
Address:	11816 Lackland Road		
City / State / Zip	St. Louis, MO 63146		
Contact:	Anna Saindon	**Phone:**	(314) 997-7440
E-Mail:	a_saindon@geotechnology.com	**Fax:**	(314) 997-2067

Samples on: ☑ ICE ☐ BLUE ICE ☐ NO ICE 4.02 °C

Preserved in: ☐ LAB ☐ FIELD

FOR LAB USE ONLY

Lab Notes

Client Comments:

re these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☒ No

re these samples known to be hazardous? ☐ Yes ☒ No

re there any required reporting limits to be met on the requested analysis?. If yes, please provide nits in the comment section. ☐ Yes ☒ No

Project Name/Number

Hutsonville ~~J0190896.05~~ J019896.06

Sample Collector's Name

Jessie Hahn

Results Requested

☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	MATRIX: Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	INDICATE ANALYSIS REQUESTED: % Moisture	Boron	BTEX	Chloride	Flash Point	Sulfate	TCLP 8 RCRA
15111371 001	QLTS - 1	11/23/15 1545	2					1	2				5				1	1	1	1	1	1	1

Relinquished By	Date/Time	Received By	Date/Time
Jessie Hahn	11/23/15 1700	UPS	11/24/15 948

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 28267

11/24/15

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

December 03, 2015

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville J019896.05 **WorkOrder:** 15111370

Dear Anna Saindon:

TEKLAB, INC received 3 samples on 11/24/2015 9:48:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15111370
Client Project: Hutsonville J019896.05
Report Date: 03-Dec-15

This reporting package includes the following:

Cover Letter	1
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Case Narrative	4
Laboratory Results	5
Quality Control Results	8
Receiving Check List	16
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15111370
Report Date: 03-Dec-15

Cooler Receipt Temp: 1.62 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2016	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

Lab ID: 15111370-001 **Client Sample ID:** BF-4

Matrix: SOLID **Collection Date:** 11/23/2015 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		**192**	°F	1	11/24/2015 12:49	R211997
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**12.9**	%	1	12/01/2015 19:20	R212169
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride	NELAP	57	J	**17**	mg/Kg-dry	1	12/01/2015 16:43	114537
SW-846 9036 (TOTAL)								
Sulfate	NELAP	115	J	**63**	mg/Kg-dry	1	12/01/2015 16:43	114538
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	11/30/2015 13:35	114455
Barium	NELAP	0.0500		**0.104**	mg/L	1	11/30/2015 13:35	114455
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	11/30/2015 13:35	114455
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 13:35	114455
Lead	NELAP	0.400		**< 0.400**	mg/L	1	11/30/2015 13:35	114455
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	11/30/2015 13:35	114455
Silver	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 13:35	114455
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	11/30/2015 13:48	114452
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.92		**5.62**	mg/Kg-dry	1	11/26/2015 0:56	114435
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.8		**ND**	µg/Kg-dry	1	11/24/2015 15:37	114424
Ethylbenzene	NELAP	4.1		**ND**	µg/Kg-dry	1	11/24/2015 15:37	114424
Toluene	NELAP	4.1		**ND**	µg/Kg-dry	1	11/24/2015 15:37	114424
Xylenes, Total	NELAP	4.1		**ND**	µg/Kg-dry	1	11/24/2015 15:37	114424
Surr: 1,2-Dichloroethane-d4		72.2-131		**111.7**	%REC	1	11/24/2015 15:37	114424
Surr: 4-Bromofluorobenzene		82.1-116		**107.0**	%REC	1	11/24/2015 15:37	114424
Surr: Dibromofluoromethane		77.7-120		**101.9**	%REC	1	11/24/2015 15:37	114424
Surr: Toluene-d8		86-116		**101.8**	%REC	1	11/24/2015 15:37	114424

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

Lab ID: 15111370-002 **Client Sample ID:** BF-9

Matrix: SOLID **Collection Date:** 11/23/2015 11:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		**196**	°F	1	11/24/2015 13:18	R211997
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**13.6**	%	1	12/01/2015 19:20	R212169
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride	NELAP	58	J	**28**	mg/Kg-dry	1	12/02/2015 15:13	114537
SW-846 9036 (TOTAL)								
Sulfate	NELAP	115	JS	**78**	mg/Kg-dry	1	12/01/2015 17:07	114538
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	11/30/2015 13:54	114455
Barium	NELAP	0.0500		**0.155**	mg/L	1	11/30/2015 13:54	114455
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	11/30/2015 13:54	114455
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 13:54	114455
Lead	NELAP	0.400		**< 0.400**	mg/L	1	11/30/2015 13:54	114455
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	11/30/2015 13:54	114455
Silver	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 13:54	114455
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	11/30/2015 13:52	114452
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.85		**4.09**	mg/Kg-dry	1	11/26/2015 1:02	114435
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.9		**ND**	µg/Kg-dry	1	11/24/2015 16:04	114424
Ethylbenzene	NELAP	4.3		**ND**	µg/Kg-dry	1	11/24/2015 16:04	114424
Toluene	NELAP	4.3		**ND**	µg/Kg-dry	1	11/24/2015 16:04	114424
Xylenes, Total	NELAP	4.3		**ND**	µg/Kg-dry	1	11/24/2015 16:04	114424
Surr: 1,2-Dichloroethane-d4		72.2-131		**113.3**	%REC	1	11/24/2015 16:04	114424
Surr: 4-Bromofluorobenzene		82.1-116		**100.8**	%REC	1	11/24/2015 16:04	114424
Surr: Dibromofluoromethane		77.7-120		**101.7**	%REC	1	11/24/2015 16:04	114424
Surr: Toluene-d8		86-116		**100.2**	%REC	1	11/24/2015 16:04	114424

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

Lab ID: 15111370-003 **Client Sample ID:** BAPL-2

Matrix: SOLID **Collection Date:** 11/23/2015 12:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		**190**	°F	1	11/24/2015 13:48	R211997
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**19.4**	%	1	12/01/2015 19:21	R212169
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride	NELAP	62	J	**23**	mg/Kg-dry	1	12/02/2015 15:40	114537
SW-846 9036 (TOTAL)								
Sulfate	NELAP	124	J	**92**	mg/Kg-dry	1	12/01/2015 17:29	114538
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	11/30/2015 14:06	114455
Barium	NELAP	0.0500		**0.415**	mg/L	1	11/30/2015 14:06	114455
Boron	NELAP	0.200		**0.280**	mg/L	1	11/30/2015 14:06	114455
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	11/30/2015 14:06	114455
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 14:06	114455
Lead	NELAP	0.400		**< 0.400**	mg/L	1	11/30/2015 14:06	114455
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	11/30/2015 14:06	114455
Silver	NELAP	0.100		**< 0.100**	mg/L	1	11/30/2015 14:06	114455
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	11/30/2015 13:57	114452
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	2.00		**11.3**	mg/Kg-dry	1	11/26/2015 1:08	114435
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.0		**1.2**	µg/Kg-dry	1	11/24/2015 16:30	114424
Ethylbenzene	NELAP	4.8		**ND**	µg/Kg-dry	1	11/24/2015 16:30	114424
Toluene	NELAP	4.8	J	**2.3**	µg/Kg-dry	1	11/24/2015 16:30	114424
Xylenes, Total	NELAP	4.8	J	**1.1**	µg/Kg-dry	1	11/24/2015 16:30	114424
Surr: 1,2-Dichloroethane-d4		72.2-131		**102.4**	%REC	1	11/24/2015 16:30	114424
Surr: 4-Bromofluorobenzene		82.1-116		**110.6**	%REC	1	11/24/2015 16:30	114424
Surr: Dibromofluoromethane		77.7-120		**89.7**	%REC	1	11/24/2015 16:30	114424
Surr: Toluene-d8		86-116		**105.8**	%REC	1	11/24/2015 16:30	114424

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

ASTM D92

Batch R211997 **SampType:** DUP Units °F RPD Limit 5

SampID: 15111370-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**194**				192.0	1.04	11/24/2015

Batch R211997 **SampType:** DUP Units °F RPD Limit 5

SampID: 15111370-002ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**196**				196.0	0.00	11/24/2015

Batch R211997 **SampType:** DUP Units °F RPD Limit 5

SampID: 15111370-003ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		**196**				190.0	3.11	11/24/2015

EPA SW846 3550C, 5035A, ASTM D2974

Batch R212169 **SampType:** LCS Units %

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	12/01/2015

Batch R212169 **SampType:** LCSQC Units %

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.1**	99.00	0	100.1	90	110	12/01/2015

STANDARD METHODS 4500-CL E (TOTAL)

Batch 114537 **SampType:** MBLK Units mg/Kg

SampID: MBLK 151130

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50	J	**20**						12/01/2015

Batch 114537 **SampType:** MS Units mg/Kg-dry

SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	58		**246**	230.2	28.20	94.5	85	115	12/02/2015

Batch 114537 **SampType:** MSD Units mg/Kg-dry RPD Limit 15

SampID: 15111370-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	58		**246**	230.2	28.20	94.5	245.8	0.05	12/02/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

STANDARD METHODS 4500-CL E (TOTAL)

Batch R212264 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**3**						12/02/2015

Batch R212264 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**3**						12/02/2015

Batch R212264 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20.00	0	100.8	90	110	12/02/2015

Batch R212264 **SampType:** LCS Units **mg/Kg**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20.00	0	100.8	90	110	12/02/2015

Batch R212264 **SampType:** MS Units **mg/L**
SampID: 15120074-002BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**37**	20.00	17.05	102.0	85	115	12/02/2015

Batch R212264 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15120074-002BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5		**37**	20.00	17.05	98.8	37.45	1.70	12/02/2015

SW-846 9036 (TOTAL)

Batch 114538 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						12/01/2015

Batch 114538 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK 151130

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100		**< 100**						12/01/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

SW-846 9036 (TOTAL)

Batch 114538 **SampType:** LCS Units **mg/Kg**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20.00	0	101.5	90	110	12/01/2015

Batch 114538 **SampType:** MS Units **mg/Kg-dry**

SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	115	S	**151**	115.1	77.82	64.0	85	115	12/01/2015

Batch 114538 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**

SampID: 15111370-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	115	S	**148**	115.1	77.82	61.3	151.5	2.07	12/01/2015

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114455 **SampType:** MBLK Units **mg/L**

SampID: MBLK-114455

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	11/30/2015
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	11/30/2015
Boron	0.200		**< 0.200**	0.2000	0	0	-100	100	11/30/2015
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	11/30/2015
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	11/30/2015
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	11/30/2015
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	11/30/2015
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	11/30/2015

Batch 114455 **SampType:** LCS Units **mg/L**

SampID: LCS-114455

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.00	0	96.2	85	115	11/30/2015
Barium	0.500		**19.7**	20.00	0	98.3	85	115	11/30/2015
Boron	0.200		**4.91**	5.000	0	98.1	85	115	11/30/2015
Cadmium	0.0200		**0.472**	0.5000	0	94.4	85	115	11/30/2015
Chromium	0.100		**2.04**	2.000	0	102.0	85	115	11/30/2015
Lead	0.400		**4.84**	5.000	0	96.9	85	115	11/30/2015
Selenium	0.500		**19.2**	20.00	0	95.8	85	115	11/30/2015
Silver	0.100		**0.488**	0.5000	0	97.6	85	115	11/30/2015

Quality Control Results

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111370-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.5**	20.00	0	97.6	75	125	11/30/2015
Barium	0.500		**19.7**	20.00	0.1040	98.0	75	125	11/30/2015
Cadmium	0.0200		**0.478**	0.5000	0	95.6	75	125	11/30/2015
Chromium	0.100		**2.05**	2.000	0	102.6	75	125	11/30/2015
Lead	0.400		**4.95**	5.000	0	99.0	75	125	11/30/2015
Selenium	0.500		**19.4**	20.00	0	97.3	75	125	11/30/2015
Silver	0.100		**0.493**	0.5000	0	98.6	75	125	11/30/2015

Batch 114455 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 15111370-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**19.6**	20.00	0	98.0	19.51	0.41	11/30/2015
Barium	0.500		**20.1**	20.00	0.1040	99.8	19.71	1.81	11/30/2015
Cadmium	0.0200		**0.478**	0.5000	0	95.6	0.4780	0.00	11/30/2015
Chromium	0.100		**2.05**	2.000	0	102.5	2.053	0.15	11/30/2015
Lead	0.400		**4.94**	5.000	0	98.9	4.952	0.16	11/30/2015
Selenium	0.500		**19.5**	20.00	0	97.4	19.45	0.21	11/30/2015
Silver	0.100		**0.487**	0.5000	0	97.4	0.4930	1.22	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.4**	20.00	0	97.3	75	125	11/30/2015
Barium	0.500		**19.9**	20.00	0.1550	98.6	75	125	11/30/2015
Cadmium	0.0200		**0.480**	0.5000	0	96.0	75	125	11/30/2015
Chromium	0.100		**2.06**	2.000	0	103.0	75	125	11/30/2015
Lead	0.400		**4.91**	5.000	0	98.2	75	125	11/30/2015
Selenium	0.500		**19.4**	20.00	0	97.0	75	125	11/30/2015
Silver	0.100		**0.487**	0.5000	0	97.4	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**

SampID: 15111371-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.3**	20.00	0	96.6	75	125	11/30/2015
Barium	0.500		**19.6**	20.00	0.2160	96.9	75	125	11/30/2015
Cadmium	0.0200		**0.477**	0.5000	0	95.4	75	125	11/30/2015
Chromium	0.100		**2.06**	2.000	0	103.0	75	125	11/30/2015
Lead	0.400		**4.90**	5.000	0	98.1	75	125	11/30/2015
Selenium	0.500		**19.3**	20.00	0	96.6	75	125	11/30/2015
Silver	0.100		**0.488**	0.5000	0	97.6	75	125	11/30/2015

Quality Control Results

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114455 **SampType:** MS Units **mg/L**
SampID: 15111394-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.00	0	96.0	75	125	11/30/2015
Barium	0.500		**20.6**	20.00	0.6920	99.3	75	125	11/30/2015
Cadmium	0.0200		**0.474**	0.5000	0	94.8	75	125	11/30/2015
Chromium	0.100		**2.04**	2.000	0	102.2	75	125	11/30/2015
Lead	0.400		**4.84**	5.000	0	96.9	75	125	11/30/2015
Selenium	0.500		**19.3**	20.00	0	96.5	75	125	11/30/2015
Silver	0.100		**0.480**	0.5000	0	96.0	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**
SampID: 15111445-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**20.0**	20.00	0	100.2	75	125	11/30/2015
Barium	0.500		**20.4**	20.00	0.07300	101.8	75	125	11/30/2015
Cadmium	0.0200		**0.491**	0.5000	0.005000	97.2	75	125	11/30/2015
Chromium	0.100		**2.10**	2.000	0	105.1	75	125	11/30/2015
Lead	0.400		**5.70**	5.000	0.6820	100.4	75	125	11/30/2015
Selenium	0.500		**19.7**	20.00	0	98.7	75	125	11/30/2015
Silver	0.100		**0.499**	0.5000	0	99.8	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**
SampID: 15111447-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.7**	20.00	0	98.6	75	125	11/30/2015
Barium	0.500		**20.4**	20.00	0.2260	101.0	75	125	11/30/2015
Cadmium	0.0200		**0.484**	0.5000	0	96.8	75	125	11/30/2015
Chromium	0.100		**2.08**	2.000	0	104.2	75	125	11/30/2015
Lead	0.400		**4.99**	5.000	0	99.8	75	125	11/30/2015
Selenium	0.500		**19.6**	20.00	0	97.8	75	125	11/30/2015
Silver	0.100		**0.496**	0.5000	0	99.2	75	125	11/30/2015

Batch 114455 **SampType:** MS Units **mg/L**
SampID: 15111464-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.5**	20.00	0	97.6	75	125	11/30/2015
Barium	0.500		**20.2**	20.00	0.2880	99.6	75	125	11/30/2015
Cadmium	0.0200		**0.478**	0.5000	0	95.6	75	125	11/30/2015
Chromium	0.100		**2.04**	2.000	0	102.2	75	125	11/30/2015
Lead	0.400		**4.91**	5.000	0	98.3	75	125	11/30/2015
Selenium	0.500		**19.5**	20.00	0	97.4	75	125	11/30/2015
Silver	0.100		**0.485**	0.5000	0	97.0	75	125	11/30/2015

Quality Control Results

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114452 **SampType:** MBLK Units **mg/L**
SampID: MBLK-114452

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	11/30/2015

Batch 114452 **SampType:** LCS Units **mg/L**
SampID: LCS-114452

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00482**	.005000	0	96.4	85	115	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111370-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00475**	.005000	0	95.0	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111370-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00472**	.005000	0	94.5	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111371-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00462**	.005000	0	92.3	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111394-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00459**	.005000	0	91.8	75	125	11/30/2015

Batch 114452 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15111394-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00467**	.005000	0	93.3	0.004590	1.67	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111445-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00540**	.005000	0.0005590	96.7	75	125	11/30/2015

Batch 114452 **SampType:** MS Units **mg/L**
SampID: 15111447-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00460**	.005000	0	92.0	75	125	11/30/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114452 **SampType:** MS Units **mg/L**

SampID: 15111464-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00468**	0.005000	0	93.5	75	125	11/30/2015

SW-846 3050B, 6010B, METALS BY ICP

Batch 114435 **SampType:** MBLK Units **mg/Kg-dry**

SampID: MBLK-114435

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.000	0	0	-100	100	11/25/2015

Batch 114435 **SampType:** LCS Units **mg/Kg-dry**

SampID: LCS-114435

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**49.4**	50.00	0	98.8	85	115	11/25/2015

Batch 114435 **SampType:** MS Units **mg/Kg-dry**

SampID: 15111371-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	1.89		**41.5**	47.17	4.189	79.2	75	125	11/26/2015

Batch 114435 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **20**

SampID: 15111371-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	1.89		**42.0**	47.17	4.189	80.1	41.54	1.06	11/26/2015

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114424 **SampType:** MBLK Units **µg/Kg**

SampID: MBLK-Y151124A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						11/24/2015
Ethylbenzene	5.0		**ND**						11/24/2015
Toluene	5.0		**ND**						11/24/2015
Xylenes, Total	5.0		**ND**						11/24/2015
Surr: 1,2-Dichloroethane-d4			**52.7**	50.00		105.4	72.2	131	11/24/2015
Surr: 4-Bromofluorobenzene			**50.3**	50.00		100.7	82.1	116	11/24/2015
Surr: Dibromofluoromethane			**50.3**	50.00		100.5	77.7	120	11/24/2015
Surr: Toluene-d8			**50.1**	50.00		100.2	86	116	11/24/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15111370

Client Project: Hutsonville J019896.05 **Report Date:** 03-Dec-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114424 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-Y151124A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**50.1**	50.00	0	100.3	50.23	0.20	11/24/2015
Ethylbenzene	5.0		**51.1**	50.00	0	102.1	50.69	0.73	11/24/2015
Toluene	5.0		**49.8**	50.00	0	99.6	49.36	0.93	11/24/2015
Xylenes, Total	5.0		**154**	150.0	0	102.3	150.3	2.11	11/24/2015
Surr: 1,2-Dichloroethane-d4			**49.8**	50.00		99.7			11/24/2015
Surr: 4-Bromofluorobenzene			**50.2**	50.00		100.4			11/24/2015
Surr: Dibromofluoromethane			**50.6**	50.00		101.2			11/24/2015
Surr: Toluene-d8			**50.4**	50.00		100.8			11/24/2015

Batch 114424 **SampType:** LCS Units **µg/Kg**

SampID: LCS-Y151124A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**50.2**	50.00	0	100.5	80.8	117	11/24/2015
Ethylbenzene	5.0		**50.7**	50.00	0	101.4	84.8	116	11/24/2015
Toluene	5.0		**49.4**	50.00	0	98.7	81.3	113	11/24/2015
Xylenes, Total	5.0		**150**	150.0	0	100.2	85.3	118	11/24/2015
Surr: 1,2-Dichloroethane-d4			**50.4**	50.00		100.8	72.2	131	11/24/2015
Surr: 4-Bromofluorobenzene			**50.0**	50.00		100.0	82.1	116	11/24/2015
Surr: Dibromofluoromethane			**51.6**	50.00		103.1	77.7	120	11/24/2015
Surr: Toluene-d8			**50.1**	50.00		100.2	86	116	11/24/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 15111370
Report Date: 03-Dec-15

Carrier: UPS

Received By: EEP

Completed by: Emily E. Pohlman
On: 24-Nov-15

Reviewed by: Shelly A. Hennessy
On: 24-Nov-15

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	1.62
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

CHAIN OF CUSTODY

pg. 1 of 1 Work order # P.O. 42369

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client:	Geotechnology, Inc.		
Address:	11816 Lackland Road		
City / State / Zip	St. Louis, MO 63146		
Contact:	Anna Saindon	**Phone:**	(314) 997-7440
E-Mail:	a_saindon@geotechnology.com	**Fax:**	(314) 997-2067

Samples on: ☑ ICE ☐ BLUE ICE ☐ NO ICE 1.0 °C
Preserved in: ☐ LAB ☐ FIELD
FOR LAB USE ONLY
Lab Notes

Client Comments:

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☒ No
Are these samples known to be hazardous? ☐ Yes ☒ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☒ No

Project Name/Number: Hutsonville J019896.05

Sample Collector's Name: Jessie Hahn

Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions:

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	MATRIX: Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	INDICATE ANALYSIS REQUESTED: % Moisture	Boron	BTEX	Chloride	Flash Point	Sulfate	TCLP 8 RCRA	TCLP Boron
15111370 001	BF-4	11/23/15 1130	2					1	2				5				1	1	1	1	1	1	1	
002	BF-9	11/23/15 1145	2					1	2				5				1	1	1	1	1	1	1	
003	BAPL-2	11/23/15 1215	2					1	2				5				1	1	1	1	1	1	1	1

Relinquished By	Date/Time	Received By	Date/Time
Jessie Hahn	11/23/15 1700	UPS	11/24/15 948 AM

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 28267

AMS 24/15

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

December 09, 2015

Jessie Hahn
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (573) 270-1313
FAX: (314) 997-2067

RE: Hutsonville J019896.06 **WorkOrder:** 15120342

Dear Jessie Hahn:

TEKLAB, INC received 1 sample on 12/3/2015 4:05:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15120342
Client Project: Hutsonville J019896.06
Report Date: 09-Dec-15

This reporting package includes the following:

Cover Letter	1
Report Contents	2
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Case Narrative	4
Laboratory Results	5
Quality Control Results	6
Receiving Check List	20
Chain of Custody	Appended

Teklab, Inc. Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit	R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits	T -	TIC(Tentatively identified compound)
X -	Value exceeds Maximum Contaminant Level		

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.06

Work Order: 15120342
Report Date: 09-Dec-15

Cooler Receipt Temp: 2.62 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2016	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2016	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2016	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2015	Collinsville
Kentucky	UST	0073		1/31/2016	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

Lab ID: 15120342-001 **Client Sample ID:** A PA Levee 1

Matrix: SOLID **Collection Date:** 12/02/2015 10:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		**>200**	°F	1	12/04/2015 13:26	R212302
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**14.7**	%	1	12/04/2015 15:17	R212335
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride	NELAP	58	J	**14**	mg/Kg-dry	1	12/08/2015 15:49	114711
SW-846 1311, 9036, IN TCLP EXTRACT								
Sulfate		10	JS	**8**	mg/L	1	12/04/2015 21:04	R212329
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 1311, 9251, IN TCLP EXTRACT								
Chloride	NELAP	5	JS	**2**	mg/L	1	12/04/2015 21:04	R212357
MS and/or MSD did not recover within control limits. Results verified by dilution.								
SW-846 9036 (TOTAL)								
Sulfate	NELAP	116		**278**	mg/Kg-dry	1	12/08/2015 15:49	114710
SW-846 9045C								
pH (1:1)	NELAP	1.00		**7.78**		1	12/08/2015 17:41	R212418
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	12/04/2015 21:18	114611
Barium	NELAP	0.0500		**0.201**	mg/L	1	12/04/2015 21:18	114611
Boron	NELAP	0.200		**0.577**	mg/L	1	12/04/2015 21:18	114611
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	12/04/2015 21:18	114611
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	12/04/2015 21:18	114611
Lead	NELAP	0.400		**< 0.400**	mg/L	1	12/04/2015 21:18	114611
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	12/04/2015 21:18	114611
Silver	NELAP	0.100		**< 0.100**	mg/L	1	12/04/2015 21:18	114611
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	12/04/2015 16:10	114612
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.89		**32.5**	mg/Kg-dry	1	12/07/2015 8:48	114619
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.9		**ND**	µg/Kg-dry	1	12/09/2015 12:59	114749
Ethylbenzene	NELAP	4.3		**ND**	µg/Kg-dry	1	12/09/2015 12:59	114749
Toluene	NELAP	4.3		**ND**	µg/Kg-dry	1	12/09/2015 12:59	114749
Xylenes, Total	NELAP	4.3		**ND**	µg/Kg-dry	1	12/09/2015 12:59	114749
Surr: 1,2-Dichloroethane-d4		72.2-131		**103.4**	%REC	1	12/09/2015 12:59	114749
Surr: 4-Bromofluorobenzene		82.1-116	S	**118.0**	%REC	1	12/09/2015 12:59	114749
Surr: Dibromofluoromethane		77.7-120		**98.1**	%REC	1	12/09/2015 12:59	114749
Surr: Toluene-d8		86-116		**108.6**	%REC	1	12/09/2015 12:59	114749
Surrogate recovery is outside QC limits due to matrix interference.								

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

EPA SW846 3550C, 5035A, ASTM D2974

Batch R212335 **SampType:** LCS Units **%**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	12/04/2015

Batch R212335 **SampType:** LCSQC Units **%**
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	12/04/2015

STANDARD METHODS 4500-CL E (TOTAL)

Batch 114711 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**1**						12/08/2015

Batch 114711 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK 151207

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50	J	**11**						12/08/2015

Batch 114711 **SampType:** LCS Units **mg/Kg**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**21**	20.00	0	102.6	90	110	12/08/2015

Batch 114711 **SampType:** MS Units **mg/Kg-dry**
SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	58		**233**	232.6	13.84	94.0	85	115	12/08/2015

Batch 114711 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **15**
SampID: 15120342-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	58		**235**	232.6	13.84	94.9	232.6	0.90	12/08/2015

SW-846 1311, 9036, IN TCLP EXTRACT

Batch R212329 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 1311, 9036, IN TCLP EXTRACT

Batch R212329 **SampType:** MBLK Units **mg/L**
SampID: MBLK 151203

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						12/04/2015

Batch R212329 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20.00	0	99.0	90	110	12/04/2015

Batch R212329 **SampType:** MS Units **mg/L**
SampID: 15120122-004BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100		**384**	100.0	277.8	106.2	90	110	12/04/2015

Batch R212329 **SampType:** MS Units **mg/L**
SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	S	**15**	10.00	7.590	72.2	85	115	12/04/2015

Batch R212329 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 15120342-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	10	S	**15**	10.00	7.590	69.4	14.81	1.91	12/04/2015

SW-846 1311, 9251, IN TCLP EXTRACT

Batch R212357 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						12/04/2015

Batch R212357 **SampType:** MBLK Units **mg/L**
SampID: MBLK 151203

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						12/04/2015

Batch R212357 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20.00	0	99.6	90	110	12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 1311, 9251, IN TCLP EXTRACT

Batch R212357 **SampType:** MS Units **mg/L**
SampID: 15120253-005AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**31**	20.00	11.35	98.5	85	115	12/04/2015

Batch R212357 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15120253-005AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5		**31**	20.00	11.35	98.1	31.04	0.23	12/04/2015

Batch R212357 **SampType:** MS Units **mg/L**
SampID: 15120265-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	2500		**14800**	10000	4481	103.1	85	115	12/04/2015

Batch R212357 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15120265-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	2500		**15800**	10000	4481	113.4	14790	6.76	12/04/2015

Batch R212357 **SampType:** MS Units **mg/L**
SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	S	**19**	20.00	2.200	83.7	85	115	12/04/2015

Batch R212357 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 15120342-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5	S	**19**	20.00	2.200	83.8	18.94	0.05	12/04/2015

SW-846 9036 (TOTAL)

Batch 114710 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						12/08/2015

Batch 114710 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK 151207

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100		**< 100**						12/08/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 9036 (TOTAL)

Batch 114710 **SampType:** LCS Units **mg/Kg**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20.00	0	97.3	90	110	12/08/2015

Batch 114710 **SampType:** MS Units **mg/Kg-dry**
SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	116		**379**	116.3	277.9	86.8	85	115	12/08/2015

Batch 114710 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**
SampID: 15120342-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	116		**381**	116.3	277.9	89.0	378.9	0.67	12/08/2015

SW-846 9045C

Batch R212418 **SampType:** LCS Units
SampID: LCS-R212418

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH (1:1)	1.00		**7.02**	7.000	0	100.3	99.1	100.8	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**
SampID: 15120342-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**8.08**				7.780	3.78	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**
SampID: 15120340-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.12**				6.020	1.65	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**
SampID: 15120340-002ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.14**				5.990	2.47	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**
SampID: 15120340-003ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.15**				6.150	0.00	12/08/2015

Quality Control Results

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 9045C

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-004ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.20**				5.370	3.22	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-005ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.24**				5.370	2.45	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-006ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.17**				5.070	1.95	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-007ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.13**				5.020	2.17	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-008ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.34**				5.720	6.87	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-009ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.33**				5.180	2.85	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-010ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.15**				5.110	0.78	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-011ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.12**				5.140	0.39	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-012ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**4.86**				4.940	1.63	12/08/2015

Quality Control Results

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 9045C

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-013ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**4.67**				4.750	1.70	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-016ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.98**				5.650	5.67	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-017ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.01**				6.030	0.33	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-018ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.14**				6.130	0.16	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-019ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.16**				6.210	0.81	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-020ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.01**				6.060	0.83	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-021ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.80**				5.490	5.49	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-022ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.27**				5.370	1.88	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-023ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.09**				6.150	0.98	12/08/2015

Quality Control Results

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 9045C

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-024ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.39**				5.400	0.19	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-025ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.38**				5.380	0.00	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-026ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.49**				5.610	2.16	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-027ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.14**				6.210	1.13	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-028ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.11**				6.250	2.27	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-029ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**5.20**				5.200	0.00	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120340-030ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00	H	**6.29**				6.240	0.80	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120428-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**6.54**				6.660	1.82	12/08/2015

Batch R212418 **SampType:** DUP Units RPD Limit **10**

SampID: 15120516-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**7.62**				7.670	0.65	12/08/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 9045C

Batch R212418 **SampType:** DUP Units RPD Limit 10

SampID: 15120516-002ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**8.66**				8.960	3.41	12/08/2015

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114611 **SampType:** MBLK Units **mg/L**

SampID: MBLK-114611

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	12/04/2015
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	12/04/2015
Boron	0.200		**< 0.200**	0.2000	0	0	-100	100	12/04/2015
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	12/04/2015
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	12/04/2015
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	12/04/2015
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	12/04/2015
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	12/04/2015

Batch 114611 **SampType:** LCS Units **mg/L**

SampID: LCS-114611

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.6**	20.00	0	98.2	85	115	12/04/2015
Barium	0.500		**20.3**	20.00	0	101.6	85	115	12/04/2015
Boron	0.200		**4.97**	5.000	0	99.3	85	115	12/04/2015
Cadmium	0.0200		**0.495**	0.5000	0	99.0	85	115	12/04/2015
Chromium	0.100		**2.10**	2.000	0	105.0	85	115	12/04/2015
Lead	0.400		**5.02**	5.000	0	100.3	85	115	12/04/2015
Selenium	0.500		**19.6**	20.00	0	97.8	85	115	12/04/2015
Silver	0.100		**0.491**	0.5000	0	98.2	85	115	12/04/2015

Batch 114611 **SampType:** MS Units **mg/L**

SampID: 15120267-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.00	0	96.0	75	125	12/04/2015
Barium	0.500		**20.5**	20.00	0.5840	99.8	75	125	12/04/2015
Cadmium	0.0200		**0.492**	0.5000	0.007000	97.0	75	125	12/04/2015
Chromium	0.100		**2.07**	2.000	0	103.4	75	125	12/04/2015
Lead	0.400		**4.96**	5.000	0	99.1	75	125	12/04/2015
Selenium	0.500		**19.1**	20.00	0	95.6	75	125	12/04/2015
Silver	0.100		**0.479**	0.5000	0	95.8	75	125	12/04/2015

Batch 114611 **SampType:** MS Units **mg/L**

SampID: 15120317-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		**4.97**	5.000	0.1140	97.2	75	125	12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114611 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 15120317-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	0.400		**4.97**	5.000	0.1140	97.2	4.974	0.02	12/04/2015

Batch 114611 **SampType:** MS Units **mg/L**

SampID: 15120319-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.0**	20.00	0	95.2	75	125	12/04/2015
Barium	0.500		**20.0**	20.00	0.1770	99.1	75	125	12/04/2015
Cadmium	0.0200		**0.475**	0.5000	0	95.0	75	125	12/04/2015
Chromium	0.100		**2.01**	2.000	0	100.6	75	125	12/04/2015
Lead	0.400		**4.81**	5.000	0	96.1	75	125	12/04/2015
Selenium	0.500		**18.9**	20.00	0	94.5	75	125	12/04/2015
Silver	0.100		**0.476**	0.5000	0	95.2	75	125	12/04/2015

Batch 114611 **SampType:** MS Units **mg/L**

SampID: 15120320-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**18.7**	20.00	0	93.4	75	125	12/04/2015
Barium	0.500		**19.8**	20.00	0.3040	97.3	75	125	12/04/2015
Cadmium	0.0200		**0.532**	0.5000	0.07500	91.4	75	125	12/04/2015
Chromium	0.100		**2.00**	2.000	0	100.0	75	125	12/04/2015
Lead	0.400		**4.70**	5.000	0	93.9	75	125	12/04/2015
Selenium	0.500		**18.5**	20.00	0	92.5	75	125	12/04/2015
Silver	0.100		**0.469**	0.5000	0	93.8	75	125	12/04/2015

Batch 114611 **SampType:** MS Units **mg/L**

SampID: 15120322-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.00	0	96.2	75	125	12/04/2015
Barium	0.500		**20.2**	20.00	0.1950	100.0	75	125	12/04/2015
Cadmium	0.0200		**0.477**	0.5000	0	95.4	75	125	12/04/2015
Chromium	0.100		**2.03**	2.000	0	101.7	75	125	12/04/2015
Lead	0.400		**4.83**	5.000	0	96.6	75	125	12/04/2015
Selenium	0.500		**19.1**	20.00	0	95.4	75	125	12/04/2015
Silver	0.100		**0.482**	0.5000	0	96.4	75	125	12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 114611 **SampType:** MS Units **mg/L**

SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**18.9**	20.00	0	94.4	75	125	12/04/2015
Barium	0.500		**19.8**	20.00	0.2010	98.1	75	125	12/04/2015
Boron	0.200		**5.23**	5.000	0.5770	93.1	75	125	12/04/2015
Cadmium	0.0200		**0.467**	0.5000	0	93.4	75	125	12/04/2015
Chromium	0.100		**1.99**	2.000	0	99.3	75	125	12/04/2015
Lead	0.400		**4.72**	5.000	0	94.4	75	125	12/04/2015
Selenium	0.500		**18.6**	20.00	0	93.1	75	125	12/04/2015
Silver	0.100		**0.473**	0.5000	0	94.6	75	125	12/04/2015

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114612 **SampType:** MBLK Units **mg/L**

SampID: MBLK-114612

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	12/04/2015

Batch 114612 **SampType:** LCS Units **mg/L**

SampID: LCS-114612

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00531**	0.00500	0	106.3	85	115	12/04/2015

Batch 114612 **SampType:** MS Units **mg/L**

SampID: 15120267-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00521**	0.00500	0	104.2	75	125	12/04/2015

Batch 114612 **SampType:** MS Units **mg/L**

SampID: 15120319-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00504**	0.00500	0	100.8	75	125	12/04/2015

Batch 114612 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 15120319-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00489**	0.00500	0	97.8	0.005042	3.12	12/04/2015

Batch 114612 **SampType:** MS Units **mg/L**

SampID: 15120320-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00458**	0.00500	0	91.6	75	125	12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 114612 **SampType:** MS Units **mg/L**
SampID: 15120322-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00500**	0.00500	0	100.1	75	125	12/04/2015

Batch 114612 **SampType:** MS Units **mg/L**
SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00470**	0.00500	0	94.0	75	125	12/04/2015

SW-846 3050B, 6010B, METALS BY ICP

Batch 114619 **SampType:** MBLK Units **mg/Kg-dry**
SampID: MBLK-114619

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.000	0	0	-100	100	12/07/2015

Batch 114619 **SampType:** LCS Units **mg/Kg-dry**
SampID: LCS-114619

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**48.4**	50.00	0	96.8	85	115	12/07/2015

Batch 114619 **SampType:** MS Units **mg/Kg-dry**
SampID: 15120342-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	1.89		**72.9**	47.17	32.52	85.7	75	125	12/07/2015

Batch 114619 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **20**
SampID: 15120342-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	1.89		**72.2**	47.17	32.52	84.1	72.94	1.04	12/07/2015

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114642 **SampType:** MBLK Units **µg/Kg**
SampID: MBLK-F151204A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						12/04/2015
Ethylbenzene	5.0		**ND**						12/04/2015
Toluene	5.0		**ND**						12/04/2015
Xylenes, Total	5.0		**ND**						12/04/2015
Surr: 1,2-Dichloroethane-d4			**49.6**	50.00		99.2	72.2	131	12/04/2015
Surr: 4-Bromofluorobenzene			**52.0**	50.00		104.1	82.1	116	12/04/2015
Surr: Dibromofluoromethane			**49.9**	50.00		99.8	77.7	120	12/04/2015
Surr: Toluene-d8			**49.2**	50.00		98.5	86	116	12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114642 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-F151204A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**56.1**	50.00	0	112.2	54.36	3.11	12/04/2015
Ethylbenzene	5.0		**53.9**	50.00	0	107.8	51.62	4.30	12/04/2015
Toluene	5.0		**53.4**	50.00	0	106.9	51.57	3.58	12/04/2015
Xylenes, Total	5.0		**162**	150.0	0	108.3	156.9	3.53	12/04/2015
Surr: 1,2-Dichloroethane-d4			**53.3**	50.00		106.5			12/04/2015
Surr: 4-Bromofluorobenzene			**49.7**	50.00		99.4			12/04/2015
Surr: Dibromofluoromethane			**52.4**	50.00		104.7			12/04/2015
Surr: Toluene-d8			**48.9**	50.00		97.9			12/04/2015

Batch 114642 **SampType:** LCS Units **µg/Kg**

SampID: LCS-F151204A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**54.4**	50.00	0	108.7	80.8	117	12/04/2015
Ethylbenzene	5.0		**51.6**	50.00	0	103.2	84.8	116	12/04/2015
Toluene	5.0		**51.6**	50.00	0	103.1	81.3	113	12/04/2015
Xylenes, Total	5.0		**157**	150.0	0	104.6	85.3	118	12/04/2015
Surr: 1,2-Dichloroethane-d4			**54.1**	50.00		108.3	72.2	131	12/04/2015
Surr: 4-Bromofluorobenzene			**49.8**	50.00		99.6	82.1	116	12/04/2015
Surr: Dibromofluoromethane			**52.8**	50.00		105.6	77.7	120	12/04/2015
Surr: Toluene-d8			**48.6**	50.00		97.2	86	116	12/04/2015

Batch 114642 **SampType:** LCSGD Units **%REC** RPD Limit **0**

SampID: LCSGD-F151204A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**50.3**	50.00		100.6			12/04/2015
Surr: 4-Bromofluorobenzene			**49.0**	50.00		98.0			12/04/2015
Surr: Dibromofluoromethane			**50.8**	50.00		101.5			12/04/2015
Surr: Toluene-d8			**50.2**	50.00		100.4			12/04/2015

Batch 114642 **SampType:** LCSG Units **%REC**

SampID: LCSG-F151204A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**50.5**	50.00		100.9	72.2	131	12/04/2015
Surr: 4-Bromofluorobenzene			**52.3**	50.00		104.6	82.1	116	12/04/2015
Surr: Dibromofluoromethane			**50.6**	50.00		101.1	77.7	120	12/04/2015
Surr: Toluene-d8			**51.0**	50.00		101.9	86	116	12/04/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114749 **SampType:** MBLK Units **µg/Kg**

SampID: MBLK-Y151209A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						12/09/2015
Ethylbenzene	5.0		**ND**						12/09/2015
Toluene	5.0		**ND**						12/09/2015
Xylenes, Total	5.0		**ND**						12/09/2015
Surr: 1,2-Dichloroethane-d4			**49.8**	50.00		99.7	72.2	131	12/09/2015
Surr: 4-Bromofluorobenzene			**49.5**	50.00		99.0	82.1	116	12/09/2015
Surr: Dibromofluoromethane			**47.7**	50.00		95.5	77.7	120	12/09/2015
Surr: Toluene-d8			**50.0**	50.00		100.0	86	116	12/09/2015

Batch 114749 **SampType:** LCSD Units **µg/Kg** RPD Limit **40**

SampID: LCSD-Y151209A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**47.8**	50.00	0	95.7	43.26	10.08	12/09/2015
Ethylbenzene	5.0		**48.5**	50.00	0	97.0	44.70	8.15	12/09/2015
Toluene	5.0		**48.2**	50.00	0	96.3	43.73	9.64	12/09/2015
Xylenes, Total	5.0		**145**	150.0	0	96.6	133.3	8.30	12/09/2015
Surr: 1,2-Dichloroethane-d4			**46.6**	50.00		93.2			12/09/2015
Surr: 4-Bromofluorobenzene			**50.2**	50.00		100.4			12/09/2015
Surr: Dibromofluoromethane			**49.3**	50.00		98.5			12/09/2015
Surr: Toluene-d8			**50.3**	50.00		100.6			12/09/2015

Batch 114749 **SampType:** LCS Units **µg/Kg**

SampID: LCS-Y151209A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**43.3**	50.00	0	86.5	80.8	117	12/09/2015
Ethylbenzene	5.0		**44.7**	50.00	0	89.4	84.8	116	12/09/2015
Toluene	5.0		**43.7**	50.00	0	87.5	81.3	113	12/09/2015
Xylenes, Total	5.0		**133**	150.0	0	88.9	85.3	118	12/09/2015
Surr: 1,2-Dichloroethane-d4			**47.7**	50.00		95.4	72.2	131	12/09/2015
Surr: 4-Bromofluorobenzene			**49.7**	50.00		99.4	82.1	116	12/09/2015
Surr: Dibromofluoromethane			**49.1**	50.00		98.1	77.7	120	12/09/2015
Surr: Toluene-d8			**50.5**	50.00		101.0	86	116	12/09/2015

Batch 114749 **SampType:** LCSGD Units **%REC** RPD Limit **0**

SampID: LCSGD-Y151209A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**48.3**	50.00		96.5			12/09/2015
Surr: 4-Bromofluorobenzene			**49.5**	50.00		99.0			12/09/2015
Surr: Dibromofluoromethane			**48.2**	50.00		96.5			12/09/2015
Surr: Toluene-d8			**51.0**	50.00		102.0			12/09/2015

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 15120342

Client Project: Hutsonville J019896.06 **Report Date:** 09-Dec-15

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 114749 **SampType:** LCSG Units **%REC**

SampID: LCSG-Y151209A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**47.6**	50.00		95.3	72.2	131	12/09/2015
Surr: 4-Bromofluorobenzene			**49.6**	50.00		99.3	82.1	116	12/09/2015
Surr: Dibromofluoromethane			**47.9**	50.00		95.9	77.7	120	12/09/2015
Surr: Toluene-d8			**51.0**	50.00		102.0	86	116	12/09/2015

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 15120342
Client Project: Hutsonville J019896.06
Report Date: 09-Dec-15

Carrier: Nick Harvey
Received By: KF

Completed by: Emily E. Pohlman
On: 03-Dec-15

Reviewed by: Elizabeth A. Hurley
On: 03-Dec-15

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	2.62
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

Collection time was added per sample containers. KF/EAH 12/3/15

Electronic Filing: Received, Clerk's Office 09/28/2020

15120342

CHAIN OF CUSTODY

pg. 1 of 1 Work Order # 42388

TEKLAB, INC. 5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618) 344-1004 ~ Fax: (618) 344-1005

Client: Geotechnology, Inc
Address: 11816 Lackland Road, Suite 150
City / State / Zip: St. Louis, MO 63146
Contact: Jessie Hahn Phone: (314)625-9854
E-Mail: j_hahn@geotechnology.com Fax: (314) 997-2067

Samples on: ☒ Ice ☐ Blue Ice ☐ No Ice 2.6 °C
Preserved in: ☐ Lab ☐ Field **FOR LAB USE ONLY**
Lab Notes:

Comments: Teklab Inc. Courier Pick Up

- Are these samples known to be involved in litigation? If yes, a surcharge will apply. ☐ Yes ☒ No
- Are these samples known to be hazardous? ☐ Yes ☒ No
- Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in comment section. ☐ Yes ☒ No

Project Name / Number: Hutsonville J019896.06
Sample Collector's Name: Jessie Hahn

Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other_____ ☐ 3 Day (50% Surcharge)
Billing Instructions:

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO_3	NaOH	H_2SO_4	HCL	MeOH	$NaHSO_4$	Other	MATRIX: Water	Drinking Water	Soil	Sludge	Sp. Waste	INDICATE ANALYSIS REQUESTED: %Moisture	Boron	BTEX	Chloride	Flash Pt	Sulfate	TCLP SRCRA	TCLP Boron	TCLP Chloride	TCLP Sulfate	pH
15120342-W1	APA Levee 1	12/2/15	2					1	2				5			1	1	1	1	1	1	1	1	1	1	1

Relinquished By	Date / Time	Received By	Date / Time
Jessie Hahn	12/3/2015 2:50		12/3/15 2:50
	12/3/15 405	Kaley Jerabe	12/3/15 405

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement on the reverse side, and that he/she has the authority to sign on behalf of client.

WHITE – LAB YELLOW – SAMPLER'S COPY

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

April 21, 2016

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville J019896.05

WorkOrder: 16041043

Dear Anna Saindon:

TEKLAB, INC received 1 sample on 4/15/2016 4:05:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Emily E. Pohlman
Project Manager
(618)344-1004 ex 44
epohlman@teklabinc.com

Electronic Filing: Received, Clerk's Office 09/28/2020

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 16041043
Report Date: 21-Apr-16

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Teklab, Inc.
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Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 16041043
Client Project: Hutsonville J019896.05
Report Date: 21-Apr-16

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon
B -	Analyte detected in associated Method Blank
E -	Value above quantitation range
H -	Holding times exceeded
I -	Associated internal standard was outside method criteria
J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)
X -	Value exceeds Maximum Contaminant Level

Teklab, Inc.
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Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 16041043
Report Date: 21-Apr-16

Cooler Receipt Temp: 1.22 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2017	Collinsville
Kansas	KDHE	E-10374	NELAP	5/31/2016	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2017	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2016	Collinsville
Kentucky	UST	0073		1/31/2017	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc.
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Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 16041043
Client Project: Hutsonville J019896.05
Report Date: 21-Apr-16
Lab ID: 16041043-001
Client Sample ID: QLS-Conf-1
Matrix: SOLID
Collection Date: 04/14/2016 14:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D92								
Ignitability, Open Cup		60		>200	°F	1	04/19/2016 9:42	R217428
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		18.8	%	1	04/19/2016 17:48	R217497
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride	NELAP	60	J	31	mg/Kg-dry	1	04/19/2016 18:27	118243
SW-846 9036 (TOTAL)								
Sulfate	NELAP	120	S	136	mg/Kg-dry	1	04/19/2016 18:28	118244
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		< 0.250	mg/L	1	04/20/2016 14:42	118221
Barium	NELAP	0.500		0.522	mg/L	1	04/20/2016 14:42	118221
Cadmium	NELAP	0.0200		< 0.0200	mg/L	1	04/20/2016 14:42	118221
Chromium	NELAP	0.100		< 0.100	mg/L	1	04/20/2016 14:42	118221
Lead	NELAP	0.400		< 0.400	mg/L	1	04/20/2016 14:42	118221
Selenium	NELAP	0.500		< 0.500	mg/L	1	04/20/2016 14:42	118221
Silver	NELAP	0.100		< 0.100	mg/L	1	04/20/2016 14:42	118221
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	04/19/2016 16:09	118216
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.96		2.08	mg/Kg-dry	1	04/19/2016 11:38	118203
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.0	J	0.6	µg/Kg-dry	1	04/19/2016 14:33	118230
Ethylbenzene	NELAP	4.8		ND	µg/Kg-dry	1	04/19/2016 14:33	118230
Toluene	NELAP	4.8		ND	µg/Kg-dry	1	04/19/2016 14:33	118230
Xylenes, Total	NELAP	4.8		ND	µg/Kg-dry	1	04/19/2016 14:33	118230
Surr: 1,2-Dichloroethane-d4		72.2-131		97.0	%REC	1	04/19/2016 14:33	118230
Surr: 4-Bromofluorobenzene		82.1-116		104.1	%REC	1	04/19/2016 14:33	118230
Surr: Dibromofluoromethane		77.7-120		96.2	%REC	1	04/19/2016 14:33	118230
Surr: Toluene-d8		86-116		99.0	%REC	1	04/19/2016 14:33	118230

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Quality Control Results

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Client: Geotechnology, Inc.
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Work Order: 16041043
Report Date: 21-Apr-16

ASTM D92

Batch R217428 **SampType:** DUP Units °F RPD Limit 5
SampID: 16041077-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Open Cup	60		>200				0	0.00	04/19/2016

EPA SW846 3550C, 5035A, ASTM D2974

Batch R217497 **SampType:** LCS Units %
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		99.0	99.00	0	100.0	90	110	04/19/2016

Batch R217497 **SampType:** LCSQC Units %
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		99.0	99.00	0	100.0	90	110	04/19/2016

STANDARD METHODS 4500-CL E (TOTAL)

Batch 118243 **SampType:** MBLK Units mg/Kg
SampID: MBLK 160418

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50	J	18						04/19/2016

Batch 118243 **SampType:** MBLK Units mg/Kg
SampID: MB-R217503

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	2						04/19/2016

Batch 118243 **SampType:** LCS Units mg/Kg
SampID: LCS-R217503

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		20	20.00	0	98.8	90	110	04/19/2016

Batch 118243 **SampType:** MS Units mg/Kg-dry
SampID: 16041043-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	60		259	240.2	31.23	94.7	85	115	04/19/2016

Batch 118243 **SampType:** MSD Units mg/Kg-dry RPD Limit 15
SampID: 16041043-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	60		260	240.2	31.23	95.0	258.7	0.32	04/19/2016

Teklab, Inc.
Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 16041043
Report Date: 21-Apr-16

SW-846 9036 (TOTAL)

Batch 118244 **SampType:** MBLK Units **mg/Kg**
SampID: MBLK 160418

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	100		**< 100**						04/19/2016

Batch 118244 **SampType:** MBLK Units **mg/Kg**
SampID: MB-R217500

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						04/19/2016

Batch 118244 **SampType:** LCS Units **mg/Kg**
SampID: LCS-R217500

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20.00	0	95.2	90	110	04/19/2016

Batch 118244 **SampType:** MS Units **mg/Kg-dry**
SampID: 16041043-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	120		**239**	120.1	135.8	85.7	85	115	04/19/2016

Batch 118244 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**
SampID: 16041043-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	120	S	**231**	120.1	135.8	79.5	238.8	3.17	04/19/2016

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 118221 **SampType:** MBLK Units **mg/L**
SampID: MBLK-118221

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	04/20/2016
Arsenic	0.250		**< 0.250**	0.2500	0	0	-100	100	04/19/2016
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	04/19/2016
Barium	0.500		**< 0.500**	0.5000	0	0	-100	100	04/20/2016
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	04/20/2016
Cadmium	0.0200		**< 0.0200**	0.02000	0	0	-100	100	04/19/2016
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	04/20/2016
Chromium	0.100		**< 0.100**	0.1000	0	0	-100	100	04/19/2016
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	04/19/2016
Lead	0.400		**< 0.400**	0.4000	0	0	-100	100	04/20/2016
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	04/19/2016
Selenium	0.500		**< 0.500**	0.5000	0	0	-100	100	04/20/2016
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	04/19/2016
Silver	0.100		**< 0.100**	0.1000	0	0	-100	100	04/20/2016

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc. **Work Order:** 16041043

Client Project: Hutsonville J019896.05 **Report Date:** 21-Apr-16

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 118221 **SampType:** LCS Units mg/L

SampID: LCS-118221

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.93**	5.000	0	98.7	85	115	04/20/2016
Arsenic	0.250		**4.91**	5.000	0	98.2	85	115	04/19/2016
Barium	0.500		**20.6**	20.00	0	103.2	85	115	04/20/2016
Barium	0.500		**20.2**	20.00	0	101.0	85	115	04/19/2016
Cadmium	0.0200		**0.500**	0.5000	0	100.0	85	115	04/19/2016
Cadmium	0.0200		**0.512**	0.5000	0	102.4	85	115	04/20/2016
Chromium	0.100		**2.08**	2.000	0	103.9	85	115	04/20/2016
Chromium	0.100		**2.01**	2.000	0	100.3	85	115	04/19/2016
Lead	0.400		**5.15**	5.000	0	103.0	85	115	04/19/2016
Lead	0.400		**5.25**	5.000	0	104.9	85	115	04/20/2016
Selenium	0.500		**5.11**	5.000	0	102.2	85	115	04/19/2016
Selenium	0.500		**5.04**	5.000	0	100.9	85	115	04/20/2016
Silver	0.100		**0.516**	0.5000	0	103.2	85	115	04/19/2016
Silver	0.100		**0.525**	0.5000	0	105.0	85	115	04/20/2016

Batch 118221 **SampType:** MS Units mg/L

SampID: 16040971-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		**5.05**	5.000	0	101.0	75	125	04/20/2016

Batch 118221 **SampType:** MS Units mg/L

SampID: 16040979-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.67**	5.000	0	93.4	75	125	04/20/2016
Barium	0.500		**20.3**	20.00	0	101.7	75	125	04/20/2016
Cadmium	0.0200		**0.496**	0.5000	0	99.2	75	125	04/20/2016
Chromium	0.100		**2.00**	2.000	0	99.8	75	125	04/20/2016
Lead	0.400		**5.10**	5.000	0	101.9	75	125	04/20/2016
Selenium	0.500		**4.77**	5.000	0	95.4	75	125	04/20/2016
Silver	0.100		**0.505**	0.5000	0	101.0	75	125	04/20/2016

Batch 118221 **SampType:** MS Units mg/L

SampID: 16040979-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.59**	5.000	0	91.8	75	125	04/20/2016
Barium	0.500		**20.8**	20.00	0.8180	99.8	75	125	04/20/2016
Cadmium	0.0200		**0.483**	0.5000	0	96.6	75	125	04/20/2016
Chromium	0.100		**1.96**	2.000	0	98.0	75	125	04/20/2016
Lead	0.400		**4.96**	5.000	0	99.2	75	125	04/20/2016
Selenium	0.500		**4.61**	5.000	0	92.2	75	125	04/20/2016
Silver	0.100		**0.496**	0.5000	0	99.2	75	125	04/20/2016

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.05

Work Order: 16041043

Report Date: 21-Apr-16

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 118221 **SampType:** MS Units mg/L

SampID: 16041030-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.81**	5.000	0	96.2	75	125	04/20/2016
Barium	0.500		**20.6**	20.00	0	103.0	75	125	04/20/2016
Cadmium	0.0200		**0.487**	0.5000	0	97.4	75	125	04/20/2016
Chromium	0.100		**2.01**	2.000	0	100.3	75	125	04/20/2016
Lead	0.400		**5.11**	5.000	0	102.2	75	125	04/20/2016
Selenium	0.500		**4.85**	5.000	0	97.0	75	125	04/20/2016
Silver	0.100		**0.521**	0.5000	0	104.2	75	125	04/20/2016

Batch 118221 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 16041030-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**4.83**	5.000	0	96.6	4.809	0.46	04/20/2016
Barium	0.500		**20.7**	20.00	0	103.4	20.61	0.34	04/20/2016
Cadmium	0.0200		**0.481**	0.5000	0	96.2	0.4870	1.24	04/20/2016
Chromium	0.100		**2.00**	2.000	0	100.1	2.006	0.20	04/20/2016
Lead	0.400		**5.09**	5.000	0	101.9	5.112	0.35	04/20/2016
Selenium	0.500		**4.81**	5.000	0	96.2	4.850	0.83	04/20/2016
Silver	0.100		**0.526**	0.5000	0	105.2	0.5210	0.96	04/20/2016

Batch 118221 **SampType:** MS Units mg/L

SampID: 16041043-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.73**	5.000	0	94.6	75	125	04/20/2016
Barium	0.500		**20.8**	20.00	0.5220	101.5	75	125	04/20/2016
Cadmium	0.0200		**0.491**	0.5000	0	98.2	75	125	04/20/2016
Chromium	0.100		**2.02**	2.000	0	100.8	75	125	04/20/2016
Lead	0.400		**5.12**	5.000	0	102.3	75	125	04/20/2016
Selenium	0.500		**4.94**	5.000	0	98.8	75	125	04/20/2016
Silver	0.100		**0.515**	0.5000	0	103.0	75	125	04/20/2016

Batch 118221 **SampType:** MS Units mg/L

SampID: 16041096-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.77**	5.000	0	95.3	75	125	04/20/2016
Barium	0.500		**20.8**	20.00	0	104.0	75	125	04/20/2016
Cadmium	0.0200		**0.504**	0.5000	0	100.8	75	125	04/20/2016
Chromium	0.100		**2.03**	2.000	0	101.4	75	125	04/20/2016
Lead	0.400		**5.12**	5.000	0	102.4	75	125	04/20/2016
Selenium	0.500		**4.84**	5.000	0	96.9	75	125	04/20/2016
Silver	0.100		**0.515**	0.5000	0	103.0	75	125	04/20/2016

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 16041043

Client Project: Hutsonville J019896.05 **Report Date:** 21-Apr-16

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 118221 **SampType:** MS Units mg/L
SampID: 16041101-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**4.93**	5.000	0	98.6	75	125	04/19/2016
Barium	0.500		**20.9**	20.00	0.7880	100.7	75	125	04/19/2016
Cadmium	0.0200		**0.502**	0.5000	0	100.4	75	125	04/19/2016
Chromium	0.100		**2.00**	2.000	0	100.0	75	125	04/19/2016
Lead	0.400		**5.14**	5.000	0	102.8	75	125	04/19/2016
Selenium	0.500		**5.02**	5.000	0	100.5	75	125	04/19/2016
Silver	0.100		**0.515**	0.5000	0	103.0	75	125	04/19/2016

Batch 118221 **SampType:** MS Units mg/L
SampID: 16041118-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		**5.17**	5.000	0.07100	102.0	75	125	04/19/2016

Batch 118221 **SampType:** MSD Units mg/L RPD Limit **20**
SampID: 16041118-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	0.400		**5.06**	5.000	0.07100	99.8	5.172	2.13	04/19/2016

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 118216 **SampType:** MBLK Units mg/L
SampID: MBLK-118216

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	.000200	0	0	-100	100	04/19/2016

Batch 118216 **SampType:** LCS Units mg/L
SampID: LCS-118216

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00467**	0.00500	0	93.3	85	115	04/19/2016

Batch 118216 **SampType:** MS Units mg/L
SampID: 16040979-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00477**	0.00500	0	95.3	75	125	04/19/2016

Batch 118216 **SampType:** MS Units mg/L
SampID: 16040979-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00455**	0.00500	0	91.1	75	125	04/19/2016

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 16041043
Report Date: 21-Apr-16

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 118216 **SampType:** MS Units mg/L
SampID: 16041003-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020	S	**0.00439**	0.005000	0.001079	66.3	75	125	04/19/2016

Batch 118216 **SampType:** MS Units mg/L
SampID: 16041030-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00410**	0.005000	0	82.1	75	125	04/19/2016

Batch 118216 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 16041030-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00425**	0.005000	0	84.9	0.004105	3.37	04/19/2016

Batch 118216 **SampType:** MS Units mg/L
SampID: 16041043-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00456**	0.005000	0	91.3	75	125	04/19/2016

Batch 118216 **SampType:** MS Units mg/L
SampID: 16041096-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00457**	0.005000	0	91.4	75	125	04/19/2016

Batch 118216 **SampType:** MS Units mg/L
SampID: 16041101-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00479**	0.005000	0	95.9	75	125	04/19/2016

SW-846 3050B, 6010B, METALS BY ICP

Batch 118203 **SampType:** MBLK Units mg/Kg-dry
SampID: MBLK-118203

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.000	0	0	-100	100	04/19/2016

Batch 118203 **SampType:** LCS Units mg/Kg-dry
SampID: LCS-118203

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**48.2**	50.00	0	96.3	85	115	04/19/2016

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 16041043

Client Project: Hutsonville J019896.05 **Report Date:** 21-Apr-16

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 118230 **SampType: MBLK** Units µg/Kg

SampID: MBLK-A160419A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		ND						04/19/2016
Ethylbenzene	5.0		ND						04/19/2016
Toluene	5.0		ND						04/19/2016
Xylenes, Total	5.0		ND						04/19/2016
Surr: 1,2-Dichloroethane-d4			46.0	50.00		91.9	72.2	131	04/19/2016
Surr: 4-Bromofluorobenzene			48.0	50.00		95.9	82.1	116	04/19/2016
Surr: Dibromofluoromethane			47.4	50.00		94.9	77.7	120	04/19/2016
Surr: Toluene-d8			49.8	50.00		99.5	86	116	04/19/2016

Batch 118230 **SampType: LCS** Units µg/Kg

SampID: LCS-A160419A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		57.6	50.00	0	115.1	80.8	117	04/19/2016
Ethylbenzene	5.0		53.0	50.00	0	106.1	84.8	116	04/19/2016
Toluene	5.0		52.9	50.00	0	105.8	81.3	113	04/19/2016
Xylenes, Total	5.0		157	150.0	0	104.4	85.3	118	04/19/2016
Surr: 1,2-Dichloroethane-d4			48.3	50.00		96.7	72.2	131	04/19/2016
Surr: 4-Bromofluorobenzene			48.4	50.00		96.7	82.1	116	04/19/2016
Surr: Dibromofluoromethane			49.8	50.00		99.6	77.7	120	04/19/2016
Surr: Toluene-d8			47.6	50.00		95.3	86	116	04/19/2016

Batch 118230 **SampType: LCSD** Units µg/Kg RPD Limit 40

SampID: LCSD-A160419A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		57.7	50.00	0	115.5	57.55	0.31	04/19/2016
Ethylbenzene	5.0		53.3	50.00	0	106.6	53.05	0.45	04/19/2016
Toluene	5.0		52.9	50.00	0	105.8	52.91	0.04	04/19/2016
Xylenes, Total	5.0		157	150.0	0	104.6	156.7	0.15	04/19/2016
Surr: 1,2-Dichloroethane-d4			48.1	50.00		96.2			04/19/2016
Surr: 4-Bromofluorobenzene			48.9	50.00		97.7			04/19/2016
Surr: Dibromofluoromethane			50.5	50.00		100.9			04/19/2016
Surr: Toluene-d8			48.0	50.00		96.0			04/19/2016

Batch 118230 **SampType: LCSG** Units %REC

SampID: LCSG-A160419A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			44.7	50.00		89.4	72.2	131	04/19/2016
Surr: 4-Bromofluorobenzene			48.6	50.00		97.2	82.1	116	04/19/2016
Surr: Dibromofluoromethane			46.4	50.00		92.7	77.7	120	04/19/2016
Surr: Toluene-d8			50.7	50.00		101.4	86	116	04/19/2016

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 16041043
Report Date: 21-Apr-16

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 118230 **SampType:** LCSGD Units %REC RPD Limit 0
SampID: LCSGD-A160419A-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**45.0**	50.00		89.9			04/19/2016
Surr: 4-Bromofluorobenzene			**49.2**	50.00		98.4			04/19/2016
Surr: Dibromofluoromethane			**45.9**	50.00		91.8			04/19/2016
Surr: Toluene-d8			**49.7**	50.00		99.4			04/19/2016

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.05

Work Order: 16041043
Report Date: 21-Apr-16

Carrier: Nicholas Reed

Received By: KF

Completed by: M. Kaminski
On: 15-Apr-16
Mary Anne Kaminski

Reviewed by: MLA
On: 15-Apr-16
Michael L. Austin

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 1.22
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.				
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

CHAIN OF CUSTODY

pg. 1 of 1 Work order # ~~16041042~~ 16041043 mace 4/15/16

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Geotechnology, Inc.
Address: 11816 Lackland Road
City / State / Zip St. Louis, MO 63146
Contact: Anna Saindon **Phone:** (314) 997-7440
E-Mail: a_saindon@geotechnology.com **Fax:** (314) 997-2067

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 1.00 °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes

Client Comments:

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☒ No
Are these samples known to be hazardous? ☐ Yes ☒ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☒ No

Project Name/Number: Hutsonville J019896.05
Sample Collector's Name: Jessie Hahn

Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)
Billing Instructions: P.O.#43312

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	MATRIX: Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	INDICATE ANALYSIS REQUESTED: % Moisture	Boron	BTEX	Chloride	Flash Point	Sulfate	TCLP 8 RCRA
16041043 001	QLS-Conf-1	04/14/2016 1430	2					1	2				X				X	X	X	X	X	X	X

Relinquished By	Date/Time	Received By	Date/Time
Jessie Hahn [signature]	4/14/16 1725	[signature]	4/15/16 0700
[signature] Rosanna Saindon	4/15/16	Nicholas Reed	4/15/16 1500
Nicholas Reed	4/15/16 1605	[signature]	4/15/16 1605

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 28877

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

May 04, 2016

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: J019896.05 Hutsonville

WorkOrder: 16041804

Dear Anna Saindon:

TEKLAB, INC received 1 sample on 4/28/2016 3:40:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Emily Pohlman

Emily E. Pohlman
Project Manager
(618)344-1004 ex 44
epohlman@teklabinc.com

Electronic Filing: Received, Clerk's Office 09/28/2020

Report Contents

Client: Geotechnology, Inc.
Work Order: 16041804
Client Project: J019896.05 Hutsonville
Report Date: 04-May-16

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	4
Laboratory Results	5
Quality Control Results	6
Receiving Check List	7
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 16041804

Client Project: J019896.05 Hutsonville
Report Date: 04-May-16

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
I -	Associated internal standard was outside method criteria	J -	Analyte detected below quantitation limits
M -	Manual Integration used to determine area response	ND -	Not Detected at the Reporting Limit
R -	RPD outside accepted recovery limits	S -	Spike Recovery outside recovery limits
T -	TIC(Tentatively identified compound)	X -	Value exceeds Maximum Contaminant Level

Teklab, Inc.
Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.05 Hutsonville

Work Order: 16041804
Report Date: 04-May-16

Cooler Receipt Temp: 2.62 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2017	Collinsville
Kansas	KDHE	E-10374	NELAP	7/31/2016	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2016	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2016	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2016	Collinsville
Arkansas	ADEQ	88-0966		3/14/2017	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2016	Collinsville
Kentucky	UST	0073		1/31/2017	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2016	Collinsville

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 16041804
Client Project: J019896.05 Hutsonville
Report Date: 04-May-16
Lab ID: 16041804-001
Client Sample ID: Stock Pile
Matrix: SOLID
Collection Date: 04/27/2016 11:57

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**21.9**	%	1	05/02/2016 20:31	R218077
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Boron	NELAP	0.200		**0.351**	mg/L	1	05/02/2016 17:00	118598

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.05 Hutsonville

Work Order: 16041804
Report Date: 04-May-16

EPA SW846 3550C, 5035A, ASTM D2974

Batch R218077 **SampType:** LCS Units %
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	05/02/2016

Batch R218077 **SampType:** LCSQC Units %
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		**99.0**	99.00	0	100.0	90	110	05/02/2016

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 118598 **SampType:** MBLK Units mg/L
SampID: MBLK-118598

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.200	J	**0.088**	0.2000	0	44.0	-100	100	05/02/2016
Boron	0.200	J	**0.088**	0.2000	0	44.0	-100	100	05/02/2016

Batch 118598 **SampType:** LCS Units mg/L
SampID: LCS-118598

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.200		**4.93**	5.000	0	98.6	85	115	05/02/2016
Boron	0.200		**4.53**	5.000	0	90.6	85	115	05/02/2016

Batch 118598 **SampType:** MS Units mg/L
SampID: 16041804-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.200		**5.18**	5.000	0.3510	96.5	75	125	05/02/2016

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.05 Hutsonville

Work Order: 16041804
Report Date: 04-May-16

Carrier: Nick Reed

Completed by: Kalyn Foecke
On: 28-Apr-16

Received By: AMD

Reviewed by: Elizabeth A. Hurley
On: 28-Apr-16

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 2.62
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

APPENDIX D

40-MIL HDPE GEOMEMBRANE

Hutsonville Power Station
Ash Pond A Closure
Geomembrane Roll List

Roll Number	Material	Thickness (Nominal)	Textured/ Smooth	Manufacturer	Color	Length	Width	On-Site
108183102	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183949	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183950	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183951	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183952	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183953	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183954	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183955	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183956	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183957	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183958	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108183959	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/21/2015
108184058	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184059	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184060	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184061	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184062	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184063	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184064	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184065	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184066	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184067	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184068	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184069	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184070	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184071	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184072	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184073	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184074	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184075	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184076	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184077	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184078	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184079	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184080	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015
108184081	HDPE	40 mil	Textured	GSE	black	700 feet	22.5 feet	9/28/2015

GSE Roll Allocation

Order SO-076747
Customer National Lining Systems
Project Name NLS Ameren Hutsonville Closure

Roll#	Resin Lot	Product Code	Mfg Date	Length
108183102	D150520932	HDT-040GE-BBB-B-W0	7/28/2015	700
108183949	HFH820390	HDT-040GE-BBB-B-W0	9/14/2015	700
108183950	HFH820390	HDT-040GE-BBB-B-W0	9/14/2015	700
108183951	HFH820390	HDT-040GE-BBB-B-W0	9/14/2015	700
108183952	HFH820390	HDT-040GE-BBB-B-W0	9/14/2015	700
108183953	HFH820390	HDT-040GE-BBB-B-W0	9/14/2015	700
108183954	HFH820390	HDT-040GE-BBB-B-W0	9/14/2015	700
108183955	HFH820400	HDT-040GE-BBB-B-W0	9/14/2015	700
108183956	HFH820400	HDT-040GE-BBB-B-W0	9/14/2015	700
108183957	HFH820400	HDT-040GE-BBB-B-W0	9/14/2015	700
108183958	HFH820400	HDT-040GE-BBB-B-W0	9/14/2015	700
108183959	HFH820400	HDT-040GE-BBB-B-W0	9/14/2015	700

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GSE Environmental, LLC

ENVIRONMENTAL™

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/15/2015

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-076747	National Lining Systems	Hutsonville IL US	HDT-040GE-BBB-B-W0	

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views In Cat1-Cat2)	Asperity Height ASTM D7466 (mils) A Side	Asperity Height ASTM D7466 (mils) B Side
108183102	41	38	125	136	16	16	146	128	516	452	43	48	110	0.945	2.4	10	22	22
108183949	40	37	105	88	16	15	134	112	479	442	40	38	113	0.944	2.4	10	22	21
108183950	40	37	103	103	16	15	147	115	548	456	39	37	114	0.945	2.6	10	22	20
108183951	40	37	103	103	16	15	147	115	548	456	39	37	114	0.945	2.6	10	22	20
108183952	39	36	103	103	16	15	147	115	548	456	39	37	114	0.945	2.6	10	22	20
108183953	40	37	106	112	16	16	157	135	588	548	40	39	110	0.944	2.6	10	21	22
108183954	38	35	106	112	16	16	157	135	588	548	40	39	110	0.944	2.6	10	22	23
108183955	38	34	106	112	16	16	157	135	588	548	40	39	110	0.944	2.6	10	22	23
108183956	38	35	104	108	16	16	145	132	518	528	43	40	122	0.944	2.5	10	23	22
108183957	38	35	104	108	16	16	145	132	518	528	43	40	122	0.944	2.5	10	23	22
108183958	38	35	104	108	16	16	145	132	518	528	43	40	122	0.944	2.5	10	24	21
108183959	38	35	111	117	16	16	151	131	539	508	42	42	117	0.944	2.6	10	24	21

Laboratory Manager _____

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Total Petrochemicals & Refining USA, Inc.
Bayport Polyethylene Plant
Bayport, TX 77555
U.S.A.

GSE / Attn: Sue P.
fax#281-230-8630
PALESTINE TX

SHIPPED TO:
GSE LINING TECHNOLOGY, LLC.
UP Track 14732 Westfield
WESTFIELD TX 77090

Quality certificate

Date
06/24/2015
Purchase order item/date
03-501864
Delivery item/date
85633921 000001 / 06/24/2015
Order item
32223036 000001
Customer number
80131640

Material: Our / Your reference
MDPE 37120 (441840) /

Please find below test data and pertinent information on TOTAL PETROCHEMICALS & REFINING USA, INC. Polyethylene material shipped to your plant.

Batch D150520932 **Quantity** 188,600 LB **Railcar** UTCX001873

Characteristic	Unit	Value
Density	g/cc	0.938
Melt Index 21.6/190	g/10 min	10.9
Railcar Prefix	-	UTCX
Railcar Number	-	001873

Sincerely,

Charles R. St. Ama
Quality Control Laboratory Supervisor
12212 Port Road, Pasadena, Texas 77507
P.O. Box 5010, LaPorte, Texas 77572-5010

Questions? Contact Customer Service at 1-800-344-3462

Electronic Filing: Received, Clerk's Office 09/28/2020

CoA Date: 08/21/2015

Certificate of Analysis

Shipped To: GSE ENVIRONMENTAL, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Phouangsavanh
Fax:

Delivery #: 89111763
PO #: 03-504080
Weight: 181000 LB
Ship Date: 08/21/2015
Package: BULK
Mode: Hopper Car
Car #: CHVX892001
Seal No: 35589

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: HFH820390

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	11.5	g/10mi
Density	D1505 or D4883	0.937	g/cm3
Production Date		08/10/2015	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

CoA Date: 08/21/2015

Certificate of Analysis

Shipped To: GSE ENVIRONMENTAL, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Phouangsavanh
Fax:

Delivery #: 89111759
PO #: 03-504080
Weight: 180900 LB
Ship Date: 08/21/2015
Package: BULK
Mode: Hopper Car
Car #: GACX201058
Seal No: 33207

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: HFH820400

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	11.7	g/10mi
Density	D1505 or D4883	0.937	g/cm3
Production Date		08/10/2015	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

Electronic Filing: Received, Clerk's Office 09/28/2020

GSE ENVIRONMENTAL™

Report Date
9/15/2015

Quality Assurance Laboratory Test Results

Job Name: NLS Ameren Hutsonville Closure
Sales Order: 76747

Required Testing: ASTM D 3895 -- Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D 5397 -- Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

Specification: D 3895 - > 100 Minutes
D 5397 - > 500 Hours

Product Code	Resin Lot Number	Test Results
HDT-040GE-BBB-B-W0	D150520932	PASS
HDT-040GE-BBB-B-W0	HFH820390	PASS
HDT-040GE-BBB-B-W0	HFH820400	PASS

Approved By:	Debra Gortemiller
Date Approved:	September 15, 2015

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Report Date
9/15/2015

GSE ENVIRONMENTAL

Quality Assurance Laboratory Test Results

Job Name: NLS Ameren Hutsonville Closure
SO Number: 76747

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after Oven and UV Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 5885				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Total 37120	995	812	82	80	995	937	94	50

Approved By: Debra Gortemiller
Date: September 15, 2015

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Report Date
9/15/2015

GSE ENVIRONMENTAL

Quality Assurance Laboratory Test Results

Job Name: NLS Ameren Hutsonville Closure
SO Number: 76747

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after UV and Oven Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 5885				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Chevron Phillips Marlex® K306 + Carbon Black	697	661	94	80	697	565	81	50

Approved By: Debra Gortemiller
Date: September 15, 2015

The above stated data shall not be reproduced except in full, without the written approval of the laboratory.

GSE Roll Allocation

Order SO-076747
Customer National Lining Systems
Project Name NLS Ameren Hutsonville Closure

Roll#	Resin Lot	Product Code	Mfg Date	Length
108184058	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184059	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184060	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184061	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184062	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184063	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184064	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184065	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184066	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184067	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184068	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184069	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184070	HFH820360	HDT-040GE-BBB-B-W0	9/20/2015	700
108184071	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184072	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184073	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184074	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184075	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184076	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184077	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184078	HFH820420	HDT-040GE-BBB-B-W0	9/20/2015	700
108184079	HFH820420	HDT-040GE-BBB-B-W0	9/21/2015	700
108184080	HFH820420	HDT-040GE-BBB-B-W0	9/21/2015	700
108184081	HFH820420	HDT-040GE-BBB-B-W0	9/21/2015	700

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GSE Environmental, LLC

ENVIRONMENTAL™

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/21/2015

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-076747	National Lining Systems	Hutsonville IL US	HDT-040GE-BBB-B-W0	

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height ASTM D7466 (mils) A Side	Asperity Height ASTM D7466 (mils) B Side
108184058	38	36	104	113	15	15	143	108	541	390	40	37	114	0.945	2.3	10	21	21
108184059	39	36	106	112	16	15	153	121	554	467	40	39	118	0.945	2.5	10	21	21
108184060	39	37	106	112	16	15	153	121	554	467	40	39	118	0.945	2.5	10	21	22
108184061	39	37	106	112	16	15	153	121	554	467	40	39	118	0.945	2.5	10	21	22
108184062	38	36	103	102	16	16	160	123	590	497	42	41	111	0.945	2.6	10	22	20
108184063	40	37	103	102	16	16	160	123	590	497	42	41	111	0.945	2.6	10	22	20
108184064	40	35	103	102	16	16	160	123	590	497	42	41	111	0.945	2.6	10	22	22
108184065	39	35	102	107	16	16	161	122	611	494	41	37	110	0.945	2.6	10	22	22
108184066	39	35	102	107	16	16	161	122	611	494	41	37	110	0.945	2.6	10	21	22
108184067	39	35	102	107	16	16	161	122	611	494	41	37	110	0.945	2.6	10	21	22
108184068	38	35	100	109	16	16	143	122	528	447	39	37	115	0.944	2.7	10	22	23
108184069	39	35	100	109	16	16	143	122	528	447	39	37	115	0.944	2.7	10	22	23
108184070	39	35	100	109	16	16	143	122	528	447	39	37	115	0.944	2.7	10	23	23
108184071	39	35	102	111	16	15	144	124	548	513	39	38	117	0.944	2.5	10	23	23
108184072	38	35	102	111	16	15	144	124	548	513	39	38	117	0.944	2.5	10	22	22
108184073	38	35	102	111	16	15	144	124	548	513	39	38	117	0.944	2.5	10	22	22
108184074	39	35	100	105	16	16	134	116	489	471	40	39	131	0.945	2.5	10	23	23
108184075	38	35	100	105	16	16	134	116	489	471	40	39	131	0.945	2.5	10	23	23
108184076	38	36	100	105	16	16	134	116	489	471	40	39	131	0.945	2.5	10	23	23
108184077	39	35	102	107	16	16	157	122	587	432	39	38	115	0.944	2.6	10	23	23
108184078	39	36	102	107	16	16	157	122	587	432	39	38	115	0.944	2.6	10	22	23
108184079	39	37	102	107	16	16	157	122	587	432	39	38	115	0.944	2.6	10	22	23
108184080	38	36	103	104	16	15	156	135	583	574	40	38	116	0.945	2.6	10	22	22
108184081	39	35	103	104	16	15	156	135	583	574	40	38	116	0.945	2.6	10	22	22

Laboratory Manager _____

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CoA Date: 08/21/2015

Certificate of Analysis

Shipped To: GSE ENVIRONMENTAL, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Phouangsavanh
Fax:

Delivery #: 89111766
PO #: 03-504080
Weight: 183400 LB
Ship Date: 08/21/2015
Package: BULK
Mode: Hopper Car
Car #: CHVX898144
Seal No: 33255

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: HFH820360

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	11.6	g/10mi
Density	D1505 or D4883	0.937	g/cm3
Production Date		08/09/2015	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

CoA Date: 08/21/2015

Certificate of Analysis

Shipped To: GSE ENVIRONMENTAL, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Phouangsavanh
Fax:

Delivery #: 89111761
PO #: 03-504080
Weight: 184300 LB
Ship Date: 08/21/2015
Package: BULK
Mode: Hopper Car
Car #: CHVX890107
Seal No: 33471

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: HFH820420

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	12.0	g/10mi
Density	D1505 or D4883	0.937	g/cm3
Production Date		08/10/2015	

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Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

Electronic Filing: Received, Clerk's Office 09/28/2020

GSE ENVIRONMENTAL

Report Date
9/21/2015

Quality Assurance Laboratory Test Results

Job Name: NLS Ameren Hutsonville Closure
Sales Order: 76747

Required Testing: ASTM D 3895 -- Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D 5397 -- Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

Specification: D 3895 - > 100 Minutes
D 5397 - > 500 Hours

Product Code	Resin Lot Number	Test Results
HDT-040GE-BBB-B-W0	D150520932	PASS
HDT-040GE-BBB-B-W0	HFH820390	PASS
HDT-040GE-BBB-B-W0	HFH820400	PASS
HDT-040GE-BBB-B-W0	HFH820360	PASS
HDT-040GE-BBB-B-W0	HFH820420	PASS

Approved By:	Debra Gortemiller
Date Approved:	September 21, 2015

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Report Date
9/21/2015

GSE ENVIRONMENTAL

Quality Assurance Laboratory Test Results

Job Name: NLS Ameren Hutsonville Closure
SO Number: 76747

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after UV and Oven Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 5885				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Chevron Phillips Marlex® K306 + Carbon Black	697	661	94	80	697	565	81	50

Approved By: Debra Gortemiller
Date: September 15, 2015

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September 24, 2015

Mail To:

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road, Suite 150
St. Louis, MO 63146

email: a_saindon@geotechnology.com

Bill To:

<= Same (P.O. #: 41782)

Dear Ms. Saindon:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Ameren Hutsonville Power Station Closure**
TRI Job Reference Number:	E2401-99-04
Material(s) Tested:	Two, GSE 40 mil Textured HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D 5994) Tensile Properties (ASTM D 6693) Puncture Strength (ASTM D 4833) Tear Resistance (ASTM D 1004)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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GEOMEMBRANE TEST RESULTS
TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonville Power Station Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108183102
TRI Log #: E2401-99-04

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	43	44	44	47	42	40	40	43	40	39	42	2
											39	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	150	147	142	142	135						143	6
TD Yield Strength (ppi)	119	132	136	138	141						133	9
MD Break Strength (ppi)	162	177	163	143	159						161	12
TD Break Strength (ppi)	107	104	95	116	102						105	8
MD Yield Elongation (%)	18	16	17	17	17						17	1
TD Yield Elongation (%)	12	13	14	12	15						13	1
MD Break Elongation (%)	482	546	516	402	510						491	55
TD Break Elongation (%)	314	265	347	217	113						251	92
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	114	111	114	116	122						115	4
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	40.5	47.4	48.9	46.0	43.1	41.0	41.9	42.9	43.5	44.6	44.0	2.7
TD Tear Strength (lbs)	39.0	41.3	41.4	43.0	39.6	44.1	42.9	42.4	44.0	39.6	41.7	1.9

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS
TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonville Power Station Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108183955
TRI Log #: E2401-99-04

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	39	42	38	36	41	38	40	41	38	40	**39** **36**	2 << min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	125	117	111	123	124						**120**	6
TD Yield Strength (ppi)	118	120	116	120	115						**118**	2
MD Break Strength (ppi)	148	145	154	127	138						**142**	10
TD Break Strength (ppi)	137	112	131	94	132						**121**	18
MD Yield Elongation (%)	16	15	13	17	17						**16**	2
TD Yield Elongation (%)	14	12	14	14	14						**14**	1
MD Break Elongation (%)	481	483	541	381	423						**462**	61
TD Break Elongation (%)	494	399	498	239	441						**414**	106
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	114	112	114	106	101						**109**	6
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	40.5	41.9	44.4	43.0	42.6	38.5	42.4	37.4	41.4	44.6	**41.7**	2.3
TD Tear Strength (lbs)	37.0	34.8	34.4	37.4	39.0	38.0	40.3	37.4	40.9	40.1	**37.9**	2.2

MD Machine Direction TD Transverse Direction

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September 24, 2015

Mail To:

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road, Suite 150
St. Louis, MO 63146

email: a_saindon@geotechnology.com

Bill To:

<= Same (P.O. #: 41782)

Dear Ms. Saindon:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Ameren Hutsonville Power Station Closure**
TRI Job Reference Number:	E2402-06-09
Material(s) Tested:	Four, GSE 40 mil Textured HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D 5994) Tensile Properties (ASTM D 6693) Puncture Strength (ASTM D 4833) Tear Resistance (ASTM D 1004)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

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GEOMEMBRANE TEST RESULTS
TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonville Power Station Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108184058
TRI Log #: E2402-06-09

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	48	44	45	43	43	48	42	48	44	41	**45**	3
											41	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	125	124	125	125	127						**125**	1
TD Yield Strength (ppi)	116	116	122	113	120						**117**	4
MD Break Strength (ppi)	152	135	138	121	138						**137**	11
TD Break Strength (ppi)	121	119	129	134	130						**127**	6
MD Yield Elongation (%)	15	17	15	15	18						**16**	1
TD Yield Elongation (%)	14	14	14	14	15						**14**	0
MD Break Elongation (%)	483	437	443	266	430						**412**	84
TD Break Elongation (%)	439	452	484	532	500						**481**	37
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	120	111	106	118	111						**113**	6
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	42.0	41.3	44.4	38.4	42.6	39.5	41.3	44.9	45.5	42.6	**42.3**	2.3
TD Tear Strength (lbs)	40.0	37.8	41.4	43.5	42.6	40.0	42.4	37.9	43.0	38.5	**40.7**	2.2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS
TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonville Power Station Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108184064
TRI Log #: E2402-06-09

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	44	45	47	41	44	46	44	41	42	44	**44**	2
											41	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	117	120	112	112	117						**116**	4
TD Yield Strength (ppi)	114	116	124	118	112						**117**	5
MD Break Strength (ppi)	161	182	138	139	158						**156**	18
TD Break Strength (ppi)	135	127	145	126	122						**131**	9
MD Yield Elongation (%)	17	17	15	15	17						**16**	1
TD Yield Elongation (%)	13	13	14	16	14						**14**	1
MD Break Elongation (%)	528	590	451	431	495						**499**	63
TD Break Elongation (%)	493	461	537	481	467						**488**	30
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	104	108	105	105	105						**105**	2
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	43.6	39.3	41.9	43.0	39.0	45.1	42.4	47.4	46.0	45.6	**43.3**	2.8
TD Tear Strength (lbs)	38.0	38.3	38.4	42.4	41.6	36.0	38.3	39.9	40.4	40.6	**39.4**	1.9

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS
TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonville Power Station Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108184070
TRI Log #: E2402-06-09

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	41	46	49	48	43	46	44	46	41	41	**45**	3
											41	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	108	109	117	115	118						**113**	5
TD Yield Strength (ppi)	116	107	117	118	122						**116**	6
MD Break Strength (ppi)	152	142	157	151	164						**153**	8
TD Break Strength (ppi)	89	124	119	112	134						**116**	17
MD Yield Elongation (%)	18	16	17	15	17						**17**	1
TD Yield Elongation (%)	15	12	13	14	15						**14**	1
MD Break Elongation (%)	492	439	497	493	530						**490**	33
TD Break Elongation (%)	326	473	446	354	478						**415**	71
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	98	105	110	109	105						**105**	5
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	43.1	41.3	44.9	46.5	40.1	43.1	48.4	46.4	45.5	43.6	**44.3**	2.5
TD Tear Strength (lbs)	38.5	37.8	38.9	43.0	37.0	41.0	39.3	37.4	42.4	39.6	**39.5**	2.1

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS
TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonville Power Station Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108184076
TRI Log #: E2402-06-09

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	48	42	45	48	46	43	43	46	48	43	**45**	2
											42	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	112	114	113	117	107						**113**	4
TD Yield Strength (ppi)	134	131	125	117	119						**125**	7
MD Break Strength (ppi)	148	157	157	158	161						**156**	5
TD Break Strength (ppi)	141	150	121	90	141						**129**	24
MD Yield Elongation (%)	17	14	16	16	17						**16**	1
TD Yield Elongation (%)	15	13	12	13	13						**13**	1
MD Break Elongation (%)	499	521	503	501	544						**514**	19
TD Break Elongation (%)	467	519	399	38	487						**382**	197
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	107	112	104	103	100						**105**	5
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	39.5	41.9	39.9	41.4	44.1	44.1	41.3	40.9	37.9	43.6	**41.5**	2.1
TD Tear Strength (lbs)	41.5	38.3	40.4	40.9	38.0	40.5	45.4	42.9	38.9	44.6	**41.1**	2.5

MD Machine Direction TD Transverse Direction

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Date: 2015-11-04

Mail To:

Anna Saindon
Geotechnology, Inc
11816 Lackland Road
St. Louis , MO , 63146

Bill To:
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Accounts Payable
ap@geotechnology.com
, ,
Proj: J019896.05.2370, PO 42190

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Ash Pond A**
TRI Job Reference Number:	**18725**
Material(s) Tested:	(19) Heat Fusion Weld Seam(s) (1) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	82	80	76	79	84	**80**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	93	98	105	98	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	121	125	124	129	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-2B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	78	88	77	72	96	**82**
Peel Incursion (%)	15	<5	<5	10	<5	
Peel Locus Of Failure Code	AD-BRK	SE	SE	AD-BRK	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	106	97	98	100	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	121	127	126	124	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-4A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	90	89	93	95	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	97	100	90	106	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	126	130	123	125	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	98	102	111	90	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	105	102	111	107	102	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	123	124	121	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	85	100	104	91	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	110	111	109	112	118	**112**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	123	123	125	123	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	103	102	94	110	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	103	94	100	101	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	125	125	123	125	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	80	86	87	97	63	**83**
Peel Incursion (%)	20	<5	<5	<5	20	
Peel Locus Of Failure Code	AD-BRK	SE	SE	SE	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	93	100	104	96	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	131	126	127	126	125	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	102	101	99	100	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	103	108	110	99	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	123	126	123	125	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-11 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	97	93	95	96	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	105	106	111	107	109	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	132	131	123	126	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	97	108	115	105	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	90	98	103	100	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	124	122	127	128	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-13 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	101	110	104	103	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	101	97	107	99	113	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	130	125	126	122	125	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-14 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	88	95	98	99	59	**88**
Peel Incursion (%)	75	<5	<5	<5	30	
Peel Locus Of Failure Code	AD-BRK	SE	SE	SE	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	63	102	101	111	102	**96**
Peel Incursion (%)	20	<5	<5	<5	<5	
Peel Locus Of Failure Code	AD-BRK	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	118	120	119	126	122	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-16 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	105	108	106	80	73	**94**
Peel Incursion (%)	<5	<5	<5	<5	10	
Peel Locus Of Failure Code	SE	SE	SE	SE	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	100	98	111	108	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	127	123	124	126	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-17 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	90	112	103	110	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	103	99	94	104	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	123	124	119	120	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-18 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	82	78	104	81	**88**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	90	100	101	102	96	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	120	121	120	122	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-19 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	88	93	100	84	93	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	108	102	114	94	103	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	121	122	125	124	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-20 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	111	112	86	110	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	85	96	102	111	114	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	121	118	122	116	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-21 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	113	102	113	96	111	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	90	96	92	96	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	127	123	123	121	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-22 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	114	116	93	111	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	117	117	118	106	110	**114**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	118	123	118	124	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18725

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-30 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	73	61	58	90	83	**73**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	116	116	114	116	115	**115**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2015-11-05

Mail To:

Anna Saindon
Geotechnology, Inc
11816 Lackland Road
St. Louis , MO , 63146

Bill To:
Geotechnology, Inc
Accounts Payable
ap@geotechnology.com
, ,
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e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Ash Pond A**
TRI Job Reference Number:	**18748**
Material(s) Tested:	(10) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18748

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-24 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	88	98	92	98	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	100	97	102	106	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	122	118	120	116	**119**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-25 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	101	101	99	103	101	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	100	99	97	99	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	121	118	118	115	**119**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18748

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-26 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	86	80	93	88	89	**87**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	95	96	102	101	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	119	116	117	114	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-27 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	79	84	90	83	88	**85**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	95	93	99	97	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	119	118	117	115	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18748

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-28 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	101	94	102	103	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	102	98	102	103	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	119	119	116	115	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-29 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	74	96	84	102	89	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	94	89	100	94	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	118	117	116	116	114	**116**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18748

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-32 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	102	95	99	94	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	89	105	90	109	102	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	126	122	123	120	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-33 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	109	88	104	88	109	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	105	105	108	105	104	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	120	116	118	111	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18748

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-35 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	108	102	104	99	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	115	107	113	104	**109**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	128	123	124	121	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-39 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	96	96	98	101	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	93	96	92	97	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	121	121	118	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2015-11-10

Mail To:

Anna Saindon
Geotechnology, Inc
11816 Lackland Road
St. Louis , MO , 63146

Bill To:
Geotechnology, Inc
Accounts Payable
ap@geotechnology.com
, ,
Proj: J019896.05.2370, PO 42193

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Ash Pond A**
TRI Job Reference Number:	**18789**
Material(s) Tested:	(18) Heat Fusion Weld Seam(s) (1) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-31 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	94	100	101	101	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	91	91	91	93	97	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	121	124	125	118	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-34 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	100	106	103	95	105	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	112	93	106	109	99	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	130	125	129	115	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-36 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	84	86	90	91	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	88	91	74	90	**88**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	115	121	115	112	115	**116**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-37 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	95	96	96	95	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	110	103	105	109	105	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	124	125	118	122	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-38 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	101	113	107	106	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	107	109	115	106	115	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	129	120	121	116	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-40 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	103	101	104	102	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	98	98	98	98	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	120	121	121	122	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-41 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	94	103	94	92	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	112	114	111	104	108	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	122	122	126	119	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-42 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	98	102	97	95	92	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	96	94	100	87	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	128	126	124	122	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-43 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	100	99	95	96	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	103	92	88	98	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	121	121	122	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-44 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	88	90	91	83	88	**88**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	92	95	94	94	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	123	126	121	126	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-45 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	96	94	94	100	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	113	95	108	96	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	128	126	124	128	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-46 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	84	94	93	96	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	98	103	90	97	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	121	120	123	123	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-47 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	88	90	94	92	99	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	90	100	94	103	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	122	127	125	125	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-50 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	106	104	103	102	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	90	97	94	96	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	123	125	126	127	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-52 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	91	87	99	97	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	86	88	85	101	90	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	129	135	134	130	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-53 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	91	93	93	91	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	98	92	89	100	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	117	123	129	128	127	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-54 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	87	93	83	103	86	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	101	102	96	102	89	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	124	122	126	120	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-55 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	95	100	98	106	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	98	100	99	104	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	132	126	130	127	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18789

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-56 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	102	114	112	107	134	**114**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	131	127	122	125	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2015-11-11

Mail To:

Anna Saindon
Geotechnology, Inc
11816 Lackland Road
St. Louis , MO , 63146

Bill To:
Geotechnology, Inc
Accounts Payable
ap@geotechnology.com
, ,
Proj: J019896.05.2370, PO 42220

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Ash Pond A**
TRI Job Reference Number:	**18807**
Material(s) Tested:	(12) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18807

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-14A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	100	96	97	107	89	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	97	107	104	98	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	119	118	121	120	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-14B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	79	65	92	67	**79**
Peel Incursion (%)	<5	45	30	<5	100	
Peel Locus Of Failure Code	SE	AD-BRK	AD-BRK	SE	AD	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	NON-FTB	
Side: B						**Peel B**
Peel Strength (ppi)	91	98	99	100	98	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	118	120	120	121	123	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18807

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-15A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	85	96	95	102	103	**96**
Peel Incursion (%)	15	<5	<5	<5	<5	
Peel Locus Of Failure Code	AD-BRK	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	94	89	95	96	99	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	121	123	125	127	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-15B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	108	114	113	115	107	**111**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	110	104	113	116	109	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	125	126	122	127	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18807

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-23A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	108	101	97	106	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	107	108	103	103	110	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	125	124	123	127	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-23B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	99	76	99	93	**92**
Peel Incursion (%)	<5	<5	40	<5	<5	
Peel Locus Of Failure Code	SE	SE	AD-BRK	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	107	98	99	95	102	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	121	121	120	125	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18807

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-48A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	83	92	92	86	81	**87**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	91	102	95	95	100	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	117	116	115	118	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-48B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	99	85	95	82	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	107	113	104	105	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	118	118	121	121	122	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18807

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-49B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	77	82	58	88	85	**78**
Peel Incursion (%)	<5	<5	40	<5	<5	
Peel Locus Of Failure Code	SE	SE	AD-BRK	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	109	78	103	65	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	114	120	120	123	124	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-51A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	107	107	84	109	**102**
Peel Incursion (%)	<5	<5	<5	10	<5	
Peel Locus Of Failure Code	SE	SE	SE	AD-BRK	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	108	113	104	116	103	**109**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	116	123	120	127	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18807

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-51B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	115	116	113	110	115	**114**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	117	110	105	105	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	121	121	123	121	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-57 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	98	96	102	94	94	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	93	96	91	96	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	122	126	129	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2015-11-12

Mail To:

Anna Saindon
Geotechnology, Inc
11816 Lackland Road
St. Louis , MO , 63146

Bill To:
Geotechnology, Inc
Accounts Payable
ap@geotechnology.com
, ,
Proj: J019896.05.2370, PO 42233

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Ash Pond A**
TRI Job Reference Number:	**18823**
Material(s) Tested:	(6) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18823

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-14B1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	97	94	99	95	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	97	103	106	89	**99**
Peel Incursion (%)	<5	<5	<5	<5	30	
Peel Locus Of Failure Code	SE	SE	SE	SE	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	116	115	114	113	**116**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-23B1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	95	93	92	89	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	111	97	102	102	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	123	119	125	116	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18823

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-49B1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	84	91	87	86	**88**
Peel Incursion (%)	<5	50	<5	<5	<5	
Peel Locus Of Failure Code	SE	AD-BRK	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	102	110	107	105	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	111	115	111	118	110	**113**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-58 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	104	98	103	97	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	89	94	95	104	95	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	118	121	120	118	122	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18823

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-59 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	81	96	89	90	91	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	90	85	91	82	92	**88**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	123	125	123	123	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-61 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	97	105	99	97	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	101	94	102	99	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	136	131	130	128	131	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2015-11-13

Mail To:

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Geotechnology, Inc
11816 Lackland Road
St. Louis , MO , 63146

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Accounts Payable
ap@geotechnology.com
, ,
Proj: J019896.05.2370, PO 42234

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Ash Pond A**
TRI Job Reference Number:	**18835**
Material(s) Tested:	(8) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18835

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-3A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	100	97	102	95	92	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	106	94	93	97	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	124	124	122	124	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-14B2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	107	102	104	105	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	110	106	105	103	106	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	131	132	133	132	138	**133**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18835

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-49B2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	106	112	105	115	106	**109**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	105	106	113	101	111	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	131	122	123	123	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-60A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	113	106	106	102	110	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	101	105	96	95	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	130	131	127	133	**130**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18835

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-60B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	99	98	101	109	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	108	94	104	98	104	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	131	131	134	136	140	**134**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-62 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	100	100	95	101	99	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	93	88	85	92	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	113	116	116	115	117	**115**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Ash Pond A

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 18835

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: D-63 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	106	94	99	99	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	107	96	94	97	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	123	124	129	130	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: D-64 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	88	94	95	86	93	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	96	91	81	93	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	114	117	117	118	119	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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National Lining Systems, Inc.
16970-3 San Carlos Blvd., Suite 191
Ft Myers, FL 33908

WB Koester Construction LLC

Ameren Hutsonville Energy Center
15142 E 1900th Avenue
Hutsonville, IL 62433

Ameren Ash Ponds Closure

Quality Control Project Book
Project # 1000-332

QC Daily

Date: Oct. 28' 2015

Material	Daily Quantity	To Date Quantity

Install: ☐ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☒ Geo-net

☐ Other: _____

Liner: ☐ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☐ Air test

☐ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather _____ AM _____ PM

Commennt Sandbags

Date: Oct. 29' 2015

Material	Daily Quantity	To Date Quantity

Install: ☐ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☐ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☐ Air test

☐ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather _____ AM _____ PM

Commennt Sandbags, set up wedge, clean-up trailer,

Date: Oct. 30' 2015

Material	Daily Quantity	To Date Quantity

Install: ☒ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☐ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☐ Air test

☐ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather 57° AM _____ PM

Commennt _____

Date: Oct. 31' 2015

Material	Daily Quantity	To Date Quantity
Liner 40m		41,228.5

Install: ☒ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☐ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☒ Air test

☐ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather 57° windy AM _____ PM

Commennt half day !!!

QC Daily

Date: NOV. 1. 2015

Material	Daily Quantity	To Date Quantity
Liner 40 mil	47,513	88,741.5

Install: [X] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [ ] Repaired [ ] Tie-in [ ] Boot [ ] Battening [X] Air test
[ ] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: ____ Passed % Detail Complete
____ Failed ____
Weather ____ AM ____ PM
Commennt

Date: Nov. 2. 2015

Material	Daily Quantity	To Date Quantity

Install: [ ] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [X] Repaired [ ] Tie-in [X] Boot [ ] Battening [X] Air test
[ ] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: 13 Passed % Detail Complete
4 Failed ____
Weather 54° AM 70° PM
Commennt

Date: Nov 3' 2015

Material	Daily Quantity	To Date Quantity
Liner 40mil	87,601.5	176,343

Install: [X] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [ ] Repaired [ ] Tie-in [ ] Boot [ ] Battening [X] Air test
[ ] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: 6 Passed % Detail Complete
2 Failed ____
Weather 54° AM 75° PM
Commennt

Date: Nov 4'2015

Material	Daily Quantity	To Date Quantity
Liner	203,961	
Liner	80,190	
	21,477.5	481,961.5
	305,618.5	

Install: [X] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [ ] Repaired [ ] Tie-in [ ] Boot [ ] Battening [X] Air test
[ ] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: 10 Passed % Detail Complete
____ Failed ____
Weather ____ AM ____ PM
Commennt

QC Daily

Date: Nov 5 '2015

Material	Daily Quantity	To Date Quantity
Liner	15,314	447,275.5
Ash Pond "D"		

Install: [X] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [ ] Repaired [ ] Tie-in [ ] Boot [ ] Battening [X] Air test
[ ] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: ____ Passed % Detail Complete
____ Failed
Weather 55 cloudy AM 67 PM
Commennt

Date: Nov. 7 '2015

Material	Daily Quantity	To Date Quantity

Install: [ ] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [X] Repaired [ ] Tie-in [ ] Boot [ ] Battening [X] Air test
[ ] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: 16 Passed % Detail Complete
3 Failed
Weather 39° AM 59° PM
Commennt

Date: Nov. 9'2015

Material	Daily Quantity	To Date Quantity
Liner 40 mil	6,110	503,385.5

Install: [X] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [X] Repaired [ ] Tie-in [ ] Boot [ ] Battening [X] Air test
[X] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: 4 Passed % Detail Complete
3 Failed
Weather 39° AM 55 PM
Commennt

Date: Nov 10' 2015

Material	Daily Quantity	To Date Quantity

Install: [ ] Liner [ ] GCL [ ] Composite [ ] Geo-textile [ ] Geo-net
[ ] Other:
Liner: [X] Repaired [ ] Tie-in [ ] Boot [ ] Battening [ ] Air test
[X] V-box [ ] Other:
Composite / Textile: [ ] Sewing / Heat bond [ ] Tie-seam [ ] Repaired
[ ] Other:
Destuctive Sample: ____ Passed % Detail Complete
____ Failed
Weather 52° AM 57° PM
Commennt

QC Daily

Date: Nov 11, 2015

Material	Daily Quantity	To Date Quantity

Install: ☐ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☒ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☒ Air test

☐ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: cap.

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather 54° Windy AM 57° PM

Commennt _____

Date: Nov. 12' 2015

Material	Daily Quantity	To Date Quantity

Install: ☐ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☒ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☒ Air test

☒ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather 54° Windy AM 57 Windy PM

Commennt _____

Date: Nov. 13' 2015

Material	Daily Quantity	To Date Quantity

Install: ☐ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☒ Repaired ☐ Tie-in ☒ Boot ☐ Battening ☐ Air test

☒ V-box ☐ Other: clean-up

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather _____ AM _____ PM

Commennt _____

Date: _____

Material	Daily Quantity	To Date Quantity

Install: ☐ Liner ☐ GCL ☐ Composite ☐ Geo-textile ☐ Geo-net

☐ Other: _____

Liner: ☐ Repaired ☐ Tie-in ☐ Boot ☐ Battening ☐ Air test

☐ V-box ☐ Other: _____

Composite / Textile: ☐ Sewing / Heat bond ☐ Tie-seam ☐ Repaired

☐ Other: _____

Destuctive Sample: _____ Passed % Detail Complete

_____ Failed _____

Weather _____ AM _____ PM

Commennt _____

National Lining Systems, Inc.

Trial Weld Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Cashmore

Project Number: # 1000 - 332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
Oct 1 30	9:50	S/S	LP	W#10	850	13	103 100	105 88	90 105	94 105	94 97	140	140	149	133	133	P
Oct 1 30	9:56	T/T	LP	W#10	850	10	90 95	105 96	102 100	101 107	90 105	119	118	129	114	111	P
Oct 1 30	11:14	S/S	DE	W#11	850	13	103 93	91 92	93 101	92 106	89 80	128	126	125	120	120	P
Oct 1 30	11:30	S/S	JL	W#102	850	14	91 88	76 83	85 92	83 81	81 73	121	117	123	118	122	P
Oct 1 30	10:40	T/T	JL	W#102	850	13	98 66	109 108	104 97	103 85	98 90	129	127	125	130	128	P
Oct 1 30	1:25	S/S	LP	W#10	850	13	85 91	78 88	98 91	90 82	85 87	106	108	106	107	112	P
Oct 1 30	1:35	S/S	DE	W# 101	850	12	95 93	96 82	86 92	84 85	94 86	110	111	108	109	114	P
Oct 1 30	1:45	S/S	JL	W#102	850	12	90 89	73 67	82 69	78 69	73 84	109	106	106	108	107	P
Oct 1 31	8:55	S/S	DE	W#101	850	10	94 93	90 87	106 97	101 94	104 99	128	132	136	133	126	P
Oct 1 31	8:10	S/T	DE	W#101	850	9	97 87	101 91	94 74	100 78	111 98	142	140	148	141	144	P
Oct 1 31	8:15	S/S	JL	W# 102	850	10	103 102	102 85	103 106	95 90	100 87	146	135	131	140	111	P
Oct 1 31	8:32	T/T	JL	W#102	850	8	95 83	100 106	85 96	74 99	112 115	130	145	143	139	138	P
Oct 1 31	9:30	S/T	JL	W#102	850	7	93 84	108 102	98 96	88 98	102 107	137	135	129	130	134	P
Oct 131	10:30	S/S	LP	W#10	850	10	101 94	89 93	105 95	106 90	98 93	139	136	139	137	138	P

Peel / Shear = Pounds Per Inch Width Weld Type= F - Fusion / Ext - E Material Type= T- Textured/ S- Smooth

National Lining Systems, Inc.

Trial Weld Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: # 1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
Oct / 31	11:10	S/T	LP	W#10	850	8	107 102	88 89	107 75	101 88	101 98	137	130	135	134	129	P
Nov. / 1	8:05	S/S	JL	W#102	850	9	89 100	88 105	97 80	97 82	103 105	133	128	127	122	120	P
Nov / 1	8:15	S/S	DE	W#101	850	9	103 79	102 87	89 79	90 92	91 103	129	128	129	127	118	P
Nov / 1	8:25	S/T	DE	W#101	850	8	86 92	88 100	92 80	87 87	97 86	122	121	124	124	124	P
Nov / 1	9:05	T/T	JL	W#102	850	8	85 94	87 103	90 116	93 102	74 92	110	112	112	118	116	P
Nov / 1	9:47	T/T	DE	W#101	850	8	100 109	105 99	100 99	111 103	99 104	111	117	112	110	104	P
Nov / 1	1:15	S/S	DE	W#101	850	10	85 96	91 91	94 96	86 85	87 80	112	110	110	108	109	P
Nov / 1	1:23	S/S	LP	W#10	850	10	87 84	83 81	94 83	85 87	95 87	118	108	121	120	116	P
Nov / 1	1:30	S/T	JL	W#102	850	8	109 86	102 76	97 83	96 90	98 101	108	110	108	111	109	P
Nov / 1	1:40	S/S	JL	W#102	850	10	93 74	92 97	94 98	93 88	92 92	108	109	104	109	108	P
Nov / 2	8:03	S/S	SS	G#10	280	240	105	109	120	104	128	132	124	117	97	129	P
Nov / 2	8:12	S/S	DE	G#20	240	220	105	91	110	111	112	127	121	125	117	124	P
Nov / 2	8:22	S/S	TC	G#19	240	220	103	66	101	97	78	128	129	118	119	123	P
Nov / 2	1:00	S/S	SS	G#10	280	240	100	93	101	111	100	103	103	102	103	103	P

Peel / Shear = Pounds Per Inch Width Weld Type= F - Fusion / Ext - E Material Type= T- Textured/ S- Smooth

National Lining Systems, Inc.

Trial Weld Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: # 1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
nov / 2	1 :10	S/S	DE	GH 20	240	220	91	96	70	86	71	108	106	104	108	109	P
nov / 3	8 :19	S/S	SS	W#12	455	8	86 80	83 78	83 77	81 73	83 73	123	105	127	117	119	P
nov / 3	8 :00	S/S	DE	W# 101	840	12	84 92	85 85	101 77	96 83	101 73	83	125	93	119	120	P
nov / 3	8 :09	S/S	JL	W#102	850	10	107 102	93 94	112 91	106 89	90 100	133	128	111	125	129	P
nov / 3	8 :27	S/T	JL	W#102	850	8	107 89	92 96	89 100	80 95	91 93	122	116	126	115	110	P
nov / 3.	8 :39	T/T	DE	W#101	840	8	107 112	97 102	115 106	95 102	114 97	115	115	122	113	111	P
nov / 3	8 :57	T/T	SS	W# 12	450	7	96 87	80 96	107 104	90 94	95 83	122	112	116	116	116	P
nov / 3	9 :06	S/S	JL	W#20	450	10	101 71	93 95	84 93	97 85	101 96	108	113	110	116	119	P
nov / 3	9 :14	S/T	JL	W#20	450	8	94 92	89 83	72 81	90 91	89 82	106	108	113	107	105	P
nov / 3	1 :10	S/S	DE	W# 101	850	12	99 79	78 82	93 86	88 81	80 80	106	101	102	103	99	P
nov / 3	1 :15	S/T	SS	W#12	450	9	73 78	85 79	82 73	77 68	85 86	97	99	98	97	106	P
nov / 3	1 :20	S/S	LP	W# 20	450	10	89 79	78 84	95 77	79 91	72 70	108	106	107	100	110	P
nov / 3	1 :25	T/T	DE	W# 101	850	8	101 104	97 103	98 99	99 101	103 92	98	105	105	99	101	P
nov / 3	1 :30	S/T	DE	W# 101	850	8	77 87	78 75	82 86	99 73	81 78	97	102	101	95	104	P

Peel / Shear = Pounds Per Inch Width Weld Type= F - Fusion / Ext - E Material Type= T- Textured/ S- Smooth

National Lining Systems, Inc.

Trial Weld Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Caramira

Project Number: #1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
nov / 3	1 : 25	S|S	S.S	N#12	450	10	81	80	85	82	93	104	104	109	104	108	P
							90	89	88	86	84						
nov / 3	1 : 40	T|T	S.S	N#12	450	9	92	99	94	95	98						F
							96	94	104	104	85						
nov / 3	1 : 45	S|T	L.P	N# 20	450	8	76	82	98	92	89	104	101	102	102	106	P
							76	94	90	83	83						
nov / 4	8 : 25	S|S	D.E	N#102	850	11	81	103	89	81	81	113	108	116	108	119	P
							87	92	96	92	89						
nov / 4	8 : 35	S|S	S.S.	N# 12	450	8	87	81	96	90	89	117	109	120	112	122	P
							95	95	96	106	75						
nov / 4	8 : 45	S|S	J.L	N# 20	450	10	99	84	93	93	99	118	106	119	100	121	P
							84	75	101	95	102						
nov / 4	9 : 01	S|T	J.L	N# 20	450	9	102	90	97	101	100	119	127	118	109	109	P
							92	85	88	89	91						
nov / 4	9 : 10	T|T	D.E	N#101	850	11	106	102	108	102	111	108	109	117	108	119	P
							89	99	105	101	112						
nov / 4	9 : 17	S|T	D.E	N#101	850	11	85	104	97	88	96	106	114	117	113	119	P
							80	87	78	97	78						
nov / 4	9 : 22	T|T	S.S	N#12	450	8	92	85	93	80	99	98	103	116	104	109	P
							104	78	94	88	99						
nov / 4	9 : 33	S|T	S.S.	N#12	450	8	78	87	84	91	83	108	97	119	109	107	P
							84	89	78	93	77						
nov / 4	10 : 30	T|T	JL	N#20	450	9	101	110	96	110	107	107	109	117	106	114	P
							95	110	96	98	98						
nov / 4	1 : 45	S|S	S.S.	N# 12	450	10	88	68	78	77	72	119	104	109	114	104	P
							81	86	80	88	85						
nov / 4	1 : 50	S|S	DE	N#120	450	10	79	83	77	72	79	112	119	109	115	105	P
							85	78	93	78	74						

Peel / Shear = Pounds Per Inch Width Weld Type= F - Fusion / Ext - E Material Type= T- Textured/ S- Smooth

National Lining Systems, Inc.

Trial Weld Log

Project Name: Ameron, Ash Pmol A

QA/QC Name: Michelle Cisneros

Project Number: #1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
Nov / 4	2:00	T/T	DE	W#20	450	8	82 84	92 83	81 76	86 81	87 76	99	109	102	107	101	P
Nov / 4	2:06	S/T	DE	W#20	450	8	82 84	73 84	84 91	82 84	79 94	109	98	112	107	99	P
Nov / 4	2:12	S/T	S.S.	W#12	450	8	80 82	71 72	87 86	74 75	74 75	107	91	103	105	109	P
Nov / 4	2:18	T/T	S.S	W#12	450	8	83 95	84 75	89 83	78 89	82 83	103	93	104	94	105	P
Nov / 5	8:30	S/S	D.E	W#20	450	9	85 91	85 85	82 85	80 86	86 79	118	101	121	113	120	P
Nov / 5	8:35	S/S	J.L	W#12	450	9	82 80	85 74	73 71	85 78	78 80	119	113	111	117	110	P
Nov / 5	9:18	S/T	JL	W#12	450	7	77 84	70 86	88 67	77 88	82 73	98	102	115	104	116	P
Nov / 7	7:47	T/T	TC	G#20	250	220	89	90	75	77	91	104	106	112	108	112	P
Nov / 7	8:22	T/T	SS	G#10	280	240	100	102	109	108	116	130	120	124	119	113	P
Nov / 7	1:20	T/T	TC	G#20	250	220	113	110	115	116	110	117	102	102	107	114	P
Nov / 7	1:38	T/T	SS	G#10	280	240	108	110	103	102	113	109	104	110	107	106	P
Nov / 9	7:49	T/T	RT	G#20	250	220	106	84	104	95	107	118	109	128	124	127	P
Nov / 9	8:19	T/T	SS	G#10	280	240	84	78	93	101	100	129	117	135	124	131	P
Nov / 9	1:42	S/S	JL	W#20	450	9	91 92	77 79	90 86	79 81	89 92	116	102	110	119	108	P

Peel / Shear = Pounds Per Inch Width Weld Type= F - Fusion / Ext - E Material Type= T- Textured/ S- Smooth

National Lining Systems, Inc.

Trial Weld Log

Page: _____ of _____

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle CAMMIRO

Project Number: # 1000-392

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
nov / 9	1 :45	T/T	RT	G#20	240	220	82	89	94	69	93	113	111	118	109	119	P
nov / 9	1 :52	S/T	JL	W#20	450	8	87 105	79 74	88 97	82 90	78 78	112	101	112	101	105	P
nov / 9	2 :10	T/T	SS	G#10	280	240	119	109	114	117	120	116	104	111	115	120	P
nov / 10	8 :10	T/T	SS	G#10	280	240	129	112	135	112	125	133	123	136	129	126	P
nov / 10	8 :20	T/T	TC	G#20	240	220	100	87	74	104	97	122	116	123	112	125	P
nov / 10	1 :10	T/T	TC	G#20	240	220	85	97	104	103	114	120	123	112	105	107	P
nov / 10	1 :20	T/T	SS	G#10	280	240	85	82	95	89	82	108	108	99	102	105	P
nov / 11	8 :00	T/T	TC	G#20	240	220	91	83	76	80	84	140	130	147	124	133	P
nov / 11	8 :10	T/T	SS	G#10	280	240	124	113	140	111	133	129	126	122	118	121	P
nov / 11	8 :20	T/T	JL	W#12	450	6.5	110 120	99 103	108 108	101 107	113 115	134	123	135	124	133	P
nov / 11	8 :30	S/T	JL	W#12	450	6.5	107 86	82 94	89 95	83 93	94 117	136	121	134	121	135	P
nov / 11	11 :20	T/T	DE	W#20	450	7	92 104	89 84	92 97	82 83	101 94	116	107	117	106	120	P
nov / 11	1 :20	T/T	JL	W#12	450	6.5	94 94	86 88	97 95	96 94	100 98	121	109	108	99	109	P
nov / 11	1 :25	T/T	SS	G#10	280	240	81	93	109	88	99	110	105	112	108	103	P

Peel / Shear = Pounds Per Inch Width **Weld Type=** F - Fusion / Ext - E **Material Type=** T- Textured/ S- Smooth

National Lining Systems, Inc.

Trial Weld Log

Page: _____ of _____

Project Name: AmeRen - Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: #1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

Test Date	Time	Material type	Op. Int	Mch. #	Set Temp	Speed / Preheat	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	P/F P=Pass F= Fail
Nov / 11	1 : 30	S/T	JL	W#12	450	6.5	73 90	70 70	77 88	78 76	93 93	113	104	116	106	112	P
Nov / 11	3 : 18	T/T	TC	G#20	240	220	104	92	86	85	94	113	120	115	120	119	P
Nov / 12	8 : 11	T/T	TC	G#20	240	220	92	85	102	101	114	114	109	102	111	120	P
Nov / 12	8 : 23	T/T	SS	G#10	280	240	100	77	92	88	96	100	98	125	104	127	P
Nov / 12	8 : 31	S/T	JL	W#12	450	6	99 86	79 82	97 107	81 70	81 91	126	107	102	111	128	P
Nov / 12	8 : 36	T/T	JL	W#12	450	6	80 88	85 90	93 101	85 87	86 92	128	119	128	124	128	P
Nov / 12	1 : 27	T/T	TC	G#20	240	220	108	96	97	91	88	125	100	114	120	133	P
Nov / 12	1 : 32	T/T	S.S.	G#10	280	240	94	85	91	71	82	134	115	108	117	120	P
Nov / 13	8 : 00	T/T	SS	#10	280	240	82	80	80	69	92	99	107	111	112	117	P
/	:																
/	:																
/	:																
/	:																
/	:																

Peel / Shear = Pounds Per Inch Width Weld Type= F - Fusion / Ext - E Material Type= T- Textured/ S- Smooth

National Lining Systems, Inc.

Page: 1

Panel Placement Log

Project Name: Ameren, Ash Pond A

Project Number: 1000-332

QA/QC Name: Michelle Casimiro

Material Type: 40 mil

Secondary [ ] Primary [ ]

Panel No.	Roll No.	Date	Length	Width	Square Feet	Comments
P1	4072	Nov. 4	624.5	22	13,739	632 | 617
P2	4073	Nov 4	639	22	14,058	645 | 633
P3	4066	Nov 4	654.5	22	14,399	663 | 646
P4	4061	Nov 4	670	22	14,740	676 | 664
P5	4075	Nov 4	683.5	22	15,037	690 | 677
P6	3953	Nov 4	679	22	14,938	
P7	3952	Nov 4	694	22	15,268	
P8	4065	Nov 4	693	22	15,246	
P9	4060	Nov 4	688	22	15,136	
P10	4059	Nov 4	686	22	15,092	
P11	4062	Nov. 4	684	22	15,048	
P12	3958	Nov. 4	690	22	15,180	
P13	3957	Nov 4	632.5	22	14,322	651 | 614
P14	3954	Nov. 4	534	22	11,748	203.951
P15	4081	Oct. 31	64	22	1,408	
P16	4081	Oct. 31	66	22	1,452	
P17	4081	Oct. 31	69	22	1,518	
P18	4081	Oct. 31	71	22	1,562	
P19	4081	Oct. 31	74	22	1,628	
P20	4081	Oct 31	77	22	1,694	
P21	4081	Oct. 31	79	22	1,738	
P22	4081	Oct. 31	81	22	1,782	
P23	4074	Oct. 31	67.5	22	1,485	80 | 55
P24	4074	Oct. 31	40	22	880	53 | 27
P25	4074	Oct. 31	23.5	19	218.5	Δ
P26	4074	Oct. 31	41	28	574	Δ
P27	4074	Oct. 31	55	22	1,210	68 | 42
P28	4074	Oct. 31	77.5	22	1,705	87 | 68
P29	4074	Oct. 31	262	22	5,764	
P30	4074	Oct. 31	69	22	1,518	
P31	4068	Oct 31	189	22	4,158	
P32	4068	Oct 31	252	22	5,544	
P33	4068	Oct 31	233	22	5,126	
P34	4071	Oct 31	12	22	264	41,2385
P35	4071	Nov 1	236	22	5,192	
P36	4071	Nov. 1	226	22	4,972	

National Lining Systems, Inc.

Panel Placement Log

Page: 2

Project Name: Ameren, Ash Pond A

Project Number: # 1000-332

QA/QC Name: Michelle Casmiro

Material Type: 40 mil

Secondary [ ] Primary [ ]

Panel No.	Roll No.	Date	Length	Width	Square Feet	Comments
P37	4071	nov. 1	186	22	4,092	
P38	4081	nov. 1	35	22	770	
P39	4070	nov. 1	211	22	4,642	
P40	4070	nov. 1	203	22	4,466	
P41	4070	nov. 1	192	22	4,224	
P42	4070	nov. 1	61	22	1,342	
P43	4076	nov. 1	123	22	2,706	
P44	4076	nov. 1	93	19	883.5	
P45	4076	nov. 1	171	22	3,762	
P46	4076	nov. 1	167	22	3,674	
P47	4076	nov. 1	155	22	3,410	
P48	4076	nov. 1	26	22	572	
P49	4069	nov. 1	117	22	2,574	
P50	4069	nov. 1	135	22	2,970	47,573
P51	4078	nov. 4	610	22	13,420	
P52	4080	nov 4	594.5	22	13,079	
P53	4067	nov 4	579	22	12,738	
P54	4063	nov 4	490.5	22	10,791	
P55	4079	nov 4	475	22	10,450	
P56	3955	nov 4	456.5	22	10,043	
P57	3950	nov 4	439.5	22	9,669	80,140
P58	3950	nov 3	242.5	22	5,335	251/234
P59	3955	nov 3	233	22	5,126	242/224
P60	4079	nov 3	214	22	4,708	224/204
P61	4063	nov 3	201.5	22	4,433	207/196
P62	3102	nov 3	179	22	3,938	
P63	3102	nov 3	170	22	3,740	
P64	3102	nov 3	172	22	3,784	
P65	3102	nov 3	159	22	3,498	
P65 A	4064	nov 3	8	22	176	
P66	4064	nov 3	328.5	22	7,227	
P67	4064	nov 3	292.5	22	6,435	
P68	4064	nov. 3	20	6	60	Δ
P69	4064	nov. 3	35	22	770	20/19
P70	4077	nov. 3	56.5	22	1,243	50/20
P71	4077	nov. 3	66.5	22	1,463	

National Lining Systems, Inc.

Panel Placement Log

Project Name: Ameren, Ash Pond A Project Number: # 1000-332

QA/QC Name: Michelle CARMIRO Material Type: 40 mil

Secondary [ ] Primary [ ]

Panel No.	Roll No.	Date	Length	Width	Square Feet	Comments
P72	# 4077	Nov 3	71.5	22	1,573	
P73	4077	Nov. 3	74	22	1,628	
P74	4077	Nov 3	74.5	22	1,639	
P75	4077	Nov. 3	74	22	1,628	
P76	4077	Nov 3	72.5	22	1,595	
P77	4077	Nov 3	69.5	22	1,529	
P78	4077	Nov 3	59	22	1,298	
P79	# 4058	Nov 3	7	22	154	
P80	4058	Nov 3	61.5	22	1,353	
P81	4058	Nov 3	55.5	22	1,221	
P82	4058	Nov 3	26	9	117	Δ
P83	4058	Nov 3	52	22	990	
P84	4058	Nov 3	54	22	1,188	
P85	4058	Nov 3	57	22	1,254	
P86	4058	Nov 3	59	22	1,298	
P87	4058	Nov 3	61.5	22	1,353	
P88	4058	Nov 3	29	9	130.5	Δ
P89	4058	Nov. 3	46	22	1,012	
P90	4058	Nov. 3	64	22	1,408	
P91	4058	Nov. 3	54	22	1,188	
P92	# 4069	Nov. 3	12	22	264	
P93	4069	Nov. 3	67.5	22	1,485	
P94	4069	Nov. 3	67	22	1,474	
P95	4069	Nov. 3	65.5	22	1,441	
P96	4069	Nov. 3	65	22	1,430	
P97	4069	Nov. 3	64	22	1,408	
P98	4069	Nov. 3	19	22	418	21|17
P99	# 4067	Nov. 3	43.5	22	957	45|42
P100	4067	Nov. 3	41.5	22	913	48|35
P101	4078	Nov. 3	14	22	308	18|10
P102	4080	Nov. 3	51.5	22	1,133	66|37
P103	4080	Nov. 3	26	22	572	37|15
P104	4078	Nov. 3	17	12	102	Δ 87.601 S
P105	# 4066	Nov. 4	17.5	22	385	23|12
P106	# 4072	Nov 4	14	22	308	20|8
P107	# 4073	Nov 4	25	22	550	30|20

National Lining Systems, Inc.

Page: _____

Panel Placement Log

Project Name: Ameren - Ash Pond A Project Number: # 1000-332

QA/QC Name: Michelle CasimiRO Material Type: 40 mil

Secondary [ ] Primary [ ]

Panel No.	Roll No.	Date	Length	Width	Square Feet	Comments
P 108	# 3959	Nov. 4	36	22	792	42/30
P 109	3959	nov. 4	49.5	22	1,089	51/48
P 110	3959	nov. 4	51.5	22	1,133	52/51
P 111	# 3957	nov. 4	61.5	22	1,253.	80/43 -
P 112	# 3954	nov. 4	40.5	22	891	44/37
P 113	3954	nov. 4	25	17	212.5	Δ
P 114	3954	nov. 4	32.5	22	715	44/21
P 115	3954	nov. 4	43.5	22	957	44/43
P 116	3954	nov. 4	20	16	160	Δ
P 117	# 4078	nov. 4	25	22	550	27/23
P 118	# 3959	nov 4	33	22	726	34/32
P 119	3959	nov 4	26	9	117	Δ
P 120	3959	nov 4	44.5	22	979	
P 121	3959	nov 4	55	22	1,210	
P 122	3959	nov 4	121.5	22	2,673	127/116
P 123	3959	nov 4	111	22	2,442	116/106
P 124	3959	nov 4	101	22	2,222	106/96
P 125	3959	nov. 4	12.5	22	275	17/8
P 126	# 3949	nov. 4	79	22	1,738	80/78 21.4775
P 127	# 3956	nov. 9	55.5	22	1,221	56/55
P 128	# 3956	nov. 9	60	22	1,320	64/56
P 129	3956	nov. 9	69.5	22	1,529	64/75
P 130	3956	nov. 9	79.5	22	1,749	83/76
P 131	3956	nov. 9	33	4	66	Δ
P 132	3956	nov. 9	45	10	225	Δ 6.110.-
P 133	# 3951	nov. 11	417			
P 134	3951	nov 11	81			
P 135	3951	nov 11	94'			
P 136	3951	nov 11	62'			CAP STRIPS
P 137	3951	nov 11	81			
P 138	3951	nov 11	170'			
P 139	3951	nov 11	122			
P 140	3951	nov 12'	287			
P 141	3951	nov 11	109			

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren - ash Pond A

Project Number: # 1000 · 392

QA/QC Name: Michelle Casimiro

Material Type: 40 mil

Seam No.	Length	Date	Time	Operator Int.	Machine No.	Set Temp.	Speed / Preheat	Comments
P1 - P2	446	Oct. 30	10:42	LP	W# 10	850	13	
P2 - P3	440	Oct. 30	11:00	DE	W# 11	850	13	
P3 - P4	170	Oct. 30	10:31	JL	W# 102	850	13	
P3 - P4	674	Oct 30	11' 40	JL	W# 102	850	13	
P4 - P5	443'	Oct 30	1:28	LP	W# 10	850	13	
P5 - P6	440	Oct. 30	1:59	JL	W# 102	850	12	
P6 - P7	436	Oct. 30	1:40	DE	W# 101	850	12	
P7 - P8	434	Oct. 30	2:32	LP	W# 10	850	13	
P8 - P9	433	Oct. 30	2:55	DE	W# 101	850	12	
P9 - P10	482	Oct. 30	2 58	JL	W# 102	850	12	
P10 - P11	428	Oct. 30	3:43	JL	W# 102	850	12	
P11 - P12	429	Oct. 30	3:45	DE	W# 101	850	12	
P12 - P13	425	Oct. 30	4:25	JL	W# 102	850	12	
P13 - P14	255	Oct 30	4:36	DE	W# 101	850	12	
P13 - P14	168	Oct. 30	5:00	DE	W# 101	850	12	
P14 - P15	63	Oct 31	8:15	DE	W# 101	850	10	
P15 - P16	65	Oct 31	8:26	JL	W# 102	850	10	
P16 - P17	68	Oct 31	8:30	DE	W# 101	850	10	
P17 - P18	69	Oct. 31	8:34	JL	W# 102	850	10	
P18 - P19	71	Oct. 31	8:43	DE	W# 101	850	10	
P19 - P20	74	Oct. 31	8:47	JL	W# 102	850	10	
P20 - P21	77	Oct 31	9 02	JL	W# 102	850	10	
P21 - P22	79	Oct 31	9 00	DE	W# 101	850	10	
P22 - P23	81	Oct 31	9:15	DE	W# 101	850	10	
P23 - P24	53	Oct. 31	9:30	DE	W# 101	850	10	
P24 - P25	26	Oct. 31	9:45	DE	W# 101	850	10	
P23 - P28	32	Oct 31	10 06	JL	W# 102	850	10	
P23 - P27	4	Oct 31	10:10	JL	W# 102	850	10	
P24 - P27	28	Oct 31	10:12	JL	W# 102	850	10	
P24 - P26	9	Oct 31	10 15	JL	W# 102	850	10	
P25 - P26	80	Oct 31	10:16	JL	W# 102	850	10	
P26 - P27	41	Oct 31	9:50	JL	W# 102	850	10	
P27 - P28	68	Oct 31	11:00	DE	W# 101	850	10	
P28 - P29	87	Oct 31	10:10	DE	W# 101	850	10	
P29 - P30	69	Oct 31	10:30	DE	W# 101	850	10	
P29 - P31	189	Oct 31	10:32	DE	W# 101	850	10	

National Lining Systems, Inc.

Seaming Log

Project Name: AmerEn, Ash Pond A **Project Number:** #1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P30-P31	22	Oct 31	10:43	JL	W#102	850	10	
P30-P32	69	Oct 31	11:05	DE	W#101	850	10	
P31-P32	189	Oct. 31	11:15	DE	W#101	850	10	
P32-P34	12	Oct. 31	10:26	LP	W#10	850	10	
P32-P33	933	Oct 31	10:27	LP	W#10	850	10	
P33-P34	22	Oct. 31	10:28	JL	W#102	850	10	
P22-P29	11	Oct. 31	10:51	JL	W#102	850	10	
P21-P29	22	Oct. 31	10:53	JL	W# 102	850	10	
P20-P29	17	Oct 31	11:14	LP	W#10	850	10	
P19-P29	22	Oct. 31	11:17	LP	W#10	850	10	
P18-P29	22	Oct 31	11:21	LP	W#10	850	10	
P17-P29	22	Oct. 31	11:24	LP	W#10	850	10	
P16-P29	22	Oct. 31	11:27	LP	W#10	850	10	
P15-P29	22	Oct 31	11:33	LP	W#10	850	10	
P14-P34	22	Oct. 31	11:37	LP	W#10	850	10	
P14-P32	22	Oct. 31	11:40	LP	W#10	850	10	
P14-P30	22	Oct. 31	11:43	LP	W#10	850	10	
P14-P29	22	Oct. 31	11:46	LP	W#10	850	10	
P33-P35	18	Nov. 1	8:30	JL	W# 102	850	9	
P33-P35	211	Nov. 1	8:36	JL	W#102	850	9	
P34-P35	10'	Nov 1	9:00	JL	W#102	850	9	
P35-P36	226	Nov. 1	8:32	DE	W#101	850	9	
P36-P37	185	Nov 1	9:06	JL	W#102	850	9	
P36-P38	35	Nov 1	9:30	JL	W#102	850	9	
P37-P38	22	Nov 1	9:07	DE	W#101	850	8	
P37-P39	185	Nov 1	9:15	DE	W#101	850	9	
P38-P39	35	Nov 1	9:35	DE	W#101	850	9	
P39-P40	203	Nov 1	9:40	JL	W#102	850	9	
P40-P41	192	Nov 1	9:45	DE	W#101	850	9	
P41-P42	61	Nov 1	10:16	JL	W#102	850	9	
P41-P43	123	Nov 1	10:24	JL	W#102	850	9	
P42-P43	19'	Nov 1	10:11	JL	W#102	850	8	
P42-P45	61	Nov 1	10:42	DE	W#101	850	9	
P43-P45	35	Nov 1	10:47	DE	W#101	850	9	
P43-P44	93	Nov 1	10:56	DE	W#101	850	9	
P44-P45	82	Nov 1	10:35	DE	W#101	850	9	

National Lining Systems, Inc.

Seaming Log

Project Name: AmeRen, Ash Prod A
Project Number: # 1000-332
QA/QC Name: Michelle Casimiro
Material Type: 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P45 - P46	171	Nov 1	10:40	JL	W# 102	850	9	
P46- P47	155	Nov 1	11:06	JL	W # 102	850	9	
P47- P49	117	Nov 1	11:25	DE	W # 101	850	9	
P48- P49	22	Nov 1	11:40	DE	W # 101	850	8	
P47- P48	26	Nov 1	11:42	DE	W# 101	850	9	
P49- P50	117	Nov 1	11:29	JL	W # 102	850	9	
P48- P50	26	Nov 1	11:41	JL	W # 102	850	9	
P14- P50	24	Nov 1	1:39	JL	W # 102	850	8	
P14- P49	24	Nov 1	1:42	JL	W # 102	850	8	
P14- P47	24	Nov 1	1:45	JL	W # 102	850	8	
P14- P46	24	Nov 1	1:49	JL	W # 102	850	8	
P14- P42	22	Nov 1	1:53	JL	W # 102	850	8	
P14- P41	22	Nov 1	1:57	JL	W # 102	850	8	
P14- P40	22	Nov 1	2:01	JL	W # 102	850	8	
P14- P39	22	Nov 1	2.05	JL	W # 102	850	8	
P14- P38	22	Nov 1	2:09	JL	W # 102	850	8	
P14- P36	22	Nov 1	2:13	JL	W # 102	850	8	
P14- P35	22	Nov 1	2:17	JL	W # 102	850	8	
P1- P51	449	Nov 1	1:30	DE	W # 101	850	10	
P51- P52	513	Nov 1	1:31	LP	W # 10	850	10	
P52- P53	504	Nov 1	2:15	DE	W # 101	850	10	
P53- P54	495	Nov 1	2:22	JL	W# 102	850	10	
P54- P55	484	Nov 1	2:46	LP	W # 10	850	10	
P55- P56	464	Nov 1	3:20	DE	W # 101	850	10	
P56- P57	450	Nov 3	9.00	SS	W # 12	455	8	
P57- P62	179	Nov 3	9:13	JL	W # 102	850	10	
P57- P58	251	Nov. 3	8.15	DE	W # 101	840	12	
P58- P62	22	Nov. 3	10:04	SS	W# 12	450	7	
P62- P63	170	Nov 3	9:20	DE	W # 101	850	10	
P59- P63	22	Nov 3	10.10	SS	W # 12	450	7	
P59- P62	9	Nov 3	9:35	DE	W # 101	840	12	
P58- P59	284	Nov 3	8:16	JL	W # 102	850	10	
P63- P64	190	Nov 3	9.44	JL	W # 20	450	10	
P59- P60	224	Nov 3	8.20	SS	W # 12	455	8	
P64- P65	159	Nov 3	9:05	DE	W # 101	840	12	
P60- P64	22	Nov 3	10.22	SS	W # 12	450	7	

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren, Ash Pond A

Project Number: #1000-332

QA/QC Name: Michelle Casimiro

Material Type: 40 mil

Seam No.	Length	Date	Time	Operator Int.	Machine No.	Set Temp.	Speed / Preheat	Comments
P60 - P61	204	Nov 3	8:48	DE	W#101	840	12	
P65- P65A	22	Nov 3	10:12	DE	W#101	840	8	
P61- P65A	22	Nov 3	10:27	SS	W#12	450	7	
P65- P66	159	Nov 3	10:06	JL	W#20	450	10	
P65A- P66	7	Nov 3	10:25	JL	W#20	450	10	
P61- P66	196	Nov 3	10:26	JL	W#20	450	10	
P66- P67	311	Nov 3	10:25	DE	W#101	840	12	
P67- P68	6	Nov 3	2:00	SS	W#12	450	9	
P67- P69	22	Nov 3	2:07	SS	W#12	450	9	
P67- P70	22	Nov 3	2:10	SS	W#12	450	9	
P67- P71	22	Nov 3	2:13	SS	W#12	450	9	
P67- P72	22	Nov 3	2:15	SS	W#12	450	9	
P67- P73	22	Nov 3	2:18	SS	W#12	450	9	
P67- P74	22	Nov 3	2:22	SS	W#12	450	9	
P67- P75	22	Nov 3	2:24	SS	W#12	450	9	
P67- P76	22	Nov 3	2:26	SS	W#12	450	9	
P67- P77	22	Nov 3	2:28	SS	W#12	450	9	
P67- P79	22	Nov 3	2:31	SS	W#12	450	9	
P67- P80	22	Nov 3	2:34	SS	W#12	450	9	
P67- P81	22	Nov 3	2:36	SS	W#12	450	9	
P68- P69	20	Nov 3	10:47	SS	W#12	450	9	
P69- P70	50	Nov 3	10:54	JL	W#20	450	10	
P70- P71	68	Nov 3	10:56	SS	W#12	455	8	
P71- P72	70	Nov 3	11:06	JL	W#20	450	10	
P72- P73	73	Nov 3	11:15	JL	W#20	450	10	
P73- P74	75	Nov 3	11:05	DE	W#101	840	12	
P74- P75	74	Nov 3	11:18	DE	W#101	840	12	
P75- P76	74	Nov 3	11:08	SS	W#12	455	8	
P76- P77	71	Nov 3	11:20	SS	W#12	455	8	
P71- P79	7	Nov 3	11:34	SS	W#12	455	8	
P77- P78	61	Nov 3	11:35	SS	W#12	455	8	
P78- P79	22	Nov 3	11:35	DE	W#101	840	8	
P79- P80	7	Nov 3	11:42	DE	W#101	840	12	
P78- P80	57	Nov 3	11:45	DE	W#101	840	12	
P80- P81	58	Nov 3	11:34	JL	W#20	450	10	
P81- P82	26	Nov 3	11:50	JL	W#20	450	8	

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren, Ash Pond A
Project Number: # 1000-332
QA/QC Name: Michelle Casimiro
Material Type: 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P81- P83	26	Nov 3	11:46	JL	W#20	450	8	
P82 - P83	24	Nov 3	11:41	JL	W#20	450	8	
P83- P84	52	Nov 3	1:35	DE	W# 101	850	12	
P84 - P85	56	Nov 3	1:50	DE	W# 101	850	12	
P85- P86	58	Nov 3	2:05	DE	W# 101	850	12	
P86- P87	60	Nov 3	1:47	LP	W #20	450	10	
P87- P88	28	Nov 3	2:19	LP	W #20	450	8	
P87- P89	34	Nov 3	2:14	LP	W #20	450	8	
P88- P89	29	Nov 3	2:08	LP	W #20	450	8	
P89- P90	63	Nov 3	2:28	LP	W#20	450	10	
P90- P92	11	Nov 3	2:25	DE	W# 101	850	12	
P90- P91	54	Nov. 3	2:27	DE	W# 101	850	12	
P91- P92	22	Nov 3	2:20	DE	W# 101	850	8	
P92- P93	13	Nov 3	2:43	LP	W#20	450	10	
P91- P93	54	Nov 3	2:46	LP	W#20	450	10	
P93- P94	68	Nov 3	2:45	DE	W# 101	850	12	
P94- P95	66	Nov 3	3:05	DE	W# 101	850	12	
P95- P96	65	Nov 3	3:25	DE	W# 101	850	12	
P96- P97	65	Nov 3	3:05	SS	W# 12	450	10	
P97- 99	42	Nov. 3	3:23	SS	W# 12	450	10	
P97- P98	21	Nov 3	3:27	SS	W# 12	450	10	
P98- P99	22	Nov 3	3:20	DE	W# 101	850	8	
P98- P100	17	Nov 3	3:28	LP	W#20	450	10	
P99- P100	35	Nov 3	3:25	LP	W#20	450	10	
P99 P101	10	Nov 3	3:36	SS	W# 12	450	10	
P100- 101	22	Nov 3	3:30	DE	W# 101	850	8	
P101 - 102	21	Nov 3	3:40	DE	W# 101	850	12	
P100 - 102	48	Nov 3	3:42	DE	W# 101	850	12	
P102 - 103	37	Nov 3	3:44	LP	W# 20	450	10	
P103 - 104	15	Nov 3	3:54	LP	W#20	450	8	
P67- P83	11	Nov 3	4:13	DE	W# 101	850	8	
P67- P84	23	Nov 3	4:16	DE	W# 101	850	8	
P67 P85	3	Nov 3	4:18	DE	W# 101	850	8	
P66- 85	16	Nov 3	4:19	DE	W# 101	850	8	
P66- 86	21	Nov 3	4:20	DE	W# 101	850	8	
P61- 87	23	Nov 3	4:22	DE	W# 101	850	8	

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren, Ash Pond A **Project Number:** #1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P61-P89	10	Nov 3	4:24	DE	W#101	850	8	
P60-P89	2	Nov 3	4:25	DE	W#101	850	8	
P60-P90	22	Nov 3	4:26	DE	W#101	850	8	
P60-P92	7	Nov 3	4:28	DE	W#101	850	8	
P59-P92	16	Nov 3	4:30	DE	W#101	850	8	
P59-P93	14	Nov 3	4:33	DE	W#101	850	8	
P58-P93	9	Nov 3	4:32	DE	W#101	850	8	
P58-P94	20	Nov 3	4:33	DE	W#101	850	8	
P57-94	2	Nov 3	4:34	DE	W#101	850	8	
P57-95	23	Nov 3	4:35	DE	W#101	850	8	
P57-96	5	Nov 3	4:37	DE	W#101	850	8	
P56-96	18	Nov 3	4:38	DE	W#101	850	8	
P56-97	13	Nov 3	4:40	DE	W#101	850	8	
P55-97	10	Nov 3	4:41	DE	W#101	850	8	
P55-99	21	Nov 3	4:42	DE	W#101	850	8	
P54-101	23	Nov 3	4:47	DE	W#101	850	8	
P53-104	17	Nov 3	4:42	SS	W#12	450	9	
P53-103	30	Nov 3	4:39	SS	W#12	450	9	
P53-102	30	Nov 3	4:35	SS	W#12	450	9	
P1-P2	187	Nov 4	8:50	SS	W#12	450	8	
P2-P3	204	Nov 4	8:55	JL	W#20	450	10	
P3-P4	218	Nov 4	9:21	JL	W#20	450	10	
P4-P5	237	Nov 4	9:30	SS	W#12	450	8	
P5-P6	232	Nov 4	9:30	DE	W#102	850	11	
P6-P7	59	Nov 4	10:00	JL	W#20	450	10	
P6-P7	179	Nov 4	10:15	JL	W#20	450	10	
P7-P8	259	Nov 4	9:58	SS	W#12	450	8	
P8-P9	254	Nov 4	10:40	JL	W#20	450	10	
P9-P10	251	Nov 4	11:23	JL	W#20	450	10	
P10-P11	253	Nov 4	11:33	SS	W#12	450	8	
P11-P12	261	Nov 4	11:55	DE	W#102	850	11	
P5-P105	12	Nov 4	11:06	SS	W#12	450	8	
P6-P105	22	Nov 4	10:58	SS	W#12	450	8	
P7-P105	14	Nov 4	11:05	SS	W#12	450	8	
P105-P106	8	Nov 4	11:04	SS	W#12	450	8	
P7-P106	22	Nov 4	10:44	SS	W#12	450	8	

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren, ash Pond A **Project Number:** # 1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P106- P107	20	Nov 4	10:48	SS	W# 12	450	8	
P8 - P107	22	Nov. 4	10:35	SS	W # 12	450	8	
P107- P108	30	Nov. 4	11:13	JL	W# 20	450	10	
P9- P108	22	Nov 4	11.13	SS	W# 12	450	8	
P9- P109	6	Nov. 4	11:48	JL	W# 20	450	9	
* P103- P102	42	Nov. 4	11:49	JL	W# 20	450	10	
P10- P109	22	Nov 4	11:16	SS	W# 12	450	8	
P109- P110	51	Nov. 4	11:29	SS	W# 12	450	8	
P 11- P110	22	Nov 4	11:21	SS	W # 12	450	8	
P 110- P112	44	Nov. 4	11:50	DE	W# 101	850	11	
P 12- P112	22	Nov. 4	2:00	DE	W# 20	450	8	
P 112- P113	25	Nov 4	2:29	SS	W# 12	450	8	
P 112- P114	11	Nov. 4	2:31	SS	W# 12	450	8	
P12- P114	22	Nov. 4	2:34	SS	W # 12	450	8	
P 12- P116	15	Nov. 4	2:44	SS	W #12	450	8	
P 13- P116	11	Nov 4	3:33	SS	W # 12	450	8	
P 13- P118	93	Nov 4	3:40	SS	W# 12	450	8	
P 13- P120	9	Nov. 4	3:41	SS	W# 12	450	8	
P 111- 121	22	Nov. 4	3.42	SS	W# 12	450	8	
P 113- 114	21	Nov. 4	2:11	SS	W# 12	450	8	
P 114- 115	44	Nov. 4	2:19	SS	W# 12	450	8	
P 115- 116	20	Nov. 4	2:40	DE	W # 20	450	8	
P 116- 118	16	Nov. 4	2:50	SS	W # 12	450	8	
P 115- 118	16	Nov. 4	2:52	SS	W# 12	450	8	
P 115- 117	27	Nov. 4	2:53	SS	W # 12	450	8	
P117- 118	22	Nov. 4	2:45	DE	W # 20	450	8	
P 118- 120	34	Nov. 4	3.06	SS	W # 12	450	8	
P 117- 119	23	Nov. 4	3:10	SS	W# 12	450	8	
P 119- 120	24	Nov. 4	2:55	DE	W # 20	450	8	
P 120- 121	55	Nov. 4	3:19	SS	W# 12	450	8	
P 12- P13	226	Nov. 4	1:44	DE	W# 20	450	10	
P 13- P14	110	Nov. 4	3:25	SS	W# 12	450	10	
P 52- 53	81	Nov. 3	3.57	LP	W# 20	450	10	
P 51- 52	90	Nov. 3	4:08	LP	W# 20	450	10	
P 1- 51	168	Nov. 4	9:30	DE	N 102	850	11	
P14- 111	22	Nov. 4	3:05	DE	W# 20	450	8	

National Lining Systems, Inc.

Seaming Log

Project Name: AmerEn, Ash Pond A **Project Number:** # 1000 - 332

QA/QC Name: Michelle Casamiro **Material Type:** 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P13- 111	80	nov. 4	3:18	DE	W#20	450	10	
P14- 125	24	nov 4	3:25	DE	W#20	450	8	
P14- 124	24	nov. 4	4:30	DE	W# 20	450	8	
P14- 123	24	nov. 4	4:34	DE	W# 20	450	8	
P14- 122	24	nov 4	4:38	DE	W # 20	450	8	
P125- 126	22	nov. 4	4:15	SS	W# 12	450	8	
P 124- 126	80	nov 4	4:13	SS	W# 12	450	10	
P 124- 125	17	nov. 4	4:16	SS	W#12	450	10	
P 123- 124	106	nov 4	4:10	DE	W# 20	450	10	
P 122- 123	116	nov. 4	3:54	SS	W# 12	450	10	
P 50- 122	127	nov 4	3:55	DE	W # 20	450	10	
P121- 127	55	nov. 9	3:03	JL	W# 20	450	9	
P 127- 128	56	nov. 9	2:11	JL	W # 20	450	9	
P 128- 129	64	nov. 9	1:57	JL	W # 20	450	9	
P 129- 130	75	nov. 9	1:44	JL	W# 20	450	9	
P 130. 131	33	nov. 9	2:47	JL	W# 20	450	9	
P 130- 132	44	nov. 9	2:52	JL	W# 20	450	9	
P 125- 130	8	nov. 9	2:26	JL	W# 20	450	9	
P 126- 131	33	nov. 9	2:27	JL	W # 20	450	9	
P 126- 132	45	nov. 9	2:32	JL	W# 20	450	9	
P 111- 127	22	nov 9	3:41	JL	W# 20	450	8	
P 111- 128	25	nov 9	3:43	JL	W# 20	450	8	
P 111- 129	15	nov. 9	3:47	JL	W # 20	450	8	
P14- 129	10	nov. 9	3:51	JL	W # 20	450	8	
P14- 130	19	nov. 9	3:54	JL	W# 20	450	8	
P 64- 65A	9	nov. 10	1:50	SS	GW 10	280	240	
P61- 64	5	nov 10	1:55	SS	G # 10	280	240	

Electronic Filing: Received, Clerk's Office 09/28/2020

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren ; Ash Pond A

Project Number: # 1000 - 332

QA/QC Name: Michelle Cassmiro

Material Type: 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P2- P133	417	Nov 11	10:12	JL	W# 12	450	6.5	
P 2. P134	31	Nov 11	10.06	JL	W# 12	450	6.5	
P 3. P133	417	Nov 11	8:49	JL	W# 12	450	6.5	
P 3. P134	31	Nov 11	9:57	JL	W# 12	450	6.5	
P 3. P135	94	Nov 11	1:32	JL	W# 12	450	6.5	
P 4- P135	94	Nov 11	11:37	JL	W# 12	450	6.5	
P3 P138	170	Nov 11	3:23	JL	W#12	450	6.5	
P4- P138	170	Nov 11	2.50	JL	W# 12	450	6.5	
P7- P139	122	Nov 11	3:59	JL	W# 12	450	6.5	
P8. P139	122	Nov 11	4.24	JL	W# 12	450	6.5	
P22- P137	81	Nov 11	2:00	DE	W# 20	450	7	
P 23- P137	81	Nov 11	1:40	DE	W# 20	450	7	
P29- P136	62	Nov. 11	11:40	DE	W#20	450	7	
P 31- P136	62	Nov. 11	11:59	DE	W# 20	450	7	
P7- 140	287	Nov. 12	8:48	JL	W# 12	450	6	
P 8. 140	287	Nov. 12	9:57	JL	W# 12	450	6	
P4- 141	109	Nov. 11	2:20	JL	W# 12	450	6.5	
P5. 141	109	Nov 11	2:00	JL	W# 12	450	6.5	

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: ameRen, Ash Pond A **Project Number:** #1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P13-P14	Oct 31	LP	A	8:56	9:01	35	35	P	0-54
P13-P14	Oct 31	LP	A	8:56	9:01	35	35	P	54-67
P13-P14	Oct 31	LP	A	9:05	9:10	35	35	P	67-240
P13-P14	Oct. 31	LP	A	9:14	9:19	35	34	P	240-255
P13-P14	Oct 31	LP	A	9:16	9:21	32	30	P	255-423
P12-P13	Oct 31	LP	A	9:26	9:31	35	34	P	0-16
P12-P13	Oct 31	LP	A	9:26	9:31	31	30	P	16-425
P11-P12	Oct 31	LP	A	9:34	9:39	31	30	P	0-133
P11-P12	Oct 31	LP	A	9:38	9:43	34	32	P	133 343
P10-P11	Oct 31	LP	A	9:43	9:48	34	34	P	0-428
P9-P10	Oct 31	LP	A	9:50	9:55	33	33	P	0-432
P8-P9	Nov 1	LP	A	7:27	7:32	32	32	P	0-433
P7-P8	Nov 1	LP	A	8:06	8:11	32	31	P	0-200
P7-P8	Nov 1	LP	A	8:45	8:50	32	31	P	200-237
P7-P8	Nov 1	LP	A	8:51	8:56	33	31	P	237-285
P7-P8	Nov 1	LP	A	9:01	9:06	33	31	P	318-355
P7-P8	Nov 1	LP	A	9:03	9:08	31	31	P	355-434
P6-P7	Nov 1	LP	A	8:15	8:20	34	34	P	0-56
P6-P7	Nov 1	LP	A	8:15	8:20	32	31	P	56-92
P6-P7	Nov 1	LP	A	8:23	8:28	35	35	P	92-176
P6-P7	Nov 1	LP	A	8:30	8:35	34	34	P	176-214
P6-P7	Nov 1	LP	A	9:46	9:51	34	33	P	214-296
P6-P7	Nov 1	LP	A	9:44	9:49	32	31	P	296-349
P6-P7	Nov 1	LP	A	9:33	9:38	33	33	P	349-372
P6-P7	Nov 1	LP	A	9:33	9:38	32	32	P	372-389 / 389-408 (cap)
P6-P7	Nov 1	LP	A	9:21	9:26	32	32	P	408-436
P5-P6	Nov 1	LP	A	9:55	10:00	32	32	P	0-440
P4-P5	Nov 1	LP	A	9:55	10:00	33	32	P	0-443
P3-P4	Nov 1	LP	A	10:17	10:22	33	33	P	0-170 / 170-444 (cap)
P2-P3	Nov 1	LP	A	10:06	10:11	34	33	P	0-17
P2-P3	Nov 1	LP	A	10:17	10:21	32	31	P	17-291
P2-P3	Nov 1	LP	A	11:10	11:15	35	34	P	291-337 (337-351 / cap)
P2-P3	Nov 1	LP	A	11:20	11:25	31	31	P	351-373
P2-P3	Nov 1	LP	A	11:11	11:16	32	31	P	373-440
P1-P2	Nov 1	LP	A	10:24	10:29	32	32	P	0-446
P40-P41	Nov 2	LP	A	10:44	10:49	35	34	P	

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren, Ash Pond A
Project Number: # 1000 - 332
QA/QC Name: Michelle Casimiro
Material Type: 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P39- P40	Nov 2	LP	A	11:05	11:10	32	32	P	
P 38 - P 39	Nov 2	LP	A	11:14	11:19	32	31	P	
P 37- P38	Nov 2	LP	A	11:21	11:26	33	33	P	
P37- P39	Nov 2	LP	A	11:21	11:26	33	32	P	
P36- P38	Nov 2	LP	A	11:30	11:35	34	32	P	0-7
P36- P38	Nov 2	LP	A	11:39	11:44	32	31	P	7- E.O.S
P 36- P37	Nov 2	LP	A	11:35	11:40	33	31	P	0-60
P36- P37	Nov 2	LP	A	8:43	8:48	30	30	P	60- 125
P36- P37	Nov 2	LP	A	8:55	9:00	29	28	P	125- E O S
P35- P36	Nov 2	LP	A	11:43	11:48	34	33	P	0-153
P35- P36	Nov 2	LP	A	8:58	9:03	31	30	P	153- E.O.S
P34- P35	Nov 2	LP	A	11:49	11:54	33	33	P	
P32- P34	Nov 2	LP	A	1:27	1:32	33	31	P	
P33-35	Nov 2	LP	A	1:12	1:17	32	32	P	0-209
P33- P35	Nov 2	LP	A	9:01	9:06	31	29	P	209- E O S
P33- 34	Nov 2	LP	A	1:12	1:17	32	32	P	
P32- 33	Nov 2	LP	A	1:30	1:35	35	34	P	
P30- 31	Nov 2	LP	A	8:03	8:08	30	30	P	
P29- 30	Nov 2	LP	A	1:46	1:51	31	28	P	
P14- P41	Nov 2	LP	A	10:33	10:38	34	32	P	
P14--40	Nov 2	LP	A	10:50	10:56	33	32	P	
P14- P39	Nov 2	LP	A	11:06	11:10	33	32	P	
P14- P38	Nov 2	LP	A	11:14	11:19	32	32	P	
P14- P36	Nov 2	LP	A	11:43	11:48	32	32	P	
P14- P35	Nov 2	LP	A	11:49	11:54	31	31	P	
P14- P34	Nov 2	LP	A	1:12	1:17	31	30	P	
P14- P32	Nov 2	LP	A	1:27	1:32	34	32	P	
P14- P30	Nov 2	LP	A	1:34	1:39	32	31	P	
P14- P29	Nov 2	LP	A	1:46	1:51	32	31	P	
P15 P29	Nov 2	LP	A	1:57	2:02	33	31	P	
P16- P29	Nov 2	LP	A	2:09	2:14	31	30	P	
P17- P29	Nov 2	LP	A	2:19	2:24	34	33	P	
P18- P29	Nov 2	LP	A	-	-	-	-	F	ND A.T > CAP 22'
P19- P29	Nov 2	LP	A	8:11	8:16	31	31	P	
P 20-29	Nov 2	LP	A	8:24	8:29	31	29	P	
P 21- P29	Nov 2	LP	A	8:33	8:38	29	26	P	

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren, Ash Pond A **Project Number:** # 1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P22-P29	Nov 2	LP	A	8:43	8:48	30	30	P	
P23-P28	Nov 2	LP	A	5:53	5:58	33	32	P	0-10
P23-P28	Nov 2	LP	A	4:09	4:14	32	31	P	10-E.O.S
P24-P27	Nov 2	LP	A	4:17	4:22	30	31	P	
P24-P26	Nov 2	LP	A	4:17	4:22	30	29	P	
P25-P26	Nov 2	LP	A	4:29	4:34	33	32	P	
P24-P25	Nov 2	LP	A	4:35	4:40	30	30	P	0-12 / 12-E.O.S cap 12
P26-P27	Nov 2	LP	A	4:19	4:24	32	29	P	0-21 / 21-E.O.S cap 21
P27-P28	Nov 2	LP	A	4:09	4:14	30	28	P	
P28-P29	Nov 2	LP	A	3:53	3:58	31	30	P	
P14-P15	Nov 2	LP	A	2:03	2:08	32	32	P	
P15-P16	Nov 2	LP	A	2:09	2:14	31	30	P	
P16-P17	Nov 2	LP	A	2:25	2:30	31	28	P	
P17-P18	Nov 2	LP	A	2:25	2:30	31	30	P	
P18-P19	Nov 2	LP	A	3:19	3:24	31	29	P	
P19-P20	Nov 2	LP	A	3:30	3:35	32	30	P	
P20-P21	Nov 2	LP	A	3:26	3:31	30	28	P	
P21-P22	Nov 2	LP	A	4:03	4:08	31	29	P	
P22-P23	Nov 2	LP	A	8:43	8:48	30	29	P	
P23-P24	Nov 2	LP	A	4:09	4:14	30	29	P	
P29-P31	Nov 3	LP	A	2:56	3:01	30	29	P	0-59
P29-P31	Nov 3	LP	A	9:28	9:33	30	30	P	59-79
P29-P31	Nov 3	LP	A	9:33	9:38	30	30	P	79-E.O.S
P41-P42	Nov 3	LP	A	8:37	8:42	31	29	P	0-28
P41-P42	Nov 3	LP	A	8:32	8:07	30	30	P	28-43
P41-P42	Nov 3	LP	A	8:22	8:27	28	27	P	43-E.O.S
P42-P43	Nov 3	LP	A	8:02	8:07	30	29	P	
P41-P43	Nov 3	LP	A	8:02	8:07	32	30	P	
P42-P45	Nov 3	LP	A	10:16	10:21	33	32	P	
P43-P45	Nov 3	LP	A	7:52	7:57	33	31	P	
P43-P44	Nov 3	LP	A	7:52	7:57	31	31	P	
P44-P45	Nov 3	LP	A	7:52	7:57	32	31	P	0-19
P44-P45	Nov 3	LP	A	8:04	8:09	31	31	P	19-E.O.S
P45-P46	Nov 3	LP	A	10:11	10:16	33	33	P	
P46-P47	Nov 3	LP	A	10:08	10:13	32	31	P	
P47-P49	Nov 3	LP	A	10:05	10:10	33	32	P	

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: AmerCen, Ash Pond A
Project Number: # 1000-332
QA/QC Name: Michelle Casimiro
Material Type: 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P49-P50	Nov 3	LP	A	9:48	9:53	33	31	P	
P48-P49	Nov 3	LP	A	7:32	7:37	32	30	P	
P47-48	Nov 3	LP	A	7:40	7:45	31	31	P	
P48-50	Nov 3	LP	A	7:32	7:37	31	31	P	
P14-49	Nov 3	LP	A	9:48	9:53	33	31	P	
P14-47	Nov 3	LP	A	9:54	9:59	35	34	P	
P14-46	Nov 3	LP	A	10:08	10:13	31	31	P	
P14-42	Nov 3	LP	A	10:28	10:33	33	32	P	
P67-68	Nov 4	LP	A	1:46	1:51	30	29	P	
P67-69	Nov 4	LP	A	2:45	2:50	30	30	P	
P67-70	Nov 4	LP	A	2:48	2:53	29	28	P	
P67-71	Nov 4	LP	A	2:56	3:01	30	29	P	
P67-72	Nov 4	LP	A	3:01	3:06	30	30	P	
P67-73	Nov 4	LP	A	3:08	3:13	29	29	P	
P67-74	Nov 4	LP	A	3:09	3.14	30	30	P	
P67-75	Nov 4	LP	A	2:53	2:58	30	30	P	
P67-76	Nov 4	LP	A	3:42	3:47	28	28	P	
P67-77	Nov 4	LP	A	3:42	3:47	30	30	P	
P67-79	Nov 4	LP	A	3:42	3:47	30	29	P	
P67-80	Nov 4	LP	A	3:58	4:03	30	30	P	
P67-81	Nov 4	LP	A	3:58	4.03	31	30	P	
P67-83	Nov 4	LP	A	4:09	4:14	29	29	P	
P67-84	Nov 4	LP	A	4:17	4:22	28	28	P	
P67-85	Nov 4	LP	A	4:17	4:22	29	29	P	
P66-85	Nov 4	LP	A	4:29	4:34	29	29	P	
P66-86	Nov 4	LP	A	4:29	4:34	30	29	P	
P61-87	Nov 5	LP	A	7:50	7:55	30	29	P	0-11
P61-87	Nov 5	LP	A	7:50	7:56	30	30	P	11-EOS
P87-89	Nov 5	LP	A	8:14	8:19	29	29	P	
P61-89	Nov 5	LP	A	8:08	8:13	30	29	P	
P60-90	Nov 5	LP	A	8:17	8:22	29	29	P	
P60-92	Nov 5	LP	A	8:20	8:25	29	28	P	
P59-92	Nov 5	LP	A	8:26	8:31	29	28	P	
P59-93	Nov 5	LP	A	8:44	8:49	30	29	P	
P58-93	Nov 5	LP	A	8:44	8:49	29	28	P	
P58-94	Nov 5	LP	A	9:15	9:20	30	30	P	

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren, Ash Pond A **Project Number:** # 1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P57-95	Nov 5	LP	A	9:15	9:20	28	28	P	
P57-96	-	-	-	-	-	-	-	-	5' cap
P56-96	NOV 5	LP	A	9:26	9:31	30	30	P	
P56-97	NOV 5	LP	A	9:30	9:35	29	29	P	
P55-97	Nov 5	LP	A	9:26	9:31	30	28	P	
P55-99	NOV 5	LP	A	1:59	2:04	29	29	P	
P54-101	NOV 5	LP	A	10:07	10:12	30	30	P	
P68-69	NOV 5	LP	A	2:45	2:50	31	31	P	
P69-70	Nov 5	LP	A	2:45	2:50	28	28	P	
P70-71	Nov 5	LP	A	2:56	3:01	30	29	P	
P71-72	Nov 5	LP	A	3:01	3:06	30	28	P	
P72-73	Nov 5	LP	A	3:05	3:10	30	29	P	
P73-74	Nov 5	LP	A	3:09	3:14	28	28	P	
P74-75	Nov 5	LP	A	3:12	3:17	29	29	P	
P75-76	Nov 5	LP	A	2:53	2:58	30	30	P	
P76-77	Nov 5	LP	A	3:42	3:47	30	29	P	
P77-78	Nov 5	LP	A	3:51	3:56	30	30	P	
P77-79	Nov 5	LP	A	3:51	3:56	31	30	P	
P78-80	Nov 5	LP	A	3:51	3:56	31	30	P	
P79-80	Nov 5	LP	A	3:58	4:03	29	28	P	
P78-79	Nov 5	LP	A	3:51	3:56	30	29	P	
P80-81	Nov 5	LP	A	3:58	4:03	30	29	P	
P81-82	Nov 5	LP	A	4:08	4:13	29	29	P	
P82-83	Nov 5	LP	A	4:08	4:13	29	29	P	
P83-84	Nov 5	LP	A	4:17	4:22	29	28	P	
P84-85	Nov 5	LP	A	4:17	4:22	30	30	P	
P85-86	Nov 5	LP	A	7:40	7:45	30	29	P	
P86-87	Nov 5	LP	A	7:50	7:55	29	29	P	
P87-88	Nov 5	LP	A	7:58	8:03	29	29	P	
P88-89	Nov 5	LP	A	7:58	8:03	29	28	P	
P89-90	Nov 5	LP	A	8:08	8:13	31	30	P	0-12
P89-90	Nov 5	LP	A	8:17	8:22	30	30	P	12-EOS
P90-92	Nov 5	LP	A	8:17	8:22	29	28	P	
P92-93	Nov 5	LP	A	8:32	8:37	28	28	P	
P90-91	Nov 5	LP	A	8:23	8:28	29	29	P	0-41
P90-91	Nov 5	LP	A	8:36	8:41	30	30	P	41-EOS

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren. Ash Pond A
QA/QC Name: Michelle Casimiro
Project Number: # 1000 - 332
Material Type: 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P91-93	Nov 5	LP	A	8:32	8:37	30	29	P	
P93-94	Nov 5	LP	A	8:48	8:53	28	28	P	0-33
P93-94	Nov 5	LP	A	8:58	9:03	30	30	P	33- E.O.S
P94-95	Nov 5	LP	A	9:15	9:20	29	29	P	
P95-96	Nov 5	LP	A	9:15	9:20	29	28	P	
P96-97	Nov 5	LP	A	9:27	9:32	30	29	P	
P97-99	Nov 5	LP	A	9:36	9:41	29	28	P	
P97-98	Nov 5	LP	A	9:36	9:41	29	28	P	
P98-100	Nov 5	LP	A	9:43	9:48	28	28	P	
P98-99	Nov 5	LP	A	9:36	9:41	29	28	P	
P99-100	Nov 5	LP	A	9:43	9:48	30	28	P	0-23
P99-100	Nov 5	LP	A	9:59	10:04	29	28	P	23- E.O.S
P99-101	Nov 5	LP	A	-	-	-	-	-	10' cap no A.T
P100-[illegible]	Nov 5	LP	A	10:06	10:11	29	29	P	
P101-102	[illegible]	LP	A	10:06	10:11	30	29	P	
P100-102	Nov 5	LP	A	9:56	10:01	28	28	P	0-24
P100-102	Nov 5	LP	A	9:55	10:00	30	29	P	24-34
P100-102	Nov 5	LP	A	9:53	9:58	30	29	P	34-E O.S
P102-103	Nov 5	LP	A	7:30	7:35	29	28	P	
P103-104	Nov 5	LP	A	7:30	7:35	30	30	P	
P53-102	Nov 5	LP	A	10:10	10:15	31	30	P	
P53-103	Nov 5	LP	A	7:30	7:35	30	29	P	
P53-104	Nov 5	LP	A	7:30	7:35	29	29	P	
P1-51	Nov 4	LP	A	8:02	8:07	29	28	P	0-12
P1-51	Nov 4	LP	A	8:02	8:07	30	30	P	12-24
P 1-51	Nov 4	LP	A	10:35	10:40	29	28	P	24-392 / 392-403 cap
P 1-51	Nov 4	LP	A	10:35	10:40	30	30	P	403-451
P1-51	Nov 4	LP	A	7:48	7:53	31	31	P	451-515
P1-51	Nov 4	LP	A	7:48	7:53	30	30	P	515-531
P1-51	Nov 4	LP	A	7:58	8:03	30	29	P	531-568
P1-51	Nov 4	LP	A	7:58	8:03	29	29	P	568-576
P1-51	Nov 4	LP	A	7:58	8:03	29	28	P	576-595
P1-51	Nov 4	LP	A	7:58	8:03	30	30	P	595- E.O.S
P51-52	Nov 4	LP	A	7:53	7:58	31	31	P	0-97
P51-52	Nov 4	LP	A	10:45	10:50	30	29	P	97-513
P51-52	Nov 4	LP	A	7:41	7:46	28	28	P	513-524

National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren - Ash Pond A
Project Number: # 1000-332
QA/QC Name: Michelle Cassmire
Material Type: 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P51-52	Nov 4	LP	A	7:46	7:51	30	29	P	524- E O S
P52-53	Nov 4	LP	A	7:57	8:02	30	29	P	0-40
P52-53	Nov 4	LP	A	7:33	7:38	30	30	P	40-88
P52-53	Nov 4	LP	A	11:04	11:09	29	28	P	88-332
P52-53	Nov 4	LP	A	11:02	11:07	30	30	P	332-377
P52-53	Nov 4	LP	A	10:51	10:56	29	29	P	377-504
P52-53	Nov 4	LP	A	7:41	7:46	30	30	P	504-E O S
P53-54	Nov 4	LP	A	11:27	11:32	28	28	P	0-185
P53-54	Nov 4	LP	A	11:16	11:21	29	29	P	185- E.O.S.
P54-55	Nov 4	LP	A	11:31	11:36	30	28	P	
P55-56	Nov 4	LP	A	11:30	11:35	31	30	P	0-62 162-74 (cap)
P55-56	Nov 4	LP	A	7:28	7:33	31	31	P	74-200
P55-56	Nov 4	LP	A	7:41	7:46	30	28	P	200- E.O.S.
P56-57	Nov 4	LP	A	1:17	1:22	30	29	P	
P57-62	Nov 4	LP	A	1:09	1:14	30	30	P	
P62-63	Nov 4	LP	A	1:50	1:55	28	28	P	
P63-64	Nov 4	LP	A	1:50	1:55	29	29	P	
P64-65	Nov 4	LP	A	2:21	2:26	28	27	P	
P65-66	Nov 4	LP	A	1:24	1:29	29	28	P	0-112
P65-66	Nov 4	LP	A	1:53	1:58	30	29	P	112- E O S
P58-62	Nov 4	LP	A	1:09	1:14	31	31	P	
P59-62	Nov 4	LP	A	1:33	1:38	29	28	P	
P57-58	Nov 4	LP	A	1:09	1:14	30	29	P	
P58-59	Nov 4	LP	A	8:44	8:49	30	28	P	0-8
P58-59	Nov 4	LP	A	8:58	9:03	28	28	P	8-28
P58-59	Nov 4	LP	A	9:07	9:12	29	28	P	28-37
P58-59	Nov 4	LP	A	1:31	1:36	30	30	P	37-131
P58-59	Nov 4	LP	A	1:31	1:36	30	29	P	131-192
P58-59	Nov 4	LP	A	1:39	1:44	29	28	P	192- E O S.
P59-63	Nov 4	LP	A	1:43	1:48	29	29	P	
P59-60	Nov 4	LP	A	2:16	2:21	28	28	P	0-27
P59-60	Nov 4	LP	A	2:24	2:29	30	30	P	27-E O S
P60-64	Nov 4	LP	A	2:00	2:05	30	30	P	
P60-61	Nov 4	LP	A	2:24	2:29	29	29	P	
P66-65A	Nov 4	LP	A	2:33	2:38	28	28	P	
P64-65A	Nov 4	LP	A	-	-	-	-	-	cap

National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren, Ash Pond A **Project Number:** # 1000 - 332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P65-65A	Nov 4	LP	A	2:16	2:21	30	30	P	
P65A-61	Nov 4	LP	A	–	–	–	–	–	cap 22'
P61-66	Nov 4	LP	A	0:33	2:38	30	28	P	
P66-67	Nov 4	LP	A	4:29	4:34	30	29	P	0-133
P66-67	Nov 4	LP	A	2:35	2:40	28	28	P	133-182
P66-67	Nov 4	LP	A	1:24	1:29	30	29	P	182-E.O.S
P1-2	Nov 7	LP	A	8:10	8:15	31	30	P	446-E.O.S
P2-3	Nov 7	LP	A	8:10	8:15	29	28	P	445-E.O.S
P3-4	Nov 7	LP	A	8:10	8:15	30	29	P	446-E.O.S
P4-5	Nov 7	LP	A	8:10	8:15	29	29	P	445-E.O.S
P5-6	Nov 7	LP	A	8:23	8:28	31	31	P	440-497
P5-6	Nov 7	LP	A	8:23	8:28	29	29	P	497-508
P5-6	Nov 7	LP	A	8:23	8:28	30	30	P	508-519
P5-6	Nov 7	LP	A	8:23	8:28	30	29	P	519-575
P5-6	Nov 7	LP	A	8:36	8:41	30	30	P	575-606
P5-6	Nov 7	LP	A	8:36	8:41	29	28	P	606-644
P5-6	Nov 7	LP	A	8:36	8:41	31	30	P	644-670
P5-6	Nov 7	LP	A	8.47	8:52	29	28	P	670-E.O.S
P6-7	Nov 7	LP	A	9:10	9:15	31	30	P	436-497
P6-7	Nov 7	LP	A	9:06	9:11	30	29	P	497-E.O.S.
P7-8	Nov 7	LP	A	8.56	9.01	29	29	P	434-E.O.S
P8-9	Nov 7	LP	A	9:08	9:13	30	29	P	435-600
P8-9	Nov 7	LP	A	9:19	9:24	28	28	P	600-E.O.S
P9-10	Nov 7	LP	A	9:24	9.29	29	28	P	433-E.O.S
P10-11	Nov 7	LP	A	9:29	9:34	30	30	P	429-E.O.S
P11-12	Nov 7	LP	A	9:44	9:49	29	28	P	430-E.O.S
P12-13	Nov 7	LP	A	10:44	10:49	29	28	P	425-E.O.S
P13-14	Nov 7	LP	A	11:39	11:44	30	29	P	423-486
P13-14	Nov 7	LP	A	11:39	11:44	31	31	P	486-498 / 498-509(cap)
P13-14	Nov 7	LP	A	2:06	2:11	30	29	P	509-E.O.S.
P13-111	Nov 7	LP	A	11:30	11:35	29	29	P	0-67
P13-111	Nov 7	LP	A	11:30	11:35	28	27	P	67-E.O.S.
P14-111	Nov 7	LP	A	11:32	11:37	29	29	P	
P112-113	Nov 7	LP	A	2:29	2:34	30	30	P	
P112-114	Nov 7	LP	A	11:01	11:06	30	30	P	
P12-114	Nov 7	LP	A	10:36	10:41	31	30	P	

National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Amcken, Ash Pond A **Project Number:** #1000-832

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P12-116	Nov. 7	LP	A	10:44	10:49	30	30	P	
P13-116	Nov 7	LP	A	11:01	11:06	29	29	P	
P113-114	Nov 7	LP	A	10:36	10:41	29	29	P	
P114-115	Nov 7	LP	A	10:44	10:49	30	28	P	
P115-117	Nov 7	LP	A	10:52	10:57	30	29	P	
P115-116	Nov 7	LP	A	10:44	10:49	28	28	P	
P115-118	Nov 7	LP	A	10:52	10:57	28	28	P	
P116-118	Nov 7	LP	A	10:52	10:57	31	30	P	
P117-118	Nov 7	LP	A	10:52	10:57	30	28	P	
P117-119	Nov 7	LP	A	11:10	11:15	30	29	P	
P118-120	Nov 7	LP	A	11:10	11:15	30	30	P	
P119-120	Nov 7	LP	A	11:10	11:15	29	29	P	
P120-121	Nov 7	LP	A	11:12	11:17	30	30	P	
P13-118	Nov 7	LP	A	11:01	11:06	28	28	P	
P13-120	Nov 7	LP	A	11:01	11:06	29	28	P	
P111-121	Nov 7	LP	A	11:30	11:35	28	28	P	
P14-125	Nov 7	LP	A	1:24	1:29	29	28	P	
P14-124	Nov 7	LP	A	1:24	1:29	30	28	P	
P14-123	Nov 7	LP	A	1:15	1:20	29	29	P	
P14-122	Nov 7	LP	A	1:15	1:20	29	28	P	
P125-126	Nov 7	LP	A	1:31	1:36	30	29	P	
P124-125	Nov 7	LP	A	1:24	1:29	30	29	P	
P124-126	Nov 7	LP	A	1:31	1:36	28	28	P	
P123-124	Nov 7	LP	A	1:24	1:29	30	29	P	
P122-123	Nov 7	LP	A	1:15	1:20	30	29	P	
P50-122	Nov 7	LP	A	1:15	1:20	30	30	P	
P6-105	Nov 7	LP	A	9:06	9:11	31	31	P	
P5-105	Nov 7	LP	A	8:36	8:41	28	28	P	
P7-105	Nov 7	LP	A	8:47	8:52	30	30	P	
P105-106	Nov 7	LP	A	8:47	8:52	30	29	P	
P7-106	Nov. 7	LP	A	8:47	8:52	29	28	P	
P106-107	Nov 7	LP	A	9:01	9:06	29	28	P	
P8-107	Nov 7	LP	A	8:56	9:01	30	30	P	
P107-108	Nov 7	LP	A	8:56	9:01	28	28	P	
P9-108	Nov 7	LP	A	9:19	9:24	30	30	P	
P9-109	Nov 7	LP	A	9:14	9:19	30	29	P	

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National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren. Ash Pond A **Project Number:** # 1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P 108 - 109	nov 7	LP	A	9:19	9:24	28	27	P	
P 10 - 109	nov 7	LP	A	9:29	9:34	30	30	P	
P 109 - 110	nov 7	LP	A	9:29	9:34	28	28	P	
P 11 - 110	nov 7	LP	A	9:44	9:49	30	30	P	
P 12 - 110	nov 7	LP	A	9:44	9:49	30	30	P	
P 110 - 112	nov 7	LP	A	9:54	9:59	30	30	P	
P 12 - 112	nov 7	LP	A	10:36	10:41	30	29	P	
P81 - 83	nov 11	LP	A	4:08	4:13	30	30	P	
P 121 - 127	nov 9	LP	A	3:30	3:35	30	30	P	
P 128 - 129	nov 9	LP	A	2:25	2:30	29	29	P	
P 129 - 130	nov 9	LP	A	2:25	2:30	29	28	P	0-26
P 129 - 130	nov 9	LP	A	2:25	2:30	30	30	P	26-E.O.S.
P 125 - 130	nov 9	LP	A	4:07	4:12	28	28	P	
P 130 - 131	nov 9	LP	A	3:08	3:13	29	29	P	
P 131 - 132	-	-	-	-	-	-	-	-	cap 4'
P 130 - 132	nov 9	LP	A	3:08	3:13	29	28	P	
P 126 - 131	nov 9	LP	A	3:14	3:19	31	30	P	
P 126 - 132	nov 9	LP	A	3:14	3:19	29	29	P	
P 111 - 127	nov 9	LP	A	3:58	4:03	30	29	P	
P 111 - 128	nov 9	LP	A	3:58	4:03	29	29	P	
P 111 - 129	nov 9	LP	A	3:58	4:03	30	29	P	
P 14 - 129	nov 9	LP	A	3:58	4:03	29	28	P	
P 14 - 130	nov 9	LP	A	4:07	4:12	31	30	P	
P 2 - P 133	nov 11	LP	A	11:47	11:52	29	29	P	
P 2 - P 134	nov 11	LP	A	1:05	1:10	30	30	P	0-20
P 2 - 134	nov 11	LP	A	1:05	1:10	30	29	P	20-E.O.S
P 3 - 133	nov 11	LP	A	11:47	11:52	29	28	P	
P 3 - 134	nov. 11	LP	A	1:05	1:10	28	28	P	
P 3 - 135	nov 11	LP	A	1:52	1:57	30	30	P	
P 4 - 135	nov 11	LP	A	12:57	1:02	30	29	P	
P 3 - 138	nov 11	LP	A	3:52	3:57	31	30	P	
P 4 - 138	nov 11	LP	A	3:40	3:45	29	28	P	0-55
P 4 - 138	nov 11	LP	A	3:40	3:45	30	30	P	55-86
P 4 - 138	nov 11	LP	A	3:40	3:45	28	28	P	86-95
P 4 - 138	nov 11	LP	A	3:40	3:45	29	29	P	95-E.O.S
P 7 - 139	nov 11	LP	A	4:27	4:32	30	30	P	

National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren, Ash Pond A **Project Number:** # 1000 - 332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P8 - P139	Nov 11	LP	A	4:44	4:49	29	29	P	
P28 - 137	Nov. 11	LP	A	2:42	2:47	28	28	P	0-11
P 28 - 137	Nov. 11	LP	A	2:35	2:40	30	29	P	11 - E.O.S
P 82 - 137	Nov 11	LP	A	2:35	2:40	30	29	P	0-29
P 22 - 137	Nov 11	LP	A	2:35	2:40	29	28	P	29-56
P 22 - 137	Nov 11	LP	A	2:35	2:40	29	29	P	56 - E.O.S.
P 89 - 136	Nov. 11	LP	A	2:06	2:11	29	29	P	
P 31 - 136	Nov 11	LP	A	2:06	2:11	30	29	P	
P 4 - 141	Nov 11	LP	A	8:00	8:05	29	29	P	
P 5 - 141	Nov 11	LP	A	8:00	8:05	30	30	P	
P 7 - 140	Nov. 12	LP	A	9:44	9:49	30	30	P	
P 8 - 140	Nov. 12	LP	A	10:59	11:04	28	27	P	
P 14-50	Nov 3	LP	A	7:29	7:34	31	30	P	0 - 7
14-50	Nov 3	LP	A	-	-	-	-	-	7 - E.O.S (gap) R-50
P 31-32	Nov 3	LP	A	7:30	7:35	29	29	P	
P 91-92	Nov 5	LP	A	8:23	8:28	30	30	P	
P 127 - 128	Nov 9	LP	A	2:25	2:30	30	30	P	

National Lining Systems, Inc.

Destructive Test Log

Page: ____ of 1

Project Name: AmeRen - Ash Pond A
QA/QC Name: Michelle Casimiro

Project Number: # 1077-332
Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear
Extrusion (PPI) 52 Min. Peel 80 Min. Shear

DS No.	Date	Seam No.	Op. Int	Mch No.	Location	Peel	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	Result P=Pass F= Fail
1	Nov 12	P2 / P1	LP	W# 10	P1/P2 @ 275	74 75	94 96	84 92	80 95	90 93		130	125	120	140	120	P
2	Nov 12	P3 / P2	DE	W# 101	P2/P3 @ 23												F
3	Nov 12	P4 / P3	JL	W# 102	P1/P3 @ 400'							CAP					F
4	Nov 12	P5 / P4	LP	W# 10	P4/P5 @ 340												F
4a	Nov 12	P4 / P5	LP	W# 10		80 82	88 92	85 91	86 78	78 82		105	118	102	111	109	P
4B	Nov 12	P4 / P5	LP	W# 10													F
5	Nov 12	P5 / P6	JL	W# 102	P5/P6 @ 340'	86 86	100 91	100 97	94 82	90 92		117	120	125	118	119	P
6	Nov 12	P6 / P7	DE	W# 101	P6/P7 @ 275'	97 102	96 100	101 103	95 89	103 89		117	118	130	135	120	P
7	Nov 12	P7 / P8	LP	W# 10	P7/P8 @ 420							CA	P				F
8	Nov 12	P8 / P9	DE	W# 101	P8/P9 @ 367	84 86	98 88	86 90	86 90	85 82		101	109	112	110	101	P
9	Nov 12	P9 / P10	JL	W# 102	P9/P10 @ 410	71 94	76 73	79 84	85 83	78 79		113	108	119	113	110	P
10	Nov 12	P11 / P12	DE	W# 101	P11/P10 @ 300	94 92	84 93	88 94	78 89	95 82		111	109	108	107	111	P
11	Nov 12	P10 / P11	JL	W# 102	P10/P11 @ 10	96 94	91 85	93 90	96 81	93 80		112	109	118	113	112	P
12	Nov 12	P10 / P12	JL	W# 102	P12/P13 @ 30	96 85	93 93	92 91	90 92	92 94		109	120	123	106	107	P

Peel / Shear = Pounds Per Inch W **Weld Type**= F - Fusion / Ex **Material Type**= T- Textured/ S- Smooth

National Lining Systems, Inc.

Destructive Test Log

Page: ____ of 2

Project Name: Ameren - Ash Pond A

QA/QC Name: Michelle Casmiro

Project Number: # 1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

DS No.	Date	Seam No.	Op. Int	Mch No.	Location	Peel	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	Result P=Pass F= Fail
13	Nov/2	P13/P14	D.E	W#101	P13/P14 @ 200	87 86	90 82	90 92	86 85	85 91		101	101	107	104	109	P
14	Oct/31	P22/23	D.E	W#101	P22/P23 @ 50	80 66	80 82	74 84	95 93	86 83		105	109	99	103	91	P
15	Oct/31	P29/31	D.E	W#101	P29/31 @ 20	90 87	78 77	97 84	94 88	96 86		SAMPLE PEELED					F
15A	Oct/31	P30/32	DE	W#101		103 93	85 90	85 92	85 90	102 95		107	111	104	110	110	P
15B	Oct/31	P29/31	DE	W#101		107 113	108 96	114 107	103 105	116 110		117	100	98	102	119	P
16	Oct/31	P23/28	J.L	W#102	P23/28 @ 15	88 101	99 93	86 91	96 100	96 79		91	115	98	120	103	P
17	Oct/31	P29/17	LP	W#10	P29/17 @ 10	86 90	98 103	84 90	93 98	90 94		114	99	109	98	101	P
18	Oct/31	P36/37	J.L	W#102	P36/37 @ 89	93 75	71 70	98 98	86 81	96 86		110	107	108	99	112	P
19	Nov/3	P41/43	J.L	W#102	P41/43 @ 25	87 89	73 97	88 94	89 92	92 87		105	100	108	110	111	P
20	Nov/3	P14/50	J.L	W#102	P14/50 @ 12	98 84	106 85	99 86	99 81	95 88		99	99	105	107	101	P
21	Nov/3	P53/54	J.L	W#102	P53/54 @ 100	90 95	86 84	85 76	96 101	85 97		109	104	111	104	107	P
22	Nov/2	P37/38	D.E	W#101	P37/38 @ 12'	101 88	99 93	114 105	109 81	110 95		104	107	103	105	103	P
23	Nov/3	P43/45	DE	W#101	P43/45 @ 20'	SAMPLE PEELED											F
23A	Nov/10	P43/45	DE	W#101		100 101	86 93	93 102	89 90	99 98		103	102	94	109	120	P

Peel / Shear = Pounds Per Inch Width

National Lining Systems, Inc.

Destructive Test Log

Project Name: AmeRen, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: #1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 50' Min. Peel 80 Min. Shear

DS No.	Date	Seam No.	Op. Int	Mch No.	Location	Peel	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	Result P=Pass F= Fail
23 B	nov/1	P43/45	DE	W#101		91 99	90 86	106 183	97 87	92 87							F
24	nov/4	P1/51	DE	#101	P1/51 @ 250	83 85	81 93	99 84	82 86	93 78		105	101	110	100	108	P
25	nov/4	P52/53	DE	#101	P52/53 @ 490	96 88	88 82	91 84	91 89	83 86		100	101	110	103	109	P
26	nov/4	P51/52	LP	#10	P51/52 @ 400	97 80	77 82	91 86	86 68	95 84		108	100	109	99	106	P
27	nov/4	P54/55	LP	#10	P54/55 @ 250	74 78	89 89	80 82	98 82	70 93		111	102	112	100	103	P
28	nov/4	P55/56	DE	#101	P55/56 @ 100	82 89	91 91	88 85	92 90	95 87		108	102	108	101	105	P
29	nov/4	P55/56	J.L	#102	P55/56 @ 420'	87 91	74 92	92 87	66 66	85 91		111	103	104	114	114	P
30	nov/2	P3/005	SS	~~G~~#10	DX	89	89	87	68	93		94	107	101	102	93	P
31	nov/9	60/61	DE	W#101		103 95	91 94	94 104	100 112	96 87		122	129	124	125	127	P
32	nov/4	58/59	JL	W#102	P58/59 @ 150'	82 89	88 77	85 90	89 79	84 92		111	100	112	101	112	P
33	nov/4	P65/66	JL	W#20	P65/66 @ 100	92 91	95 89	91 97	95 88	87 95		108	100	112	105	101	P
34	nov/9	P82/81	JL	W#20	P81/82 @ 15'	88 96	93 82	90 95	89 92	94 86		128	125	136	130	122	P
35	nov/4	P66/67	D.E	W#101	P66/67 @ 100'	94 92	97 96	98 94	94 96	103 92		116	105	116	107	114	P
36	nov/3	P78/80	D.E	W#101	P78/80 @ 30'	103 99	105 95	96 94	97 105	91 101		124	126	123	122	122	P

Peel / Shear = Pounds Per Inch Width

National Lining Systems, Inc.

Destructive Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casamira

Project Number: 41 1000-332

Material Type: 40 mil

Fusion (PPI) 60 Min. Peel 80' Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

DS No.	Date	Seam No.	Op. Int	Mch No.	Location	Peel	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	Result P=Pass F= Fail
37	nov/7	P102/100	DE	W#101	P100/102 @ 20'	92 101	89 98	110 95	90 92	97 98		121	127	123	119	127	P
38	nov/7	P54/101	DE	W#101	P54/101 @ 10'	109 110	95 93	98 104	100 100	96 93		105	105	97	106	98	P
39	nov/4	P56/57	J.L	W#102	P56/57 @ 50'	87 91	74 92	92 87	66 66	85 91		111	103	104	114	114	P
40	nov/7	P75/76	S.S	W#12	P75/76 @ 40'	88 92	82 93	85 92	81 94	94 97		104	105	120	122	121	P
41	11/7	P67/75	SS	#12	P67/75 @ 10'	89 89	85 94	89 89	94 98	98 89		114	104	111	105	109	P
42	11/7	P87/88	LP	#20	P87/88 @ 15'	100 91	98 96	92 88	97 89	94 93		122	124	115	120	123	P
43	11/7	P52/53	LP	#20	P52/53 @ 40'	98 92	91 89	95 88	87 87	91 91		125	112	118	112	115	P
44	11/7	P3/4	JL	#20	P3/4 @ 50'	96 92	84 93	92 87	84 91	84 82		120	114	113	113	102	P
45	11/7	P8/9	JL	#20	P8/9 @ 100	98 91	91 87	93 91	88 96	81 84		124	115	122	117	123	P
46	11/7	P108/109	JL	#20	P108/109 @ 15'	100 92	97 83	96 100	89 93	92 89		126	117	128	127	120	P
47	11/7	P5/6	DE	#101	P5/6 @ 100	86 111	85 102	99 103	87 92	83 96		129	131	122	120	127	P
48	11/7	P14/111	DE	#20	P14/111 @ 10'	105 92	104 86	103 100	90 97	102 101		124	130	126	122	124	P
49	11/7	P14/122			P14/122 @ 10'	102 86	81 84	96 101	86 84	104 84		127	129	124	122	124	P
50	11/7	P4/5	SS	#12	P4/5 @ 150'	100 86	91 92	84 99	95 99	86 80		125	107	122	110	128	P

Peel / Shear = Pounds Per Inch Width

National Lining Systems, Inc.

Destructive Test Log

Page: ____ of 3

Project Name: _____

QA/QC Name: _____

Project Number: _____

Material Type: _____

Fusion (PPI) 60 Min. Peel 80 Min. Shear

Extrusion (PPI) 52 Min. Peel 80 Min. Shear

DS No.	Date	Seam No.	Op. Int	Mch No.	Location	Peel	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	Shear	Result P=Pass F= Fail
51	Nov/7	P9/108	SS	W#12	P9/108 @ 10'	87 115	109 94	97 84	86 90	120 117		123	127	131	126	124	F
52	Nov/7	P12/13	SS	W#12	P12/13 @ 200'	100 98	94 85	99 92	90 94	93 96		125	120	133	127	118	P
53	Nov/7	P118/120	SS	W#12	P118/120 @ 10'	101 87	91 98	106 110	99 89	100 105		126	131	128	126	130	P
54	11/10	P2D/3D	DE	#20	P2D/3D @ 10	101 89	91 98	106 110	100 105	99 89		126	131	128	126	130	P
55	11/10	P9D/10D	JL	#12	P9D/10D @ 30	103 82	87 82	108 75	82 61	91 97		115	133	109	102	117	P
56	11/10	APD/8D	SS	#10	Ash Prod D/8D DX	109	101	98	105	85		123	109	124	115	105	P
57	11/10	121/127	JL	#20	P121/127 @ 25'	94 88	78 81	80 85	87 75	92 88		108	110	114	112	114	P
58	11/10	3/133	|	|		90 98	70 88	84 81	88 90	88 92		118	103	118	104	120	P
59	11/11	2/133	JL	#12		79 87	84 89	96 80	94 85	84 89		109	120	114	102	115	P
60	11/11	31/136	DE	#20	69'W	—	—	—	—	—							Fail
61	11/11	4/138	JL	#12		80 86	81 91	86 97	85 97	9 91		118	121	123	126	128	P
14-A	11/10	22/23	DE	#101	under R 375	92 94	84 72	85 88	86 81	90 85		102	111	113	109	114	P
51-A	11/10	9/108	SS	#12		104 110	103 98	111 105	90 98	110 105		108	80	100	98	113	P
51-B	11/10	9/108	|	|		102 101	98 93	104 108	103 96	110 108		104	84	119	104	108	P

Peel / Shear = Pounds Per Inch Width

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National Lining Systems, Inc.

Destructive Test Log

Project Name: _____ **Project Number:** 6

QA/QC Name: _____ **Material Type:** _____

Fusion (PPI) 60 Min. Peel 80 Min. Shear **Extrusion (PPI)** 52 Min. Peel 80 Min. Shear

DS No.	Seam No.	Test Date	Tester Int.	Weld Type	Operator Int.	Machine No.	Peel	Peel	Peel	Peel	Peel	Peel	Shear	Shear	Shear	Shear	FTP Result	Result P=Pass F= Fail
63	140/8	11-12	DC	T/T	JL	#12	96 97	85 98	98 96	95 87	95 95		122 91	90	102	122 T	P	
69	140/7			S/T	JL	#12	91 87	87 94	100 90	82 85	100 90		113	102	W/O	108	P	
60A	137/22			T/T	DE	#20	86 90	99 89	73 74	86 73	89 95		127 133	130	124	128	P	
60B	136/31			T/T	DE	#20	89 95	99 104	113 102	88 96	98 92		117 130	113	121	124	P	
1982	21/22			SS	DE	#101	101 100	85 109	92 112	74 91	15 100		127	106	102		P	
4982	14/125			STT	DE	#20	88 108	76 70	89 102	79 96	71 98		120 96	99	114	108	P	
3A	4/5			SS	JL	#102	112 96	109 89	105 102	85 89	91 89		109 122	122	118	122	P	
48A	13/111	nov 10	DC	S/S	DE	#20	88 88	80 80	90 82	81 83	75 81		114	101	104	101	P	
DS4981	14/124	nov 12	DC		DE	#20	—	—	—	—	—						F	
DS-62	9/139	nov 12	DC	S/T	JL	#12	90 92	85 92	95 87	96 91	78 93		112	107	120	127	P	
DS-60	136/31	—	—	—	—	—											F	
DS-497	14/123	nov 12	DC	S/T	DE	#20	—	—	—	—	—		—	—	—	—	F	
DS-188	120/119	nov 10	DC	S/T	DE	#20	91 100	81 88	95 92	80 98	92 102		93	101	106	104/114	P	
DS-TAB	7/8	nov 2	DC	Coq	LP	#10	—	—	—	—	—		—	—	—	—	F	

Peel / Shear = Pounds Per Inch Width **Weld Type**= F - Fusion / Ext - Extrusion

National Lining Systems, Inc.

Repair / Vacuum Test Log

Page: ____ of 1

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: # 1000 - 332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Tester Int.	Result P=Pass F=Fail
1	1 / 2	Nov 2	DE	G# 20	1X1	P	@ S. AT	nov 10	RJ	P
2	1 / 2	Nov 2	PE	G#20	2X5	DS-1	370'n	nov 10	RJ	P
3	1 / 2	Nov 2	DE	G#20	1X1	P	446'n	Nov 10	RJ	P
4	2 / 3	nov 2	SS	G#10	2X8	P	440'n	[illegible]	RJ	P
5	2 / 3	Nov 2	SS	G#10	1X1	P	342'n	nov10	RJ	P
6	2 / 3	Nov. 2	SS	G#10	2X15	cap	272'n	Nov10	RJ	P
7	2 / 3	Nov. 2	SS	G#10	1X2	P	291'N	nov 10	RJ	P
8	2 / 3	Nov 2	SS	G#10	2X5	DS-2	224'n	Nov10	RJ	P
9	2 / 3	Nov. 2	SS	G#10	2X4	P	17'n / 17'n of R10	Nov 10	RJ	P
10	2 / 3	Nov 2	DE	G#20	1X2	P	@ S. AT	Nov 10	RJ	P
11	3 / 4	Nov 2	SS	G#10	2X23	cap	(230' cap) / 170'n - 400'n	nov 10	RJ	P
12	3 / 4	Nov 2	SS	G#10	2X5	DS-3	403'n	nov 10	RJ	P
13	3 / 4	Nov 11	JL	WH 12	3X91	CAP	444'n / 42'n of R12 } CAP	nov 10	RJ	P
14	4 / 5	—	—	—	—	CAP	442'n			
15	4 / 5	Nov 2	SS	G#10	2X5	DS-4	358'n	Nov 10	KJ	P
16	4 / 5	Nov 2	DE	G#20	2X5	P	@ S. AT	Nov 9	RJ	P
17	5 / 1	Nov 2	PE	G#20	1X1	P	1'n / 2'E of R-16	Nov 9	RJ	P
18	5 / 6	Nov 2	DE	#20	1X4	P	@ S. AT	Nov 10	RJ	P
19	5 / 6	Nov 2	SS	G#10	2X5	DS-5	340'n	Nov 10	RJ	P
20	5 / 6	Nov 2	SS	#10	3X4		440'n	Nov 10	RJ	P
21	6 / 7	Nov 2	SS	#10	2X2	P	429'n	Nov 10	RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: AmeRen, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: #1050-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Tester Int.	Result P=Pass F=Fail
22	6 / 7	Nov. 2	DE	#20	1X20	cap	400'n / 17'n of R23	Nov 9	RJ	P
23	6 / 7	Nov 2	DE	#20	1X2	P	376'n / 24'n of R24	Nov 9	RJ	P
24	6 / 7	Nov 2	DE	#20	1X2	P	352'n / 24's of R23	Nov 9	RJ	P
25	6 /	Nov 2	DE	#20	8X4	Boot	311'n / 3'N of P17	Nov 9	RJ	P
26	6 / 7	Nov 2	DE	#20	2X2	P	300'n / 29'n of R27	Nov 9	RJ	P
27	6 / 7	Nov 2	DE	#20	2X5	DS-6	270'n / 29'n of R28	Nov 9	RJ	P
28	6 / 7	Nov 2	DE	#20	1X1	P	243'n / 26'n of R-29	Nov 9	RJ	P
29	6 / 7	Nov 2	DE	#20	1X2	P	217'n / 39'n of R-30	Nov 9	RJ	P
30	6 / 7	Nov 2	DE	#20	1X2	P	179'n	Nov 9	RJ	P
31	6 / 7	Nov 2	DE	#20	1X4	P	95'n	Nov 9	RJ	P
32	6 / 7	Nov 2	DE	#20	1X2	P	59'n	Nov 9	RJ	P
33	6 / 7	Nov 2	DE	#20	1X9	P	@ S.AT	Nov 9	RJ	P
34	7 / 8	Nov 2	DE	#20	1X2	P	@ S.AT	Nov 9	RJ	P
35	7 / 8	Nov 2	DE	#20	1X2	P	200'n / 38'8 of R36	Nov 9	RJ	P
36	7 / 8	Nov 2	TC	#19	1X2	P	238'n / 38'n of R35	Nov 9	RJ	P
37	7 / 8	Nov 2	TC	#19	1X34	cap	285'n - 320'n	Nov 9	RJ	P
38	7 / 8	Nov 2	DE	#20	2X2	P	355'n	Nov 9	RJ	P
39	7 / 8	-	-	-	-	DS-7A	400'n / 13's of R40	cap		
40	7 / 8	-	-	-	-	DS 7	414'n / 14'n of R39			
41	7 / 8	-	-	-	-	DS-7B	430'n / 12'n of R40			
42	8 / 9	Nov 2	TC	#19	2X5	DS-8	314'n	Nov 9	RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Cassinos

Project Number: #1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Tester Int.	Result P=Pass F=Fail
43	8 / 9	Nov 2	DE	#20	2x5	P	1'n / @ S-AT	Nov 10	RJ	P
44	9 / 10	Nov 2	TC	#19	2x5	DS-9	408'n	Nov 10	RJ	P
45	10 / 11	Nov 2	TC	#19	2x3	P	428'n	Nov 10	RJ	P
46	10 / 11	Nov 2	SS	#10	2x5	DS-11	12'n	Nov 12	RJ	P
47	11 / 12	Nov 2	SS	#10	1x2	P	133'n / 64's of R48	Nov. 10	RJ	P
48	11 / 12	Nov 2	SS	#10	2x5	DS-10	198'n / 64'n of R47	Nov 10	RJ	P
49	12 / 13	Nov 12	SS	#10	2x7	DS-12	21'n	Nov. 12	RJ	P
56	14 /	Nov 2	SS	#10	2x3	Boot	168'n / 11'E	Nov. 12	RJ	P
51	14 /	Nov 2	SS	#10	1x10	P	168'n	Nov. 10	RJ	P
52	14 /	Nov. 2	SS	#10	2x6	P	169'n / 6'E	Nov 10	RJ	P
53	13 / 14	Nov 2	SS	#10	1x1	P	184'n / 14'n of R51	Nov 10	RJ	P
54	13 / 14	Nov 2	SS	#10	2x5	DS-13	200'n / 15'n of R53	Nov 10	RJ	P
55	13 / 14	Nov 7	TC	#20	5x6	Boot	357'n	Nov 10	RJ	P
56	13 / 14	Nov 7	TC	#20	1x1	P	366'n	Nov 10	RJ	P
57	14/49/50	Nov 7	TC	#20	2x9	cap	18' cap / 6's of R139	Nov 10	RJ	P
58	14 / 50	Nov 7	TC	#20	3x9	DS-20	J	Nov. 10	RJ	P
59	14/47/49	Nov 2	SS	#10	2x3	P	TJ	Nov 9	RJ	P
60	14/46/47	Nov 2	SS	#10	2x5	P	TJ	Nov 9	RJ	P
61	14/42/45/46	Nov 2	SS	#10	2x4	P	TJ	Nov. 9	RJ	P
62	14/41/42	Nov 2	SS	#10	2x3	P	TJ	Nov 9	RJ	P
63	14/40/41	Nov 2	SS	#10	2x5	P	TJ	Nov. 9	RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Caramiro

Project Number: #1030-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Tester Int.	Result P=Pass F=Fail
64	14/39/40	Nov 2	SS	#10	2X3	P	TJ	Nov 9	RJ	P
65	14/38/39	Nov 2	SS	#10	2X3	P	TJ	Nov 9	RJ	P
66	14/36/38	Nov 2	SS	#10	1X7	P	TJ	Nov 9	RJ	P
67	14/35/26	Nov 2	SS	#10	2X3	P	TJ	Nov 9	RJ	P
68	14/34/35	Nov 2	SS	#10	2X3	P	TJ	Nov 9	RJ	P
69	14/32/34	Nov 2	SS	#10	1X2	P	TJ	Nov 9	RJ	P
70	14/30/32	Nov 9	SS	#10	1X2	P	TJ	Nov 9	RJ	P
71	14/29/30	Nov 2	SS	#16	1X2	P	TJ	Nov 9	RJ	P
72	14/15/29	Nov 2	DE	#20	1X3	P	TJ	Nov 9	RJ	P
73	14/15	Nov 2	DE	#20	1X5	P	@ S.AT	Nov 9	RJ	P
74	15/16/29	Nov 2	DE	#20	2X3	P	TJ	Nov 9	RJ	P
75	16/17/29	Nov 2	DE	#20	2X5	P	TJ	Nov 9	RJ	P
76	16/17	Nov 7	SS	#10	1X1	P	@ S.AT	Nov 9	RJ	P
77	17/18	Nov 7	SS	#10	1X1	P	@ S.AT	Nov 9	RJ	P
78	18/19	Nov 7	SS	#10	1X1	P	5'n	Nov 9	RJ	P
79	19/20	Nov 7	SS	#10	1X1	P	@ S.AT	Nov 9	RJ	P
80	21/22	Nov 7	SS	#10	1X1	P	5'n	Nov 9	RJ	P
81	17/18/19/29	Nov 7	SS	#10	2X34	cap	11'E of R75	Nov 9	RJ	P
82	19/29	Nov 2	DE	#20	2X4	P	5'E of RB1	Nov 9	RJ	P
83	19/20/29	Nov 2	DE	#20	2X2	P	TJ	Nov 9	RJ	P
84	20/21/29	Nov 7	SS	#10	2X7	cap	TJ/ 15'E of RB3	Nov 9	RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: AmeRen, Ash Pond A

QA/QC Name: Michelle Casamiro

Project Number: #1000 - 332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
85	P 21-22-29	Nov 7	10:05	SS	#10	2X13	Cap	TJ/ 21'E of R84	Nov 9		RJ	P
86	22-23-28-29	Nov 7	10:15	SS	#10	4X4	P	TJ	Nov 9		RJ	P
87	23/28	Nov 7	10:30	SS	#10	2X5	DS-16	9'SE of R86	Nov 9		RJ	P
88	23-24-27-28	Nov 7	10:38	SS	#10	2X11	P	8'SE of R87	Nov 9		RJ	P
89	24-26-27	Nov 7	10:45	SS	#10	2X3	P	TJ	Nov 9		RJ	P
90	24-25-26	Nov 7	11:12	SS	#10	2X6	P	6'SE of R89	Nov 9		RJ	P
91	24-25	Nov 7	11:10	SS	#10	2X14	Cap	11' NE	Nov 9		RJ	P
92	25-26	Nov 7	11:39	SS	#10	2X2	P	15'SE of R90 / 16 SE of	Nov 9		RJ	P
93	26-27	Nov 7	11:32	SS	#10	2X16	Cap	7'SE / 20'SE of R89	Nov 9		RJ	P
94	29-31	Nov 7	2:01	SS	#10	1X7	P		Nov 9		RJ	P
95	29-31	Nov 7	2:05	SS	#10	2X9	DS 15		Nov 9		RJ	P
96	29-31	Nov 7	2:01	SS	#10	1X6	P	R-94-99	Nov 9		RJ	P
97	29-31	Nov. 7	2:01	SS	#10	2X5	DS-15	47' cap	Nov 9		RJ	P
98	29-31	Nov 7	2:01	SS	#10	1X11	DS 15 B	3'@ East. 47	Nov 9		RJ	P
99	29-31	Nov 7	2:01	SS	#10	2X10	Cap		Nov 9		RJ	P
100	29-31	Nov 7	10:25	SS	#10	2X6	P		Nov 9		RJ	P
101	29-31	Nov 7	9:42	SS	#10	2X6	P	18'E of R101 / 55' wol R99	Nov 9		RJ	P
102	29-30-31	Nov 7	8:53	SS	#10	4X5	P	18'W of R100	Nov 9		RJ	P
103	30-31-32	Nov 7	9:05	SS	#10	2X7	P	TJ	Nov 9		RJ	P
104	29-30	Nov. 7	9:11	SS	#10	2X3	P	TJ	Nov 9		RJ	P
105	32-33-34	Nov 2	3:30	SS	#10	2X4	P	14'W of R102	Nov 9		RJ	P
								TJ	Nov 9		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: # 1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
106	33-34-35	Nov 2	3:20	SS	#10	2X3	P	TJ	Nov 9		RJ	P
107	33-35	Nov. 7	11:15	Tc	#20	2X4	P	16'W of R108 / 19'E AT	Nov 9		RJ	P
108	33-35	Nov 7	11:18	TC	#20	1X1	P	1'E AT / 16'E of R107	Nov 9		RJ	P
109	35-36	Nov. 7	11:10	Tc	#20	2X4	P	@ E. AT	Nov 9		RJ	P
110	35-36	Nov 7	11:00	Tc	#20	2X6	P	8'W of R109	Nov 9		RJ	P
111	35-36	Nov 7	10:42	TC	#20	1X2	P	62'W of R110	Nov 9		RJ	P
112	36-38	Nov 2	3:15	SS	#10	2X3	P	6'W of R113	Nov 9		RJ	P
113	36-37-38	Nov. 2	3:11	SS	#10	2X3	P	TJ	Nov 9		RJ	P
114	37-38	Nov 2	3:06	SS	#10	2X5	DS-22	9'N of R113 / 7'S of R115	Nov 9		RJ	P
115	37-38-39	Nov 2	3:10	SS	#10	2X2	P	TJ	Nov 9		RJ	P
116	36-37	Nov 7	10:30	Tc	#20	2X9	P	24'W of R117	Nov 9		RJ	P
117	36-37	Nov 7	10:40	Tc	#20	2X5	DS-18	28'W of R118	Nov 9		RJ	P
118	36-37	Nov 7	10:45	TC	#20	1X2	P	54'W of R119 / 61'W	Nov 9		RJ	P
119	36-37	Nov 7	10:55	Tc	#20	2X9	P	@ E. AT	Nov 9		RJ	P
120	37-39	Nov 7	10:50	Tc	#20	2X4	P	@ E. AT	Nov 9		RJ	P
121	40-41	Nov 7	10:06	Tc	#20	2X8	P	67'E of R63 / 125'W	Nov. 12		RJ	P
122	41-43	Nov 7	1:25	Tc	#20	1X1	P	@ E. AT	Nov 16		RJ	P
123	41-43	Nov 7	9:12	Tc	#20	2X6	DS-19	26'W / 26'W of R122	Nov 9		RJ	P
124	41-42-43	Nov 7	8:10	Tc	#20	2X3	P	TJ	Nov 9		RJ	P
125	41-42	Nov 7	8:06	Tc	#20	1X2	P	17'W of R124 / 14'E of R126	Nov 9		RJ	P
126	41-42	Nov 7	8:01	Tc	#20	2X4	P	14'N of R125	Nov 9		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A
QA/QC Name: Michelle Casimiro
Project Number: # 1000-330
Material Type: 40 mil
Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
127	P41-42	Nov 7	7:55	TC	#20	1X1	P	beside R-62	Nov. 9		RJ	P
128	P42-43-45	Nov. 7	8:35	TC	#20	3X4	P	TJ	Nov 9		RJ	P
129	P43-45	Nov 7	8:39	TC	#20	2X5	DS-23B	1'E of R 128 / 113'W	Nov 9		RJ	P
130	P43-45	Nov 7	8:51	TC	#20	2X5	DS-23	102'W cap-26'	Nov 9		RJ	P
131	P43-45	Nov 7	8:53	TC	#20	2X10	DS-23A	92'W 92'W-118'W	Nov 9		RJ	P
132	P43-45	Nov 7	8:51	TC	#20	3X5	P	108'W	Nov 9		RJ	P
133	P43-44-45	Nov 7	9:18	TC	#20	2X3	P	TJ	Nov 9		RJ	P
134	P43-44	Nov 7	9:21	TC	#20	2X6	P	19'E of R 133 / 63'W	Nov 9		RJ	P
135	P43-44	Nov 7	9:35	TC	#20	1X7	P	@ E AT	Nov 9		RJ	P
136	P46-47	Nov 7	9:43	TC	#20	2X10	P	@ E. AT	Nov 9		RJ	P
137	P47-48-49	Nov 7	9:45	TC	#20	2X24	P	TJ and cap	Nov 9		RJ	P
138	P48-49-50	Nov 7	2:36	TC	#20	2X3	P	TJ	Nov 9		RJ	P
139	P14-50-122	Nov 7	2:10	TC	#20	3X3	P	TJ	Nov 9		RJ	P
140	P14-122	Nov 7	2:20	TC	#20	2X5	DS-49	413'N / 7'N of R139	Nov 9		RJ	P
141	P14-122-123	Nov. 7	2:23	TC	#20	2X3	P	TJ	Nov 9		RJ	P
142	P14-123-124	Nov. 7	2:26	TC	#20	1X1	P	TJ	Nov 9		RJ	P
143	P14-124-125	Nov 7	2:40	TC	#20	2X3	P	TJ	Nov 9		RJ	P
144	P124-125-126	Nov 7	2:48	TC	#20	1X2	P	TJ	Nov 9		RJ	P
145	P50-122	Nov 7	1:30	TC	#20	1X1	P	5'W / @ E AT	Nov 9		RJ	P
146	P126-131-132	Nov 7	9:40	TC	#20	2X4	P	TJ	Nov 9		RJ	P
147	P130-131-132	Nov 7	9:38	TC	# 20	2X6	P	TJ	Nov 9		RJ	P

Repair Type P=Patch DS= Destructive Test Location
Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: AmeRen, Ash Pond A

QA/QC Name: Michelle Casamiro

Project Number: # 1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
148	125-126-130 131	Nov 10	9:20	TC	#20	2X6	P	TJ	11/10		RJ	P
149	14-125-130	Nov 10	9:10	TC	#20	2X3	P	TJ	11/10		RJ	P
150	14-129-130	Nov 10	9:55	TC	#20	1X7	P	TJ	Nov. 10		RJ	P
151	129-130	Nov 10	9:50	TC	#20	1X2	P	48'W / 27'E of R150	Nov. 10		RJ	P
152	14-111	Nov. 10	10:05	TC	#20	3X8	P		Nov 10		RJ	P
153	14-111	Nov 7	4:05	TC	#20	2X5	DS-48	Cap cross seam '24	Nov 10		RJ	P
154	13-14-111	Nov. 10	10:05	TC	#20	2X12	DS-48B		Nov 10		RJ	P
155	111-128-129	Nov. 10	10:32	TC	#20	2X3	P	TJ	Nov 10		RJ	P
156	111-127-128	Nov. 10	10:30	TC	#20	2X11	cap	TJ	Nov 10		RJ	P
157	111-121-127	Nov. 10	10:34	TC	#20	3X4	P	TJ	Nov 10		RJ	P
158	13-111	Nov 10	10:40	TC	#20	2X12	DS-48A	601'N-613'N cap	Nov. 10		RJ	P
159	13-111-120-121	Nov 7	4:25	TC	#20	2X3	P	TJ	Nov 10		RJ	P
160	13-118-120	Nov 7	4:27	TC	#20	1X1	P	TJ	Nov 10		RJ	P
161	12-13	Nov 9	7:55	RT	#20	2X4	P	630'N / 9'W of R162	Nov 10		RJ	P
162	13-116-118	Nov 9	7:45	RT	#20	2X3	P	TJ	Nov 10		RJ	P
163	12-13-116	Nov 9	7:50	RT	#20	2X2	P	TJ	Nov 10		RJ	P
164	12-115-116	Nov 9	9:00	RT	#20	4X9	P	TJ	Nov 10		RJ	P
165	115-116-118	Nov 9	9:05	RT	#20	1X1	P	TJ	Nov 10		RJ	P
166	115-117-118	Nov 9	8:15	RT	#20	1X1	P	TJ	Nov 10		RJ	P
167	118-120	Nov 9	8:05	RT	#20	2X4	DS-53	4'W of R168 / 25'E of R160	Nov 10		RJ	P
168	117-118-119-120	Nov 9	8:10	RT	#20	2X6	P	TJ	Nov 10		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: #1000 - 332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
169	119-120	Nov 9	8:45	RT	#20	2X4	P	14'E of R168 / 3'W	NOV 10		RJ	P
170	117-119	Nov 9	8:48	RT	#20	1X1	P	@ E AT	Nov 10		RJ	P
171	115-1171	Nov 9	8:50	RT	#20	1X2	P	@ E. AT	Nov 10		RJ	P
172	114-115	Nov 9	8:55	RT	#20	1X1	P	@ E AT	Nov10		RJ	P
173	112-113	Nov 9	9:15	RT	#20	2X5	P	@ N.E AT	Nov 10		RJ	P
174	112-113-114	Nov 9	9:10	RT	#20	1X1	P	TJ	Nov 10		RJ	P
175	12-112-114	Nov 9	9:05	RT	#20	1X2	P	TJ	Nov 10		RJ	P
176	11-12-110-112	Nov.9	9:20	RT	#20	2X11	P/cap	TJ	Nov 10		RJ	P
177	110-112	Nov 9	9:23	RT	#20	1X1	P	12'W of R178	Nov 10		RJ	P
178	110-112	Nov 9	9:25	RT	#20	2X3	P	@ N.E AT	Nov 10		RJ	P
179	109-110	Nov 9	9:30	RT	#20	1X2	P	@ N.E AT	Nov 10		RJ	P
180	10-11-109-110	Nov 10	1:05	Tc	#20	2X4	P	TJ	Nov 10		RJ	P
181	9-10-109	Nov 10	1:16	Tc	#20	1X2	P	TJ	Nov 10		RJ	P
182	9-108-109	Nov 10	1:18	Tc	#20	1X2	P	TJ	Nov 10		RJ	P
183	9-108	Nov 10	1:23	Tc	#20	1X7	DS-51A	cap cross seam 20'	Nov 10		RJ	P
184	9-108	Nov 10	1:27	Tc	#20	2X4	DS-51		Nov 10		RJ	P
185	9-108	Nov10	1:30	Tc	#20	1X8	DS-51B		Nov 10		RJ	P
186	108-109	Nov.9	9:25	RT	#20	2X5	DS-46	19'W / 22'E of R182	Nov 10		RJ	P
187	107-108	Nov.7	4:35	SS	#10	1X3	P	@ N E AT	Nov 10		RJ	P
188	8-9-107-108	Nov 9	4:30	SS	#10	3X8	P	TJ	Nov 10		RJ	P
189	7-8-106-107	Nov 9	4:23	SS	#10	8X4	P	TJ	Nov 10		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

Electronic Filing: Received, Clerk's Office 09/28/2020

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle CASIMIRO

Project Number: #1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
190	105-106	Nov 7	4:24	SS	#10	1X2	P	@ N.AT	Nov 10		RJ	P
191	7-105-106	Nov 7	4:21	SS	#10	1X2	P	TJ	Nov 10		RJ	P
192	6-7-105	Nov 7	4:20	SS	#10	2X5	P	TJ	Nov 10		RJ	P
193	5-6-105	Nov 7	4:17	SS	#10	2X2	P	TJ	Nov 10		RJ	P
194	5-6	Nov. 7	4:16	SS	#10	2X5	P	671'N/5'W of R193	Nov 10		RJ	P
195	5-6	Nov 7	4:12	SS	#10	1X2	P	644'N/27'W of R194	Nov 10		RJ	P
196	14-13-111	Nov 7	4:06	TC	#20	1X2	P	TJ	Nov 10		RJ	P
197	13-14	Nov 7	3:50	TC	#20	2X11	Cap	500'N/10'N of R198	Nov 10		RJ	P
198	13-14	Nov 7	3:45	TC	#26	1X2	P	487'N/10's of R197	Nov 10		RJ	P
199	13-14	Nov 7	2:53	TC	#20	2X3	P	423'N	11/10		RJ	P
200	12-13	Nov 7	3:00	TC	#20	2X3	P	425'N	11/10		RJ	P
201	11-12	Nov 7	3:05	TC	#20	2X2	P	429'N	11/10		RJ	P
202	11-12	Nov 12	2:10	SS	#10	1X1	P	344'N	Nov 12		RJ	P
203	10-11	Nov 7	3:10	TC	#20	2X2	P	429'N/beside R45	11/10		RJ	P
204	9-10	Nov 7	3:18	TC	#20	3X4	P	432'N	11/10		RJ	P
205	8-9	Nov 9	10:00	RT	#20	2X3	P	603'N/63'N of R206	11-10		RJ	P
206	8-9	Nov9	10:05	RT	#20	2X5	DS-45	538'N	11-10		RJ	P
207	8-9	Nov7	3:20	TC	#20	2X3	P	483'N	11-10		RJ	P
208	6-7	Nov 7	3:45	SS	#10	3X5	Boot	498'N	11-10		RJ	P
209	6-7	Nov 7	2:32	SS	#10	2X5	P	436'N	11-10		RJ	P
210	5-6	Nov 7	2:58	SS	#10	1X1	P	497'N/10's of R211	11-10		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Cushman

Project Number: # 1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
211	5-6	Nov. 7	2:59	SS	#10	1X1	P	507'N | 10'N of R210	Nov 10		RJ	P
212	5-6	nov 7	3:00	SS	#10	1X2	P	519'N | 12'N of R211	nov 10		RJ	P
213	5-6	nov 7	3:12	SS	#10	2X5	DS-47	533'N | 14'N of R212	nov 10		RJ	P
214	5-6	nov 7	4:09	SS	#10	1X2	P	575'N | 30's of R215	nov 10		RJ	P
215	5-6	nov 7	4:10	SS	#10	1X2	P	606'N | 30'N of R214	Nov 10		RJ	P
216	4-5	-	cap -					444'N cap				
217	4-5	nov 9	10:10	RT	#20	2X5	DS50	588'N	nov 10		RJ	P
218	3-4	nov 11	11:35	SS	#10	2X5	DS-44	490'N	nov 10		RJ	P
219	1-51	nov 9	10:20	RT	#20	1X2	P	595'N |20'N of R220	nov 10		RJ	P
220	1-51	nov 9	10 25	RT	#20	1X2	P	576'N	nov 10		RJ	P
221	1-51	nov 9	10:30	RT	#20	1X1	P	567'N	nov 10		RJ	P
222	1-51	nov 9	10:35	RT	#20	1X2	P	552'N	nov 10		RJ	P
223	1-51	nov 9	10:40	RT	#20	1X2	P	531'N	nov 10		RJ	P
224	1-51	nov 9	10:45	RT	#20	1X1	P	515'N	nov 10		RJ	P
225	1-51	nov. 11	11:28	SS	#10	2X3	P	449'N	Nov. 11		RJ	P
226	1-51	nov. 9	4:15	SS	#10	2X12	cap	391'	nov 10		RJ	P
227	1-51	nov 11	11:00	SS	#10	2X5	DS-24	195'N	nov 11		RJ	P
228	1-51	Nov 11	9:25	SS	#10	1X3	P	24'N	nov 11		RJ	P
229	1-51	nov 11	9:32	SS	#10	2X2	P	13'N	nov 11		RJ	P
230	1-51	nov 11	9:10	SS	#10	1X2	P	@ S.AT	nov 11		RJ	P
231	51-52	nov 11	10:48	SS	#10	2X2	P	98'N	nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Cosimiro

Project Number: # 1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
232	P 51-52	nov. 9	4:20	SS	#10	2X5	DS-26	404'N	nov 10		RJ	P
233	51-52	nov 9	10:50	RT	#20	2X5	P	514'N	nov 10		RJ	P
234	51-52	nov. 9	10:55	RT	#20	2X2	P	523'N / 10'N of R233	nov 10		RJ	P
235	52-53	nov 9	11:05	RT	#20	2X5	P	@ N.AT	nov 10		RJ	P
236	52-53	nov 9	11:00	RT	#20	2X5	DS-43	568'N	nov 10		RJ	P
237	52-53	nov 9	11:30	RT	#20	3X5	P	505'N	nov 10		RJ	P
238	52-53	nov 9	11:35	RT	#20	2X5	DS-25	485'N	nov 10		RJ	P
239	52-53	nov 9	11:40	RT	#20	5X6	Boot	378'N	nov 10		RJ	P
240	52-53	nov 9	3:16	SS	#10	2X3	P	333'N	nov 10		RJ	P
241	52-53	nov. 11	10:50	SS	#10	1X2	P	88'N	nov 11		RJ	P
242	52-53	nov. 11	10:55	SS	#10	2X6	P	46'N	nov 11		RJ	P
243	53-54	nov 11	9:07	SS	#10	1X1	P	3'N	nov 11		RJ	P
244	53-54	nov 11	8:19	SS	#10	2X5	DS-21	100'N	nov 11		RJ	P
245	53-54	nov 9	3:15	SS	#10	2X4	P	311'N	nov 11		RJ	P
246	54-55	nov 9	3:10	SS	#10	2X5	DS-27	244'N	nov 11		RJ	P
247	55-56	nov 11	8:50	SS	#10	1X1	P	7'N	nov. 11		RJ	P
248	55-56	nov 11	8:25	SS	#10	2X5	DS-28	120'N	nov 11		RJ	P
249	55-56	nov. 9	3:04	SS	#10	3X3	P	264'N	nov 10		RJ	P
250	55-56	nov 9	3:20	RT	#20	2X13	P	390'N-402'N	nov 11		RJ	P
251	55-56	nov 9	3:15	RT	#20	2X6	DS-29	421'N	nov 11		RJ	P
252	56-57	nov 11	8:35	SS	#10	2X5	DS-39	55'N	nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: # 1000-332

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
253	57-62	Nov 11	8:34	SS	#10	1X1	P	@ SAT	Nov 11		RJ	P
254	57-58-62	Nov 10	11:17	SS	#10	2X3	P	TJ	Nov 11		RJ	P
255	57-58	Nov 10	2:49	SS	#10	2X3	P	241'N | 60'N of R254	Nov 11		RJ	P
256	57-58	Nov 9	2:25	SS	#10	2X3	P	58'N of R255	Nov 11		RJ	P
257	57-58	Nov 9	2:30	SS	#10	1X2	P	16'n of R256	Nov 11		RJ	P
258	58-59	Nov 10	8:32	SS	#10	1X1	P	21'n of R259 | 391'n	Nov 11		RJ	P
259	58-59	Nov 9	2:23	SS	#10	1X2	P	8'N of R260 | 370'n	Nov 11		RJ	P
260	58-59	Nov 9	2:24	SS	#10	1X2	P	33'N of R261 | 363'n	Nov 11		RJ	P
261	58-59	Nov 9	2:25	SS	#10	1X2	P	7'N of R262 | 327'n	Nov 11		RJ	P
262	58-59	Nov 9	2:28	SS	#10	2X5	DS-32	57'N of R263 | 320'n	Nov 11		RJ	P
263	58-59	Nov 9	2:37	SS	#10	2X3	P	7'N of R264 | 262'n	Nov 11		RJ	P
264	58-59	Nov 9	2:45	SS	#10	1X1	P	47'n of R265 | 255'n	Nov 11		RJ	P
265	58-59	Nov 10	11:10	SS	#10	2X3	P	33'n of R266 | 210'n	Nov 11		RJ	P
266	58-59-62	Nov 10	11:15	SS	#10	5X6	boot	TJ, 182'n | 8'n of R267	Nov 11		RJ	P
267	59-62-63	Nov 10	11:21	SS	#10	5X5	P	TJ	Nov 11		RJ	P
268	62-63	Nov 10	5:00	SS	#10	1X1	P	@ SAT	Nov 11		RJ	P
269	63-64	Nov 10	4:44	SS	#10	1X1	P	@ SAT	Nov 11		RJ	P
270	59-60-63-64	Nov 10	11:30	SS	#10	4X5	P	TJ	Nov 11		RJ	P
271	59-60	Nov 10	11:32	SS	#10	1X1	P	25'N of R270	Nov 11		RJ	P
272	59-60	Nov 9	2:40	SS	#10	1X2	P	94'N of R271	Nov 11		RJ	P
273	60-61	Nov 10	11:01	SS	#10	2X5	DS-31	859'N | 87'N of R274	Nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

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National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A
Project Number: # 1000-332
QA/QC Name: Michelle CASIMIRO
Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
274	60-61-64	Nov 10	1:30	SS	#10	1X3	P	TJ	Nov 11		RJ	P
275	65A-61-64-66	Nov 10	1:45	SS	#10	2X24	cap	Cross Seam / TJ	Nov. 13		RJ	P
276	64-65-65A	Nov 10	1:50	SS	#10	1X2	P	TJ	Nov 11		RJ	P
277	64-65	Nov 10	4:35	SS	#10	1X1	P	@ S AT	Nov 11		RJ	P
278	65-66	Nov 10	4:30	SS	#10	1X1	P	@ S AT	Nov 11		RJ	P
279	65-66	Nov 10	3:39	SS	#10	2X6	DS-33	95'N	Nov 11		RJ	P
280	65-66	Nov 10	3:35	SS	#10	2X4.	P	111'N / 11'N of R279	Nov 11		RJ	P
281	65-65A-66	Nov 10	2:15	SS	#10	2X2	P	TJ	Nov 11		RJ	P
282	66-67	Nov 10	2:30	SS	#10	2X25	cap	175'N - 200'N / 47'n of R283	Nov 11		RJ	P
283	66-67	Nov 10	3:34	SS	#10	2X3	P	126'N / 14'W of R284	Nov 11		RJ	P
284	66-67	Nov. 10	3:40	SS	#10	2X5	DS-35	109'N	Nov 11		RJ	P
285	66-67	Nov 10	4:25	SS	#10	2X6	P	@ S. AT	Nov 11		RJ	P
286	67-68	Nov 10	4:22	SS	#10	1X1	P	@ Southwest A.T	Nov 11		RJ	P
287	67-68-69	Nov 10	4:20	SS	#10	2X3	P	TJ	Nov 11		RJ	P
288	67-69-70	Nov 10	4:02	SS	#10	2X3	P	TJ	Nov 11		RJ	P
289	67-70-71	Nov 10	4:00	SS	#10	2X2	P	TJ	Nov 11		RJ	P
290	67-71-72	Nov 10	3:55	SS	#10	1X2	P	TJ	Nov 11		RJ	P
291	67-72-73	Nov 10	3:54	SS	#10	1X2	P	TJ	Nov 11		RJ	P
292	67-73-74	Nov 10	3:51	SS	#10	1X1	P	TJ	Nov 11		RJ	P
293	67-74-75	Nov 10	3:19	SS	#10	2X3	P	TJ	Nov 11		RJ	P
294	74-75	Nov 10	3:16	SS	#10	1X2	P	38'N of R293 / 34'E	Nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location
Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A **Project Number:** #1000-332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
295	74-75	Nov. 10	3:14	SS	#10	1X1	P	@ W. AT	Nov 12		RJ	P
296	75-76	Nov 10	3:10	SS	#10	2X5	DS-40	39'E /31'N of R297	Nov 12		RJ	P
297	67-75-76	Nov 10	3:00	SS	#10	1X1	P	TJ	Nov 11		RJ	P
298	67-75	Nov 10	3.03	SS	#10	2X5	DS-41	8'N of R293	Nov 11		RJ	P
299	67-76-77	Nov. 10	2:39	SS	#10	1X1	P	TJ	Nov 11		RJ	P
300	67-77-79	Nov 10	2:38	SS	#10	1X2	P	TJ	Nov 11		RJ	P
301	77-78-79	Nov 10	2:42	SS	#10	2X6	P	TJ	Nov 12		RJ	P
302	78-80	Nov. 10	10:55	SS	#10	2X5	DS-36	19'E /32'W of R303	Nov 11		RJ	P
303	78-79-80	Nov. 10	2:43	SS	#10	1X1	P	TJ	Nov 11		RJ	P
304	67-79-80	Nov 10	2:37	SS	#10	1X2	P	TJ	Nov 11		RJ	P
305	67-80-81	Nov 10	2:36	SS	#10	1X1	P	TJ	Nov 11		RJ	P
306	80-81	Nov 10	10:50	SS	#10	1X3	P	@ W AT	Nov 11		RJ	P
307	81-82	Nov 10	10:49	SS	#10	2X5	DS-34	10'E / 12'W of R308	Nov 11		RJ	P
308	81-82-83	Nov 10	10:48	SS	#10	2X2	P	TJ	Nov 11		RJ	P
309	67-81-83	Nov 10	10:35	SS	#10	2X3	P	TJ	Nov 11		RJ	P
310	67-83-84	Nov 10	10:32	SS	#10	1X1	P	TJ	Nov 11		RJ	P
311	67-84-85	Nov 10	10:31	SS	#10	2X9	P	TJ	Nov 11		RJ	P
312	84-85	Nov 10	9:55	SS	#10	1X1	P	@ W.AT	Nov 12		RJ	P
313	85-86	Nov 10	9:51	SS	#10	1X2	P	@ W.AT	Nov 12		RJ	P
314	66-67-85	Nov. 10	10:38	SS	#10	1X1	P	TJ	Nov 11		RJ	P
315	66-85-86	Nov. 10	10:15	SS	#10	3X4	P	TJ	Nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A
QA/QC Name: Michelle CASIMIRO
Project Number: # 1551 - 330
Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
316	61-66-86-87	Nov 10	10:08	SS	#10	1X4	P	TJ	Nov 11		RJ	P
317	86-87	Nov. 10	9:44	SS	#10	1X2	P	7'E of R318 / 21'E	Nov 11		RJ	P
318	86-87	Nov. 10	9:45	SS	#10	1X2	P	9'E of R319 / 12'E	Nov 11		RJ	P
319	86-87	Nov 10	9:47	SS	#10	1X2	P	2'E / 9'W of R318	Nov 11		RJ	P
320	61-87	Nov. 10	10:06	SS	#10	1X2	P	9'N of R316	Nov 11		RJ	P
321	61-87-89	Nov. 10	4:30	SS	#10	1X4	P	TJ	Nov 11		RJ	P
322	87-88-89	Nov. 10	9:15	SS	#10	3X8	P	TJ	Nov 11		RJ	P
323	87-88	Nov. 10	9:25	SS	#10	2X5	DS-42	16'E / 6'NW of R322	Nov 11		RJ	P
324	87-88	Nov 10	9:26	SS	#10	1X1	P	1'NW / 14'W of R323	Nov 11		RJ	P
325	88-89	Nov 10	9:35	SS	#10	1X1	P	@ NW AT.	Nov 11		RJ	P
326	89-90	Nov 10	11:56	SS	#10	2X4	P	@ NW AT.	Nov 11		RJ	P
327	89-90	Nov 10	8:48	SS	#10	1X2	P	11'NW of R328 / 50's	Nov 11		RJ	P
328	60-61-89-90	Nov 10	4:32	SS	#10	1X4	P	TJ	Nov 11		RJ	P
329	60-90-92	Nov 10	4:34	SS	#10	1X1	P	TJ	Nov 11		RJ	P
330	59-60-92	Nov 10	4:35	SS	#10	1X1	P	TJ	Nov 11		RJ	P
331	90-91-92	Nov 10	4:37	SS	#10	1X1	P	TJ	Nov 11		RJ	P
332	90-91	Nov 10	8:55	SS	#10	2X3	P	12's / 40'N of R331	Nov 11		RJ	P
333	91-93	Nov 11	10:00	SS	#10	2X4	P	@ N.AT	Nov. 11		RJ	P
334	91-93	Nov 10	8:20	SS	#10	1X1	P	4'N of R335	Nov 11		RJ	P
335	91-92-93	Nov 10	8:18	SS	#10	1X1	P	TJ	Nov 11		RJ	P
336	59-92-93	Nov 10	4:45	SS	#10	2X9	P	TJ	Nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location
Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A **Project Number:** # 1000 - 332

QA/QC Name: Michelle Casimiro **Material Type:** 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
337	59-93	Nov 10	4:47	SS	#10	2x4	P	8's of R338 | beside R336	Nov 11		RJ	P
338	58-59-93	Nov. 10	4:51	SS	#10	2x3	P	TJ	Nov 11		RJ	P
339	58-93-94	Nov 10	3:28	SS	#10	1x1	P	TJ	Nov 11		RJ	P
340	93-94	Nov. 10	8:30	SS	#10	2x4	P	33's | 31'N of R 339	Nov 11		RJ	P
341	95-96	Nov. 10	3:00	SS	#10	1x1	P	4's	Nov 11		RJ	P
342	57-58-94-95	Nov 9	3:25	RT	#20	2x5	P	TJ	Nov 11		RJ	P
343	56-57-95-96	Nov 9	3:10	RT	#20	2x7	P	TJ	Nov 11		RJ	P
344	56-96-97	Nov 9	2:30	RT	#20	2x4	P	TJ	Nov 11		RJ	P
345	55-56-97	Nov 9	2:26	RT	#20	2x2	P	TJ	Nov 11		RJ	P
346	55-97-99	Nov 9	2:23	RT	#20	2x2	P	TJ	Nov 11		RJ	P
347	97-98-99	Nov 9	2:40	RT	#20	1x1	P	TJ	Nov 11		RJ	P
348	97-98	Nov 9	2:45	RT	#20	1x1	P	9'N of R347	Nov 11		RJ	P
349	97-98	Nov 9	2:50	RT	#20	1x3	P	@ N.AT	Nov 11		RJ	P
350	98-100	Nov 9	2:10	RT	#20	1x3	P	@ N.AT	Nov 11		RJ	P
351	98-99-100	Nov 9	2:05	RT	#20	1x1	P	TJ	Nov 11		RJ	P
352	99-100	Nov 9	2:08	RT	#20	1x1	P	11 N of R353	Nov 11		RJ	P
353	99-100-101	Nov 9	2:13	RT	#20	2x10	P-Cap	TJ | beside R354	Nov 11		RJ	P
354	54-55-99-101	Nov 9	2:20	RT	#20	3x7	P	TJ	Nov 11		RJ	P
355	54-101	Nov 9	1:40	RT	#20	2x5	DS-38	9'E of R354 | 3'W of R356	Nov 11		RJ	P
356	53-54-101-102	Nov. 9	11:40	RT	#20	3x4	P	TJ	Nov 11		RJ	P
357	100-101-102	Nov 9	1:35	RT	#20	2x2	P	TJ	Nov 11		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A **Project Number:** # 1733-332

QA/QC Name: Michelle CASIMIRO **Material Type:** 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
358	100-102	Nov 9	1:45	RT	#20	2X5	DS-37	16'N of R357	Nov 10		RJ	P
359	100-102	Nov 9	1:55	RT	#20	1X1	P	2'N of R358	Nov 10		RJ	P
360	100-102	Nov-9	2:00	RT	#20	1X2	P	1'n of R359	Nov. 10		RJ	P
361	102-103-104	Nov. 11	10:30	SS	#10	4X27	Extension Patch	@ P AT	Nov 10		RJ	P
362	53-104	Nov 9	11:20	RT	#20	1X5	P	@ N.AT	Nov. 10		RJ	P
363	53-103-104	Nov 9	11:10	RT	#20	2X2	P	TJ	Nov. 10		RJ	P
364	53-102-103	Nov 9	11:25	RT	#20	2X2	P	TJ	Nov 10		RJ	P
365	3-4-135	Nov. 12	8:10	SS	#10	4X4	P	445'n	Nov. 12		RJ	P
366	2-3-133	Nov 11	1:45	SS	#10	4X4	P	443'n	Nov. 11		RJ	P
367	P3-133	Nov. 12	9:15	SS	#10	3X5	DS-58	314'n	Nov. 12		RJ	P
368	P2-133	Nov 12	9:10	SS	#10	8X5	DS-59	321'N	Nov 12		RJ	P
369	P31-136	Nov 11	8:20	TC	#20	1X1	P	105'N | 2'N of R370	Nov 12		RJ	P
370	P29-136	Nov 11	8:25	TC	#20	1X1	P	105'W | 2's of R369	Nov 12		RJ	P
371	P31-136	Nov 11	8:30	TC	#20	2X5	P	46'W	Nov 12		RJ	P
372	29-136	Nov 11	3:34	TC	#20	1X1	P	49'W	Nov 12		RJ	P
373	31-136	Nov 11	4:25	TC	#20	2X5	DS-60	69'W	Nov 11		RJ	P
374	22-137	Nov 11	3:40	TC	#20	1X2	P	80'N | 1'W of R375	Nov 11		RJ	P
375	23-28-137	Nov 11	3:45	TC	#20	2X3	P	TJ	Nov 12		RJ	P
376	22-137	Nov 11	3:50	TC	#20	1X2	P	61'N	Nov 12		RJ	P
377	22-137	Nov 11	3:55	TC	#20	1X2	P	55'N	Nov 12		RJ	P
378	22-137	Nov 11	4:06	TC	#20	1X3	P	29'N	Nov 12		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A
Project Number: # 1000 - 332
QA/QC Name: Michelle Casimiro
Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
379	23-137	nov 11	4:05	TC	#20	1X2	P	11'n	Nov 11		RJ	P
380	22-137	nov 11	4:10	TC	#20	1X3	P	@ N.E AT	nov 11		RJ	P
381	23-137	nov 11	4:13	TC	#20	1X1	P	@ N. AT	nov 11		RJ	P
382	30-31-32	nov 11	9:04	TC	#20	5X97	Cap	157'w-253'w	nov 11		RJ	P
383	21-22	nov 12	9:56	TC	#20	3X24	D14B1	cap 0-24'n	Nov. 12		RJ	P
384	2-3-134	nov 12	11:40	SS	#10	3X4	P	31'N	nov 12		RJ	P
385	3-134	nov 12	11:45	SS	#10	2X6	P	25'n-30'n	nov 12		RJ	P
386	2-134	nov 12	10:46	SS	#10	1X1	P	22'n	nov 12		RJ	P
387	2-134	nov 12	10:55	SS	#10	1X1	P	3'n	nov 12		RJ	P
388	3-134	nov 12	10:51	SS	#10	1X2	P	2'n	nov 12		RJ	P
389	3-138	nov 12	11:05	SS	#10	1X1	P	4'n	nov 12		RJ	P
390	4-138	nov 12	11:05	SS	#10	1X1	P	2'n	nov 12		RJ	P
391	4-138	nov 12	10:35	SS	#10	2X3	P	56'n	nov 12		RJ	P
392	4-138	nov 12	10:29	SS	#10	1X2	P	88'n	nov 12		RJ	P
393	4-138	nov 12	10:28	SS	#10	1X2	P	96'n	Nov. 12		RJ	P
394	4-138	nov 12	10:21	SS	#10	2X5	DS-61	131'n	nov 12		RJ	P
395	4-138	nov 12	10:15	SS	#10	1X1	P	167'n	nov 12		RJ	P
396	3-138	nov 12	10:17	SS	#10	1X1	P	167'n	nov 12		RJ	P
397	3-4-135	nov 12	8:30	SS	#10	3X5	P	352'n	nov 12		RJ	P
398	4-141	nov 12	8:15	SS	#10	1X1	P	446'n	nov 12		RJ	P
399	5-141	nov 12	8:17	SS	#10	1X1	P	445'n	nov 12		RJ	P

Repair Type P=Patch DS= Destructive Test Location
Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

Project Number: #1 1000 · 332

QA/QC Name: Michelle Casimiro

Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
400	4-5-141	nov. 12	8:37	SS	#10	4X4	P	340'n	nov 12		RJ	P
401	4-5	nov 12	8:45	SS	#10	1X2	P	319'n	nov 12		RJ	P
402	4-5	nov 12	9:20	SS	#10	1X2	P	294'n	nov 12		RJ	P
403	4-5	nov 12	9:22	SS	#10	1X1	P	275'n	nov 12		RJ	P
404	8-140	nov. 12	1:45	SS	#10	2X5	DS-63	207'n	nov 12		RJ	P
405	7-140	nov. 12	1:40	SS	#10	2X5	DS-64	162'n	nov 12		RJ	P
406	7-140	nov 12	11:33	SS	#10	1X1	P	6'n	nov 12		RJ	P
407	8-140	nov 12	11:35	SS	#10	1X2	P	3'n	nov 12		RJ	P
408	81-136	nov 12	10:30	TC	#20	2X44	cap	43'w-92'w under cap P-136	nov. 12		RJ	P
409	7-139	nov. 12	1:59	SS	#10	2X5	DS-62	367'n	nov 12		RJ	P
410	7-139	nov. 12	10:00	SS	#10	1X1	P	320'N	nov 12		RJ	P
411	8-139	nov 12	10:02	SS	#10	1X1	P	319'N	nov 12		RJ	P
412	P3-cap	nov 11	2:40	SS	#10	2X5	DX-30	312'n	nov 12		RJ	P
413	7-140	nov 12	1:40	SS	#10	1X1	P	286'n	nov 12		RJ	P
414	8-140	nov 12	1:43	SS	#10	1X2	P	287'n	nov 12		RJ	P
415	5-6	nov 12	2:20	SS	#10	3X5	DS-3A	9'N	nov 12		RJ	P
416	5-6	nov 12	11:15	SS	#10	1X1	P	5'N	nov. 12		RJ	P
417	52-53	nov 11	9:07	SS	#10	1X1	P	1'N	nov. 11		RJ	P
418	7-139	nov 12	9:38	SS	#10	1X1	P	437'N	nov 12		RJ	P
419	8-139	nov 12	9:37	SS	#10	1X1	P	437'N	nov 12		RJ	P
420	119-120	nov 10	11:20	TC	#20	2X16	DS48B	cap 5-21'NE / 7'N of R167	nov 10		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

National Lining Systems, Inc.

Repair / Vacuum Test Log

Project Name: Ameren, Ash Pond A

QA/QC Name: Michelle Casimiro

Project Number: # 1000-352

Material Type: 40 mil

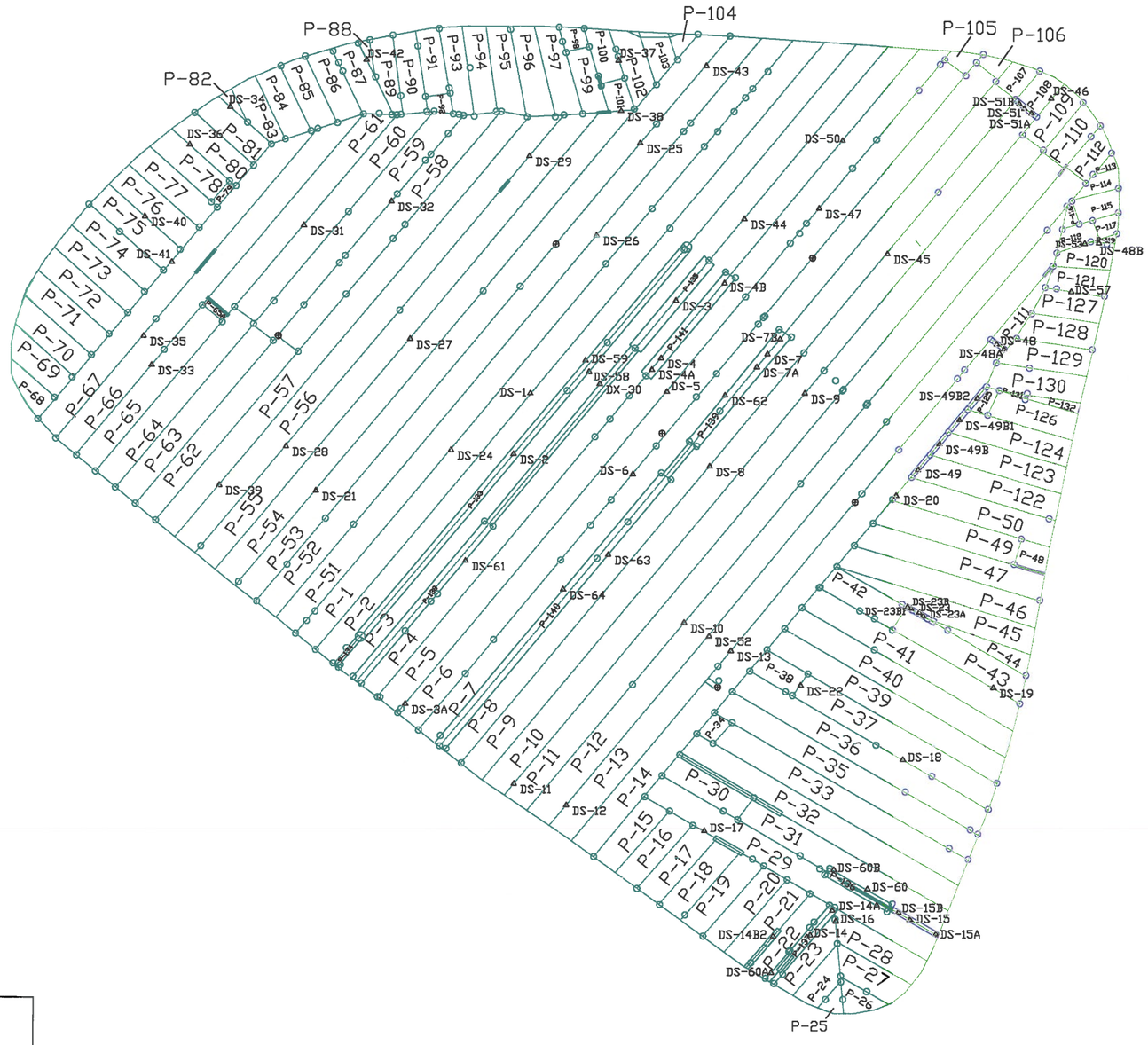
Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Repair Time	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Test Time	Tester Int.	Result P=Pass F=Fail
421	121-127	Nov 10	10:35	TC	#20	1X2	P	9' NE of R422	Nov. 10		RJ	P
422	121-127	Nov 10	10:38	TC	#20	2X2	P	@ N.E AT	Nov. 10		RJ	P
423	121-127	Nov 10	11:15	TC	#20	2X5	DS-57	22'N of R157	Nov. 10		RJ	P
424	128-129	Nov 10	11:20	TC	#20	2X4	P	@ N.E AT	Nov 12		RJ	P
425	31-136	Nov 12	8:20	SS	#10	2X11	DS-60B	cap 44'W-55'N	Nov 12		RJ	P
426	22-137	Nov 12	8:28	SS	#10	2X17	CAP	cap 11'N-28'N	Nov 12		RJ	P
427	22-137	Nov 12	8:40	TC	#20	2X5	DS-60A	5'N / 3'N of R380	Nov. 12		RJ	P
428	42-45	Nov 10	3:05	TC	#20	2X8	D23B1	cap 1'W of R125	Nov. 12		RJ	P
429	42-45	Nov 10	3:06	TC	#20	1X2	P	beside R 428	Nov. 10		RJ	P
430	P10	Nov 7	8:15	TC	#20	1X1	P	430'N / 8'W of R203	Nov 10		RJ	P
431	14-124	Nov. 10	2:00	TC	#20	3X24	Cap	cross seam	Nov 10		RJ	P
432	14-123	Nov 10	1:57	TC	#20	2X20	DS 49B	) cross seam	Nov 10		RJ	P
433	14-122	Nov 10	2:30	TC	#20	2X12	cap	J cross seam	Nov 10		RJ	P
434	14-122	Nov 10	2:31	TC	#20	2X7	cap	cross seam	Nov 10		RJ	P
435	14-125	Nov. 13	8:30	SS	#10	2X21	DS-49B2	cap cross seam	Nov 13		RJ	P
436	14-124	Nov 12	9:50	TC	#20	3X23	DS-49B1	cap cross seam	Nov. 12		RJ	P
437	21-22	Nov 13	8:38	SS	#10	2X18	DS-14B2	cap 23-41'N	Nov. 13		RJ	P
438	22-23	Nov 7	11:15	SS	#10	2X5	DS-14	50'N	Nov 12		RJ	P
439	17-29	Nov 7	11:17	SS	#10	2X5	DS-17	10'E of R75	Nov 12		RJ	P
440	12-13	Nov 12	2:08	SS	#10	2X5	DS-52	200'n	Nov 12		RJ	P
441	C1-64-C5A	Nov 10	1:55	SS	#10	2X12	cap	TJ	Nov 12		RJ	P

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld

Electronic Filing: Received, Clerk's Office 09/28/2020



LEGEND

Panel Number	P-1...P-132
40 mil Textured HDPE Liner	
Fusion Seam	
Destructive Test DS-1...DS-64	△
Cap Strip	▭
Patch	○
Boot	⊕

GRAPHIC SCALE
0 25 50 100
(In Feet)
1" = 50 ft.

National Lining Systems, Inc.
16970-3 San Carlos Blvd., Suite 191
Ft Myers, FL 33908
Phone: (863)248-0850
Fax: (863)248-0851

PROJECT: Crawford County, Illinois

Hutsonville Power Station - Ameren - Ash Pond "A"

ASBUILT DRAWING

Size	FSCM No.	Drawing No.	Rev.
		N/A	

DRAWN BY: MBT | Scale: 1" = 50' | DATE: April 27, 2016 | Sheet: 1 of 1

Electronic Filing: Received, Clerk's Office 09/28/2020

National Lining Systems, Inc.

Page: _____

Panel Placement Log

Project Name: Ameren - Ash Pond D Project Number: #1000-332

QA/QC Name: Michelle Casimiro Material Type: 40 mil

Secondary [ ] Primary [ ]

Panel No.	Roll No.	Date	Length	Width	Square Feet	Comments
P1	#3949	Nov. 5	45	22	990	
P2	3949	Nov. 5	41	22	902	
P3	3949	Nov. 5	37	22	814	
P4	3949	Nov. 5	36	22	792	
P5	3949	Nov. 5	14	5	35	A
P6	3949	Nov. 5	35	22	770	
P7	3949	Nov. 5	48.5	22	1,067	45/52
P8	3949	Nov. 5	54	22	1,188	52/56
P9	3949	Nov. 5	57	22	1,254	56/58
P10	3949	Nov. 5	58.5	22	1,287	58/59
P11	3949	Nov 5	59	22	1,298	
P12	#8951	Nov. 5	58.5	22	1,287	58/59
P13	8951	Nov. 5	56.5	22	1,243	58/55
P14	8951	Nov 5	54.5	22	1,199	55/54
P15	3951	Nov. 5	54	22	1,188	15,314

National Lining Systems, Inc.

Seaming Log

Project Name: Ameren. Ash Pond D **Project Number:** # 1000-332

QA/QC Name: Michelle Casimiro. **Material Type:** 40 mil

Seam No.	Length (lf)	Date	Time	Operator Int.	Machine No.	Set Temp. Fahrenheit	Speed / Preheat	Comments
P1- P2	45	nov. 5	8:45	DE	W# 20	450	9	
P2. P3	41	nov. 5	9:00	DE	W# 20	450	9	
P3. P4	37	nov 5	8:57	JL	W# 12	450	9	
P4- P6	23	nov. 5	9:28	JL	W# 12	450	9	
P4. P5	13	nov. 5	9:32	JL	W #12	450	7	
P5. P6	14	nov. 5	9:06	JL	W# 12	450	7	
P6. P7	45	nov. 5	9:13	DE	W # 20	450	9	
P7- P8	52	nov. 5	9:24	DE	W# 20	450	9	
P8. P9	56	nov. 5	9:38	DE	W# 20	450	9	
P9- P10	58	nov. 5	9:39	JL	W# 12	450	9	
P10- P11	59	nov. 5	9:55	DE	W# 20	450	9	
P11- P12	59	nov. 5	9:57	JL	W# 12	450	9	
P12- P13	58	nov. 5	10:13	DE	W# 20	450	9	
P13- P14	55	nov. 5	10:08	JL	W # 12	450	9	
P14- P15	54	nov. 5	10:18	JL	W # 12	460	9	

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Ash Pond "D"

National Lining Systems, Inc.

Non-Destructive Test Log

Project Name: Ameren, Ash Pond D
Project Number: # 1000-332
QA/QC Name: Michelle Casimiro
Material Type: 40 mil Textured HDPE Liner

Seam No.	Test Date	Tester Int.	Test Type A=Air V=Vacuum	Start Time	End Time	PSI Start	PSI End	Test P= Pass F=Fail	Test Length / Location
P1-P2	Nov 7	LP	A	3:22	3:37	28	28	P	
P2-P3	Nov. 7	LP	A	3:25	3:30	29	29	P	
P3-P4	Nov 7	LP	A	3:25	3:30	32	31	P	
P4-P6	Nov 7	LP	A	3:12	3:17	32	32	P	
P4-P5	Nov 7	LP	A	3:25	3:30	28	27	P	
P5-P6	Nov 7	LP	A	3:25	3:30	28	28	P	
P6-P7	Nov 7	LP	A	1:18	1:23	29	29	P	
P7-P8	Nov. 7	LP	A	3:12	3:17	30	28	P	
P8-P9	Nov. 7	LP	A	3:12	3:17	31	30	P	
P9-P10	Nov 7	LP	A	3:00	3:05	31	30	P	
P10-P11	Nov 7	LP	A	3:00	3:05	28	28	P	
P11-P12	Nov 7	LP	A	3:00	3:05	30	29	P	
P12-13	Nov 7	LP	A	3:00	3:05	29	29	P	
P13-14	Nov 7	LP	A	2:40	2:45	29	28	P	
P14-15	Nov 7	LP	A	2:40	2:45	29	29	P	

National Lining Systems, Inc.

Repair / Vacuum Test Log

Page: _____ of _____

Ash Pond "D"

Project Name: ameren, ash Pond D

QA/QC Name: Michelle Casimiro

Project Number: # 1000-332

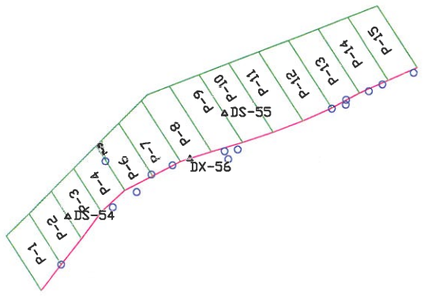
Material Type: 40 mil

Secondary [ ] Primary [ ]

Repair No.	Seam / Panel No.	Repair Date	Operator Int.	Machine No.	Repair Size (lf)	Repair Type	Location	Test Date	Tester Int.	Result P=Pass F=Fail
1	1 / 2	nov 9	SS	#10	3X5	P	TJ ✓	11/9	RJ	P
2	2 / 3	nov 9	SS	#10	2X5	DS-54	19'N ✓	11/9	RJ	P
3	existing / liner	nov 9	SS	#10	3X4	P	3'S of P4 ✓	11/9	RJ	P
4	4/5 / 6	nov 9	SS	#10	2X2	P	TJ ✓	11/9	RJ	P
5	6 / 7	nov 9	SS	#10	1X1	P	3'N ✓	11/9	RJ	P
6	existing / liner	nov 9	SS	#10	1X3	P	5'S of P6 / 20'E of R3 ✓	11/9	RJ	P
7	7 to existing liner	nov 9	SS	#10	4X10	P	19'E of R6 ✓	11/9	RJ	P
8	8 / EXIST	nov 9	SS	#10	2X5	DS-56	(OX) 12'E of R7	11/9	RJ	P
9	Existing liner	nov 9	SS	#10	3X7	P	1'S of R10 ✓	11/9	RJ	P
10	Existing / liner	nov 9	SS	#10	1X1	P	1'N of P9 ✓	11/9	RJ	P
11	Existing / liner	nov 9	SS	#10	1X1	P	6'E of R10 ✓	11/9	RJ	P
12	9 / 10	nov 9	SS	#10	2X5	DS-55	25'N ✓	11/9	RJ	P
13	12 / 13	nov 9	SS	#10	2X2	P	1'n ✓	11/9	RJ	P
14	existing / liner	nov 9	SS	#10	1X2	P	3'S of P13 ✓	11/9	RJ	P
15	existing / liner	nov 9	SS	#10	1X1	P	2'n of R14 ✓	11/9	RJ	P
16	existing / liner	nov 9	SS	#10	2X3	P	10'W of R17 / 20'E of R15 ✓	11/9	RJ	P
17	existing / liner	nov 9	SS	#10	2X2	P	10'E of R16 ✓	11/9	RJ	P
18	existing / liner	nov 9	SS	#10	2X7	P	3'S of P15 ✓	11/9	RJ	P
19	P1 / P15	Nov 9	SS	#10	322'	Ext	So. Edge P-1 thru P-15 @ tie-in	11/9	RJ	P
	/									
	/									

Repair Type P=Patch DS= Destructive Test Location

Location TJ=T Joint AT=Anchor Trench EXT=Extrusion Weld



NORTH

LEGEND

Panel Number	P-1...P-15
40 mil Textured HDPE Liner	
Fusion Seam	
Destructive Tests DS-54, DS-55, DX-56	△
Extrusion Weld	
Patch	○

GRAPHIC SCALE
0 25 50 100
(In Feet)
1" = 50 ft.

National Lining Systems, Inc.
16970-3 San Carlos Blvd., Suite 191
Ft Myers, FL 33908
Phone: (863)248-0850
Fax: (863)248-0851

PROJECT: Crawford County, Illinois

Hutsonville Power Station - Ameren - Slope From Ash Pond "D"

ASBUILT DRAWING

Size	FSCM No.	Drawing No.	Rev.
		N/A	

DRAWN BY: MBT | Scale: 1" = 50' | DATE: December 31, 2015 | Sheet: 1 of 1

APPENDIX E

INSTALLER CERTIFICATION

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Lining Systems **DATE :** 11/5/2015

GEOSYNTHETIC MATERIAL: 40 mil HDPE

AREA ACCEPTED:

Ash Pond D slope at the Bottom Ash Pond
(Panels 1D – 15D)

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: KhamKhoun Thaypravanh

Title of Installer's Authorized Representative: PM

Date: 11-5-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/5/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE :** 11/20/2015

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED:

Ash Pond D slope

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 11/20/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/20/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Lining Systems **DATE :** 10/30/15

GEOSYNTHETIC MATERIAL: 40 mil HDPE

AREA ACCEPTED:

Panel 1 through 14

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Kham Khoun Thayravanh

Title of Installer's Authorized Representative: NLS - Construction Mgr.

Date: 10-30-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: STEPHEN GRAHAM

Date: 10/30/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Liner Systems **DATE :** 10/31/15

GEOSYNTHETIC MATERIAL: 40 mil HDPE

AREA ACCEPTED:

SouthEast Corner
(Panels 15 - 34)

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: KhamKhoun Thayravanh

Title of Installer's Authorized Representative: QM.

Date: 10-31-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: STEPHEN GRAHAM

Date: 10/30/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Lining Systems **DATE:** 11/01/2015

GEOSYNTHETIC MATERIAL: 40 mil HDPE

AREA ACCEPTED:

~~East~~ Panels 35 - 56

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Khamkhoun Thayravanh

Title of Installer's Authorized Representative: QM.

Date: 11-1-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/01/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Lining Systems **DATE:** 11/3/2015

GEOSYNTHETIC MATERIAL: 40 mil HDPE

AREA ACCEPTED:

Southwest corner of Ash Pond A
Panels 57-104

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Khamkhoun Thayaranh

Title of Installer's Authorized Representative: Construction Mgr

Date: 11-3-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/03/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Lining Systems **DATE:** 11/04/2015

GEOSYNTHETIC MATERIAL: 40 mil HDPE

AREA ACCEPTED:

Panels 105 - 126 and The north end of Panels 1 - 14 ~~and~~ 24

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: KhamKhoun Thayravanh

Title of Installer's Authorized Representative: CM

Date: 11.04.2015

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/04/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: National Lining Systems **DATE :** 11/9/15

GEOSYNTHETIC MATERIAL: 40 mil textured HDPE

AREA ACCEPTED:

Panels 127-132

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Kham Khoun Thayravanh

Title of Installer's Authorized Representative: QA

Date: 11.9.15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/9/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE :** 11/23/2015

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED:

Road (3' thick minimum) from crown of East side of Ash Pond A extending toward the crown of Ash Pond A, reaching about half-way.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 11/23/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Jessie Hahn

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/23/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: W B Koester **DATE :** 11/24/2015

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED:

Completed horseshoe-shaped haul road on liner and covered ~~encl~~ area enclosed by road. (Road is between ramps on East Levee of Ash Pond A.)

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 11/24/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/24/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE :** 11/25/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED:

Extension of arc-shaped road to crest of Ash Pond A.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 11/25/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Jessie Hahn

Printed Name of CQA Officer-in-Absentia: Jessie Hahn

Date: 11/25/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 11/30/15

GEOSYNTHETIC MATERIAL: Top Soil

AREA ACCEPTED: Dewatered haul road, removed top soil from borrow field.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 11/30/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Seth Lamble

Printed Name of CQA Officer-in-Absentia: Seth Lamble

Date: 11/30/2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/01/15

GEOSYNTHETIC MATERIAL: Protective Soil Cover

AREA ACCEPTED: Hauled shale to support & repair Haul road; On Ash Landfill A and borrow field Haul Road
- Hauled & placed Protective soil cover on Ash Landfill A on the north west slope.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/01/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Seth Lamble

Date: 12/01/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12-2-2015

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Protective soil cover placed on Ash Landfill A, minimum 3', on north west & north east slopes.
Shale was placed on haul road ramp to provide stable ramp.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/2/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Seth Lambe

Date: 12-2-2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: W.B. Koester **DATE:** 12-3-15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Protective cover (3' thick minimum) from crown of west side of Ash Pond A extending along the west slope of Ash Pond A, reaching about halfway.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/3/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Seth Lamble

Printed Name of CQA Officer-in-Absentia: Seth Lamble

Date: 12-3-15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: W.B. Koester **DATE:** 12-4-15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Protective cover (3' thick minimum) from crown of landfill, extending along the east slope and west slope of Ash Pond A, reaching about halfway.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/4/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Seth Lamblc

Date: 12-4-2015

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12-5-15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Protective cover (3' thick minimum) from crown of landfill, extending along the west slope & crown of Ash Pond A, reaching about halfway. Folded levee material at northwest corner of Ash Pond A landfill with protective cover.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12-5-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Seth Lamble

Date: 12-5-15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12-6-15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Protective cover (3' thick minimum) from crown of landfill, extending along the west slope and south slop of Ash Pond A, reaching about halfway Folded levee material of ~~northwest corner of~~ on SE south boundary of Ash Pond A landfill, with Protective cover.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: CL Atk

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12-6-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Seth Lamble

Printed Name of CQA Officer-in-Absentia: Seth Lamble

Date: 12-6-15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/07/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Protective cover of 3' in depth was placed and extended on the top (crown) and moved to the southwest, North and along the west slope of ash pond A to the extend of a little over half way.
Folded levee material of south east & east boundary of Ash Pond A, with the Protective cover in place. 2848 yds

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/7/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Cassandra Baresel

Date: 12/7/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/08/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED:
Placed Protective Cover in Ash Pond A Landfill from the excavated material of the borrow field. The protective cover was placed to the north moving around to the West, a little over center of Ash Pond A. Folded levee material of the Northeast and south boundaries of Ashpond A landfill. 2816 yds

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/8/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Cassandra Barsel

Date: 12/9/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/09/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED:
Placed Protective Cover in Ash Pond A landfill from the borrow field excavation. The protective cover was plased on the West and northwest areas of ~~the~~ Ash Pond A just over the half way mark.
Folded levee materal on the North boundries of Ash Pond A landfill, along with the south East.
2688 Yds

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/9/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable):

Printed Name of CQA Officer-in-Absentia: Cassandra Baresel

Date: 12/9/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/10/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Placed Protective Cover in Ash Pond A landfill. ~~EGL~~ Cover Material from borrow field. The Protective cover was place on The West & Northwest of the Ash Pond A Landfill.

2832 yds

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/10/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Cassandra Barsel

Printed Name of CQA Officer-in-Absentia: Cassandra Barsel

Date: 12/10/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/11/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Placed Protective cover on the West and Northwest of Ash Pond A Landfill. Material used was from the borrow field.

2732 YDS

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/11/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): [signature]

Printed Name of CQA Officer-in-Absentia: Cassandra Barese

Date: 12/12/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE :** 12/12/15

GEOSYNTHETIC MATERIAL: _____

AREA ACCEPTED: Protective cover was placed on the North and around to the south west of Ash Pond A landfill.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: _____

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/12/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: Cassandra Barsel

Date: 12/12/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/13/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Placed protective cover on the northwest ~~corner~~ boundrie and around to the west of Ash Pond A landfill

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/13/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): CB

Printed Name of CQA Officer-in-Absentia: Cassandra Barese

Date: 12/13/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/15/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Placed protective cover to ~~the~~ West and along the Northwest Levee.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/15/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): CBL

Printed Name of CQA Officer-in-Absentia: Cassandra Baresel

Date: 12/15/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12/16/15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Placed protective cover West to the levee & Southwest to the levee of Ash Pond A.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12/16/15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable):

Printed Name of CQA Officer-in-Absentia: Cassandra Barsel

Date: 12/16/15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE
(Form CQAP-4.1)

INSTALLER: WB Koester **DATE:** 12-17-15

GEOSYNTHETIC MATERIAL: Protective Cover

AREA ACCEPTED: Placed protective cover west to the levee and South west to the levee, of Ash Pond A
Scraped & graded placed protective cover of Ash Pond A.

INSTALLER: The undersigned authorized representative of the Installer certifies that he has visually inspected the substrate for the above referenced area and has found the surface to be acceptable for installation of the above referenced geosynthetic material on the date so noted.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Chris Atkinson

Printed Name of Installer's Authorized Representative: Chris Atkinson

Title of Installer's Authorized Representative: Foreman

Date: 12-17-15

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): Seth Lamble

Printed Name of CQA Officer-in-Absentia: Seth Lamble

Date: 12-17-15

Signature of CQA Officer: _____

Printed Name of CQA Officer: _____

Date: _____

APPENDIX F

CALIBRATIONS

Electronic Filing: Received, Clerk's Office 09/28/2020

R. M. Wester and Associates, Inc.

UNITS: PCF

GAGE MODEL: C-MC3 SER: 30059559

CALIB DATE: 03/18/15
CALIB BAY: 1

SOURCE TYPE: GAMMA NEUTRON STD COUNT: DENSITY: 23996
SERIAL: C59559 A59559 MOISTURE: 9500

** DENSITY CALIBRATION DATA **

DEPTH	MAGNESIUM 110.9	MAGN/ALUM 137.5	ALUMINUM 169.3	LIMESTONE 139.5	GRANITE 163.9
BS	17590	13156	9721	11500	9822
AC	34866	26390	19101	23670	19129
2	76432	55564	37135	50047	36888
4	67692	46511	28804	40268	28521
6	49332	31369	17725	26627	17818
8	31305	18347	9861	15454	9617
10	18817	10399	5600	8475	5557
12	11073	6226	3611	5100	3674

** DENSITY PERFORMANCE at 2000 kg/m^3 [125 pcf] **

DEPTH	A	B	C	CR	PREC	CE	RMSE
BS	3.42096	59.63820	0.17841	1.65	0.35	3.47	3.55
AC	5.32480	77.83057	0.12569	1.47	0.26	2.02	2.08
2	12.61018	84.89296	-0.32048	1.42	0.15	0.96	1.01
4	13.96427	71.82388	-0.27715	1.52	0.14	1.47	1.49
6	14.51101	57.13665	-0.11316	1.69	0.14	1.59	1.61
8	15.56107	43.09917	0.04512	2.01	0.15	0.76	0.82
10	15.50197	35.00970	0.07913	2.36	0.18	1.53	1.58
12	10.69081	32.67261	0.07496	2.51	0.25	2.35	2.40

** MOISTURE CALIBRATION DATA **

LOW W	HIGH W
0.0	33.0
488.0	5975.0

** MOISTURE PERFORMANCE at 160 kg/m^3 [10pcf] **

A(F)	B(E)	CR	PREC	RMSE
57.06920	2.93156	2.91	0.14	0.31

Electronic Filing: Received, Clerk's Office 09/28/2020

R. M. Wester and Associates, Inc.

UNITS: SI

GAGE MODEL: C-MC3 SER: 30059559

CALIB DATE: 03/18/15
CALIB BAY: 1

SOURCE TYPE: GAMMA NEUTRON STD COUNT: DENSITY: 23996
SERIAL: C59559 A59559 MOISTURE: 9500

** DENSITY CALIBRATION DATA **

DEPTH	MAGNESIUM 1777	MAGN/ALUM 2203	ALUMINUM 2712	LIMESTONE 2235	GRANITE 2625
BS	17590	13156	9721	11500	9822
AC	34866	26390	19101	23670	19129
50	76432	55564	37135	50047	36888
100	67692	46511	28804	40268	28521
150	49332	31369	17725	26627	17818
200	31305	18347	9861	15454	9617
250	18817	10399	5600	8475	5557
300	11073	6226	3611	5100	3674

** DENSITY PERFORMANCE at 2000 kg/m^3 [125 pcf] **

DEPTH	A	B	C	CR	PREC	CE	RMSE
BS	3.42096	0.95528	0.17841	1.65	5.65	55.66	56.80
AC	5.32480	1.24669	0.12569	1.47	4.10	32.32	33.35
50	12.61018	1.35982	-0.32048	1.42	2.42	15.38	16.13
100	13.96427	1.15047	-0.27715	1.52	2.22	23.53	23.94
150	14.51101	0.91521	-0.11316	1.69	2.22	25.46	25.85
200	15.56107	0.69036	0.04512	2.01	2.45	12.10	13.06
250	15.50197	0.56079	0.07913	2.36	2.95	24.56	25.26
300	10.69081	0.52335	0.07496	2.51	3.99	37.67	38.50

** MOISTURE CALIBRATION DATA **

LOW W	HIGH W
0.0	528.0
488.0	5975.0

** MOISTURE PERFORMANCE at 160 kg/m^3 [10pcf] **

A(F)	B(E)	CR	PREC	RMSE
57.07	46.959	2.91	2.2	5.0

Electronic Filing: Received, Clerk's Office 09/28/2020

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St. Peters, MO 63376
(636) 928-9628
www.rmwester.com

RADIOACTIVE SEALED SOURCE LEAK TEST REPORT

Test Date: March 20, 2015 Analytical Date: March 20, 2015

Source Identification:

Manufacturer: CPN Model No.: MC3

Mach S/N: M30059559

Radionuclide: Cs-137 Activity: 10.0 mCi

Source S/N: C9559

Radionuclide: Am-241/Be Activity: 50.0 mCi

Source S/N: A9559

Sample Submitted By: Kenneth Bachmann, Health Physicist

Facility: Geotechnology, Inc.

Address: 11 French Village Industrial Park

Fairview Heights, IL 62208

The identified sealed source listed above has been tested for leakage of radioactive materials as required by the United States Nuclear Regulatory Commission. The analysis of the wipe material used in testing the sealed source reveals the presence of $\leq 7.75 \times 10^{-5}$ µCi of loose contamination for Cs-137 and $\leq 3.13 \times 10^{-5}$ µCi of loose contamination for Am-241.

(X) This source is acceptable for continued use.

( ) This source has been found to have a level of loose contamination greater than 0.005 µCi of removable radioactive materials, and should be removed from service immediately.

(N/A) Operational and performance check of shutter mechanism satisfactory.

Nest Leak Test Date: September 20, 2015

Analysis By: Kenneth Bachmann

Reviewed By: K Mc

Tom's Equipment

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 241288

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 4509241288
Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: 1.808537 Scale: 5.042961

Applied Force lbs:	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%: 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

JW

Date: 04/27/15

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 667871

Calibration Apparatus:
Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 2711667871
Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: 2.703394 Scale: 3.183917

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards.

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

JW

Date: 04/27/15

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 667871

Calibration Apparatus:
Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 2711667871
Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: 2.703394 Scale: 3.183917

Applied Force lbs:	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Excitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

JW

Date: 04/27/15

Certificate of Calibration

Device Calibrated: Instron 5kN Load Cell - Compression		Bldg A, Conf Lab, Rm 137
TRI ID: 57419	Serial No: 57419	Model No: Instron 5kN
Range, lbs: 1,124	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 10K Calibration Load Cell		
Serial No: 398111	Calibration Due: 3-16-2016	Uncertainty: 2.92 lbs

COMPRESSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
51.0	51.3	0.3	0.5	Y
102.5	102.9	0.4	0.4	Y
200.5	201.1	0.6	0.3	Y
409.0	410.6	1.6	0.4	Y
601.0	603.1	2.1	0.3	Y
822.0	825.0	3.0	0.4	Y
1000.0	1004	4.0	0.4	Y

Temp: 20.0°C, Rel. Humidity: 51%, Thermo/Hygro S/N: 130561731, Cal. Due: 9-24-2015

Notes: Calibrated on Cal Load Frame

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-100
Calibration Date: 4-7-2015	Calibration Due Date: 4-7-2016	
Signature of Calibrator: W White		
Calibration Reviewed by: Richard A. Long		Review Date: 4-23-2015

Certificate No: C15-308

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Certificate of Calibration

Device Calibrated: Instron 5kN Load Cell - Compression		Bldg A, Conf Lab, Rm 137
TRI ID: 57419	Serial No: 57419	Model No: Instron 5kN
Range, lbs: 1,124	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 10K Calibration Load Cell		
Serial No: 398111	Calibration Due: 3-16-2016	Uncertainty: 2.92 lbs

COMPRESSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
55.0	55.2	0.1	0.3	Y
103.0	103.3	0.3	0.3	Y
202.0	202.3	0.3	0.1	Y
402.0	402.8	0.8	0.2	Y
608.0	609.7	1.7	0.3	Y
815.0	817.5	2.5	0.3	Y
1022.0	1025	3.0	0.3	Y

Temp: 20.0°C, Rel. Humidity: 51%, Thermo/Hygro S/N: 130561731, Cal. Due: 9-24-2015

Notes: Calibrated on Cal Load Frame

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-100
Calibration Date: 4-7-2015	Calibration Due Date: 4-7-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Jones		Review Date: 4-23-2015

Certificate No: C15-308

Certificate of Calibration

Device Calibrated: Metrox 1K Load Cell - Station 1		Bldg A, Conf Lab, Rm 137
TRI ID: M750660	Serial No: M750660	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
56.00	55.73	-0.27	-0.48	Y
101.30	100.81	-0.49	-0.48	Y
253.00	252.29	-0.71	-0.28	Y
524.00	523.32	-0.68	-0.13	Y
760.00	758.89	-1.11	-0.15	Y
1018.00	1016.24	-1.76	-0.17	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard A. Jones	Review Date: 6-24-2015

Certificate No: C15-476

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Certificate of Calibration

Device Calibrated: Metrox 1K Load Cell - Station 1		Bldg A, Conf Lab, Rm 137
TRI ID: M750660	Serial No: M750660	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
50.00	50.15	0.15	0.30	Y
104.50	104.36	-0.14	-0.13	Y
253.00	252.79	-0.21	-0.08	Y
510.50	509.64	-0.86	-0.17	Y
761.00	765.47	4.47	0.59	Y
1007.00	1011.17	4.17	0.41	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Jones		Review Date: 6-24-2015

Certificate No: C15-476

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Certificate of Calibration

Device Calibrated: No Name (GeoTac?) 1K Load Cell - Station 2		Bldg A, Conf Lab, Rm 137
TRI ID: 278882	Serial No: 278882	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
54.00	53.96	-0.04	-0.07	Y
101.30	101.36	0.06	0.06	Y
251.00	250.62	-0.38	-0.15	Y
500.00	499.21	-0.79	-0.16	Y
748.00	746.80	-1.20	-0.16	Y
1005.00	1003.47	-1.53	-0.15	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard M Jung	Review Date: 6-24-2015

Certificate No: C15-475

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Certificate of Calibration

Device Calibrated: No Name (GeoTac?) 1K Load Cell - Station 2		Bldg A, Conf Lab, Rm 137
TRI ID: 278882	Serial No: 278882	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
53.50	53.45	-0.05	-0.09	Y
102.60	102.87	0.27	0.26	Y
254.00	254.65	0.65	0.26	Y
501.00	500.73	-0.27	-0.05	Y
761.00	759.91	-1.09	-0.14	Y
1002.00	1000.44	-1.56	-0.16	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Jung		Review Date: 6-24-2015

Certificate No: C15-475

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Certificate of Calibration

Device Calibrated: Trancell Tech 1K Load Cell - Station 3		Bldg A, Conf Lab, Rm 137
TRI ID: 226110006267	Serial No: 226110006267	Model No: BSS-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
49.50	49.35	-0.15	-0.30	Y
109.70	109.17	-0.53	-0.48	Y
250.70	250.24	-0.46	-0.18	Y
502.00	500.48	-1.52	-0.30	Y
762.00	759.70	-2.30	-0.30	Y
1005.00	1002.46	-2.54	-0.25	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard M. Jones	Review Date:

Certificate No: C15-477

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Certificate of Calibration

Device Calibrated: Trancell Tech 1K Load Cell - Station 3		Bldg A, Conf Lab, Rm 137
TRI ID: 226110006267	Serial No: 226110006267	Model No: BSS-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
50.50	50.35	-0.15	-0.30	Y
102.70	102.69	-0.01	-0.01	Y
253.00	253.23	0.23	0.09	Y
503.00	502.48	-0.52	-0.10	Y
756.00	755.71	-0.29	-0.04	Y
1003.00	1002.46	-0.54	-0.05	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard M Tracy		Review Date:

Certificate No: C15-477

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Certificate of Calibration

Device Calibrated: Metrox 1K Load Cell - Station 4		Bldg A, Conf Lab, Rm 137
TRI ID: M750717	Serial No: M750717	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
54.20	54.07	-0.13	-0.24	Y
100.90	100.55	-0.35	-0.35	Y
253.00	253.16	0.16	0.06	Y
499.50	499.74	0.24	0.05	Y
747.84	748.30	0.46	0.06	Y
1008.10	1008.51	0.41	0.04	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard N. Jones	Review Date: 6-24-2015

Certificate No: C15-478

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Certificate of Calibration

Device Calibrated: Metrox 1K Load Cell - Station 4		Bldg A, Conf Lab, Rm 137
TRI ID: M750717	Serial No: M750717	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
55.80	55.85	0.05	0.09	Y
104.60	104.60	0.00	0.00	Y
250.00	249.62	-0.38	-0.15	Y
500.00	501.76	1.76	0.35	Y
756.00	755.92	-0.08	-0.01	Y
1011.40	1011.60	0.20	0.02	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Jones		Review Date: 6-24-2015

Certificate No: C15-478

Certificate of Calibration

Device Calibrated: Metrox 1K Load Cell - Station 5		Bldg A, Conf Lab, Rm 137
TRI ID: M750662	Serial No: M750662	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
52.20	52.23	0.03	0.06	Y
100.90	100.91	0.01	0.01	Y
253.70	254.07	0.37	0.15	Y
502.00	502.34	0.34	0.07	Y
753.70	754.07	0.37	0.05	Y
1009.00	1008.65	-0.35	-0.03	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Jacoy		Review Date: 6-24-2015

Certificate No: C15-479

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Certificate of Calibration

Device Calibrated: Metrox 1K Load Cell - Station 5		Bldg A, Conf Lab, Rm 137
TRI ID: M750662	Serial No: M750662	Model No: 1000
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.169 lbs - Tension

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
56.00	55.78	-0.22	-0.39	Y
105.00	104.97	-0.03	-0.03	Y
254.00	254.06	0.06	0.02	Y
504.00	505.58	1.58	0.31	Y
758.00	759.64	1.64	0.22	Y
1025.00	1026.38	1.38	0.13	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-4-2015	Calibration Due Date: 6-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Tony		Review Date: 6-24-2015

Certificate No: C15-479

Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 1		Bldg A, Conf Lab, Rm 137
TRI ID: 303331	Serial No: 303331	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AS FOUND

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
52.30	52.00	-0.30	-0.57	Y
101.00	100.60	-0.40	-0.40	Y
250.90	249.10	-1.80	-0.72	Y
503.00	499.00	-4.00	-0.80	Y
771.00	763.70	-7.30	-0.95	Y
1005.50	995.00	-10.50	-1.04	N

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes:

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-8-2015	Calibration Due Date: UNACCEPTABLE
Signature of Calibrator: W White	
Calibration Reviewed by: Richard M Jones	Review Date: 6-24-2015

Certificate No: C15-489

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Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 1		Bldg A, Conf Lab, Rm 137
TRI ID: 303331	Serial No: 303331	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AFTER ADJUSTMENT - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
50.60	50.80	0.20	0.40	Y
107.00	107.40	0.40	0.37	Y
250.60	251.20	0.60	0.24	Y
509.80	509.20	-0.60	-0.12	Y
759.20	755.20	-4.00	-0.53	Y
1007.20	1003.50	-3.70	-0.37	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: New Cal Factor = 0.031947

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Tracy		Review Date: 6-24-2015

Certificate No: C15-489

Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 1		Bldg A, Conf Lab, Rm 137
TRI ID: 303331	Serial No: 303331	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AFTER ADJUSTMENT - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
55.70	55.60	-0.10	-0.18	Y
100.80	101.10	0.30	0.30	Y
257.20	257.20	0.00	0.00	Y
512.00	513.30	1.30	0.25	Y
755.60	755.90	0.30	0.04	Y
1012.00	1010.80	-1.20	-0.12	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: New Cal Factor = 0.031947

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard M. Jung	Review Date: 6-24-2015

Certificate No: C15-489

Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 2		Bldg A, Conf Lab, Rm 137
TRI ID: 303327	Serial No: 303327	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 - T

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
54.00	54.00	0.00	0.00	Y
102.00	102.00	0.00	0.00	Y
245.00	245.00	0.00	0.00	Y
503.40	503.40	0.00	0.00	Y
758.00	757.50	-0.50	-0.07	Y
1025.00	1024.20	-0.80	-0.08	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: Cal Factor = 0.032541

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard A. Jones	Review Date: 6-24-2015

Certificate No: C15-487

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Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 2		Bldg A, Conf Lab, Rm 137
TRI ID: 303327	Serial No: 303327	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 - T

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
52.00	52.00	0.00	0.00	Y
98.40	98.50	0.10	0.10	Y
253.20	253.30	0.10	0.04	Y
501.00	501.10	0.10	0.02	Y
753.00	752.50	-0.50	-0.07	Y
1005.00	1004.30	-0.70	-0.07	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: Cal Factor = 0.032541

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Tracy		Review Date: 6-24-2015

Certificate No: C15-487

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Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 3		Bldg A, Conf Lab, Rm 137
TRI ID: 312656	Serial No: 312656	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
54.30	54.40	0.10	0.18	Y
102.00	102.00	0.00	0.00	Y
251.00	251.70	0.70	0.28	Y
505.00	506.00	1.00	0.20	Y
750.00	752.10	2.10	0.28	Y
1016.00	1017.20	1.20	0.12	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: Cal Factor = 0.032925

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-8-2015	Calibration Due Date: 6-8-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard A. Jung	Review Date: 6-24-2015

Certificate No: C15-490

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Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 3		Bldg A, Conf Lab, Rm 137
TRI ID: 312656	Serial No: 312656	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
49.90	50.00	0.10	0.20	Y
103.30	103.70	0.40	0.39	Y
252.00	252.80	0.80	0.32	Y
502.00	503.10	1.10	0.22	Y
755.00	756.40	1.40	0.19	Y
1005.00	1006.50	1.50	0.15	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: Cal Factor = 0.032925

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-8-2015	Calibration Due Date: 6-8-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Jones		Review Date: 6-24-2015

Certificate No: C15-490

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Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 4		Bldg A, Conf Lab, Rm 137
TRI ID: 303329	Serial No: 303329	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
52.00	51.70	-0.30	-0.58	Y
103.00	103.10	0.10	0.10	Y
251.00	249.80	-1.20	-0.48	Y
506.00	503.30	-2.70	-0.53	Y
760.00	754.70	-5.30	-0.70	Y
1012.00	1004.50	-7.50	-0.74	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: Cal Factor = 0.031979

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard M. Jones	Review Date: 6-24-2015

Certificate No: C15-488

Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 4		Bldg A, Conf Lab, Rm 137
TRI ID: 303329	Serial No: 303329	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AS FOUND - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
52.10	52.70	0.60	1.15	OK/RSL
112.60	113.00	0.40	0.36	Y
256.00	256.10	0.10	0.04	Y
514.00	512.30	-1.70	-0.33	Y
756.50	752.80	-3.70	-0.49	Y
1015.00	1008.70	-6.30	-0.62	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: Cal Factor = 0.031979

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard A. Young		Review Date: 6-24-2015

Certificate No: C15-488

Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 5		Bldg A, Conf Lab, Rm 137
TRI ID: 312657	Serial No: 312657	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AS FOUND - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
48.70	48.60	-0.10	-0.21	Y
124.00	123.30	-0.70	-0.56	Y
256.60	254.20	-2.40	-0.94	Y
523.00	517.30	-5.70	-1.09	N
782.00	774.30	-7.70	-0.98	Y
1022.00	1007.40	-14.60	-1.43	N

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: As Found Cal Factor = 0.032050

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: UNACCEPTABLE
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard A. Jones	Review Date: 6-24-2015

Certificate No: C15-491

Certificate of Calibration

Device Calibrated: Transducer Techniques - Wall Station 5		Bldg A, Conf Lab, Rm 137
TRI ID: 312657	Serial No: 312657	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AFTER ADJUSTMENT - RUN 1

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
58.90	58.60	-0.30	-0.51	Y
100.40	100.30	-0.10	-0.10	Y
256.50	256.50	0.00	0.00	Y
510.00	509.50	-0.50	-0.10	Y
774.50	774.30	-0.20	-0.03	Y
1025.00	1023.80	-1.20	-0.12	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: New Cal Factor = 0.031649

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard N. Jones	Review Date: 6-24-2015

Certificate No: C15-491

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Device Calibrated: Transducer Techniques - Wall Station 5		Bldg A, Conf Lab, Rm 137
TRI ID: 312657	Serial No: 312657	Model No: SB0-1K
Range, lbs: 1,000	Readability, lbs: 0.01	Max. Allowable Error: ±1%

Calibration Equipment Used: Futek 1K Calibration Load Cell		
Serial No: 555581	Calibration Due: 3-16-2016	Uncertainty: 0.1690 lbs - T

TENSION - AFTER ADJUSTMENT - RUN 2

Reference Load (lbs)	Device Value (lbs)	Error (lbs)	Error (%)	Acceptable Y/N
53.90	53.90	0.00	0.00	Y
110.00	110.00	0.00	0.00	Y
256.00	257.00	1.00	0.39	Y
508.20	508.70	0.50	0.10	Y
749.40	750.00	0.60	0.08	Y
1008.00	1008.90	0.90	0.09	Y

Temp: 20.3°C Rel. Humidity: 47% Thermo/Hygro S/N: 130561731 Cal. Due: 9-24-2015

Notes: New Cal Factor = 0.031649

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-101
Calibration Date: 6-10-2015	Calibration Due Date: 6-10-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard A. Tony	Review Date: 6-24-2015

Certificate No: C15-491

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Certificate of Calibration

Device Calibrated: Corner 5-Station UTM		Bldg A, Conf Lab, Rm 137
TRI ID: TRI-004	Serial No: N/A	Model No: Instron 5565
Range, in: 0-70	Readability, in: 0.001	Max. Allowable Error: ±1%

Calibration Equipment Used: Fowler 42-in Reference Calipers		
Serial No: 000239	Calibration Due: 6-20-2015	Uncertainty: 0.0025 in

CROSSHEAD EXTENSION

Reference Extension (in)	Device Value (in)	Error (in)	Error (%)	Acceptable Y/N
1.0040	1.008	0.004	0.4	Y
2.0000	2.004	0.004	0.2	Y
3.9975	4.002	0.004	0.1	Y
10.0000	10.010	0.010	0.1	Y
19.9910	20.000	0.009	0.0	Y
29.8610	29.850	-0.011	0.0	Y
13.6285	13.630	0.002	0.0	Y
20.0555	20.070	0.015	0.1	Y

Temp: 21.8°C, Rel. Humidity: 42%, Thermo/Hygro S/N: 101460584, Cal. Due: 3-8-2015

Notes: Reset gauge length on Instron after adjusting calipers at 30 inches

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-106
Calibration Date: 2-9-2015	Calibration Due Date: 2-9-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard A. Long	Review Date: 2-17-2015

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Certificate of Calibration

Device Calibrated: Corner 5-Station UTM		Bldg A, Conf Lab, Rm 137
TRI ID: TRI-004	Serial No: N/A	Model No: Instron 5565
Range, in: 0-70	Readability, in: 0.001	Max. Allowable Error: ±1%

Calibration Equipment Used: Accusplit 625XCL Stopwatch		
Serial No: N/A	Calibration Due: 11-5-2015	Uncertainty: 0.05 sec

CROSSHEAD EXTENSION RATE (SPEED)

UTM Speed Setting (in/min) : 2.00000

Extension Instron Value (in)	Elapsed Stopwatch Time (s)	Actual Speed (in/min)	Error (%)	Acceptable Y/N
1.000	0.00			
3.000	59.75	2.01	0.4	Y
5.000	119.72	2.00	0.2	Y
7.000	179.84	2.00	0.1	Y

UTM Speed Setting (in/min) : 12.00

Extension Value (in)	Elapsed Time (s)	Actual Speed (in/min)	Error (%)	Acceptable Y/N
1.000	0.00			
7.000	30.07	11.97	-0.2	Y
13.000	60.16	11.97	-0.3	Y
19.000	90.18	11.98	-0.2	Y

Temp: 21.8°C, Rel. Humidity: 42%, Thermo/Hygro S/N: 101460584, Cal. Due: 3-8-2015

Notes:

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-106
Calibration Date: 2-9-2015	Calibration Due Date: 2-9-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard Lacy		Review Date: 2-17-2015

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Certificate of Calibration

Device Calibrated: Isle 5-Station UTM		Bldg A, Conf Lab, Rm 137
TRI ID: TRI-719	Serial No: N/A	Model No: N/A
Range, in: 0-24	Readability, in: .001	Max. Allowable Error: ±1%

Calibration Equipment Used: Fowler 42-in Reference Calipers		
Serial No: 000239	Calibration Due: 6-20-15	Uncertainty: 0.0025 in

CROSSHEAD EXTENSION

Reference Extension (in)	Device Value (in)	Error (in)	Error (%)	Acceptable Y/N
0.4830	0.4830	0.000	0.00	Y
0.9955	1.0000	0.004	0.45	Y
2.0030	2.0100	0.007	0.35	Y
5.0165	5.0270	0.010	0.21	Y
10.0220	10.0370	0.015	0.15	Y

Temp: 20.9°C, Rel. Humidity: 45%, Thermo/Hygro S/N: 101460584, Cal. Due: 3-18-2015

Notes: Used "D638@2" for 2-in/min; "Grab Tens" for 12in/min.

Calibration Performed by: Willard White	Cal. Procedure: 30SOP-CAL-106
Calibration Date: 2-4-2015	Calibration Due Date: 2-4-2016
Signature of Calibrator: W. White	
Calibration Reviewed by: Richard S. Lacy	Review Date: 2-17-2015

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Certificate of Calibration

Device Calibrated: Isle 5-Station UTM		Bldg A, Conf Lab, Rm 137
TRI ID: TRI-719	Serial No: N/A	Model No: N/A
Range, in: 0-24	Readability, in: .001	Max. Allowable Error: ±1%

Calibration Equipment Used: Accusplit 625XCL Stopwatch		
Serial No: N/A	Calibration Due: 11-5-2015	Uncertainty: 0.005 sec

CROSSHEAD EXTENSION RATE (SPEED)

UTM Speed Setting (in/min) : 2.00000

Extension Value (in)	Elapsed Time (s)	Actual Speed (in/min)	Error (%)	Acceptable Y/N
1.000	0.00			
3.000	60.32	1.99	-0.5	Y
5.000	120.26	2.00	-0.2	Y
13.000	360.08	2.00	0.0	Y

UTM Speed Setting (in/min) : 12.00

Extension Value (in)	Elapsed Time (s)	Actual Speed (in/min)	Error (%)	Acceptable Y/N
1.000	0.00			
7.000	30.01	12.00	0.0	Y
13.000	60.02	12.00	0.0	Y
19.000	90.03	12.00	0.0	Y

Temp: 20.9°C, Rel. Humidity: 45%, Thermo/Hygro S/N: 101460584, Cal. Due: 3-18-2015

Notes: Used "D638@2" for 2-in/min; "Grab Tens" for 12in/min.

Calibration Performed by: Willard White		Cal. Procedure: 30SOP-CAL-106
Calibration Date: 2-4-2015	Calibration Due Date: 2-4-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard Tracy		Review Date: 2-17-2015

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Certificate No.: C15-074

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Certificate of Calibration

Device Calibrated: Mitutoyo Digital Indicator on GT-009 Base		Bldg A, Conf Lab, Rm 137
TRI ID: 17495	Serial No: 17495	Model No: ID-C112E
Range, in: 0-0.5	Readability, in: 0.000005	Max. Allowable Error: ±0.0004-in

DIGITAL INDICATOR

Calibration Equipment Used: Mitutoyo Gage Block Set		
Serial No: TRI-660/790547	Calibration Due: 6-19-2017	Uncertainty: 2.5 *u*

Reference Length (in)	Device Value (in)	Error (in)	Error (%)	Acceptable Y/N
0.05000	0.05015	0.00015	0.3	Y
0.10000	0.10015	0.00015	0.1	Y
0.15000	0.15030	0.00030	0.2	Y
0.20000	0.20035	0.00035	0.2	Y
0.25000	0.25025	0.0002	0.1	Y
0.30000	0.30035	0.00035	0.1	Y
0.35000	0.35055	0.00055	0.2	Y
0.40000	0.40040	0.00040	0.1	Y
0.45000	0.45050	0.00050	0.1	Y

Temp: 21.4°C, Rel. Humidity: 45%, Thermo/Hygro S/N: 122437978, Cal. Due: 8-12-2015

Notes: Calibrated on BT-009 Base with D5994 Setup

Calibration Performed by: Willard White		Cal. Procedure:30SOP-CAL-101
Calibration Date: 2-25-2015	Calibration Due Date: 2-25-2016	
Signature of Calibrator: W. White		
Calibration Reviewed by: Richard N. Jones		Date Reviewed: 2-27-2015

Certificate No: C15-128

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Exhibit 10

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CONSTRUCTION QUALITY ASSURANCE REPORT
ASH POND D CLOSURE
HUTSONVILLE POWER STATION
15142 EAST 1900 AVENUE
HUTSONVILLE, CRAWFORD COUNTY, ILLINOIS

Prepared for:

AMEREN ENERGY RESOURCES GENERATING COMPANY

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J019896.01
DRAFT

November 8, 2012

Electronic Filing: Received, Clerk's Office 09/28/2020

November 2, 2012 J019896.01
DRAFT

Mr. Mike Wagstaff
Hutsonville Power Station
15142 East 1900 Avenue
Hutsonville, Crawford County, Illinois

Re: Construction Quality Assurance Report
Ash Pond D Closure
Hutsonville Power Station
15142 East 1900 Avenue
Hutsonville, Crawford County, Illinois

Dear Mr. Wagstaff:

Attached is the Construction Quality Assurance report for the referenced site. This report covers the activities associated with the Ash Pond D closure at the Hutsonville Power Station in Crawford County, Illinois.

If you have any questions or comments regarding the attached information, please feel free to contact the undersigned at (314) 997-7440.

Very truly yours,

GEOTECHNOLOGY, INC.

Anna M. Saindon, R.G., P.E., Ph.D.
Senior Engineer

Eric J. Neuner, P.E.
Senior Project Manager

AMS/EJN:ams/ejn/her

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15142 EAST 1900 AVENUE
HUTSONVILLE, CRAWFORD COUNTY, ILLINOIS

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ASH POND D CLOSURE
HUTSONVILLE POWER STATION
15142 EAST 1900 AVENUE
HUTSONVILLE, CRAWFORD COUNTY, ILLINOIS

1.0 PROJECT BACKGROUND

The Ameren Energy Resources (Ameren) Hutsonville Power Station (Hutsonville) is at 15142 East 1900 Avenue, Hutsonville, Illinois. This report describes the completed Construction Quality Assurance (CQA) program for the Ash Pond D closure. The plan has been completed in general accordance with the coal combustion waste (CCW) surface impoundment closure requirements of 35 Illinois Administration Code (IAC) 840.146 entitled Construction Quality Assurance Program.

Ash Pond D was the primary disposal location for CCW generated from the Hutsonville coal fired power plant from 1968 to 2000. Reportedly, the CCW consisted primarily of fly ash and bottom ash, and was sluiced to Ash Pond D. Based on information provided by Ameren, Ash Pond D is estimated to contain between 800,000 and 850,000 cubic yards of ash.

In summary, the Ash Pond D Closure activities included: CCW subgrade grading, CCW subgrade compaction, placement of 40- mil high density polyethylene (HDPE), placement of a three-foot thick vegetative soil layer, vegetation, construction of surface water control structures, and construction of a groundwater collection system. The CQA Plan[1] required a scheduled program of monitoring, inspecting, sampling, and testing. The CQA Plan was used to evaluate compliance with the intent of the closure plans[2] and specifications[3]. This CQA report includes a summary of the site activities, construction observation, field-testing, laboratory testing, and surveying during the Ash Pond D closure. Presented in Appendix A are the weekly memorandums, daily reports, meeting minutes, and photograph logs. Presented in Appendix B are the CQA certifications.

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[1] *Construction Quality Assurance Plan, Closure of Ash Pond D, Hutsonville Power Station*, prepared by Hanson Professional Services Inc. for Ameren Energy Generating Company, 2012.

[2] *Closure Plan, Closure of Ash Pond D, Hutsonville Power Station, Revised March,* prepared by Hanson Professional Services Inc. for Ameren Energy Generating Company, 2012.

[3] *Project Manual for the Closure of Ash Pond D, Hutsonville Power Station,* prepared by Hanson Professional Services Inc. for Ameren Energy Generating Company, 2011.

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2.0 SUBGRADE PREPARATION

Subgrade preparation began on March 28, 2012 and was completed on May 29, 2012. In summary, subgrade preparation activities consisted of deconstructing the geotubes (geotextile wrapped ash), spreading geotube material into Ash Pond D, grading ash and embankment materials, compacting the top one foot of subgrade material, performing compaction testing, and surveying the final subgrade elevations. In addition, the prepared subgrade was visually assessed by the CQA Officer to observe that the surface was relatively smooth and free of deleterious materials (i.e. jagged irregular shaped protrusions) that could damage the geomembrane.

2.1 Laboratory Testing

Four CCW bulk samples were obtained from the existing subgrade and two bulk samples were obtained from the existing embankment materials. Index testing (moisture content and Atterberg limits) was performed on select samples. Standard Proctor moisture-density relationship was performed on the six bulk samples. The laboratory test results are summarized and presented in Appendix C.

2.2 Subgrade Compaction

Nuclear gauge density tests were performed for the upper 12 inches of the prepared subgrade at the 100 foot surveying grid points provided on the site plans (refer to Table 2). The field density tests were compared to the standard Proctor moisture-density relationship laboratory test data (Appendix C) to provide information regarding subgrade compaction. The project specifications required the subgrade to be compacted to 90 percent of the maximum standard Proctor dry density. Areas of failed density tests were recompacted and retested as needed. Based on the laboratory test results and field density test results at the grid points, the subgrade was compacted in conformance of the CQA plan. The field tests are summarized in Table 2 and provided in the field observation reports in Appendix A.

2.3 Subgrade Survey

The subgrade was surveyed by a licensed surveyor. In addition, the subgrade was observed by the CQA Officer to check that the prepare slopes did not have sharp grade changes, depressions, or protrusions. Repairs were made to areas that did not meet these criteria, prior to geomembrane placement. A final as-built survey of the subgrade was performed. The results of the survey are illustrated and summarized on Sheet 1. After the soil liner was smooth drum rolled, certification of the survey data and general condition of the subgrade was provided by the CQA Officer prior to installation of the 40-mil HDPE geomembrane liner (Appendix B).

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3.0 GEOMEMBRANE

After the subgrade was approved, geomembrane placement began on May 30, 2012 and was completed on June 16, 2012.

3.1 Prequalification Testing

The geomembrane manufacturer supplied an inventory list of 40-mil HDPE geomembrane rolls to the Owner and the CQA Officer. The geomembrane manufacturer submitted samples from the prequalification rolls to an independent geosynthetics laboratory for verification of selected manufacturer's guaranteed properties (presented in Appendix D). On each geomembrane roll selected for sampling, a 3-foot long sample was collected along the entire width of the roll.

In addition, the manufacturer submitted documentation that the materials supplied were tested for the parameters listed in the manufacturers list of guaranteed properties at the required testing frequency. The results of the testing, including identification of tested rolls, were submitted to the CQA Officer for review. The manufacturer certified that all rolls met the manufacturer's guaranteed properties, in accordance with the specified testing frequency rate (Appendix D).

Geomembrane prequalification testing was completed prior to delivery.

3.2 Installer Certification of Placement Surface

Prior to daily geomembrane placement, the geomembrane installer provided the CQA Officer daily "certificates of acceptance." The "certificates of acceptance" documented the geomembrane installer's inspection and acceptance of the prepared subgrade surface as being suitable for the geomembrane installation (Appendix D).

3.3 Seam Overlap Testing

The general contractor and geomembrane installer arranged the geomembrane panels in an orientation to reduce the number of field seams. Within the geomembrane footprint, seam overlaps were field measured by the geomembrane installer to verify that the required three inches of overlap was met for all seams. Seam overlaps were "shingled" in the direction of the downslope. The CQA Officer and field representatives made independent measurements of the seam overlaps for additional verification.

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3.4 Non-Destructive Testing

The geomembrane installer performed non-destructive testing of seams at the frequency specified in the CQA Plan. The seams were non-destructively tested over the full-length using a vacuum test unit, air pressure test, or other methods (spark testing for geomembrane boots around vent pipes) approved by the CQA Officer. Vacuum testing and air pressure testing procedures are presented in Sections 3.4.1 and 3.4.2. Continuity testing was completed as the seaming progressed. The CQA Officer and field representatives observed the non-destructive testing performed by the geomembrane installer. The geomembrane installer submitted all non-destructive field-testing results to the CQA Officer (Appendix D).

3.4.1 Vacuum Testing (Extrusion Welds)

Extrusion welds are typically used for repairs and protrusions through the geomembrane. The following procedures describe vacuum testing of the extrusion welds.

Equipment

The following equipment was used:

- A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, a port hole or valve assembly, and a vacuum gauge;
- A vacuum tank and pump assembly equipped with a pressure controller and pipe connections;
- A rubber pressure or vacuum hose with fittings and connections;
- A bucket; and
- A soapy solution.

Procedures

The following procedures were followed:

1. The vacuum pump was energized and tank pressure was adjusted to approximately ten inches of mercury.
2. A strip of geomembrane approximately 12 inch wide by 48 inch long (an area larger than the coverage of the vacuum box) was wetted with the soapy solution.
3. The box was placed over the wetted area.
4. The bleed valve was closed and the vacuum valve opened.
5. Creation of a leak tight seal was verified.
6. The geomembrane was observed for at least 10 seconds through the viewing window for the presence of soap bubbles.

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7. When bubbles were not observed after 10 seconds, the vacuum valve was closed, and the bleed valve opened. The box was moved to the next adjoining area, and the process was repeated.
8. All areas where soap bubbles appeared were marked, repaired, and retested until passing test results were obtained.

3.4.2 Air Pressure Testing (Double Fusion Welds)

Double fusion seams are typically used to fuse two panels of geomembrane together. The following procedures describe air pressure testing of double fusion welds.

Equipment

The following equipment was used:

- An air pump (manual or motor driven) equipped with pressure gauge capable of generating and sustaining a pressure of 25 to 30 pounds per square inch (psi) and mounted on a cushion to protect the geomembrane;
- A rubber hose with fittings and connections; and
- A sharp hollow needle.

Procedures

The following procedures were followed:

1. Both ends of the seam to be tested were sealed.
2. A needle was inserted into the tunnel created by the fusion weld.
3. A protective cushion was inserted between the air pump and the geomembrane.
4. The air pump was energized to a pressure between 25 psi and 30 psi. The valve was closed, and the pressure was sustained for a minimum of five minutes.
5. If loss of pressure exceeded 3 psi or did not stabilize, the leaking area was located, then repaired and retested until passing test results were obtained.
6. At the conclusion of a passing air pressure test, the opposite end of the seam was slit and the subsequent drop in pressure was observed. Our observation of the pressure drop indicated that the seam passed.
7. The needle was removed and the needle hole sealed.

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3.5 Destructive Testing

Destructive seam tests were performed at randomly selected geomembrane locations as seaming work progressed. The purpose of the destructive seam tests was to evaluate seam strength. The CQA Officer and field representatives observed the destructive testing performed by the geomembrane installer.

The geomembrane installer submitted the results of the field destructive testing to the CQA Officer. An independent laboratory, selected by the CQA Officer, performed the destructive seam tests that included peel and shear strength testing. The destructive seam testing results (field-testing and independent testing) are presented in Appendix D.

3.5.1 Testing Location and Frequency

The geomembrane installer selected the destructive test locations where seam samples were removed for testing. In addition, the CQA Officer or field representative could select additional destructive seam sample locations at their discretion. Destructive seam test locations include random seam testing and areas of possible defects (excess crystallinity, contamination, offset welds, equipment malfunction). The destructive seam samples were collected and tested according to the requirements in the CQA plan.

3.5.2 Sampling Procedures

Destructive seam samples were obtained as the seaming progressed. This method was used to facilitate approval of the geomembrane results prior to covering the geomembrane with the next layer of the closure construction. The geomembrane installer assigned a number to each destructive seam sample and marked the location and seaming information on each collected sample. The destructive seam sample location was recorded on an as-built drawing. The explanation for taking the sample was also recorded. The locations of the destructive seam samples were repaired in accordance with the CQA Plan. The continuity of the repairs were subsequently vacuum tested.

3.5.3 Field-Testing

The geomembrane installer used a tensiometer to test ten 1-inch wide strips from each sample identified for destructive testing. In accordance with the CQA Plan, the field destructive tests consisted of five samples for peel adhesion and five samples for shear strength. Upon successful field-testing, the remaining destructive seam samples were qualified to be submitted for independent laboratory testing.

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3.5.4 Laboratory Testing

Samples that passed the prequalifying field-tests were submitted to the independent testing laboratory. Ten specimens from each destructive seam sample were tested that included five shear strength tests and five peel adhesion tests. Laboratory testing was in accordance with "Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods" (ASTM D 6392). Acceptance was based on the criteria outlined in the Geosynthetics Research Institutes (GRI) standard GRI GM19 as provided in the CQA Plan.

3.5.5 Procedures for Failed Destructive Tests

If a destructive sample did not pass either a field or a laboratory test, the geomembrane installer had two options to remediate the failure. The geomembrane installer could reconstruct and repair the seam between any two passed test locations completed by the same technician on the same day. Alternatively, the geomembrane installer could trace the welding path to an intermediate location at least ten feet from the failed test in either direction and take additional destructive seam samples. The additional samples were then field-tested prior to sending to the independent laboratory as previously described. If the additional samples passed, then the seam was reconstructed between the two passing samples. If the additional samples failed, then the process was repeated to establish the zone in which the seam should be reconstructed.

Reconstructed seams were bounded by two locations with passing laboratory destructive tests. In cases that exceeded 150 feet of reconstructed seam, a destructive sample was taken from the zone in the reconstructed area. The geomembrane installer documented the actions taken in conjunction with destructive test failures (Appendix D).

4.0 VEGETATIVE COVER

After a section of geomembrane was constructed and approved, three feet of vegetative cover (soil) was placed over the 40-mil HDPE geomembrane. Soil grading began on June 11, 2012 and was completed on October 4, 2012. The soil grading activities consisted of:

- Visually observing that the geomembrane surface was free of defects prior to soil placement,
- Removing deleterious materials (such as roots and rocks) from the soil that could damage the geomembrane,
- Spreading the soil over the geomembrane,
- Surveying the final subgrade elevations on the established 100-foot grid points,

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- Calculating the difference between the ash subgrade and the final surface to confirm that a minimum of three feet of soil vegetative cover was present over the geomembrane.

In summary, the soil was placed in a 3-foot thick lift, which was brought to final grade in a second grading phase after the geomembrane surface was covered. The final surface survey data and calculated thickness is provided on Sheet 2. The vegetative layer (soil) installer's certificates of acceptance of the geomembrane are provided in Appendix E. Discussions of the soil placement are provided on the field observation reports presented in Appendix A.

After the vegetative layer was graded and the surface water management controls constructed, Ash Pond D was fertilized and seeded using synthetic mats, coconut mats, and hay as needed to establish vegetation.

5.0 SURFACE WATER MANAGEMENT

Berms and channels were constructed on the vegetative layer for surface water management. Construction of the berms and channels were observed and an as-built survey was performed. Concrete testing was performed on paved ditches along the west, south, and east Ash Pond D perimeter. In general accordance with the CQA Plan, concrete testing included slump testing, air entrainment, and compressive strength testing. One failed air entrainment test occurred on August 24, 2012, and the concrete plant was notified the same day. Subsequent air entrainment tests performed that day passed. The slump and air entrainment requirements for the paved ditches were adjusted from the original CQA Plan by the Ameren project manager and the design engineer, due to the paved ditches not requiring the same loading conditions as concrete in the roadway. A copy of the specifications is provided in Table 1.

A copy of the berm and channel survey data is provided on Sheet 3. Copies of the concrete test data are provided in Appendix C. Additional information on the field observations are provided in Appendix A.

6.0 GROUNDWATER COLLECTION SYSTEM

The groundwater collection system is designed to intercept and collect potentially impacted groundwater along the south side of Ash Pond A and Ash Pond D. This system is generally composed of a series of pumps, pump structures, collector pipe, discharge pipes, cleanouts, and other electrical and mechanical devises. Periodic field observations and visual observations of the connections in the groundwater collection system occurred and are included in Appendix A. The elevations of the collector pipe and dewatering sumps were field adjusted when bedrock was encountered, and surveyed for positive grade (Sheet 3). The groundwater collection system was commissioned on October 1, 2012.

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7.0 SIGNATURES

As Construction Quality Assurance (CQA) Officer for the construction of the Ash Pond D Closure (from March 28, 2012 to October 16, 2012), located at the Ameren Energy Generating Company Hutsonville Plant in Hutsonville, Illinois, I am familiar with the plans and specifications and the CQA Plan as prepared and approved for the project, and it is my professional opinion that the construction was completed as described in this Report. CQA certification by the Owner's Representative does not relieve the Contractor of their obligations to furnish all Work in accordance with the Contract.

_____

Rosanna M. Saindon, P.E., R.G., Ph.D.
Illinois Licensed Professional Engineer
Senior Engineer
Geotechnology, Inc.

As Construction Quality Assurance (CQA) Officer-In-Absentia for the construction of the Ash Pond D Closure (from March 28, 2012 to October 16, 2012), located at the Ameren Energy Generating Company Hutsonville Plant in Hutsonville, Illinois, I am familiar with the plans and specifications and the CQA Plan as prepared and approved for the project, and it is my professional opinion that the construction was completed as described in this Report. CQA certification by the Owner's Representative does not relieve the Contractor of their obligations to furnish all Work in accordance with the Contract.

_____

Joe Cravens, E.I.
Staff Engineer
Geotechnology, Inc.

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As Construction Quality Assurance (CQA) Officer-In-Absentia for the construction of the Ash Pond D Closure (from May 30, 2012 to June 16, 2012), located at the Ameren Energy Generating Company Hutsonville Plant in Hutsonville, Illinois, I am familiar with the plans and specifications and the CQA Plan as prepared and approved for the project, and it is my professional opinion that the construction was completed as described in this Report. CQA certification by the Owner's Representative does not relieve the Contractor of their obligations to furnish all Work in accordance with the Contract.

_____

Steve Graham
Senior Scientist
Geotechnology, Inc.

APPENDIX A

WEEKLY REPORTS

APPENDIX B

CQA CERTIFICATIONS

APPENDIX C

MATERIALS TESTING

APPENDIX D

40 MIL HDPE GEOMEMBRANE

APPENDIX E

GEOSYNTHETIC

APPENDIX F

INSTALLER CERTIFICATION

APPENDIX G

CALIBRATIONS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: April 3, 2012

SUBJECT: Weekly Summary Report for March 26, 2012 to March 30, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny with temperature (°F) lows in the 50s and temperature highs in the 70s. Weather related delays did not occur.

Construction Activities

Equipment mobilization, vegetation removal, ash grading, and geotube demolition occurred this week. Vegetation was removed on the north side in quadrant A and B, and on the east and west areas between the geotubes and the embankments to facilitate grade staking and preparation for ash grading. Geotubes were broken open on the south and east sides in preparation for ash grading. Geotubes on the north side were cut open to dry over the weekend. Ash was moved from quadrant A and B to lower areas of quadrant A, and the northern portion of quadrant C. Grading began in quadrant C. Refer to attached daily reports and photograph log for additional information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Water Truck

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Geotechnology, Inc. – Joe Cravens
Ash Management Systems, LLC (AMS) – Randy Porter, Jimmy Boone, and Robert Dunkley
Charah, Inc. – Joe Tasich
Belt Construction, Inc. – Shelby Belt, Jared Belt, Nick Walker, Kevin Flynn, and Brad Bolenbaugh
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, March 27, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached .

Materials

Ash in the geotubes and within the footprint of Ash Pond D was graded.

Testing/Sampling

Two ash samples were obtained to run Standard Proctor tests. Sample Ash 1 was obtained from the north side of Ash Pond D, and sample Ash 2 was obtained from the south side of Ash Pond D.

Calibration Records

Calibration information was requested from LAMAC Engineering Co., Inc. for their surveying equipment.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13761

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren UE | Date: 3/26/12

TIME: Arrive: 6:30 AM | Depart: 3:00 PM | Travel: 1.0 hr | Total: 9.5 hrs
Weather: Sunny, 70° | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: None

Site Activities / Observations / Contacts / Notes: Met with Randy Porter (AMS) and Joe Tasich, who works for Charah and is the Safety Specialist for AMS. Randy, AMS's Site Supervisor, gave me a tour of the Hutsonville Power Station and its ash ponds. At this time, Randy does not have any co-workers on site. There are three job trailers on site: 1- Geotechnology/Ameren, 2- AMS Randy's, and 3- AMS Employee's. Currently, there is no electric, data, or phone lines supplied to the trailers. Note: AMS will have three types of workers: 1- Operators, 2- Teamsters (truck drivers), and 3- Laborers. Along with the trailers, AMS has supplied Out Houses (porter potties), Dumpsters, and Smoking areas.

Met with Shelby Belt, Jared, and Nicky with Belt Construction. Belt brought out two pieces of equipment, 1- 325C Excavator and 2- D6N Dozer. Both pieces are Caterpillar (CAT) models. Full Names: Shelby Belt, Jared Belt, and Nick Walker. They went to the Newton Plant for badges.

Aside from Surveying and Mobilization, no work has been performed on site to date.

Note, the Power Plant will be completely shut down after Friday, March 30, 2012.

Additional Comments:

Randy Porter — AMS
Contractor Representative — Company
Signature — 3-26-12 Date
Geotechnology, Inc. — 3-28-12 Date
Anna Saindon
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13762

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren UE | Date: 3/27/12

TIME: Arrive: 6:30 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 10.0 hrs
Weather: Sunny, 50° AM, 75° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: None

Site Activities / Observations / Contacts / Notes: Progress Meeting 3/27/12: Attendees - Mike Wagstaff, Paul Zinsious, Jimmy Boone, Randy Porter, John Denham, Joe Tasich, Austin Ridgely, and myself. Key Components: Power to trailers needed, AMS will move the Employee trailer to join the other two, after plant shutdown on Friday, I will receive keys to all new locks (approx. 18 locks), and AMS will develop an evacuation plan for storm/hazard events.

Two pieces of equipment were delivered for Belt Construction: 1- 1812C John Deere Scraper or "Pan" by Robert Ryterski with Ryterski Trucking, and another 2- 1812C John Deere Scraper by Andrew Miller with ERB Trucking.

The coal pile will be used in Ash Pond D as Fill. The approx. 5000 c.y. of coal will be placed in the pond and covered with ash. The coal cannot come into contact with the overlying geomembrane. However, Mike, Paul, Austin, and myself discussed cleaning the entire lot where the coal was placed (i.e. the coal pile and 12"-18" of coal covering the lot would be put in the ash pond). Soil backfill would then be need to fill the entire lot, along with mulching and seeding. AMS will provide a cost to AER before preceding. The volume of coal and soil will be produced from areas calculated from aerial photos for cost.

Robert Dunkley, AMS's Teamster, arrived today and went through training with Joe Tasich.

Belt Construction delivered a CAT D6H Dozer and a John Deere 9520 Dual Wheel Tractor. They also brought a 4700 International work truck to be left on site. They will assemble their tractor and scrapers for the remainder of the day.

Additional Comments: Longer Hours are expected due to the delay of ash movement.

Randy Porter — Contractor Representative — AMS — Company
Signature — 3-27-12 — Date
Anna Saindon — Geotechnology, Inc. — 3-28-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13763

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 3/28/12

TIME: Arrive: 6:30 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.5 hrs
Weather: Sunny, 65°AM, 75°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: CAT D6N Dozer, CAT D6H Dozer, CAT 325C Excavator, John Deere 9520
Site Activities / Observations / Contacts / Notes: Tractor, Two John Deere 1812C Pans, and Water Truck.

Two new operators arrived for Belt: Kevin Flynn and Brad Bolenbaugh. They went through training with Belt and AMS, and received their badges from the Newton Plant.

Robert Dunkley will primarily drive the Water Truck and the Bus. Nick Walker will primarily operate the 9520 Tractor with the two 1812C Pans. Jared Belt will primarily operate the D6N Dozer. Brad Bolenbaugh will primarily operate the D6H Dozer. Kevin Flynn will primarily operate the 325C Excavator. This is subject to change throughout the project.

Work began in Sections A and B, or the North end of Pond D. Both Dozers and the Tractor began stripping the grass and topsoil in order for the remainder of the North end of the Pond to be staked. The 100' grid was never finished due to the tall grass. Lamac will finish the grid after clearing. On the West side of the Pond, or the NW area of the geotubes, or Sections A and C, a geotube was broken to allow access from the South end of the Pond (the cleared end with the geotubes), to the North end of the Pond (the heavily vegetated end). As of right now, one gate on the West side is the only gate big enough for the equipment to enter, hence, the path between the geotubes was created. Pipe was laid in the entryway to act as a culvert and was covered. This pipe is only temporary to allow water to flow until excessive fill is placed in the center of the Pond.

The strobe light on the Water Truck was repaired. Randy will host thee safety meetings/day. Joe found two potential storm shelters in the event of a tornado. The operators will fill out weekly inspections. Electric Utility stopped by and will use existing pole for power. Will be setup next week. No word from Frontier about phone or data.

Additional Comments:

Randy Parker — AMS
Contractor Representative — Company

Signature — 3-28-12 Date

Anna Sandon — 3-30-12 Date
Geotechnology, Inc

Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13764

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 3/29/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 11.0 hrs
Weather: Sunny, 50° AM, 70° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck

Site Activities / Observations / Contacts / Notes:

To continue from yesterday: The only entry for equipment into Pond D is on the West side of the Pond, in Section C, within the cleared area in between the geotubes. The NW area of the geotubes was cut to allow access to the North end of the Pond, in Sections A and B. The NW entryway was finished with Fill over the pipe from Sections A and B. However, during constructing, the tractor and pans got stuck in the entryway. They were pulled out with a dozer and the underlying pipe was not damaged. An entryway was also made on the NE side of the geotubes, similar to the NW entryway; with an underlying pipe to act as a temporary culvert, and Fill from the North end of Pond D. This will allow for more efficient grading with the tractor and pans, being able to make a circular route from Sections A and B to Sections C and D. Stripping the uncleared North end of the Pond continued, and the vegetation surrounding the perimeter of the geotubes was cleared. Belt began breaking the East side geotubes in Section D. They began placing Fill in Section C from Sections A and B, and they began grading Section C with a dozer.

Obtained samples for Proctors from the North and South end of the Pond. Leaking values on the Water Truck were fixed and dust control was started. Surveyors will come next Mon. or Tues. to finish staking the PGL, stake some cut areas, and stake all fill areas. Due to existing site features, the Fill will primarily consist of Fly Ash, but will also contain Bottom Ash, Geotube material, PVC, topsoil, grass, roots, and Coal. At this time, the wheels on the pans are to act as rollers. However, if compaction is not met, AMS will pursue using a sheepsfoot roller. After time restraints end for the SWP3, Work can proceed on the outer perimeter of the Pond.

Additional Comments: Same operators for the same equipment as yesterday's list.

Randy Potter — Contractor Representative — AMS — Company
Signature — 3-29-12 — Date
Geotechnology, Inc. — 3-30-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13765

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 3/30/12

TIME: Arrive: 6:30 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.5 hrs
Weather: Sunny, 55° AM, 80° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck

Site Activities / Observations / Contacts / Notes:

The majority of Pond D has been cleared of vegetation, excluding the far East side of the Pond. The D6H Dozer continued grading Section C. The 325C Excavator finished breaking the East side geotubes and began breaking the South side geotubes. At the end of the day, the tops of the North side geotubes were ripped open to dry over the weekend. This area is critical of drying because it will contain the most Fill and the Coal, once the EWO is approved, will be placed in this area as well. The D6N Dozer continued grading Section A. The 9520 Tractor continued cutting the North area of Section A and B, and filled lower areas of Section A. In all areas where dozers graded, the tractor would pull the 1812C Pans in these areas to compact the disturbed soil.

They do not need a roller to compact the Base material until they approach the Base grade elevation, where 6" lifts are required in the upper 1.0 ft, and 90% of the Maximum Dry Density of the material is required. If compaction is not reached at the Base grade, they will have to use Steel or Tamped Foot rollers.

Note: Required PPE - Hard Hat, Steel-Toe Boots, Glasses with side protection, and bright shirts or vests. Reflective vests are only required when not wearing bright clothes or at night time (AMS).

Dust Control being performed. Along with Electric (AAA) next week, Frontier will be here April 3, at 10:30 AM for phone and data.

Additional Comments: Same operators for same equipment used as yesterday's list.

Randy Porter — Contractor Representative — AMS — Company — 3-30-12 — Date
Signature
Anna Swindon — Geotechnology, Inc. — 4-2-12 — Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 2 Minutes
Tuesday, March 27, 2012

01 PUBLICATION

Publication date:	2012-03-30
Distribution:	E-mail only
Submitted by:	P. Zinsious
Notes taken by:	P. Zinsious
Meeting place:	Hutsonville Power Station

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
03	Mr. Austin Ridgely	Lamac Engineering	618-262-8651	aridgley@lamac.net
04	Mr. John Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
05	Mr. Joko Tasich	AMS - SS	502-649-7633	jtasich@charah.com
06	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
07	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
08	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-03-27	OPEN - no issues
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

04 WORKER PROTECTION ASSURANCE

2012-03-27	OPEN - no issues. LOTO for temporary electric for trailer.
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

05	**EMPLOYEE DRUG TESTING**	
	2012-03-27	OPEN - Belt Construction employees 3x tested negative [will begin work]. Scheduled testing for 1x teamster on 03-27 and 2x operators on 03-28. Reminder for 24 HR notice.
	2012-03-20	OPEN - Reminder to call ahead. All scheduling to Newton is to be coordinated reported to and coordinated by P. Zinsious. M. Wagstaff indicated AER pays for the drug test. Also if workers have copy of a drug test in the last 6x months, this will be acceptable. Lamac inquired about interns on site during the summer. No issue with AER or AMS as long as follows same CBT, drug testing, and badge as required for this project.
	2012-03-13	[No previous commentary]
06	**AMS SAFETY**	
	2012-03-27	OPEN - Portable toilets and hand wash stations on site and set up. Only smoking area is located at the employee trailer[s]. J. Cravens Geotechnology Construction Manager now full time on site. M. Wagstaff reviewed the program for J. Cravens list he gave him for the "anytime anyone see anything" safety program on site. J. Tasich general safety discussion.
	2012-03-20	OPEN - The switch gear area adjacent to the plant has bench mark within confines of the fenced area. If a surveyor or engineer requires entrance, they are to be escorted. M. Wagstaff indicated this switch gear area is not owned by AER, but by Ameren Illinois. All site access is to be coordinated through R. Porter. Geotechnology indicated training on 03-28 and/or 03-29. AMS to upcoming training 3x workers. M. Wagstaff discussed J. Cravens list he gave him for the "anytime anyone see anything" safety program on site. R. Porter indicated similar to AMS "brothers keeper".
	2012-03-13	NEW - no issues - no work on site. Training to begin on 03-22.
07	**HOUSEKEEPING**	
	2012-03-27	OPEN - no issues
	2012-03-20	OPEN - no issues
	2012-03-13	NEW - no issues - no work on site.
08	**PLANT ACCESS - CBT BADGE**	
	2012-03-27	OPEN - J. Denham concern over badge in/out at other plants and the change over required back to Hutsonville for those who go to other plants. M. Wagstaff indicated can still get a visitors badge, but he would provide J. Denham, J. Boone, and J. Tasich consultant's badge [where as "employee" of M. Wagstaff].
	2012-03-20	OPEN - R. Porter to get visitors badge if goes to other Ameren plants. When badge in/out workers are to watch the light on the swipe unit, not the green light above.
	2012-03-13	NEW - no issues - no work on site.
	[01] All employees are to be badged.	
	[02] All employees are to swipe in/out at the existing gate. This will remain active for project.	
	[03] Hauling contractor can swipe in once at beginning of their day, and out once at the end of their day.	
	[04] Employees without badge or not current are to go to Newton Power Station located at 6725 North 500th Street, Newton, IL 62447	
	[05] For option [extreme cases after push-back] AER has option of sending information to the corporate office. This is considered a last resort.	
	[06] M. Wagstaff to look into contact and schedule at the plant for CBT and drug testing.	
	[07] Key required by AMS for locks. Guard does not have key.	
	[08] Visitors over 1-2 days have to get badge. Visitor get escorted when on site.	
09	**VEHICLES ON SITE**	
	2012-03-27	OPEN - Fuel trucks [such as for Belt Construction] can be on work site. Park at trailer area. Only Geotechnology and AMS trucks allowed frequent access. For Lamac, vehicle allowed on site, but work in that area when they are surveying will be shut down.
	2012-03-20	OPEN - Employees to park in lot, ride AMS transportation bus to site and back from badge in area.
	2012-03-13	NEW - no issues - no work on site.
10	**OSHA LOG - WORK HOURS**	
	2012-03-27	OPEN - no workers on site except Site Manager and surveyor. Hours will be from previous Monday to Friday [the week].
	0,059.00	RT
	0,000.00	OT
	0,059.00	TOTAL
	2012-03-20	OPEN - no workers on site except Site Manager.
	0,000.00	
	0,000.00	
	0,000.00	
	2012-03-13	NEW - no issues - no work on site.
	0,000.00	
	0,000.00	
	0,000.00	

06 MANPOWER

01 CREW SIZE

2012-03-27 OPEN - no workers on site except Site Manager and surveyor. Projection for next week will add employees: 4x ash placement and 1x for water truck.

Current
[00] Pipe
[00] Mech
[00] Elec
[00] Cement
[00] Laborers
[00] Operators
[02] Survey [Part time]
[01] Foreman [Full time]
[03] Total

2012-03-20 OPEN - no workers on site except Site Manager.

Current
[00] Pipe
[00] Mech
[00] Elec
[00] Cement
[00] Laborers
[00] Operators
[01] Foreman
[01] Total

2012-03-13 NEW - no issues - no work on site.

Current
[00] Pipe
[00] Mech
[00] Elec
[00] Cement
[00] Laborers
[00] Operators
~~[01] Foreman~~ [00] Foreman
[00] Total

02 WORK HOURS

2012-03-27 OPEN - Standard hours

2012-03-20 OPEN - Standard hours

2012-03-13 NEW - no issues - no work on site.

03 OVER TIME

2012-03-27 OPEN - none projected

2012-03-20 OPEN - none projected

2012-03-13 NEW - no issues - no work on site.

04 TRAILER [AND GENERAL CONDITIONS]

2012-03-27 OPEN - Price form AAA Electric 03-28. AMS to move employee trailer adjacent to GEO trailer. No generators will be required for now. J. Tasich discussed the electric can be heavy wall SCH 80 conduit run on top the ground with gravel covering. Their could be issues with the Ameren Illinois requirement for the new pole height. M. Wagstaff to get with utility to review options.

2012-03-20 OPEN - Trailers on site. AMS has set 3x portable toilets with 2x hand wash stations. Units are "unisex". AMS will also set a storage container in the next week or so.

2012-03-13 NEW - no issues - no work on site. Employees trailer to be delivered 03-20. Some equipment to be delivered 03-13 and mobilized on 03-20.

07 PREVIOUS

01 SUBCONTRACTS

2012-03-27 OPEN - no issues

2012-03-20 OPEN - no issues

2012-03-13 NEW - no issues - no work on site.

02 SUBMITTALS

2012-03-27 OPEN - no issues

2012-03-20 OPEN - no issues

2012-03-13 NEW - no issues - no work on site.

08 MATERIAL

01 GENERAL

2012-03-27	OPEN - Lamac to take few more elevation shots in coal yard.
2012-03-20	OPEN - Discussion on the remaining coal pile volume, Lamac survey show approximately 3,500 CY. If area around coal pile considered to level, 3,780 CY. Coal has to be placed in the bottom of the APD, as it cannot come in contact with the liner. The schedule will need to be adjusted to account for this activity. This area may also require top soil and seeding.
2012-03-13	NEW - no issues - no work on site.

09 ADJACENT PROPERTIES

01 GENERAL

2012-03-27	OPEN - General discussion. AMS in process of reviewing subcontractors for the Perforated Collector Pipe [PCP]. When subcontractor is approved, then excavation plan will be published. AMS reiterated that if it is not necessary, the area will not be used. General consensus to "wait and see" as the scope of work is not until June.
2012-03-20	OPEN - Lamac surveyed are of License Agreement and found path of irrigation unit extends into this area. Lamac provided drawing of the wheel arc in the area. Work is scheduled in this area in June, and AMS indicated that if it is not necessary, the area will not be used. A. Ridgely indicated there is a cable in the field the irrigation unit follows. No action required at this time. When excavation plan has been created, AMS will review again. Survey stakes currently will be left in the area.
2012-03-13	NEW - General discussion regarding the adjacent Wampler Farmland. J. Denham indicated before we do anything in that area 24 HRS notice will be given.

10 QUALITY CONTROL

01 GENERAL

2012-03-27	OPEN - no issues
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

02 ASH

2012-03-27	OPEN - no issues. AMS to proceed with mixing in the "topsoil" found within the Ash Pond D into the fill. [Note: This is as noted in previous contract documents]. Reviewed the topographic survey by Lamac. A. Ridgley indicated the topo on the [AER] drawings Land Lamac survey were very close and AER engineer probably used "LiDAR" [Light Detection and Ranging], an [optical] scanning process. The delta in the survey is about 5,000 CY. Drawing will be created fro EWO baseline.
2012-03-20	OPEN - no issues. Lamac topographic survey of the ash pile was within 300 CY of the Massmann aerial survey. A. Ridgely indicated variation could be due to the actual in place fluctuations in elevation in between survey points. The delta in volume is considered almost a "wash".
2012-03-13	NEW - no issues - no work on site.

03 CLAY

2012-03-27	OPEN - no issues
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-03-27	OPEN - No significant changes. AMS to update. General discussion 2012-10-11 good end [substantial completion] date.
2012-03-20	OPEN - Review of general and critical path schedules provided by AER. General discussions of rain days and how budgeted into the schedule calendar. The end date has been extended to 2012-10-11, and is acceptable to Ameren. The primary driving factor at this item is the seeding in the fall of the cap.
2012-03-13	NEW - no issues - no work on site.

02 TIME AND MATERIAL

2012-03-27	OPEN - no issues
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

03 COORDINATION

2012-03-27	OPEN - J. Cravens and R. Porter to monitor the access to the site as team. M. Wagstaff to notify the team of any AER personnel or entity coming to the site or who should badge in. The concern was knowledge of who has permission to come on site once security is gone.
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

12 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-03-27	OPEN - General discussion items for EWO [Potential change Orders - PCO] ash cap, coal pile, pipe [in berm], surveying, and utility change. If excavating the trench in Pond A is just a few hours, AMS would not charge for this work.
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site. AMS request tax exemption clarification.

02 AMS PAY APPLICATION

2012-03-27	OPEN - no issues. J. Denham we will have pay app this month.
2012-03-20	OPEN - no issues
2012-03-13	NEW - no issues - no work on site.

13 ACTION ITEMS - AER

01 AMEREN [AER]

2012-30-27

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers.
[17] ACAD files to AMS [CLOSED - AER transmitted disc]
[18] AER to print full size schedule [CLOSED]
[19] Flood plain permit [CLOSED - AMS will publish AER info]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]

2012-30-20

[03] Fire protection [OPEN - where to go for high winds or tornado]
[13] Wetlands permit application by Hanson [CLOSED - non-issue. Hanson reviewed, AER issued e-mail.]
[14] Keys for locks [CLOSED - AMS has keys]
[15] Provide new safety SPOC [CLOSED - M. Wagstaff is safety SPOC]
[16] Tax exemption clarification [CLOSED - AER will renew when dates reaches close to expiration]
[17] ACAD files to AMS [OPEN - AER to send disc]
[18] AER to print full size schedule [NEW]
[19] Flood plain permit [NEW - AER provide copy of the permit via e-mail]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]

2012-30-13

[01] Security procedures after 2012-03-01 [CLOSED – badge in/out at gate]
[02] Vehicle tag requirements [CLOSED - not required]
[03] Fire protection [OPEN - where to go for high winds or tornado]
[04] Water source [possible use of 1MG tank on site] [CLOSED – approved for use – RFI response]
[05] Severe weather procedure [gathering place] [CLOSED - approved as submitted – RFI response]
[06] Provide existing site survey [after ash placement in PAD] [CLOSED – AER submitted]
[07] Information for "ftp" site [CLOSED]
[08] Revised drawings [CLOSED – AER has published]
[09]Tax exemption [CLOSED – AER has published]
[10] Telephone hookup in trailer area. [CLOSED - data line to be provided]
[11] Fencing specification [CLOSED - response to RFI].
[12] Investigate if AER requires copy of borrow site agreement. [CLOSED - AER not requiring]
[13] Wetlands permit application by Hanson [NEW]
[14] Keys for locks [NEW]
[15] Provide new safety SPOC [NEW]
[16] Tax exemption clarification [NEW]
[17] ACAD files to AMS [NEW]

14 ACTION ITEMS - AMS

01 ASH MANAGEMENT [AMS]

2012-03-27

[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run .
[06] RFI-01 roadway clarification [OPEN - AER sent e-mail, AMS to check]
[16] Submittal log [OPEN - AMS submit EOW] [In progress]

2012-03-20
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – revised ash placement price within week]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – AMS to create PCO, line will have to be lowered, manhole will have to be cut into. Lamac to shoot elevations of pipe at manhole.
[06] RFI-01 roadway clarification [OPEN - AER sent e-mail, AMS to check]
[11] AER request each Subcontractor to have their lead person with 30HR. AMS to create RFI. [CLOSED - AER not requiring sub supervisors to have 30 HR]
[14] Issue log [CLOSED - information to PCO and RFI]
[15] Check on drawing distribution for Lamac. [CLOSED - Lamac sent e-mail drawings were received]
[16] Submittal log [OPEN - AMS submit EOW]
[17] HDPE QA/QC [CLOSED - liner subcontractor to submit - Geotechnology to provide lab information]
[18] Last two weeks close out [CLOSED - reviewed at Ameren scheduling meeting]

2012-03-13
[01] Calculate water requirements [CLOSED – AER has submitted in RFI]
[02] Coordinate with AER safety – Mr. Richard Spurgeon [CLOSED - AER provide contact].
[03] Set up survey meeting [CLOSED – meeting 2012-02-29]
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – further disc.]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – further disc.]
[06] RFI-01 roadway clarification [OPEN - RFI to be submitted]
[07] RFI-02 12 IN bridge lift on geomembrane [CLOSED - RFI to be submitted]
[08] Provide NMA information [CLOSED – J. Denham to attend Building Trades Meeting 03-01]
[09] Coordinate liner approval [CLOSED – information submitted]
[10] E-mail radio channel frequency requirements [CLOSED – in specifications]
[11] AER request each Subcontractor to have their lead person with 30HR. AMS to create RFI.
[12] Provide trailer information. [CLOSED]
[13] SWP3 for Ash Pond D Closure submittal. [CLOSED]
[14] Issue log [NEW]
[15] Check on drawing distribution for Lamac. [NEW]
[16] Submittal log [NEW]
[17] HDPE QA/QC [NEW]
[18] Last two weeks close out [NEW]

15 PRODUCTION

01 GENERAL

2012-03-27	OPEN - no issues - no work on site.
2012-03-20	OPEN - no issues - no work on site.
2012-03-13	NEW - no issues - no work on site.

02 ASH

2012-03-27	OPEN - no issues - no work on site.
2012-03-20	OPEN - no issues - no work on site.
2012-03-13	NEW - no issues - no work on site.

03 CLAY

2012-03-27	OPEN - no issues - no work on site.
2012-03-20	OPEN - no issues - no work on site.
2012-03-13	NEW - no issues - no work on site.

16 DOCUMENTS TRANSMITTED

3/27/2012	[01] AER - CD drawings on ACAD and PDF to LEC, GEO, and AMS [02] AMS - Lamac topographic of the ash pond [COR to AER info] [03] AMS - Lamac topographic of coal ash pile
2012-03-20	[01] Critical Path schedule dated 2012-03-19 [02] Full schedule dated 2012-03-19
2012-03-13	[01] Critical Path schedule dated 2012-03-09.

17 DOCUMENTS REVIEWED

2012-03-27	None
2012-03-20	[01] Lamac revised borrow access road layout dated 20120-03-19 [road marked yellow] [02] Lamac layout of Wampler property in Geotechnology binder.
2012-03-13	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, April 3, 2012 at Hutsonville

19	DISTRIBUTION - STANDARD
	AER
01	Mr. Mike Wagstaff
02	Mr. Mike Stewart
03	Mr. Andy Antonik
04	Mr. Bob Muesenfechter
	GEO
01	Ms. Anna Saindon
02	Mr. Eric Neuner
03	Mr. Joe Cravens
04	TBD
	AMS
01	Mr. Jimmy Boone
02	Mr. John Denham
03	Mr. Joko Tasich
04	Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTO LOG

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Photograph 1 - Overview of south portion of Ash Pond D facing southeast



Photograph 2 - Overview of north portion of Ash Pond D facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc.

JRC

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Photograph 3 - Geotube on west end cut for pond access facing north



Photograph 4 - Stripping vegetation in Quadrant A facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc.

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Photograph 5 - Geotubes on south end facing east



Photograph 6 - Northwest entrance from south end to north end of Ash Pond D facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc.

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Photograph 7 - Moving ash in Quadrant A and B facing north



Photograph 8 - Breaking Geotubes on east end facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc.

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Photograph 9 - Ash placement in Quadrant C facing southeast



Photograph 10 - Dust control in Quadrant A facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc.

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Photograph 11 - Overview of south portion of Ash Pond D facing southeast



Photograph 12 - Overview of north portion of Ash Pond D facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc.

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: April 9, 2012

SUBJECT: Weekly Summary Report for April 2, 2012 to April 6, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny, but became cloudy with rain beginning the evening of April 4, 2012, continuing to the morning of April 5, 2012. Temperature (°F) lows ranged from 40 to 65°F, and temperature highs ranged from 55 to 80°F. Earthwork was not performed on April 5, 2012, due to wet site conditions.

Construction Activities

Ash grading and geotube demolition occurred this week. The remaining geotubes on the west portion of Ash Pond D were broken open in preparation for ash grading. All of the geotubes on-site have been broken. Ash was moved from quadrant A and B to lower areas of quadrant A, quadrant B, and the northern portion of quadrant C. Grading occurred in quadrants A, C, and D. On April 2, 2012, the CAT D6N bulldozer got stuck in quadrant D (between the broken geotubes and the east embankment). The CAT 325C excavator was used to pull the dozer out. A Lessons Learned/Near Miss Report was developed by AMS and is included with the daily reports. Refer to attached daily reports and photograph log for additional information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator

John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Water Truck

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, and Jimmy Boone
Charah, Inc. – Joe Tasich
Lamac Engineering – Austin Ridgely
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, and Shelby Belt
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, April 3, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash in the geotubes and within the footprint of Ash Pond D was graded. The geomembrane is estimated to be delivered in early May 2012.

Testing/Sampling

Two ash samples were obtained to run Standard Proctor tests. Sample Ash 3 was obtained from the west side of Ash Pond D, and sample Ash 4 was obtained from the east side of Ash Pond D.

Calibration Records

Calibration information was not obtained this week. LAMAC will provide calibration information for their total station in approximately one week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13766

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01 Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 Zone: —
Client: Ameren ER Date: 4/2/12

TIME: Arrive: 6:30 AM Depart: 4:45 PM Travel: 1.0 hr Total: 10.75 hrs (0.5 hr for lunch/safety)
Weather: Sunny, 65° AM, 80° PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck

Site Activities / Observations / Contacts / Notes:

The D6H continued grading Section C, as well as the Southern portion of Section A. The 9520 continued cutting the high areas of Section A and B, and filling the low, SW area of Section A. The D6N began grading Section D, where the geotubes have already been broken. The 325C continued breaking the South end geotubes, along with spreading the material out from the already broken East side geotubes.

The batteries in the Water Truck were replaced. Fittings were replaced in the hitch connecting the 1812C Scrapers. Dust Control being performed on a daily basis. Randy and I raised the Fill stakes for the operators. The fuel truck came to fuel equipment and tanks. A Konex Trailer was delivered for AMS for storage. Belt also brought a small trailer for their own use. Lomac, AAA, and Frontier will be on site tomorrow.

D6N Dozer - Jared (Belt)
D6H Dozer - Brad (Belt)
325C Excavator - Kevin (Belt)
9520 Tractor - Nick (Belt)
1812C Pans - Nick (Belt)
Water Truck - Robert (AMS)
School Bus - Robert (AMS)
AMS Chevy Pickup - Numerous

The D6N got stuck in Section D, East of the geotubes near the ponded water. The 325C pulled the dozer out, but then got stuck in the same area. They had to bring out cables and mats to get the 325C out. After the excavator buried itself passed the cab with only using the mats, the D6N pushed the mats under the tracks, and pulled it out. After, they used water hoses on the Water Truck to clean the excavator. This incident happened from approx. 1:30 PM to 4:15 PM.

Additional Comments:

Randy Poletz — Contractor Representative — AMS — Company
Signature — 4-2-12 — Date
Anna Saindon — Geotechnology Inc. — 4-6-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13767

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/3/12

TIME: Arrive: 6:30 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.5 hrs (Did paperwork through lunch)
Weather: Sunny, 55° AM, 85° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck
Site Activities / Observations / Contacts / Notes: Due to the incident regarding the 325C Excavator getting stuck in Section D, between the broken geotubes and the East embankment, AMS issued a Near Miss Report. This area will be avoided during Earth Work until a plan is developed by Randy and Paul, regarding remediation so this incident doesn't occur again. This could lead to a possible PCO or EWO if undercutting and decanting is Required. AMS will provide a proposal to AER before commencing work. Report will go towards "Lessons Learned". Austin Ridgely with Lamac was on site to finish staking the PGL around Pond D. He also staked more cut and fill locations for the 100' grid. I should receive a Cert. of Calibration for Lamac's Total Stations by the end of this week. Austin will convert Northing's and Easting's for the PGL and 100' grid system into Lat. and Long. and forward to Geotechnology. AAA Electric was here to setup a Disconneect from the existing power pole, and branch off hard wiring to the trailers in conduit from an A-Frame. All work performed is OSHA approved. AMS Employee trailer will be moved tomorrow, adjacent to the other trailers. Electric will not be on until Thursday, when local utility installs a meter for hard wiring. The potential storm shelter, selected by Joe T., is still awaiting approval. The HDPE to be used on site is currently in Houston, TX. It will be mobilized to the site within 30 days. The Coal Pile issue is still not approved. An EWO was submitted, but may not go through. The SWP3 time constraint has passed; erosion control can begin. AMS will build a large entry sign, regarding procedures and contacts for visitors, when Randy and I are away from the trailers. AMS will consistently provide a temporary berm around Pond D to prevent drainage into Wabash River. 325C continued breaking geotubes. 9520 continued cutting and filling Section A and B. D6N and D6H continued grading Section A, C, and D. Paul and Jimmy were on site to view the wet area on the East side of Pond D.

Additional Comments: Mike is trying to issue myself a stamp for submittals and deliveries.

Randy Porter — Contractor Representative — AMS — Company
Signature — 4-3-12 — Date
Anna Sandon — Geotechnology, Inc. — 4-6-12 — Date
Engineer's Signature

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Frontier arrived to install phone lines, no data yet.

Same operators for same equipment as listed on 4/2/12.

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No. A 13768

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: —
Client: Ameren ER
Date: 4/4/12

TIME: Arrive: 6:30 AM Depart: 4:15 PM Travel: 1.0 hr Total: 10.5 hrs (0.25 hr for lunch/safety)
Weather: Cloudy, 55° AM, 70° PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck

Site Activities / Observations / Contacts / Notes:

The 325C finished breaking the West end geotubes. All of the geotubes have now been broken in Pond D. The 325C then continued to spread out the geotube material across the southern portion of the Pond, excluding the broken, North end geotubes. These will remain in place since they are located in the greatest Fill area. The D6H continued grading Section C and D. The D6N graded different areas across the Pond in all four Sections. The 9520 continued cutting the north areas of Section A and B, and filling the southern areas of Section A and B. Little fill has been placed in the Center of the Pond. This is because AMS is still awaiting confirmation whether to use the Coal Pile or not.

Shelby Belt came on site to view the wet area where the excavator was stuck. AMS is still developing remediation procedures for this area. The wet area, between the East end broken geotubes and East embankment, runs from approx. Sta. 10+00 to 17+00. This wet ash shows that even though there is no geosynthetic liner, the clay liner below was constructed well.

Two samples were obtained for Standard Proctor tests from the west and east ends of the Pond. AMS's Employee trailer was moved adjacent to the other two trailers on site. AAA finished installing Electric and local utility installed the meter. Frontier hooked up the second phone line. There is still no internet on site. The existing drainage pipes from under the geotubes were moved to the Yard. The crane mats and cable still remain on the East end of the Pond.

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
4-14- — Date
Anna Sandon — Geotechnology, Inc.
4-6-12 — Date
[signature] — Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13769

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/5/12

TIME: Arrive: 6:30 AM | Depart: 1:30 PM | Travel: 1.0 hr | Total: 8.0 hrs
Weather: Rain, 50° AM, Cloudy, 60° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: None.
Site Activities / Observations / Contacts / Notes:

Rain Day - The site was too wet for earthwork. No Production in Ash Pond D.

Kevin Flynn, Brad Bolenbaugh, and Robert Dunkley did not come to the site.

Jared Belt and Nick Walker did routine maint. on their equipment. They also put up an orange fence around an above ground pipe, located next to the proposed Coal Route. Still awaiting approval from AER to move the coal.

No lunch or safety meetings took place today, strictly paperwork and phone calls.

Additional Comments:

Randy Pocket — AMS
Contractor Representative — Company
Signature — 4-5-12 Date
Anna Scindon — 4-6-12 Date
Geotechnology, Inc.
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13770

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 4/6/12

TIME: Arrive: 6:30 AM | Depart: 3:45 PM | Travel: 1.0 hr | Total: 10.25 (installed software through lunch)
Weather: Sunny, 40°AM, 55° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck
Site Activities / Observations / Contacts / Notes:

Work Proceeded; the majority of the site was dry enough to move Ash. The 325C continued spreading out geotube material in Section C and D. The 9520 continued cutting and filling Section A and B. The D6H continued grading Section C and D. The D6N continued grading Section A and D. The site is looking much more uniform.

Randy estimates they have moved approx. 23,848 CY of ash to date. (Half of org. proposed)

Randy probed for the outfall pipe (HDPE 18") from Ash Pond B to the manhole located East of Pond D, near the outfall structure. The depth ranged from 2' to 4'.

CB's are now installed in the trailers for communication with the operators. 2-way radios are put together and charging.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 4-16-12 — Date
Anna Saindon — Geotechnology, Inc — 4/6/12 — Date
Engineer's Signature

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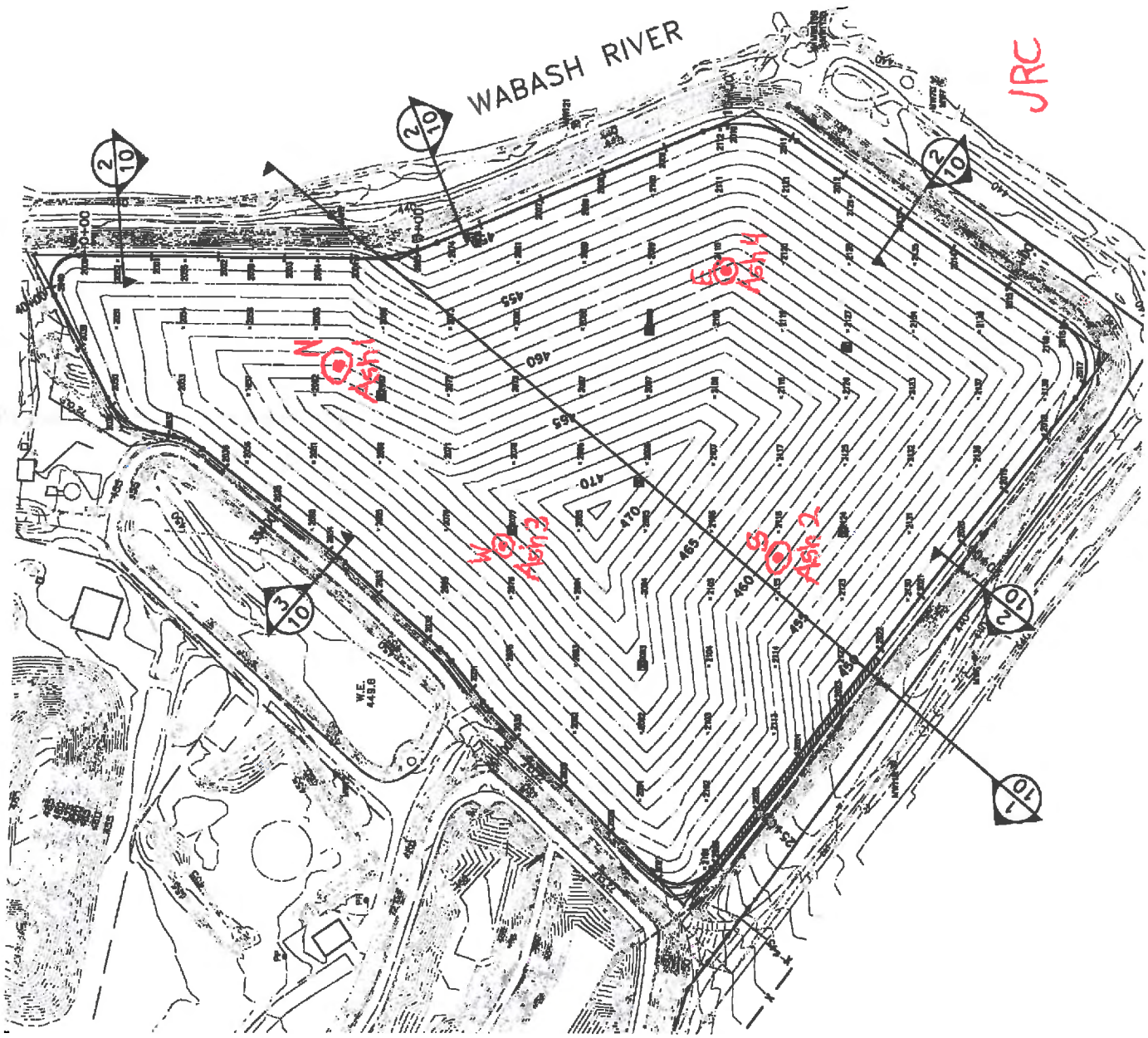
ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

2001	4349.67	5
2002	4249.88	5
2003	4149.88	5
2004	4049.88	5
2005	3951.19	5
2006	3858.58	5
2007	3766.57	5
2008	3674.55	5
2009	3582.54	5
2010	3488.99	5
2011	3392.55	5
2012	3309.05	5
2013	3225.70	5
2014	3142.36	5
2015	3059.02	5
2016	2975.68	5
2017	2941.20	5
2018	2997.56	5
2019	3058.27	5
2020	3118.97	5
2021	3179.68	5
2022	3240.39	5
2023	3301.08	5
2024	3361.80	5
2025	3422.51	5
2026	3483.21	5
2027	3569.63	4
2028	3642.39	5
2029	3714.32	5
2030	3786.25	5
2031	3855.14	5
2032	3922.52	5
2033	3997.57	5
2034	4073.63	5
2035	4152.71	5
2036	4231.79	5
2037	4317.86	5
2038	4404.01	5
2039	4452.28	5
2040	4498.05	5
2050	4400.00	5
2051	4400.00	5
2052	4400.00	5
2053	4300.00	5
2054	4300.00	5
2055	4300.00	5
2056	4200.00	5
2057	4200.00	5
2058	4200.00	5
2059	4200.00	5
2060	4100.00	5
2061	4100.00	5
2062	4100.00	5
2063	4100.00	5
2064	4100.00	5



Ash Sample locations

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AMS
Ash Management Services

Lessons Learned/Near Miss Report

Project: Hutsonville Ash Pond Closure

Site Manager: Randy Porter

Date of Incident: April 2, 2012

Details of Incident: Excavator that was being operated by Kevin Flynn was traveling across the east side of Ash Pond D at about 1:30 pm when the left track sunk without warning

Repairing the Problem Encountered: *crew immediately got and placed the mats under the tracks, one under each track being pushed underneath by dozer while excavator held the front of the tracks up by pushing down with the bucket. Crew also placed the third mat cross way under the mat that was long ways under the track. This process made the back of the tractor sink down further, but by doing this process it gives a stable ramp for excavator to be pulled out by dozer. After a safety brief and going over the safe start and hazards of the task along with the inspection of proper rigging equipment. The excavator come out without further incident. Joe Tasich ,Charah Safety Specialist was on site and Joe Cravens who is representing Ameren was also on site. Once machine was stabilized with mats Jimmy Boone was notified.*

Damage or Injury: *there was no damage to the machine or any injuries*

Lessons Learned: do not work in the east side of Ash Pond D with excavator unless on a minimum of five mats, after revaluating the scope of work to be performed in this area with Jimmy Boone and John Denham

Submitted By: Randy Porter

Reviewed By: Jimmy Boone

12601 PLANTSIDE DRIVE, LOUISVILLE, KY 40299
PHONE (502) 245-1353•FAX (502) 245-7398

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 3 Minutes
Tuesday, April 03, 2012

01 PUBLICATION

Publication date:	2012-04-06
Distribution:	E-mail only
Submitted by:	P. Zinsious
Notes taken by:	P. Zinsious
Meeting place:	Hutsonville Power Station

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
03	Mr. Austin Ridgely	Lamac Engineering	618-262-8651	aridgley@lamac.net
04	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-04-03	OPEN - no issues. CORRECTED THE NUMBERING FOR THIS TOPIC
2012-03-27	OPEN - no issues
2012-03-20	OPEN - no issues

02 WORKER PROTECTION ASSURANCE

2012-04-03	OPEN - no issues [electricians working on temporary power 04-03] Meter based LOTO by AMS. R. Porter did not want any work "hot" if meter base was to be put in. M. Wagstaff to contact Ameren Utilities for the meter, and come on site Monday or Thursday [see also action item].
2012-03-27	OPEN - no issues. LOTO for temporary electric for trailer.
2012-03-20	OPEN - no issues

03	**EMPLOYEE DRUG TESTING**	
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - Belt Construction employees 3x tested negative [will begin work]. Scheduled testing for 1x teamster on 03-27 and 2x operators on 03-28. Reminder for 24 HR notice.
	2012-03-20	OPEN - Reminder to call ahead. All scheduling to Newton is to be coordinated reported to and coordinated by P. Zinsious. M. Wagstaff indicated AER pays for the drug test. Also if workers have copy of a drug test in the last 6x months, this will be acceptable. Lamac inquired about interns on site during the summer. No issue with AER or AMS as long as follows same CBT, drug testing, and badge as required for this project.
04	**AMS SAFETY**	
	2012-04-03	OPEN - AMS submitted "Lessons Learned/Near Miss Report": Summary: Excavator was traveling across the east side of Ash Pond D when the left track sunk without warning. After a safety brief and going over the safe start and hazards of the task along with the inspection of proper rigging equipment, work proceeded to remove the excavator. The excavator come out without further incident. J. Tasich was on site and J. Cravens. There was no damage to the machine or any injuries. No work this portion of the site until further review. See report for more details.
	2012-03-27	OPEN - Portable toilets and hand wash stations on site and set up. Only smoking area is located at the employee trailer[s]. J. Cravens Geotechnology Construction Manager now full time on site. M. Wagstaff reviewed the program for J. Cravens list he gave him for the "anytime anyone see anything" safety program on site. J. Tasich general safety discussion.
	2012-03-20	OPEN - The switch gear area adjacent to the plant has bench mark within confines of the fenced area. If a surveyor or engineer requires entrance, they are to be escorted. M. Wagstaff indicated this switch gear area is not owned by AER, but by Ameren Illinois. All site access is to be coordinated through R. Porter. Geotechnology indicated training on 03-28 and/or 03-29. AMS to upcoming training 3x workers. M. Wagstaff discussed J. Cravens list he gave him for the "anytime anyone see anything" safety program on site. R. Porter indicated similar to AMS "brothers keeper".
05	**HOUSEKEEPING**	
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - no issues
	2012-03-20	OPEN - no issues
06	**PLANT ACCESS - CBT BADGE**	
	2012-04-03	AAA 2x electricians went this AM. Currently working on visitor as the badge form Newton not assigned to Hutsonville. Coordination in e-mail to ensure Newton assigns workers to Hutsonville. R. Porter reported various Ameren employees have been coming on site, such as substation maintenance. R. Porter and J. Cravens are monitoring this together.
	2012-03-27	OPEN - J. Denham concern over badge in/out at other plants and the change over required back to Hutsonville for those who go to other plants. M. Wagstaff indicated can still get a visitors badge, but he would provide J. Denham, J. Boone, and J. Tasich consultant's badge [where as "employee" of M. Wagstaff].
	2012-03-20	OPEN - R. Porter to get visitors badge if goes to other Ameren plants. When badge in/out workers are to watch the light on the swipe unit, not the green light above.
07	**VEHICLES ON SITE**	
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - Fuel trucks [such as for Belt Construction] can be on work site. Park at trailer area. Only Geotechnology and AMS trucks allowed frequent access. For Lamac, vehicle allowed on site, but work in that area when they are surveying will be shut down.
	2012-03-20	OPEN - Employees to park in lot, ride AMS transportation bus to site and back from badge in area.
08	**OSHA LOG - WORK HOURS**	
	2012-04-03	OPEN - total all hours [including subcontractors]
	0,239.00	RT
	0,000.00	OT
	0,239.00	TOTAL
	2012-03-27	OPEN - no workers on site except Site Manager and surveyor. Hours will be from previous Monday to Friday [the week].
	0,059.00	RT
	0,000.00	OT
	0,059.00	TOTAL
	2012-03-20	OPEN - no workers on site except Site Manager.
	0,000.00	
	0,000.00	
	0,000.00	

06 MANPOWER

01 CREW SIZE

2012-04-03 OPEN - AMS and Belt Construction on site.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

2012-03-27 OPEN - no workers on site except Site Manager and surveyor. Projection for next week will add employees: 4x ash placement and 1x for water truck.
Current
[00] Pipe
[00] Mech
[00] Elec
[00] Cement
[00] Laborers
[00] Operators
[02] Survey [Part time]
[01] Foreman [Full time]
[03] Total

2012-03-20 OPEN - no workers on site except Site Manager.
Current
[00] Pipe
[00] Mech
[00] Elec
[00] Cement
[00] Laborers
[00] Operators
[01] Foreman
[01] Total

02 WORK HOURS

2012-04-03 OPEN - Standard hours
2012-03-27 OPEN - Standard hours
2012-03-20 OPEN - Standard hours

03 OVER TIME

2012-04-03 OPEN - none projected. Advise GEO if change.
2012-03-27 OPEN - none projected
2012-03-20 OPEN - none projected

04 TRAILER [AND GENERAL CONDITIONS]

2012-04-03 OPEN - no issues. Power to trailer[s] this week. AMS employee trailer to move to trailer site 04-04.
2012-03-27 OPEN - Price form AAA Electric 03-28. AMS to move employee trailer adjacent to GEO trailer. No generators will be required for now. J. Tasich discussed the electric can be heavy wall SCH 80 conduit run on top the ground with gravel covering. Their could be issues with the Ameren Illinois requirement for the new pole height. M. Wagstaff to get with utility to review options.
2012-03-20 OPEN - Trailers on site. AMS has set 3x portable toilets with 2x hand wash stations. Units are "unisex". AMS will also set a storage container in the next week or so.

07 PREVIOUS

01 SUBCONTRACTS

2012-04-03 OPEN - no issues
2012-03-27 OPEN - no issues
2012-03-20 OPEN - no issues

02	**SUBMITTALS**	
	2012-04-03	OPEN - no issues. In progress.
	2012-03-27	OPEN - no issues
	2012-03-20	OPEN - no issues

08	**MATERIAL**	
01	**GENERAL**	
	20120-04-03	OPEN - M. Wagstaff concern on liner delivery. P. Zinsious contacted subcontractor, and liner has been manufactured, and is in Houston, TX. No issue with delivery [if required] within 30 D.
	2012-03-27	OPEN - Lamac to take few more elevation shots in coal yard.
	2012-03-20	OPEN - Discussion on the remaining coal pile volume, Lamac survey show approximately 3,500 CY. If area around coal pile considered to level, 3,780 CY. Coal has to be placed in the bottom of the APD, as it cannot come in contact with the liner. The schedule will need to be adjusted to account for this activity. This area may also require top soil and seeding.

09	**ADJACENT PROPERTIES**	
01	**GENERAL**	
	2012-04-03	OPEN - no issues. AMS announced Koberstein Contracting as the pipe subcontractor, who will provide excavation plan.
	2012-03-27	OPEN - General discussion. AMS in process of reviewing subcontractors for the Perforated Collector Pipe [PCP]. When subcontractor is approved, then excavation plan will be published. AMS reiterated that if it is not necessary, the area will not be used. General consensus to "wait and see" as the scope of work is not until June.
	2012-03-20	OPEN - Lamac surveyed are of License Agreement and found path of irrigation unit extends into this area. Lamac provided drawing of the wheel arc in the area. Work is scheduled in this area in June, and AMS indicated that if it is not necessary, the area will not be used. A. Ridgely indicated there is a cable in the field the irrigation unit follows. No action required at this time. When excavation plan has been created, AMS will review again. Survey stakes currently will be left in the area.

10	**QUALITY CONTROL**	
01	**GENERAL**	
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - no issues
	2012-03-20	OPEN - no issues
02	**ASH**	
	2012-04-03	OPEN - no quality issues. Safety concern - reference Item No. 05.04-2012-04-03 above. A. Ridgely indicated survey shows settlement in Pond D as minimal - approximately 2/10 FT. AMS at this time indicated not an issue.
	2012-03-27	OPEN - no issues. AMS to proceed with mixing in the "topsoil" found within the Ash Pond D into the fill. [Note: This is as noted in previous contract documents]. Reviewed the topographic survey by Lamac. A. Ridgley indicated the topo on the [AER] drawings Land Lamac survey were very close and AER engineer probably used "LiDAR" [Light Detection and Ranging], an [optical] scanning process. The delta in the survey is about 5,000 CY. Drawing will be created fro EWO baseline.
	2012-03-20	OPEN - no issues. Lamac topographic survey of the ash pile was within 300 CY of the Massmann aerial survey. A. Ridgely indicated variation could be due to the actual in place fluctuations in elevation in between survey points. The delta in volume is considered almost a "wash".
03	**CLAY**	
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - no issues
	2012-03-20	OPEN - no issues

11	**SCHEDULE REVIEW**	
01	**SCHEDULE**	
	2012-04-03	OPEN - No significant changes. AMS to update actuals and submittals. AER changed the description "piezometer" to "vent pipe" on the P6 schedule. M. Wagstaff concern addition of 17D to critical path by EWO-02 [reference item No. 12.03-2012-04-03 below] as project is already "2x weeks behind schedule". Two week look ahead - pipe filling in Pond D.
	2012-03-27	OPEN - No significant changes. AMS to update. General discussion 2012-10-11 good end [substantial completion] date.
	2012-03-20	OPEN - Review of general and critical path schedules provided by AER. General discussions of rain days and how budgeted into the schedule calendar. The end date has been extended to 2012-10-11, and is acceptable to Ameren. The primary driving factor at this item is the seeding in the fall of the cap.

02 TIME AND MATERIAL

2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues
2012-03-20	OPEN - no issues

03 COORDINATION

2012-04-03	OPEN - no issues. Reference Item No. 05.06-2012-04-03 above regarding others access to plant. AMS to laminate sign and post. Reference Item No. 14.01.20-2012-04-03 below.
2012-03-27	OPEN - J. Cravens and R. Porter to monitor the access to the site as team. M. Wagstaff to notify the team of any AER personnel or entity coming to the site or who should badge in. The concern was knowledge of who has permission to come on site once security is gone.
2012-03-20	OPEN - no issues

12 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-04-03	OPEN - AMS submitted EWO-02 and EWO-03. See Item No. 12.03 and 12.04
2012-03-27	OPEN - General discussion items for EWO [Potential change Orders - PCO] ash cap, coal pile, pipe [in berm], surveying, and utility change. If excavating the trench in Pond A is just a few hours, AMS would not charge for this work.
2012-03-20	OPEN - no issues

02 AMS PAY APPLICATION

2012-04-03	OPEN - in progress
2012-03-27	OPEN - no issues. J. Denham we will have pay app this month.
2012-03-20	OPEN - no issues

03 EWO-02 - ASH PLACEMENT

2012-04-03	NEW - AMS submitted EWO letter. M. Wagstaff requesting the description be changed from "ash placement" to "cap modification". This EWO is to include all changes from the plan changes to date. P. Zinsious indicated AMS to have AER "agree in principle" with the ash placement portion presented. AMS will provide spreadsheet showing changes of overall project such as the channels, berms, pump system, etc. M. Wagstaff question how AMS arrived at the 17D addition to the critical path. P. Zinsious to investigate calculation used. R. Porter reported there is a soft area approximately 50 FT x 1,000 FT located on the east and south perimeter of the pond. P. Zinsious indicated that J. Denham and J. Boone are in process of reviewing options, and would report back in a couple of days.

04 EWO-03 - COAL PILE

2012-04-03	NEW - AMS submitted EWO letter. M. Wagstaff indicated AER has to review as other options for site may affect the decision.

05 EWO-04 - PIPE RELOCATION

2012-04-03	NEW - R. Porter briefly explained the procedure to excavate and move the line inside the berm. M. Wagstaff requested "pothole" to locate.

05 EWO-05 - ELECTRICAL REVISION

2012-04-03	NEW - M. Wagstaff indicated drawings to be released 04-03.

13 ACTION ITEMS - AER

01 AMEREN [AER]

2012-04-03

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich reviewed location, and has proposed option. Will review 04-03]
[17] ACAD files to AMS [CLOSED - AER transmitted disc]
[18] AER to print full size schedule [CLOSED]
[19] Flood plain permit [CLOSED - AMS will publish AER info]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]
[21] M. Wagstaff to contact Ameren Utilities for the meter.
[22] Mailbox and delivery thereof status.

2012-30-27

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers.
[17] ACAD files to AMS [CLOSED - AER transmitted disc]
[18] AER to print full size schedule [CLOSED]
[19] Flood plain permit [CLOSED - AMS will publish AER info]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]

2012-30-20
[03] Fire protection [OPEN - where to go for high winds or tornado]
[13] Wetlands permit application by Hanson [CLOSED - non-issue. Hanson reviewed, AER issued e-mail.]
[14] Keys for locks [CLOSED - AMS has keys]
[15] Provide new safety SPOC [CLOSED - M. Wagstaff is safety SPOC]
[16] Tax exemption clarification [CLOSED - AER will renew when dates reaches close to expiration]
[17] ACAD files to AMS [OPEN - AER to send disc]
[18] AER to print full size schedule [NEW]
[19] Flood plain permit [NEW - AER provide copy of the permit via e-mail]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]

14 ACTION ITEMS - AMS

01 ASH MANAGEMENT [AMS]

2012-04-03
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run . [In progress]
[06] RFI-01 roadway clarification [OPEN - AMS in progress]
[16] Submittal log [OPEN - AMS submit EOW] [In progress - couple days out]
[19] All documents to be copied [e-mailed] to Mr. Joe Cravens - M. Wagstaff representative on site.
[20] Site entry signage

2012-03-27
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run .
[06] RFI-01 roadway clarification [OPEN - AER sent e-mail, AMS to check]
[16] Submittal log [OPEN - AMS submit EOW] [In progress]

2012-03-20
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – revised ash placement price within week]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – AMS to create PCO, line will have to be lowered, manhole will have to be cut into. Lamac to shoot elevations of pipe at manhole.
[06] RFI-01 roadway clarification [OPEN - AER sent e-mail, AMS to check]
[11] AER request each Subcontractor to have their lead person with 30HR. AMS to create RFI. [CLOSED - AER not requiring sub supervisors to have 30 HR]
[14] Issue log [CLOSED - information to PCO and RFI]
[15] Check on drawing distribution for Lamac. [CLOSED - Lamac sent e-mail drawings were received]
[16] Submittal log [OPEN - AMS submit EOW]
[17] HDPE QA/QC [CLOSED - liner subcontractor to submit - Geotechnology to provide lab information]
[18] Last two weeks close out [CLOSED - reviewed at Ameren scheduling meeting]

15 PRODUCTION

01 GENERAL

2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues - no work on site.
2012-03-20	OPEN - no issues - no work on site.

02 ASH

2012-04-03	OPEN - no issues - 10,300 CY as of 03-03. Estimated 13,968 CY EOD.
2012-03-27	OPEN - no issues - no work on site.
2012-03-20	OPEN - no issues - no work on site.

03 CLAY

2012-04-03	OPEN - no issues - this activity not begun. Borrow site in process closing on agreements.
2012-03-27	OPEN - no issues - no work on site.
2012-03-20	OPEN - no issues - no work on site.

16 DOCUMENTS TRANSMITTED

2012-04-03	[01] AMS - EWO-02 - ash placement to AER and GEO
	[02] AMS - EWO-03 - coal pile to AER and GEO
	[03] AMS - Lessons Learned/Near Miss Report [Incident dated 2012-04-20]
	[04] AMS - Contact list [next print out 11x17]
2012-03-27	[01] AER - CD drawings on ACAD and PDF to LEC, GEO, and AMS
	[02] AMS - Lamac topographic of the ash pond [COR to AER info]
	[03] AMS - Lamac topographic of coal ash pile
2012-03-20	[01] Critical Path schedule dated 2012-03-19
	[02] Full schedule dated 2012-03-19

17 DOCUMENTS REVIEW ONLY

2012-04-03	None
2012-03-27	None
2012-03-20	[01] Lamac revised borrow access road layout dated 20120-03-19 [road marked yellow]
	[02] Lamac layout of Wampler property in Geotechnology binder.

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, April 10, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTO LOG

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Photograph 1 - Ash grading in Quadrant C facing northeast



Photograph 2 - Ash placement in Quadrant A facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 2 and April 6, 2012

JRC



Photograph 3 - Excavator stuck in Quadrant D facing southwest



Photograph 4 - Excavator removal from ash in Quadrant D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 2 and April 6, 2012

JRC

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Photograph 5 - Breaking geotubes on west end of Ash Pond D facing south



Photograph 6 - Overview of south portion of Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 2 and April 6, 2012

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Photograph 7 - Overview of north portion of Ash Pond D facing northeast



Photograph 8 - Ash grading on Quadrant C facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 2 and April 6, 2012

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Photograph 9 - Ponded water from rain in Ash Pond D facing east



Photograph 10 - Ash removal in Quadrants A and B facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 2 and April 6, 2012

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Photograph 11 - Overview of south portion of Ash Pond D facing southeast



Photograph 12 - Overview of north portion of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 2 and April 6, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: April 16, 2012

SUBJECT: Weekly Summary Report for April 9, 2012 to April 13, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and windy. Temperature (°F) lows ranged from 35 to 45°F, and temperature highs ranged from 60 to 70°F. Weather delays did not occur.

Construction Activities

Ash grading, undercutting of soft areas, and locating the HDPE drainage pipe occurred this week. Ash was moved from quadrant A and B to lower areas of quadrant A, quadrant B, and the northern portion of quadrant C. Grading occurred in all four quadrants. On April 10, 2012, the John Deere 9520 tractor encountered soft soils andgot stuck in the southern end of quadrant A (where fill was being placed). The CAT D6N and D6H bulldozers were used to remove the tractor. A CAT 324 C Excavator dug a test pit to locate soft areas in quadrant D along the east embankment. Soft ash was undercut along the south portion of quadrant D, along the south embankment. The 18-inch HDPE gravity drainage pipe was located and surveyed along the south and east embankments of Ash Pond D. Refer to attached daily reports and photograph log for additional information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator

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Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, and Jimmy Boone
Charah, Inc. – Joe Tasich
Lamac Engineering – Austin Ridgely
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, and Shelby Belt
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, April 10, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash within the footprint of Ash Pond D was graded. The geomembrane is estimated to be delivered in early May 2012.

Testing/Sampling

Additional testing and sampling did not occur.

Calibration Records

Calibration information was obtained from Lamac for their surveying equipment.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13771

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 4/9/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 11.0 hr (created spreadsheet through lunch)
Weather: Sunny, 45° AM, 65° PM Windy | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck
Site Activities / Observations / Contacts / Notes:

The D6H continued grading Section C to match the PGL. The D6N continued grading Section A and C to match the PGL. The west side of Pond D is starting to take shape very well. The 9520 continued cutting and filling Section A and B. The 325C cut the ash on the north side of the Pond next to the PGL near the fence. This was too close to the fence for the tractor and scrapers. The 325 C then began pulling out the ripped geotube HDPE from the ash around the exterior perimeter, and placing it in the center of the Pond to be covered. This will allow for more efficient grading and compaction around the exterior perimeter of the Pond.

The locks for the gates were never changed. We will continue to use the existing locks.

Lamac will be back on Wednesday to stake additional areas in the 100' grid layout.

Data lines were never provided from Frontier. The phone lines might be cancelled.

Created a Submittal spreadsheet for review in tomorrows meeting.

Additional Comments: Same operators for same equipment as last week.

Randy Fuchs — Contractor Representative — AMS — Company
Signature — 4-9-12 — Date
Anna Saindon — Geotechnology Inc. — 4-16-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13772

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/10/12

TIME: Arrive: 6:30 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.0 (0.5 hr for lunch)
Weather: Sunny, 50° AM, 60° PM Windy | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325 C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck
Site Activities / Observations / Contacts / Notes:

The D6N continued grading Section D. The D6H continued grading the south end of Section A. The 9520 continued cutting Section A and B, and filling the south end of Section A. The 325C began clearing the remaining vegetation on the east side of the Pond, near the wet area by the east embankment. Crane mats were used as a precaution in this area, even though the actual wet area was avoided.

The 9520 got stuck in the south end of Section A, where fill was being placed. The D6N pushed the pans out of the ruts, and then pulled the tractor out with a cable, as the D6H pushed the pans from behind.

AMS plans to bring in a Long Reach Excavator to undercut the wet area of the east side of the pond. The material will be cut 18"-24", or as necessary, and will be pushed towards the center of the Pond to dry. The material from the embankment will be cut and used to fill this area once it is dried. This might begin next week and AMS may or may not have an additional operator for this procedure.

EWO-02 and EWO-03 was approved. The additional 50,000 CY will be moved, and AMS will begin moving the coal at the end of this week, or next week, once final approval goes through and the coal route is prepared.

Joe Tasich and Shelby Belt were here to observe site activities. Storm shelter will be finalized by Joe T. Weekly Progress Meeting attended.

Additional Comments: As of 4/9/12, Belt has moved approx. 28,076 CY of Ash.

Randy Potter — Contractor Representative — AMS — Company
Signature — 4-10-12 — Date
Anna Saindon — Geotechnology, Inc. — 4-16-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13773

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/11/12

TIME: Arrive: 6:30 AM | Depart: 4:15 PM | Travel: 1.0 hr | Total: 10.25 hr (0.5 hr for lunch)
Weather: Sunny, 35° AM, 60° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck
Site Activities / Observations / Contacts / Notes:

Austin Ridgely with Lamac was on-site to stake more of the 100' grid. Point numbers were written on all of the stakes to match the drawings. The 100' grid, including the PGL, is now complete. Randy raised all of the stakes to visually show the Ash Grade. Lamac will return on Monday to stake the layout of the Silt Fence for the Erosion Control.

The 325 C finished clearing the vegetation on the east side of the Pond. All of the vegetation has now been cleared, excluding the little vegetation that is left by the embankment perimeter. The cleared vegetation was then spread out to dry. The 325C dug a test pit in the wet area next to the east embankment. This was done to determine how wet the material is, and to determine the condition of the embankment material. The test pit was approx. 6' deep, and the embankment had a decent slope of clay + silt material going into the ash. The test pit was filled in to prevent accidents. The Long Reach Excavator will be here next Tuesday to undercut this area. The 325C also graded more of the PGL at the north tip of the Pond.

The D6N and D6H continued grading Section D. The 9520 continued cutting Section A and B, and filling the area located in the Center of the Sections.

Shelby Belt was here to observe site activities. AMS will attempt to dewater the standing water in the coal yard when the coal pile is moved. It is unknown when AMS will divert the ponded water in Ash Pond A. The west perimeter of the Pond needs to be evaluated for slopes, swales, and the paved ditch, to prevent the slope of the clay cap coming into the existing west gravel road.

Additional Comments: Same operators for same equipment as last week.

Randy Richter — Contractor Representative — AMS — Company — 4-11-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 4-16-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13774

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 4/12/12

TIME: Arrive: 6:30 AM | Depart: 6:15 PM | Travel: 1.0 hr | Total: 12.75 hrs (emails through lunch)
Weather: Sunny, 35°AM, 70°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck

Site Activities / Observations / Contacts / Notes:

The D6N continued grading the south end of Section A, along with Section C and D. The D6H continued grading Section D. The 9520 continued cutting the north ends of Section A and B, and filling the south end of Section A, along with Section C. The 325C continued spreading out wet ash and cleared vegetation on the east side of the Pond, next to the outfall structure. The 325C then began undercutting the south end of the Pond in Section D.

Jimmy Boone and Shelby Belt were on-site to discuss the schedule. The Long Reach Excavator will be delivered on 4/17/12, and picked up on 5/1/12. Belt will hire an additional operator to operate the Long Boom. This two week period is very critical, if there are any delays, all personnel will have to switch to 10 hour days. The Long Boom will be used to undercut the ash along the east embankment.

The silt fence (SF) will be constructed on 4/18/12 by a subcontractor. The SF will not follow the original plan. AMS will set the location of the SF instead of Lamoc. The SF cannot be set in the south and east berms until they are cut down. The northeast SF will now run along the tree line next to the river, and will extend passed the Deep Wells on the east side of the Pond. On the farmer's land, the SF will be located 2' inside the AMS property line. A section will be left open between the field and the inside of the chain link fence, until the fence is taken down on the south side of Pond B. The subcontractor can install the SF in one day with a plow, as opposed to one week if AMS were to install the SF with a trencher.

Additional Comments: NEXT PAGE

Randy Perkins — Contractor Representative — AMS — Company — 4-17-12 — Date
Signature
Anna Saindon — Geotechnology, Inc — 4-16-12 — Date
Engineer's Signature

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ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 13775

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 4/12/12

TIME: Arrive: Depart: Travel: Total:
Weather: Contractor: Subcontr./Supplier:
Equipment Working:
Site Activities / Observations / Contacts / Notes:

REFER TO PAGE ONE (1)

A forklift for the HDPE Liner will be ordered on 4/23/12, and delivered on 4/25/12. The liner will be delivered on 4/27/12. Belt will unload and stock the Liner.

Tomorrow, the 325C will locate the existing drainage pipe around the south and east embankments of Pond D in 4-6 locations. When pipe relocation from Pond B to the manhole by the outfall structure begins, AMS will hire a new laborer. The new operator and laborer will be trained next Tuesday by Joe T. The 18" HDPE gravity pipe may or may not be plugged for relocation. The pipe will be moved as a whole, 3' horizontally, and 7' vertically, starting from the outlet of Pond B, to the manhole east of Pond D. An EWO was sent this afternoon for pipe relocation. Randy and I will survey the exposed pipe with a level, to enable design for a new location and flowline of the discharge pipe.

If rain days occur, AMS plans on working on the pipe and moving the coal pile to minimize delays. This time is very critical on the schedule. Jimmy and Shelby viewed the borrow site to determine a schedule. The SF cannot be contructed around the borrow site and the haul road for another 2 weeks, per the SWPPP.

A photo log was created for the West Side PGL (Gutter location) to be submitted to Hanson. This side needs to be evaluated for the gutter and slopes / fence and gravel road. Lamac will layout the gutter next time they are on site.

Additional Comments: Same Operators for Same Equipment as last week.

Randy Porter — Contractor Representative
AMS — Company
Randy Porter — Signature
4-12-12 — Date
Anna Saindon — Geotechnology, Inc.
4-16-12 — Date
Anna Saindon — Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13776

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 4/13/12

TIME: Arrive: 6:30 AM | Depart: 4:15 PM | Travel: 1.0 hr | Total: 10.5 hrs (0.25 hr for lunch)
Weather: Sunny, 45°AM, Cloudy 70°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck
Site Activities / Observations / Contacts / Notes:

The 9520 continued cutting the north end of Section A and B, and filling Section C. The D6H graded Section C and D. The D6N graded Section C, D, south of B, and the north tip of the pond where the excavator had graded. The 325C continued undercutting the south end of Section D next to the embankment until it got too wet (the crane mats were sinking). Then the 325C began spreading out the undercut material to dry. The undercut area was blocked off with tape and tags signed by Randy P. for safety.

Randy probed for the 18" drainage HDPE pipe along the south and east embankments, and the 325C exposed the pipe in these areas along the berms. Next to the manhole and Pond B, the HDPE was cased in concrete. The pipe was 18" to 36" deep along the berms. On the east embankment, the old drainage pipe was found in two locations next to the new HDPE pipe. The old drainage is made of corrugated pipe. AMS needs to know what to do with it. There is a possibility this old corrugated pipe is located along the south embankment as well. Randy and I shot in the elevations of the pipe with a Level, with the nearby station as a control. We also shot the flowline in the outfall structure in Pond D and the outlet structure in Pond B. After surveying, the pipe was covered up for safety. This information will be sent out Monday.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 4-13-12 — Date
Anna Saindon — Geotechnology, Inc. — 4-16-12 — Date
Engineer's Signature

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ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 4 Minutes
Tuesday, April 10, 2012

01 PUBLICATION

Publish date:	2012-04-16	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-04-10-PM-02
AER PO:	567523 R2	AMS-Charah Project:	4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
03	Ms. Anna Saindon	Geotechnology	314-997-7440	a_saindon@geotechnology.com
04	Mr. John Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
05	Mr. Joko Tasich	AMS-Charah	502-649-7633	jtasich@charah.com
06	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
07	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-04-10	OPEN - no issues.
2012-04-03	OPEN - no issues. CORRECTED THE NUMBERING FOR THIS TOPIC
2012-03-27	OPEN - no issues

02 WORKER PROTECTION ASSURANCE

2012-04-10	OPEN - no issues.
2012-04-03	OPEN - no issues [electricians working on temporary power 04-03] Meter based LOTO by AMS. R. Porter did not want any work "hot" if meter base was to be put in. M. Wagstaff to contact Ameren Utilities for the meter, and come on site Monday or Thursday [see also action item].
2012-03-27	OPEN - no issues. LOTO for temporary electric for trailer.

03	**EMPLOYEE DRUG TESTING**	
	2012-04-10	OPEN - no issues. Inquiry as to liner subcontractor [Chesapeake Containment]. Trained on schedule, some already trained.
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - Belt Construction employees 3x tested negative [will begin work]. Scheduled testing for 1x teamster on 03-27 and 2x operators on 03-28. Reminder for 24 HR notice.
04	**AMS SAFETY**	
	2012-04-10	OPEN - no issues.
	2012-04-03	OPEN - AMS submitted "Lessons Learned/Near Miss Report": Summary: Excavator was traveling across the east side of Ash Pond D when the left track sunk without warning. After a safety brief and going over the safe start and hazards of the task along with the inspection of proper rigging equipment, work proceeded to remove the excavator. The excavator come out without further incident. J. Tasich was on site and J. Cravens. There was no damage to the machine or any injuries. No work this portion of the site until further review. See report for more details.
	2012-03-27	OPEN - Portable toilets and hand wash stations on site and set up. Only smoking area is located at the employee trailer[s]. J. Cravens Geotechnology Construction Manager now full time on site. M. Wagstaff reviewed the program for J. Cravens list he gave him for the "anytime anyone see anything" safety program on site. J. Tasich general safety discussion.
05	**HOUSEKEEPING**	
	2012-04-10	OPEN - no issues
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - no issues
06	**PLANT ACCESS - CBT BADGE**	
	2012-04-10	OPEN - no issues
	2012-04-03	AAA 2x electricians went this AM. Currently working on visitor as the badge form Newton not assigned to Hutsonville. Coordination in e-mail to ensure Newton assigns workers to Hutsonville. R. Porter reported various Ameren employees have been coming on site, such as substation maintenance. R. Porter and J. Cravens are monitoring this together.
	2012-03-27	OPEN - J. Denham concern over badge in/out at other plants and the change over required back to Hutsonville for those who go to other plants. M. Wagstaff indicated can still get a visitors badge, but he would provide J. Denham, J. Boone, and J. Tasich consultant's badge [where as "employee" of M. Wagstaff].
07	**VEHICLES ON SITE**	
	2012-04-10	OPEN - no issues
	2012-04-03	OPEN - no issues
	2012-03-27	OPEN - Fuel trucks [such as for Belt Construction] can be on work site. Park at trailer area. Only Geotechnology and AMS trucks allowed frequent access. For Lamac, vehicle allowed on site, but work in that area when they are surveying will be shut down.
08	**OSHA LOG - WORK HOURS**	
	2012-04-10	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday]
	0,522.00	RT
	0,000.00	OT
	0,522.00	TOTAL
	2012-04-03	OPEN - total all hours [including subcontractors]
	0,239.00	RT
	0,000.00	OT
	0,239.00	TOTAL
	2012-03-27	OPEN - no workers on site except Site Manager and surveyor. Hours will be from previous Monday to Friday [the week].
	0,059.00	RT
	0,000.00	OT
	0,059.00	TOTAL

06 MANPOWER

01 CREW SIZE

2012-04-10 OPEN - AMS and Belt Construction on site.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

2012-04-03 OPEN - AMS and Belt Construction on site.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

2012-03-27 OPEN - no workers on site except Site Manager and surveyor. Projection for next week will add employees: 4x ash placement and 1x for water truck.
Current
[00] Pipe
[00] Mech
[00] Elec
[00] Cement
[00] Laborers
[00] Operators
[02] Survey [Part time]
[01] Foreman [Full time]
[03] Total

02 WORK HOURS

2012-04-10 OPEN - Standard hours
2012-04-03 OPEN - Standard hours
2012-03-27 OPEN - Standard hours

03 OVER TIME

2012-04-10 OPEN - none projected
2012-04-03 OPEN - none projected. Advise GEO if change.
2012-03-27 OPEN - none projected

04 TRAILER [AND GENERAL CONDITIONS]

2012-04-10 OPEN - no issues. Power to trailers operational. Phone lines dead. M. Wagstaff to cancel order due to data service not available to the site by landline.
2012-04-03 OPEN - no issues. Power to trailer[s] this week. AMS employee trailer to move to trailer site 04-04.
2012-03-27 OPEN - Price form AAA Electric 03-28. AMS to move employee trailer adjacent to GEO trailer. No generators will be required for now. J. Tasich discussed the electric can be heavy wall SCH 80 conduit run on top the ground with gravel covering. Their could be issues with the Ameren Illinois requirement for the new pole height. M. Wagstaff to get with utility to review options.

07 PREVIOUS

01 SUBCONTRACTS

2012-04-10 OPEN - no issues
2012-04-03 OPEN - no issues
2012-03-27 OPEN - no issues

02 SUBMITTALS

2012-04-10	OPEN - no issues. In progress, J. Cravens and P. Zinsious to finish out log. GEO to maintain the log. Submit in groups.
2012-04-03	OPEN - no issues. In progress.
2012-03-27	OPEN - no issues

08 MATERIAL

01 GENERAL

20120-04-10	OPEN - Liner can be delivered early to the site if necessary.
20120-04-03	OPEN - M. Wagstaff concern on liner delivery. P. Zinsious contacted subcontractor, and liner has been manufactured, and is in Houston, TX. No issue with delivery [if required] within 30 D.
2012-03-27	OPEN - Lamac to take few more elevation shots in coal yard.

09 ADJACENT PROPERTIES

01 GENERAL

2012-04-10	OPEN - no issues. Excavation plan scheduled for two weeks out.
2012-04-03	OPEN - no issues. AMS announced Koberstein Contracting as the pipe subcontractor, who will provide excavation plan.
2012-03-27	OPEN - General discussion. AMS in process of reviewing subcontractors for the Perforated Collector Pipe [PCP]. When subcontractor is approved, then excavation plan will be published. AMS reiterated that if it is not necessary, the area will not be used. General consensus to "wait and see" as the scope of work is not until June.

10 QUALITY CONTROL

01 GENERAL

2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues

02 ASH

2012-04-10	OPEN - no quality issues. Ash placement by scrapers. No issue on compaction. Tests to be taken when elevation is within 1 FT of finish grade. GEO has taken samples for proctors, and 1 of 2 test analysis have been returned.
2012-04-03	OPEN - no quality issues. Safety concern - reference Item No. 05.04-2012-04-03 above. A. Ridgely indicated survey shows settlement in Pond D as minimal - approximately 2/10 FT. AMS at this time indicated not an issue.
2012-03-27	OPEN - no issues. AMS to proceed with mixing in the "topsoil" found within the Ash Pond D into the fill. [Note: This is as noted in previous contract documents]. Reviewed the topographic survey by Lamac. A. Ridgley indicated the topo on the [AER] drawings Land Lamac survey were very close and AER engineer probably used "LiDAR" [Light Detection and Ranging], an [optical] scanning process. The delta in the survey is about 5,000 CY. Drawing will be created fro EWO baseline.

03 CLAY

2012-04-10	OPEN - no issues. Samples to be taken in next week or two [by AMS]. Analysis to follow the [revised] CQA plan.
2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues

11 SCHEDULE REVIEW

01 SCHEDULE

2012-04-10	OPEN - Review of schedule with actuals dates, activity look-ahead for two weeks, and critical path. . AER to provide revised schedule next week. One rain date documented for 04-05.
2012-04-03	OPEN - No significant changes. AMS to update actuals and submittals. AER changed the description "piezometer" to "vent pipe" on the P6 schedule. M. Wagstaff concern addition of 17D to critical path by EWO-02 [reference Item No. 12.03-2012-04-03 below] as project is already "2x weeks behind schedule". Two week look ahead - pipe filling in Pond D.
2012-03-27	OPEN - No significant changes. AMS to update. General discussion 2012-10-11 good end [substantial completion] date.

02 TIME AND MATERIAL

2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues

03 COORDINATION

2012-04-10	OPEN - no issues. Hierarchy for call for site access - R. Porter, J. Craven, and then M. Wagstaff. Post sign on site.
2012-04-03	OPEN - no issues. Reference Item No. 05.06-2012-04-03 above regarding others access to plant. AMS to laminate sign and post. Reference Item No. 14.01.20-2012-04-03 below.
2012-03-27	OPEN - J. Cravens and R. Porter to monitor the access to the site as team. M. Wagstaff to notify the team of any AER personnel or entity coming to the site or who should badge in. The concern was knowledge of who has permission to come on site once security is gone.

12 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	OPEN - AMS submitted EWO-02 and EWO-03. See Item No. 12.03 and 12.04
2012-03-27	OPEN - General discussion items for EWO [Potential change Orders - PCO] ash cap, coal pile, pipe [in berm], surveying, and utility change. If excavating the trench in Pond A is just a few hours, AMS would not charge for this work.

02 AMS PAY APPLICATION

2012-04-10	OPEN - M. Wagstaff indicated the application has been received from AMS, and he has forwarded to J. Davis at AER for review.
2012-04-03	OPEN - In progress
2012-03-27	OPEN - no issues. J. Denham we will have pay app this month.

03 EWO-02 - ASH PLACEMENT

2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	NEW - AMS submitted EWO letter. M. Wagstaff requesting the description be changed from "ash placement" to "cap modification". This EWO is to include all changes from the plan changes to date. P. Zinsious indicated AMS to have AER "agree in principle" with the ash placement portion presented. AMS will provide spreadsheet showing changes of overall project such as the channels, berms, pump system, etc. M. Wagstaff question how AMS arrived at the 17D addition to the critical path. P. Zinsious to investigate calculation used. R. Porter reported there is a soft area approximately 50 FT x 1,000 FT located on the east and south perimeter of the pond. P. Zinsious indicated that J. Denham and J. Boone are in process of reviewing options, and would report back in a couple of days.

04 EWO-03 - COAL PILE

2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting. However, AER approved this work.
2012-04-03	NEW - AMS submitted EWO letter. M. Wagstaff indicated AER has to review as other options for site may affect the decision.

05 EWO-04 - PIPE RELOCATION

2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	NEW - R. Porter briefly explained the procedure to excavate and move the line inside the berm. M. Wagstaff requested "pothole" to locate.

05 EWO-05 - ELECTRICAL REVISION

2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	NEW - M. Wagstaff indicated drawings to be released 04-03.

13 ACTION ITEMS - AER

01 AMEREN [AER]

2012-04-10

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich described area and supplies for emergency shelter in old switchgear room]

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing]

[21] M. Wagstaff to contact Ameren Utilities for the meter. [CLOSED]

[22] Mailbox and delivery thereof status.[CLOSED - M. Wagstaff reports all mail now goes to Newton]

2012-04-03

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich reviewed location, and has proposed option. Will review 04-03]

[17] ACAD files to AMS [CLOSED - AER transmitted disc]

[18] AER to print full size schedule [CLOSED]

[19] Flood plain permit [CLOSED - AMS will publish AER info]

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]

[21] M. Wagstaff to contact Ameren Utilities for the meter.

[22] Mailbox and delivery thereof status.

2012-30-27
[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers.
[17] ACAD files to AMS [CLOSED - AER transmitted disc]
[18] AER to print full size schedule [CLOSED]
[19] Flood plain permit [CLOSED - AMS will publish AER info]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]

14 ACTION ITEMS - AMS

01 ASH MANAGEMENT [AMS]

2012-04-10
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.] [CLOSED - differed to discussion after progress meeting]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run . [CLOSED - differed to discussion after progress meeting]
[06] RFI-01 roadway clarification [OPEN - AMS not received]
[16] Submittal log [OPEN - AMS submit EOW] [CLOSED - reference above in submittals]
[19] All documents to be copied [e-mailed] to Mr. Joe Cravens - M. Wagstaff representative on site.[CLOSED - e-mails will be copied/forwarded]
[20] Site entry signage [CLOSED - provide draft]

2012-04-03
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run . [In progress]
[06] RFI-01 roadway clarification [OPEN - AMS in progress]
[16] Submittal log [OPEN - AMS submit EOW] [In progress - couple days out]
[19] All documents to be copied [e-mailed] to Mr. Joe Cravens - M. Wagstaff representative on site.
[20] Site entry signage

2012-03-27
[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.]
[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run .
[06] RFI-01 roadway clarification [OPEN - AER sent e-mail, AMS to check]
[16] Submittal log [OPEN - AMS submit EOW] [In progress]

15 PRODUCTION

01 GENERAL

2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues - no work on site.

02 ASH

2012-04-10	OPEN - no issues. Estimated 28,076 CY EOD 04-09.
2012-04-03	OPEN - no issues - 10,300 CY as of 03-03. Estimated 13,968 CY EOD.
2012-03-27	OPEN - no issues - no work on site.

03 CLAY

2012-04-03	OPEN - no issues - this activity not begun. Borrow site agreement signing 04-10.
2012-04-03	OPEN - no issues - this activity not begun. Borrow site in process closing on agreements.
2012-03-27	OPEN - no issues - no work on site.

16 DOCUMENTS TRANSMITTED

2012-04-10	[01] AMS - Contact List HUT-APD-CON-20120-04-10
	[02] AMS - Submittal Breakout Report [previously issued at Pre-Con] dated 20120-01-31.
	[03] AER - J. Craven submittal log draft spreadsheet.
2012-04-03	[01] AMS - EWO-02 - ash placement to AER and GEO
	[02] AMS - EWO-03 - coal pile to AER and GEO
	[03] AMS - Lessons Learned/Near Miss Report [Incident dated 2012-04-20]
	[04] AMS - Contact list [next print out 11x17]
2012-03-27	[01] AER - CD drawings on ACAD and PDF to LEC, GEO, and AMS
	[02] AMS - Lamac topographic of the ash pond [COR to AER info]
	[03] AMS - Lamac topographic of coal ash pile

17 DOCUMENTS REVIEW ONLY

2012-04-10	None
2012-04-03	None
2012-03-27	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, April 17, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTO LOG



Photograph 1 - Grading north end to PGL facing northwest



Photograph 2 - Quadrant C PGL facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 9 and April 13, 2012

JRC



Photograph 3 A - Grading Quadrant A facing northeast



Photograph 4 A - Lamac staking 100' grid facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 9 and April 13, 2012

JRC



Photograph 5 - West side PGL facing northwest



Photograph 6 - Undercutting south end of Quadrant D facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 9 and April 13, 2012

JRC



Photograph 7 - Exposing existing HDPE drainage pipe on embankments facing west



Photograph 8 - Exposing existing HDPE drainage pipe on embankments facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 9 and April 13, 2012

JRC



Photograph 9 - Exposing existing HDPE drainage pipe on embankments facing northwest



Photograph 10 - Undercut area taped off facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 9 and April 13, 2012

JRC



Photograph 11 ⮝ - Overview Ash Pond D facing southeast



Photograph 12 ⮝ - Overview Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 9 and April 13, 2012

JRC

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: April 23, 2012

SUBJECT: Weekly Summary Report for April 16, 2012 to April 20, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and windy. Temperature (°F) lows ranged from 40 to 65°F, and temperature highs ranged from 60 to 80°F. Weather delays occurred on April 16, 2012 due to rain over the weekend.

Construction Activities

Ash grading, undercutting of soft areas, coal pile transported to ash pond, silt fence installation, ADS corrugated pipe removal, and 18-inch HDPE gravity drainage pipe excavation occurred this week. Ash was moved from the northern portion of quadrant A and B, to the southern portion of quadrant A and B, and the northern portion of quadrant C. Grading occurred in all four quadrants. Soft ash was undercut along the south and east portion of quadrant D beside the embankments, and spread out within the pond to dry. The coal pile was moved to the south end of quadrant A and B to be covered with ash. The 18-inch HDPE gravity drainage pipe was exposed and approx. 600 feet of the ADS corrugated pipe was removed from the south embankment of Ash Pond D. Refer to attached daily reports and photograph log for additional information.

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Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Hyundai 290 LC-9 Long Reach Excavator
Water Truck
John Deere 5420 tractor with silt fence plow
John Deere 35D Mini Excavator with John Deere HH50 Hammer.

Geotechnology, Inc. – Joe Cravens
Ash Management Systems, LLC (AMS) – Randy Porter, Robert Dunkley, James Marks, Jimmy Boone, and Paul Zinsious
Charah, Inc. – Joe Tasich and Kirby Bilsland
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, Marc Downs,
Daylight Land Management – Adam Ziliak, John Ziliak, and Billy Georges.
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, April 17, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash within the footprint of Ash Pond D (quadrants A, B, C, and D) was graded. The geomembrane is estimated to be delivered in early May 2012.

Testing/Sampling

Testing and sampling did not occur.

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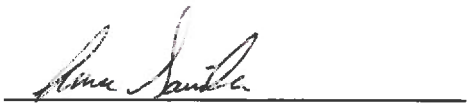
Calibration Records

Calibration information was obtained from Geotechnology, Inc. for the nuclear moisture density gauge.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13777

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/16/12

TIME: Arrive: 6:30 AM | Depart: 2:45 PM | Travel: 1.0 hr | Total: 9.25 (no lunch)
Weather: Cloudy, 50°AM, 65°PM (Windy) | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, 325C Excavator
Site Activities / Observations / Contacts / Notes:

Rain Day - No Production.

On-Site Personnel: Joe Cravens, Randy Porter, Jared Belt, Nick Walker

Jared and Nick took down one section of pipe running south of the coal yard for coal route access. One pipe support was also dug out for the coal route access. The pipe was used for drainage in the entrance to the coal yard. For the rest of the day, Jared and Nick did routine maint. on equipment.

Anthony Divers (AMS Focus Group) will be on-site next week to assist Randy.

Mike Wagstaff and I discussed the HDPE Gravity Drain Pipe and the issue with the west side Gutter. Lamac is to shoot in the west fence line next time on site.

Additional Comments:

Randy Porter — Contractor Representative | AMS — Company
Signature | 4-16-12 — Date
Anna Saindon — Geotechnology, Inc. | 4-23-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13778

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 4/17/12

TIME: Arrive: 6:30 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12 hrs (paperwork through lunch)
Weather: Sunny, 40°AM, 75°PM | Contractor: AMS | Subcontr./Supplier: Belt/Daylight Land Management
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck,
Site Activities / Observations / Contacts / Notes: 290 LC-9 Excavator, 5420 Tractor with Silt Fence Plow, and 35D Mini Excavator with HH50 Hammer

New operator for Belt arrived; Marc Downs will be operating the long boom. He was trained by Kirby Bilsland (Charah Safety) and got his badge from the Newton Plant. He completed his paperwork and CBT and began working in the PM. The Long Reach Excavator, "Long Boom", was delivered (60' Hyundai 290 LC-9) by Glenn Brown Trucking, LLC. It will have to be sent back to Diamond Equipment in two weeks.

The D6N graded south Section C and D. The D6H graded Section C and D, coal placed in the Pond, and built up the coal route entrance with gravel. The 9520 began moving the coal pile, and placing the coal in the south end of Section A and B, south of the north broken geotubes. The 325C undercut the south end of Section C and D along the south embankment. The 290 LC-9 began undercutting the east side of the Pond in Section D.

Daylight Land Management arrived to install the silt fence. Employees: Adam Ziliak, John Ziliak, and Billy Georges. Equipment: John Deere 5420 Tractor with Silt Fence Plow, and John Deere 35D Mini Excavator with John Deere HH50 Hammer. Billy will operate the Mini Ex, and John will operate the Tractor. They arrived late so they worked late. They began the fence at the north tip of the Pond, and worked SE on the outside of the berm, to wrap around the south end. They will pin up the fence tomorrow and will be completed. The Switchgear Room was viewed by Joseph King (AAA Electric) with Randy, Paul, and Mike to determine the MCC Plan. Jimmy and Paul here all day. Attended Progress Meeting. Developed official submittal log with Paul Z.

Additional Comments:

Randy Postl — Contractor Representative — AMS — Company
Signature — 4-17-12 — Date
Anna Saindon — Geotechnology, Inc. — 4-25-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13779

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 4/18/12

TIME: Arrive: 6:30 AM | Depart: 3:45 PM | Travel: 1.0 hr | Total: 10.25 hrs (photo log through lunch)
Weather: Sunny, 40°AM, 78°PM | Contractor: AMS | Subcontr./Supplier: Belt/Daylight Land Management
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck, 290 LC-9 Excavator (Daylight demobilized their equipment yesterday evening)
Site Activities / Observations / Contacts / Notes:

The 325C began cutting the south embankment, exposing the 18" HDPE Gravity Drain Pipe, and ripping out the old ADS Corrugated Drain Pipe. There will be a dumpster delivered to haul off the old ADS pipe. For now, the pipe is being layed outside of the embankment (south of the berm). The location of the ADS Pipe on the south berm differs from its location on the east berm. On the south berm, it is inside the HDPE pipe, as opposed to outside the HDPE pipe on the east berm. The cut embankment material was placed in the undercut area in Section C for grading. The 325C also spread out undercut material in Section D at the end of the day. Cutting the south berm ceased when they reached the undercut areas with ponded water.

The 9520 continued cutting the cool pile, and filling the south end of Section A and B. The D6H continued grading Section C and D. The D6N graded Section C and D, and the cut south embankment material. The 290LC-9 continued undercutting the east side of the pond in Section D along the east embankment, as well as the south side of the pond in Section D along the south embankment.

Adam Ziliak finished stapling the silt fence. The 3200' silt fence along the NE, E, SE, and S ends of the pond is complete. James Marks, AMS's new laborer, arrived today for training. Joko Tasich did the training.

Additional Comments: James is scheduled to start next Monday to assist with pipe relocation.

Randy Poertz — Contractor Representative — AMS — Company
Signature — 4-18-12 — Date
Anna Saindon — Geotechnology, Inc. — 4-23-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13780

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01 Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 Zone: —
Client: Ameren ER Date: 4/19/12

TIME: Arrive: 6:30 AM Depart: 4:00 PM Travel: 1.0 hr Total: 10.25 hrs (0.25 hr for lunch)
Weather: Sunny, 50°AM, 80° PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans, Water Truck, 290 LC-9 Excavator
Site Activities / Observations / Contacts / Notes:

Moving the coal pile has been completed. The 9520 cut the east end of the coal yard and filled the west end to promote drainage. The D6N graded within the coal yard, cut small key ways in for drainage, and re-graded coal route. If there is standing water in the coal yard after the next rain, the yard will be re-graded for drainage.

The 290 LC-9 continued undercutting the south side of the Pond along the embankment, and moving undercut wet ash within the Pond. The D6H graded section C and D. The D6N graded section C and D, as well as South Section A and B where the coal was covered. The 325C continued cutting the south embankment, exposing the pipe, and filling the undercut trench with berm material. Over 500' of the HDPE Pipe has been exposed. The 325C also moved undercut wet ash on the east side of the Pond, and spread it out within the Pond. The 9520 re-cut the western entrance to Pond D to remove the coal from the coal route. In the PM, the 9520 continued cutting the north end of Section A and B, and filling the south end of Section A and B to cover the coal.

The ponded water in the undercut south trench will be directed to the undercut east trench as it is completed. Then the water will be either pumped or bailed out. The wet ash undercut on the south end of Pond D is very wet. Drying time might delay schedule for compaction testing and/or geomembrane installation. Next week, the temporary drainage pipes (ADS) used between the N and S end of the Pond will be taken out, and the drainage ditch will be filled.

Additional Comments: The electric running to the deep wells needs determined for construction of collection pipes.

Randy Postma — AMS
Contractor Representative — Company
Signature — 4/19/12 Date
Anna Saindon — 4-23-12
Geotechnology, Inc. — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13781

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/20/12

TIME: Arrive: 6:30 AM | Depart: 3:15 PM | Travel: 1.0 hr | Total: 9.5 hrs (0.25 hr for lunch)
Weather: Sunny, 65° AM, 60° PM Cloudy/Windy/Rain | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, Two 1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290LC-9 Excavator

Randy and I uncovered the manhole located NE of Pond D. The flowline in the bottom of the manhole (flow from the outfall structure) measured 10.5' from top of lid. The flowline of the drainage pipe entering the manhole measured 5.75'. The top of the concrete invert in the manhole measured 9.1'. Therefore, there is only ≈ 5.0' to drop the drainage pipe within the manhole. AMS may try to re-route the HDPE pipe to come in where the outfall drainage comes in; instead of filling the outfall drainage with flowable fill it would just be removed. This would prevent making a new entry into the manhole. We will discuss during the next meeting.

The D6N and D6H continued grading Section C and D. The 290LC-9 continued undercutting along the east embankment in Section D. The 325C moved undercut wet ash within the pond and continued cutting the south embankment in Section D, while filling the undercut trench with berm material. The 9520 continued cutting the north end of Section A and B, and filling the south end of Section A and B.

It began raining in the PM and the D6N re-graded the west end of the coal yard.

Additional Comments:

Randy Potter — Contractor Representative — AMS — Company
Signature — 4-20-12 — Date
Anna Saindon — Geotechnology, Inc. — 4-23-12 — Date
Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 5 Minutes
Tuesday, April 17, 2012

01 PUBLICATION

Publish date:	2012-04-23	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-04-10-PM-02
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
03	Mr. Joe King	AAA Electric	N/A	N/A [Part time]
04	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
05	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-04-17	OPEN - no issues.
2012-04-10	OPEN - no issues.
2012-04-03	OPEN - no issues. CORRECTED THE NUMBERING FOR THIS TOPIC

02 WORKER PROTECTION ASSURANCE

2012-04-17	OPEN - no issues. AAA electric to be on site 04-17 to review electric switch gear room.
2012-04-10	OPEN - no issues.
2012-04-03	OPEN - no issues [electricians working on temporary power 04-03] Meter based LOTO by AMS. R. Porter did not want any work "hot" if meter base was to be put in. M. Wagstaff to contact Ameren Utilities for the meter, and come on site Monday or Thursday [see also action item].

03 EMPLOYEE DRUG TESTING

2012-04-17	OPEN - no issues. AMS worker scheduled for 04-18. Belt Construction 1x 04-17. Daylight Farms 3x 04-16. M. Wagstaff indicated drug testing cost is borne by the subcontractors, notes in specifications.
2012-04-10	OPEN - no issues. Inquiry as to liner subcontractor [Chesapeake Containment]. Trained on schedule, some already trained.
2012-04-03	OPEN - no issues

04 AMS SAFETY

2012-04-17	OPEN - no issues. Next Safety Luncheon scheduled for 04-08.
2012-04-10	OPEN - no issues.
2012-04-03	OPEN - AMS submitted "Lessons Learned/Near Miss Report": Summary: Excavator was traveling across the east side of Ash Pond D when the left track sunk without warning. After a safety brief and going over the safe start and hazards of the task along with the inspection of proper rigging equipment, work proceeded to remove the excavator. The excavator come out without further incident. J. Tasich was on site and J. Cravens. There was no damage to the machine or any injuries. No work this portion of the site until further review. See report for more details.

05 HOUSEKEEPING

2012-04-17	OPEN - no issues. AMS to reinstall caution tape on south berm where wind blew down.
2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues

06 PLANT ACCESS - CBT BADGE

2012-04-17	OPEN - no issues. M. Wagstaff to investigate AMS consultant badges.
2012-04-10	OPEN - no issues
2012-04-03	AAA 2x electricians went this AM. Currently working on visitor as the badge form Newton not assigned to Hutsonville. Coordination in e-mail to ensure Newton assigns workers to Hutsonville. R. Porter reported various Ameren employees have been coming on site, such as substation maintenance. R. Porter and J. Cravens are monitoring this together.

07 VEHICLES ON SITE

2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues

08 OSHA LOG - WORK HOURS

2012-04-17	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday]
0,746.00	RT
0,000.00	OT
0,746.00	TOTAL
2012-04-10	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday]
0,522.00	RT
0,000.00	OT
0,522.00	TOTAL
2012-04-03	OPEN - total all hours [including subcontractors]
0,239.00	RT
0,000.00	OT
0,239.00	TOTAL

06 MANPOWER

01 CREW SIZE

2012-04-17 OPEN - AMS and Belt Construction on site. Project addition of 1x Laborer and 1x Operator next week.

Current

[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

2012-04-10 OPEN - AMS and Belt Construction on site.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

2012-04-03 OPEN - AMS and Belt Construction on site.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

02 WORK HOURS

2012-04-17	OPEN - Standard hours
2012-04-10	OPEN - Standard hours
2012-04-03	OPEN - Standard hours

03 OVER TIME

2012-04-17	OPEN - If rains first week of long boom operation, will work OT second week - at AMS cost.
2012-04-10	OPEN - none projected
2012-04-03	OPEN - none projected. Advise GEO if change.

04 TRAILER [AND GENERAL CONDITIONS]

2012-04-17	OPEN - no issues. Communication line dead.
2012-04-10	OPEN - no issues. Power to trailers operational. Phone lines dead. M. Wagstaff to cancel order due to data service not available to the site by landline.
2012-04-03	OPEN - no issues. Power to trailer[s] this week. AMS employee trailer to move to trailer site 04-04.

07 PREVIOUS

01 SUBCONTRACTS

2012-04-17	OPEN - no issues. Koberstein in progress.
2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues

02 SUBMITTALS

2012-04-17	OPEN - no issues. In progress, J. Cravens and P. Zinsious to meet after the progress meeting. Resubmit with [corrected] specification numbers.
2012-04-10	OPEN - no issues. In progress, J. Cravens and P. Zinsious to finish out log. GEO to maintain the log. Submit in groups.
2012-04-03	OPEN - no issues. In progress.

08 MATERIAL

01 GENERAL

20120-04-17	OPEN - Liner sample tests not back from TRI.
20120-04-10	OPEN - Liner can be delivered early to the site if necessary.
20120-04-03	OPEN - M. Wagstaff concern on liner delivery. P. Zinsious contacted subcontractor, and liner has been manufactured, and is in Houston, TX. No issue with delivery [if required] within 30 D.

09 ADJACENT PROPERTIES

01 GENERAL

2012-04-17	OPEN - no issues. Excavation plan in progress.
2012-04-10	OPEN - no issues. Excavation plan scheduled for two weeks out.
2012-04-03	OPEN - no issues. AMS announced Koberstein Contracting as the pipe subcontractor, who will provide excavation plan.

10 QUALITY CONTROL

01 GENERAL

2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues

02 ASH

2012-04-17	OPEN - no quality issues. Ash proctors have been received. J. Cravens to review how to match results as one of the three has different characteristics.
2012-04-10	OPEN - no quality issues. Ash placement by scrapers. No issue on compaction. Tests to be taken when elevation is within 1 FT of finish grade. GEO has taken samples for proctors, and 1 of 2 test analysis have been returned.
2012-04-03	OPEN - no quality issues. Safety concern - reference Item No. 05.04-2012-04-03 above. A. Ridgely indicated survey shows settlement in Pond D as minimal - approximately 2/10 FT. AMS at this time indicated not an issue.

03 CLAY

2012-04-10	OPEN - no issues. Samples to be taken in next week or two [by AMS]. Analysis to follow the [revised] CQA plan.
2012-04-03	OPEN - no issues
2012-03-27	OPEN - no issues

11 SCHEDULE REVIEW

01 SCHEDULE

2012-04-17	OPEN - Review of schedule with actuals dates, activity look-ahead for two weeks, and critical path. [01] 04-16 - documented rain date. [02] 04-18 - silt fence installation. [03] 05-01 - two weeks estimated ash placement complete. [04] Outfall manhole access - AER permission to cut lock if no key provided.
2012-04-10	OPEN - Review of schedule with actuals dates, activity look-ahead for two weeks, and critical path. . AER to provide revised schedule next week. One rain date documented for 04-05.
2012-04-03	OPEN - No significant changes. AMS to update actuals and submittals. AER changed the description "piezometer" to "vent pipe" on the P6 schedule. M. Wagstaff concern addition of 17D to critical path by EWO-02 [reference Item No. 12.03-2012-04-03 below] as project is already "2x weeks behind schedule". Two week look ahead - pipe filling in Pond D.

02 TIME AND MATERIAL

2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues

03 COORDINATION

2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues. Hierarchy for call for site access - R. Porter, J. Craven, and then M. Wagstaff. Post sign on site.
2012-04-03	OPEN - no issues. Reference Item No. 05.06-2012-04-03 above regarding others access to plant. AMS to laminate sign and post. Reference Item No. 14.01.20-2012-04-03 below.

12 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-04-17	OPEN - no issues. AMS to provide credit from AAA Electric on EWO-01.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	OPEN - AMS submitted EWO-02 and EWO-03. See Item No. 12.03 and 12.04

02 AMS PAY APPLICATION

2012-04-17	OPEN - M. Wagstaff indicated 10% will be held at the end on the job.
2012-04-10	OPEN - M. Wagstaff indicated the application has been received from AMS, and he has forwarded to J. Davis at AER for review.
2012-04-03	OPEN - in progress

03 EWO-02 - ASH PLACEMENT

2012-04-17	OPEN - M. Wagstaff has under review. Work is soft are will be long boom excavator on matts. Area will be 35 FT wide swath first week. Standard boom excavator for back fill. The cut from the clay berm will be pushed into the are of the soft ash excavation to bridge the area.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	NEW - AMS submitted EWO letter. M. Wagstaff requesting the description be changed from "ash placement" to "cap modification". This EWO is to include all changes from the plan changes to date. P. Zinsious indicated AMS to have AER "agree in principle" with the ash placement portion presented. AMS will provide spreadsheet showing changes of overall project such as the channels, berms, pump system, etc. M. Wagstaff question how AMS arrived at the 17D addition to the critical path. P. Zinsious to investigate calculation used. R. Porter reported there is a soft area approximately 50 FT x 1,000 FT located on the east and south perimeter of the pond. P. Zinsious indicated that J. Denham and J. Boone are in process of reviewing options, and would report back in a couple of days.

04 EWO-03 - COAL PILE

2012-04-17	OPEN - M. Wagstaff to forward EWO.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting. However, AER approved this work.
2012-04-03	NEW - AMS submitted EWO letter. M. Wagstaff indicated AER has to review as other options for site may affect the decision.

05 EWO-04 - PIPE RELOCATION

2012-04-17	OPEN - M. Wagstaff approved orally. AMS reports there are tow lines in the berm, one to be relocated, and the other portions of previous line left in the berm when replaced earlier. M. Wagstaff will provide elevations at specific stations on the line for relocation. Some of the pipe has been backfilled with bottom ash, and the old line has areas encased in concrete. Areas encased in concrete to remain in place. AMS indicated the new culvert at the road crossing [between Pond A and Pond D] will be lowered [field elevations] to get underneath pipe line. Pipe may create voids if buried in the ash pond, so it was determined to dispose of the pipe removed off-site, and estimated 6-7 dumpsters for pipe disposal, also approved. Short piece of pipe from the AER yard will be connected to the manhole with a repair-type mechanical compression clamp.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	NEW - R. Porter briefly explained the procedure to excavate and move the line inside the berm. M. Wagstaff requested "pothole" to locate.

05 EWO-05 - ELECTRICAL REVISION

2012-04-17	OPEN - in progress.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.
2012-04-03	NEW - M. Wagstaff indicated drawings to be released 04-03.

13 ACTION ITEMS - AER

01 AMEREN [AER]

2012-04-17

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich described area and supplies for emergency shelter in old switchgear room - in progress]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]
[23] NEW - M. Wagstaff to provide drawings for the existing MCC.

2012-04-10

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich described area and supplies for emergency shelter in old switchgear room]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing]
[21] M. Wagstaff to contact Ameren Utilities for the meter. [CLOSED]
[22] Mailbox and delivery thereof status.[CLOSED - M. Wagstaff reports all mail now goes to Newton]

2012-04-03

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich reviewed location, and has proposed option. Will review 04-03]
[17] ACAD files to AMS [CLOSED - AER transmitted disc]
[18] AER to print full size schedule [CLOSED]
[19] Flood plain permit [CLOSED - AMS will publish AER info]
[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [NEW - AER to get revised]
[21] M. Wagstaff to contact Ameren Utilities for the meter.
[22] Mailbox and delivery thereof status.

14 ACTION ITEMS - AMS

01 ASH MANAGEMENT [AMS]

2012-04-17

[06] RFI-01 roadway clarification [CLOSED - correct RFI No. 9]

[20] [REOPEN] P. Zinsious to provide draft.

2012-04-10

[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.] [CLOSED - differed to discussion after progress meeting]

[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run . [CLOSED - differed to discussion after progress meeting]

[06] RFI-01 roadway clarification [OPEN - AMS not received]

[16] Submittal log [OPEN - AMS submit EOW] [CLOSED - reference above in submittals]

[19] All documents to be copied [e-mailed] to Mr. Joe Cravens - M. Wagstaff representative on site.[CLOSED - e-mails will be copied/forwarded]

[20] Site entry signage [CLOSED - provide draft]

2012-04-03

[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.]

[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run . [In progress]

[06] RFI-01 roadway clarification [OPEN - AMS in progress]

[16] Submittal log [OPEN - AMS submit EOW] [In progress - couple days out]

[19] All documents to be copied [e-mailed] to Mr. Joe Cravens - M. Wagstaff representative on site.

[20] Site entry signage

15 PRODUCTION

01 GENERAL

2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues
2012-04-03	OPEN - no issues

02 ASH

2012-04-17	OPEN - no issues. Estimated 38,996 CY EOD 04-16.
2012-04-10	OPEN - no issues. Estimated 28,076 CY EOD 04-09.
2012-04-03	OPEN - no issues - 10,300 CY as of 03-03. Estimated 13,968 CY EOD.

03 CLAY

2012-04-17	OPEN - no issues - this activity not begun.
2012-04-10	OPEN - no issues - this activity not begun. Borrow site agreement signing 04-10. [corrected minutes date date]
2012-04-03	OPEN - no issues - this activity not begun. Borrow site in process closing on agreements.

16 DOCUMENTS TRANSMITTED

2012-04-17	[01] AMS - Contact List HUT-APD-CON-20120-04-17
2012-04-10	[01] AMS - Contact List HUT-APD-CON-20120-04-10 [02] AMS - Submittal Breakout Report [previously issued at Pre-Con] dated 20120-01-31. [03] AER - J. Craven submittal log draft spreadsheet.
2012-04-03	[01] AMS - EWO-02 - ash placement to AER and GEO [02] AMS - EWO-03 - coal pile to AER and GEO [03] AMS - Lessons Learned/Near Miss Report [Incident dated 2012-04-20] [04] AMS - Contact list [next print out 11x17]

17 DOCUMENTS REVIEW ONLY

2012-04-17	None
2012-04-10	None
2012-04-03	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, April 24, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTO LOG

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Photograph 1 - Preparing route to move coal pile facing north



Photograph 2 - Preparing route to move coal pile facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 16 and April 20, 2012

JRC

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Photograph 3 - Grading coal in Ash Pond D facing northwest



Photograph 4 - Removing coal from coal pile facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 16 and April 20, 2012

JRC

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Photograph 5 - Undercutting soft ash in Quadrant D facing west



Photograph 6 - Installing silt fence facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 16 and April 20, 2012

JRC

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Photograph 7 - Removing ADS pipe and exposing 18" HDPE drainage pipe facing east



Photograph 8 - ADS pipe removed facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 16 and April 20, 2012

JRC

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Photograph 9 - Undercutting south side of Quadrant C facing northeast



Photograph 10 - Overview of Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 16 and April 20, 2012

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Photograph 11 - Overview of Ash Pond D facing east



Photograph 12 - Grading coal yard facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 16 and April 20, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: May 1, 2012

SUBJECT: Weekly Summary Report for April 23, 2012 to April 27, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny. Temperature (°F) lows ranged from 35 to 65°F, and temperature highs ranged from 68 to 75°F.

Construction Activities

Ash grading, undercutting of soft areas, ADS corrugated pipe removal, and 18-inch HDPE gravity drainage pipe excavation occurred this week. Ash and embankment grading occurred in all quadrants of Ash Pond D. The main fill area was in the south end of Quadrant A and B. Excess berm material was stockpiled outside of the pond. The AMS entry signs were placed at the plant entrance and by the job trailers. On April 26, 2012, a Sky Track 6036 Forklift and a Wacker RT Trench Roller was delivered. Two samples were taken from the embankment material for material testing. Four test pits were excavated to depths of approximately 8 to 13 feet below ground surface. The material found in the test pits were generally red to brown silty clays, underlain by red fine to silty, or coarse sands at various depths. Refer to the attached daily reports for additional information regarding the test pits. The test pits indicate that a dewatering system will be needed before the excavation of the trench.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Hyundai 290 LC-9 Long Reach Excavator
Sky Track 6036 Forklift
Wacker RT Trench Roller
Water Truck

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, and James Marks
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, and Marc Downs
Charah – Joe Tasich
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, April 24, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash and embankment material within the footprint of Ash Pond D (quadrants A, B, C, and D) was graded. The geomembrane is estimated to be delivered on April 30, 2012.

Testing/Sampling

Two samples of the embankment material were obtained to run Standard Proctor tests. The first sample was obtained from the south embankment at approx. Station 21+00, and the second sample was obtained from the east embankment at approx. Station 15+00.

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Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer



Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13782

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 4/23/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 10.75 hrs (0.25 hr for lunch)
Weather: Sunny, 35°AM, 68°PM Windy | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, ~~D6H Dozer,~~ 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290 LC-9 Excavator

Updated Equipment and Personnel:

	Company:
Jared Belt - Cat D6N Dozer	Belt
Nick Walker - 9520 Tractor with 2-1812C Pans	Belt
Kevin Flynn - Cat 325C Excavator	Belt
Brad Bolenbaugh - Cat D6H Dozer (Not on-site today - Dr. Appt.)	Belt
Marc Downs - Hyundai 290 LC-9 Excavator	Belt
Robert Dunkley - Water Truck / School Bus	AMS
James Marks - None (AMS Pickup Truck)	AMS

The 9520 continued cutting the north end of Section A and B, and filling the south end of Section A and B. The D6N graded ash and berm material in Section D, and graded around stakes in Section A and B. The 290 LC-9 continued undercutting along the south and east embankments in Section D. The 325C spread out berm material within the pond, and continued cutting the south embankment. Around the SE corner of the embankments, the cut material was thrown outside of the pond, instead of inside, because they are running out of room in this area to work the material. This berm material may be used in the Cap, but would have to be approved. Berm Material: Primarily Brown, Silty CLAY-CL, with large amounts of sand and gravel to cobbles.

James Marks (AMS Laborer) began work today. He piled up the old ADS pipe for pickup. Joko on site today to observe activities. Randy made a grade rod with RR iron and chains. D6N tested it out in the PM in the coal yard.

Additional Comments:

Randy Foster — Contractor Representative | AMS — Company
Signature | 4-23-12 — Date
Anna Sandon — Geotechnology, Inc. | 4-30-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13783

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/24/12

TIME: Arrive: 6:30 AM | Depart: 4:45 PM | Travel: 1.0 hr | Total: 11.0 (0.25 hr for lunch)
Weather: Sunny, 45°AM, Cloudy 70°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290 LC-9 Excavator

The 325C removed the temporary ADS corrugated drainage pipes from the north to south entrances in south Section A and B. Then the 325C began cutting the east embankment, filling the east undercut trench, and placing the excess berm material outside of the pond. The 290 LC-9 continued undercutting along the east embankment in Section D. The 9520 continued cutting the north end of Section A and B, and filling the existing ditch running east to west across Section A and B. The D6H continued grading Section C and D. The D6N continued grading Section C and D, as well as the existing ditch as it was filled. The entire south embankment has been cut down to expose the HDPE gravity drain pipe. The old ADS drainage pipe is continuously layed outside the pond.

Jeff Bosing, Lynn Elpers, and Tony Anderson, with Koberstein Contracting, Inc., visited the site to discuss the perforated collection pipe (PCP), outfall structure demo and modification, paved ditch, gutter, bentonite, and junction box. They will get trained this week and begin the outfall structure next week. The concrete from the structure will be incorporated into the fill, and the steel will be taken to the plant.

Shelby, Jimmy, and Paul were on site all day to observe activities. AAA Electric was on site to observe the MCC plans and work in the switchgear room. Any dewatering on site will more than likely be pumped into Pond B. Any excess spoils on-site from Pond D (soil) will have to be lost on site. Joko on-site all day. He put supplies in the storm shelter and will finalize a plan. Submittals need to be accelerated to get the project back on schedule.

Additional Comments:

Randy Poehe — Contractor Representative — AMS — Company — 4-24-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 4-30-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13784

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 4/25/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 10.75 hrs (0.25 hr for lunch)
Weather: Sunny, 55°AM, Cloudy, 70°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290 LC-9 Excavator

The D6H continued grading Section C and D. The D6N continued grading Section D and south Section B. The 9520 continued cutting the north end of Section A and B, and filling the south end of Section A and B. The 290 LC-9 continued undercutting along the east embankment in Section B. The 325C continued cutting the east embankment, and filling the east undercut trench, and stockpiling excess berm material outside of the pond. The 325C also moved cut material within the pond along the south embankment.

Along the east embankment, the old ADS corrugated gravity drainage pipe is located outside the 18" HDPE pipe, as opposed to inside of the pipe along the south embankment.

The 290LC-9 will be here an additional week to dig the trench in Ash Pond A.

James Marks put up the AMS entry signs at the plant entrance, and by the job trailers.

Mike Burch, with Freitag-Weinhardt, Inc., visited to discuss scheduling of the installation of the HDPE pipes (discharge) and the dewatering sumps (DS).

Randy checked grades in the field along the embankments with a laser level.

Dust Control being performed on a daily basis.

Additional Comments: Currently evaluating the issue with the stockpile material.

Randy Porter — Contractor Representative — AMS — Company
Signature — 4-25-12 — Date
Anna Samelson — Geotechnology Inc. — 4-30-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 13785

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 4/26/12

TIME: Arrive: 6:30 AM Depart: 4:15 PM Travel: 1.0 hr Total: 10.5 hrs (0.25 hr for lunch)
Weather: Sunny, 65°AM, 75°PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290 LC-9 Excavator

The D6H continued grading south Section A and B, while covering the broken north end geotubes and grading placed fill. The D6N continued grading Section D, and south Section B. The 9520 continued cutting the north end of Section A and B, and filling south end of Section A and B. The 9520 also cut the soil/ash mix along the NE embankment, so it could be covered with ash in the center of the pond, while leaving a small berm along the NE embankment to catch water runoff. The 290LC-9 continued under cutting along the east embankment in Section B (including undercutting around the outfall structure). The 325C continued cutting the east embankment, while exposing the 18" HDPE gravity pipe.

Deliveries: Sky Track 6036 Forklift and Wacker RT Trench Roller.

James gathered old geotube material in Section C, and placed by old ADS pipe.

Samples were obtained in the embankment material for proctors at ≈ 21+00 and ≈ 15+00.

John Boyer with B&T Drainage visited. He will supply AMS with a sewer laser.

In the PM, the 290LC-9 got stuck in the NE section of the pond, just NW of the outfall structure. The 325C gathered crane mats, and the D6N pulled it out with a cable. ~ Short delay in production. The usage of the embankment material has been determined.

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
4-26-12 — Date
Anna Sandon — Geotechnology, Inc.
4-30-12 — Date
[signature] — Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13786

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 4/27/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 11.0 hrs (met with B&T over lunch)
Weather: Sunny, 40°AM, 70°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290 LC-9 Excavator

The 9520 continued cutting and filling within Section A and B. The D6H graded Section A, and the D6N graded Section A, C, and D. The 290LC-9 moved wet undercut ash in Section D to dry over the weekend. The 325C finished cutting the east berm, and began cutting the NE Berm. The 325C also dug 4 test pits along the proposed line for the groundwater collection pipe to evaluate material. John Boyer with B&T was here to observe the pits.

Test Pit 1
South of - Center of Pond A
0-5' Red, Silty CLAY
5-8' Red, Fine SAND
8-10' Brown, Fine to Coarse SAND
GWT = 8.0'
Could not keep pit open after 8.0'

Test Pit 2
South of - Between Pond A and B
0-2' Brown, Silty CLAY
2-10' Red, Fine to Silty SAND
GWT = 10', Sandstone = 10'
Terminated at 10'

Test Pit 3
South of - Center of Pond D
0-1.5' Black, Coal Fines
1.5'-6' Red, Fine SAND
6-8' Brown, Fine to Coarse SAND
GWT = 8.0'
Terminated at 8'

Test Pit 4
South of - SE Corner of Pond D
0-13' Brown, Silty CLAY
GWT = 13'
Terminated at 13'

The water and the sand will cause many problems in digging the trench. A dewatering system will have to be implemented before excavation. This may cause significant changes in the schedule... More time required.

Additional Comments: Jimmy Boone and John Denham here in the AM to observe the site.

Randy Porter — Contractor Representative — AMS — Company — 4-27-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 4-30-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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Hutsonville Ash Pond D Closure – Test Pits for Groundwater Collection Pipe

Test Pit 1

Location: South of – Center of Ash Pond A

Profile:	0 - 5'	Red, Silty CLAY trace Sand
	5 - 8'	Red, Fine SAND with Silt
	8 - 10'	Brown, Fine to Coarse SAND with Gravel

GWT = 8'
Bedrock = unknown
Termination ~ 10' (could not keep test pit open)

Test Pit 2

Location: South of – Between Ash Pond A and Ash Pond B

Profile:	0 - 2'	Brown, Silty CLAY trace Sand
	2 - 10'	Red, Fine to Silty SAND

GWT = 10'
Bedrock = Sandstone at 10'
Termination = 10'

Test Pit 3

Location: South of – Center of Ash Pond D

Profile:	0 - 1.5'	Black, Coal Fines
	1.5 - 6'	Red, Fine SAND with Silt
	6 - 8'	Brown, Fine to Coarse SAND with Gravel

GWT = 8'
Bedrock = unknown
Termination = 8'

Test Pit 4

Location: South of – SE Corner of Ash Pond D

Profile:	0 - 13'	Brown, Silty CLAY trace Sand

GWT = 13'
Bedrock = unknown
Termination = 13'

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 6 Minutes
Tuesday, April 24, 2012

01 PUBLICATION

Publish date:	2012-04-30	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-04-24-PM-06
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
03	Mr. Jeff Busing	Koberstein	812-215-0778	N/A [Part time]
04	Mr. Lynn Elpers	Koberstein	812-215-5002	N/A [Part time]
05	Mr. Tony Anderson	Koberstein	N/A	N/A [Part time]
06	Mr. Joe King	AAA Electric	812-208-0464	N/A [Part time]
07	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com
08	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
09	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
10	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues.
2012-04-10	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-04-24	OPEN - no issues. AAA electric to be on site 04-24 again to review electric MCC/switch gear room.
2012-04-17	OPEN - no issues. AAA electric to be on site 04-17 to review electric switch gear room.
2012-04-10	OPEN - no issues.

03 EMPLOYEE DRUG TESTING

2012-04-24	OPEN - no issues. Koberstein 5x workers to be scheduled for 04-27.
2012-04-17	OPEN - no issues. AMS worker scheduled for 04-18. Belt Construction 1x 04-17. Daylight Farms 3x 04-16. M. Wagstaff indicated drug testing cost is borne by the subcontractors, notes in specifications.
2012-04-10	OPEN - no issues. Inquiry as to liner subcontractor [Chesapeake Containment]. Trained on schedule, some already trained.

04 AMS SAFETY

2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. Next Safety Luncheon scheduled for 04-08.
2012-04-10	OPEN - no issues.

05 HOUSEKEEPING

2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. AMS to reinstall caution tape on south berm where wind blew down.
2012-04-10	OPEN - no issues

06 PLANT ACCESS - CBT BADGE

2012-04-24	OPEN - no issues. AMS received AER consultant badges.
2012-04-17	OPEN - no issues. M. Wagstaff to investigate AMS consultant badges.
2012-04-10	OPEN - no issues

07 VEHICLES ON SITE

2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues

08 OSHA LOG - WORK HOURS

2012-04-24	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 04-23
1,051.50	RT
0,000.00	OT
1,051.50	TOTAL
2012-04-17	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday]
0,746.00	RT
0,000.00	OT
0,746.00	TOTAL
2012-04-10	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday]
0,522.00	RT
0,000.00	OT
0,522.00	TOTAL

06 MANPOWER

01 CREW SIZE

2012-04-24 OPEN - AMS and Belt Construction on site. Project addition of Koberstein next week.

Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

2012-04-17 OPEN - AMS and Belt Construction on site. Project addition of 1x Laborer and 1x Operator next week.
Current Addition of CM/GEO
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[01] CM/GEO
[01] Foreman [Full time]
[09] Total

2012-04-10 OPEN - AMS and Belt Construction on site.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[04] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[06] Total

02 WORK HOURS

2012-04-24	OPEN - Standard hours - 7:00 AM CT to 3:30 AM CT
2012-04-17	OPEN - Standard hours
2012-04-10	OPEN - Standard hours

03 OVER TIME

2012-04-24	OPEN - Referencing 04-17 commentary, current production is 100 FT/D and is good rate, no OT projected.
2012-04-17	OPEN - If rains first week of long boom operation, will work OT second week - at AMS cost.
2012-04-10	OPEN - none projected

04 TRAILER [AND GENERAL CONDITIONS]

2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. Communication line dead.
2012-04-10	OPEN - no issues. Power to trailers operational. Phone lines dead. M. Wagstaff to cancel order due to data service not available to the site by landline.

07 PREVIOUS

01 SUBCONTRACTS

2012-04-24	OPEN - no issues. Koberstein in progress.
2012-04-17	OPEN - no issues. Koberstein in progress.
2012-04-10	OPEN - no issues

02 SUBMITTALS

2012-04-24	OPEN - no issues. In progress - liner sample tests results from TRI under review by GEO
2012-04-17	OPEN - no issues. In progress, J. Cravens and P. Zinsious to meet after the progress meeting. Resubmit with [corrected] specification numbers.
2012-04-10	OPEN - no issues. In progress, J. Cravens and P. Zinsious to finish out log. GEO to maintain the log. Submit in groups.

08 MATERIAL

01 GENERAL

20120-04-24	OPEN - [ref. Item No. 07.02-2012-04-24 above].
20120-04-17	OPEN - Liner sample tests not back from TRI.
20120-04-10	OPEN - Liner can be delivered early to the site if necessary.

09 ADJACENT PROPERTIES

01 GENERAL

2012-04-24	OPEN - no issues. Excavation plan submitted by Koberstein [part time at meeting]. [01] General discussion trench width. [02] Stockpile top soil. [03] 80 FT/D production rate. Duration of work projected 50D. [04] Pump groundwater to Pond A or Pond B. [05] Alignment of pipe is flexible [for filed conditions]. Curve or "angle" OK. [06] KCI recommended double cleanouts for ease. AER indicated single [as designed] OK. [07] AER reviewed pipe can go directly into the manhole [shown on drawings as adjacent]. [08] Spoils can be "lost" on the berm embankments.
2012-04-17	OPEN - no issues. Excavation plan in progress.
2012-04-10	OPEN - no issues. Excavation plan scheduled for two weeks out.

10 QUALITY CONTROL

01 GENERAL

2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues

02 ASH

2012-04-24	OPEN - no quality issues. R. Porter report the wet ash in the east area of the pond is going to require 2-3 days [stacked] to drain the water off. J. boone indicated this area of pond is further away from the discharge inlet, thus reason for the fines [not settle out in other areas of the pond]. The wet ash is being stacked and spread out to dry.
2012-04-17	OPEN - no quality issues. Ash proctors have been received. J. Cravens to review how to match results as one of the three has different characteristics.
2012-04-10	OPEN - no quality issues. Ash placement by scrapers. No issue on compaction. Tests to be taken when elevation is within 1 FT of finish grade. GEO has taken samples for proctors, and 1 of 2 test analysis have been returned.

03 CLAY

2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. [added entry for this date]
2012-04-10	OPEN - no issues. Samples to be taken in next week or two [by AMS]. Analysis to follow the [revised] CQA plan.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-04-24	OPEN - Review of schedule 04-18. [01] Schedule to be adjusted and corrected for end date calculations. [02] 05-02 - Pipe relocation start. [03] 05-04 - Massmann to survey. [04] 05-07 - Begin demolition outfall structure. AMS to set scrap steel in plant yard. Duration 2D include flowable fill. [05] 05-07 - Illini Drilled to mob to site for cap vents. [06] 05-29 - Projected start date for the PCP. End date projection 09-11.
2012-04-17	OPEN - Review of schedule with actuals dates, activity look-ahead for two weeks, and critical path. [01] 04-16 - documented rain date. [02] 04-18 - silt fence installation. [03] 05-01 - two weeks estimated ash placement complete. [04] Outfall manhole access - AER permission to cut lock if no key provided.
2012-04-10	OPEN - Review of schedule with actuals dates, activity look-ahead for two weeks, and critical path. . AER to provide revised schedule next week. One rain date documented for 04-05.

02 TIME AND MATERIAL

2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues

03 COORDINATION

2012-04-24	OPEN - no issues. Signs on site [ref. Item No. 14.20-2012-04-24 below].
2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues. Hierarchy for call for site access - R. Porter, J. Craven, and then M. Wagstaff. Post sign on site.

12 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. AMS to provide credit from AAA Electric on EWO-01.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.

02 AMS PAY APPLICATION

2012-04-24	OPEN - M. Wagstaff indicated 10% will be held at the end on the job. AMS no issue. CLOSED
2012-04-17	OPEN - M. Wagstaff indicated 10% will be held at the end on the job.
2012-04-10	OPEN - M. Wagstaff indicated the application has been received from AMS, and he has forwarded to J. Davis at AER for review.

03 EWO-02 - ASH PLACEMENT - CAP MODIFICATIONS

2012-04-24	OPEN - AER to provide interim e-mail stating approval for this work to AMS.
2012-04-17	OPEN - M. Wagstaff has under review. Work is soft are will be long boom excavator on matts. Area will be 35 FT wide swath first week. Standard boom excavator for back fill. The cut from the clay berm will be pushed into the are of the soft ash excavation to bridge the area.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.

04 EWO-03 - COAL PILE

2012-04-17	OPEN - Work completed. Some areas graded to "original soil" under coal pile. AMS will wait for rain to determine location of the drainage trenches. AER to provide interim e-mail stating approval for this work to AMS.
2012-04-17	OPEN - M. Wagstaff to forward EWO.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting. However, AER approved this work.

05 EWO-04 - PIPE RELOCATION

2012-04-24	OPEN - M. Wagstaff published elevations. [Current progress: pipe exposed along the south and at turn of east side pond.] AER to provide interim e-mail stating approval for this work to AMS.
2012-04-17	OPEN - M. Wagstaff approved orally. AMS reports there are tow lines in the berm, one to be relocated, and the other portions of previous line left in the berm when replaced earlier. M. Wagstaff will provide elevations at specific stations on the line for relocation. Some of the pipe has been backfilled with bottom ash, and the old line has areas encased in concrete. Areas encased in concrete to remain in place. AMS indicated the new culvert at the road crossing [between Pond A and Pond D] will be lowered [field elevations] to get underneath pipe line. Pipe may create voids if buried in the ash pond, so it was determined to dispose of the pipe removed off-site, and estimated 6-7 dumpsters for pipe disposal, also approved. Short piece of pipe from the AER yard will be connected to the manhole with a repair-type mechanical compression clamp.
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.

06 EWO-05 - ELECTRICAL REVISION

2012-04-24	OPEN - in progress. AAA to be on site to inspect MCC /switchgear room. Meeting after [part of] this progress meeting.
2012-04-17	OPEN - in progress
2012-04-10	OPEN - Discussion and review of EWO's to be deferred to after the progress meeting.

13 ACTION ITEMS - AER

01 AMEREN [AER]

2012-04-24

[03] Fire protection [CLOSED - Old switchgear room will be emergency shelter. J. Tasich ahs supplies to set in place 04-24]. Signs will be posted, and a plan will be finalized.

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp.

2012-04-17

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich described area and supplies for emergency shelter in old switchgear room - in progress]

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

[23] NEW - M. Wagstaff to provide drawings for the existing MCC.

2012-04-10

[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich described area and supplies for emergency shelter in old switchgear room]

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing]

[21] M. Wagstaff to contact Ameren Utilities for the meter. [CLOSED]

[22] Mailbox and delivery thereof status.[CLOSED - M. Wagstaff reports all mail now goes to Newton]

14 ACTION ITEMS - AMS

01 ASH MANAGEMENT [AMS]

2012-04-24

[20] [REOPEN] P. Zinsious to provide draft. CLOSED - signs on site, ready to be installed].

2012-04-17

[06] RFI-01 roadway clarification [CLOSED - correct RFI No. 9]

[20] [REOPEN] P. Zinsious to provide draft.

2012-04-10

[04] Cost review – relocation flume and change to cap [when receive revised drawings] [OPEN – General discussion topo reference previous commentary above in Item No. 10.02-2012-03-27 - communication will be essential during ash placement to track changes.] [CLOSED - differed to discussion after progress meeting]

[05] Cost review – HDPE line relocation [when receive revised drawings] [OPEN – line to be moved to inside of the pond area, as pipe will get "shorter" by virtue of shorter run . [CLOSED - differed to discussion after progress meeting]

[06] RFI-01 roadway clarification [OPEN - AMS not received]

[16] Submittal log [OPEN - AMS submit EOW] [CLOSED - reference above in submittals]

[19] All documents to be copied [e-mailed] to Mr. Joe Cravens - M. Wagstaff representative on site.[CLOSED - e-mails will be copied/forwarded]

[20] Site entry signage [CLOSED - provide draft]

15 PRODUCTION

01 GENERAL

2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues
2012-04-10	OPEN - no issues

02 ASH

2012-04-24	OPEN - no issues. Estimated 55,452 CY EOD 04-23. General discussion CY are estimates and more than likely under-reported. AER inquired how AMS plan ash to grade - projection is site may possibly balance. M. Wagstaff concern ash placement may not make schedule.
2012-04-17	OPEN - no issues. Estimated 38,996 CY EOD 04-16.
2012-04-10	OPEN - no issues. Estimated 28,076 CY EOD 04-09.

03 CLAY

2012-04-24	OPEN - no issues - this activity not begun.
2012-04-17	OPEN - no issues - this activity not begun.
2012-04-10	OPEN - no issues - this activity not begun. Borrow site agreement signing 04-10. [corrected minutes date date]

16 DOCUMENTS TRANSMITTED

2012-04-24	[01] AMS - Electrical drawing package [1x copy 23 x 36] to AAA [02] AMS - Schedule dated 04-18 [03] AMS - Koberstein [1x copy] to AER "Excavation Plan" [04] AMS - Contact list HUT-APD-CON-2012-04-24
2012-04-17	[01] AMS - Contact List HUT-APD-CON-20120-04-17
2012-04-10	[01] AMS - Contact List HUT-APD-CON-20120-04-10 [02] AMS - Submittal Breakout Report [previously issued at Pre-Con] dated 20120-01-31. [03] AER - J. Craven submittal log draft spreadsheet.

17 DOCUMENTS REVIEW ONLY

2012-04-24	None
2012-04-17	None
2012-04-10	None

18 **NEXT PROGRESS MEETING**

Next meeting will be held in one week - Tuesday, May 01, 2012 at Hutsonville

19 **DISTRIBUTION - STANDARD**

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Cutting south embankment facing southeast



Photograph 2 - Undercutting wet ash in south embankment facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

JRG

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Photograph 3 - Removing temporary ADS drainage pipe in Quadrant B facing northeast



Photograph 4 - Grading Quadrant C facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

JRC



Photograph 5 - Stockpiling embankment material facing south



Photograph 6 - AMS sign at front entrance facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

JRC

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Photograph 7 - Grading Quadrant D facing north



Photograph 8 - North tip of Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

JRC



Photograph 9 - Long reach excavator stuck in wet ash, northeast corner of Ash Pond D facing northeast



Photograph 10 - Test Pit 1 excavation facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

JRC



Photograph 11 - Test Pit 1 excavation facing east



Photograph 12 - Test Pit 1 after being backfilled facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

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Photograph 13 - Test Pit 2 excavation facing west



Photograph 14 - Test Pit 2 excavation facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

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Photograph 15 - Test Pit 3 excavation facing west



Photograph 16 - Test Pit 4 excavation facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

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Photograph 17 - Overview of Ash Pond D facing southeast



Photograph 18 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 23 and April 27, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: May 7, 2012

SUBJECT: Weekly Summary Report for April 30, 2012 to May 4, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy with periods of rain. Temperature (°F) lows ranged from 60 to 70°F, and temperature highs ranged from 70 to 88°F. The rain caused production delays on May 1 and May 4, 2012.

Construction Activities

Ash grading, undercutting of soft areas, geomembrane delivery, ADS corrugated pipe removal, and 18-inch HDPE gravity drainage pipe excavation occurred this week. Ash and embankment grading occurred in all quadrants of Ash Pond D. The main fill area was in the south end of Quadrant A and B. Geomembrane was delivered and stored according to the CQA plan.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Hyundai 290 LC-9 Long Reach Excavator
Sky Track 6036 Forklift
Wacker RT Trench Roller
Water Truck

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, and James Marks
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, and Marc Downs
Charah – Joe Tasich
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, May 1, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash and embankment material within the footprint of Ash Pond D (quadrants A, B, C, and D) was graded. The geomembrane was delivered on April 30 and May 1, 2012.

Testing/Sampling

Sampling and testing did not occur this week.

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Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer



Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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No. A 13787

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: —
Client: Ameren ER
Date: 4/30/12

TIME: Arrive: 6:30 AM Depart: 4:15 PM Travel: 1.0 hr Total: 10.5 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 65°AM, Cloudy/Rain 80°PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: Water Truck, 290LC-9 Excavator, Sky Trak 6036 Forklift

The D6N continued grading Section C and D. The D6H continued grading Section A. The 9520 continued cutting and filling ash within Section A and B. The 290 LC-9 moved undercut ash in Section B and D to dry. The 325C moved undercut ash in Section C and D, and continued cutting the NE embankment.

60 of the 72 rolls of geomembrane were delivered (5 trucks, 12 rolls/truck). Brad Bolenbaugh unloaded the rolls with the forklift and placed them in the construction yard.

Truck 1	Truck 2	Truck 3	Truck 4	Truck 5
108162809	108162804	108162779	108162858	108162863
108162783	108162807	108162812	108162864	108162821
108162801	108162833	108162778	108162855	108162862
108162802	108162813	108162793	108162856	108162859
108162784	108162831	108162776	108162841	108162861
108162805	108162819	108162777	108162857	108162860
108162842	108162815	108162785	108162868	108162788
108162792	108162818	108162791	108162827	108162781
108162794	108162830	108162787	108162786	108162790
108162806	108162832	108162789	108162780	108162836
108162803	108162829	108162814	108162867	108162865
108162835	108162839	108162808	108162866	108162782

Any defects (visual) were recorded. Randy received all the papers for each delivery. All rolls were labled correctly and will be checked with the roll spreadsheet accordingly.

Additional Comments: John Boyer with B&T visited to discuss bidding.

Randy Porter
Contractor Representative
~~4-30-12~~ AMS
Company
Signature
4-30-12
Date
Anna Saindon
Geotechnology, Inc.
5-7-12
Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 13788

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 5/1/12

TIME: Arrive: 6:30 AM | Depart: 3:15 PM | Travel: 1.0 hr | Total: 9.5 hrs (0.25 hr for lunch)
Weather: Foggy/Cloudy, 60°AM, 75° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 2-1812C Pans,
Site Activities / Observations / Contacts / Notes: 290LC-9 Excavator, Sky Trak 6036 Forklift

The 325C spread out cut berm and ash material in Section B and D. The 290LC-9 undercut wet ash along the NE embankment in Section B. The D6N and D6H graded Section A and B. The D6H uncovered an old HDPE drainage pipe in Section B. It was used for temporary drainage for the old existing road running west to east across the pond. It had been abandoned and therefore ripped out and incorporated into the fill. No dust control required today; Robert Dunkley had the day off.

The last of the geomembrane was delivered (72 rolls on-site).

Truck 6

108162840	Dave Valentine (Charah) attended the meeting with Joko.
108162828	
108162817	Mike, Paul, and Joe King observed the Pond C junction box and the elec.
108162834	building near the water tank to plan running new electric.
108162824	
108162820	More stoplogs need to be put in the outfalls of Pond A and B.
108162825	
108162837	It began raining at 9:30 am and work was terminated at 10:30 am.
108162838	No Production after 10:30 am.
108162822	
108162823	B&T Drainage should submit their bid in the next couple days.
108162816	

Additional Comments: If the trenches for the collector pipe exceed 20', an engineered plan is required.

Randy Porter — Contractor Representative — AMS — Company
Signature — 5-1-12 — Date
Anna Sandy — Geotechnology, Inc. — 5-7-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 13789

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/2/12

TIME: Arrive: 6:30 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.5 hrs (no lunch)
Weather: Sunny, 70°AM, 88°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 4-1812C Pans,
Site Activities / Observations / Contacts / Notes: 290 LC-9 Excavator, Water Truck

The oil was changed in the 9520, and one of the 1812C Pans was dropped due to the following: speed up cutting and filling since the distance to move the material has reduced, not efficient to use two pans for the cut/fill that remains, and less chance of getting stuck in the wet material. The D6N and D6H continued grading Section A and B. The 325C cut down the north end of the pond to grade, until enough space was provided from the fence line for the dozers to take over. After, the 325C continued cutting the NE embankment. The 290LC-9 continued undercutting along the NE embankment. The 9520 continued cutting and filling Section A and B, primarily working in Section B.

Two 40 YD dumpsters will be delivered tomorrow for disposing of the old ADS corrugated pipe on the south side of Pond D, along with remaining geotube material.

James Marks began taking down the gate in the chain link fence, beside the box culvert, on the west side of the pond.

A dumptruck will be on-site tomorrow to test how much material can be loaded in one truck, to determine how many trucks will be required for the CBS.

Important Dates: Liner Pre. Con. Meeting - 5/22/12, Liner Mob. and Setup - 5/29/12, Begin installation of Geomembrane - 5/30/12.

Additional Comments:

Randy Parker — Contractor Representative — AMS — Company
Signature — 5-2-12 — Date
Anna Spindor — Geotechnology, Inc. — 5-7-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13790

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/3/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 10.75 hr (0.25 hr for lunch)
Weather: Sunny, 70°AM, 85° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 1812C Pan,
Site Activities / Observations / Contacts / Notes: Water Truck, 290LC-9 Excavator

The 9520 continued cutting and filling within Section A and B, as well as filling the northern portion of Section C. The D6N graded Section B and D. The D6H graded Section B and D, as well as the eastern portion of Section C. The 325C continued cutting the NE embankment, and moved wet undercut ash in Section B and D. The 290LC continued undercutting along the NE embankment, and moved wet undercut ash in B.

A dumptruck (Fawnlane Trucking) was brought to the site to test how many excavator buckets it can carry, without exceeding the load limit. The bucket on the 325C is 60" at 2.33 CY. At 4 buckets, the weight was approx. 15 tons. At 5 buckets (max), the weight was approx. 16.5 tons. When the dumptruck came back to the site after weighing, the load was ≈ 31,700 lb ≈ 15.85 tons. Therefore, each dumptruck used for the CBS can carry 5 buckets of material, or ≈ 16 tons and be within the loading limits. This will help AMS to develop a more accurate schedule for moving the CBS.

The 40 yd dumpsters were delivered today to dispose of the old ADS corrugated pipe and remaining geotube materials. They were placed on the south side of Pond D, along the gravel road. They will be loaded tomorrow by the 325C.

James Marks began filling the dumpster with small pieces.
Jimmy Boone here today to observe site activities.

Additional Comments: Geomembrane Pre-Con Meeting moved to 5/8/12.

Randy Porter — AMS
Contractor Representative — Company
Signature — 5-3-12 Date
Anna Saindon — 5-7-12 Date
Geotechnology Inc.
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13791

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 5/4/12

TIME: Arrive: 6:30 AM | Depart: 11:00 AM | Travel: 1.0 hr | Total: 5.5 hrs
Weather: Cloudy, 70°AM, 60°PM, Cloudy/Rain | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: D6N Dozer, D6H Dozer, 325C Excavator, 9520 Tractor, 1812C Pan,
Site Activities / Observations / Contacts / Notes: Water Truck, 290LC-9 Excavator

The D6H continued grading Section D. The D6N continued grading Section B, and filled undercut areas with embankment material. The 325C filled the dumpsters with the old ADS corrugated pipe and remaining geotube material, and continued cutting the NE embankment along with moving undercut ash in Section B. The 290LC-9 continued undercutting along the NE embankment, and moved ash in Section B. The 9520 did not perform cutting and filling. Instead, the 9520 drove around in all 4 Sections, smoothing out the ash surface with one 1812C Pan, for preparation for the rain. This will allow the site to drain better.

James cleaned up areas around existing grade stakes in Section C and D.

It began raining at 9:30 AM and work ceased at 10:00 AM.
No Production after 10:00 AM.

Additional Comments:

Randy Portra — AMS
Contractor Representative — Company
Signature — 5-4-12 Date
Anna Snindon — 5-7-12 Date
Geotechnology, Inc.
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 7 Minutes
Tuesday, May 1, 2012

01 PUBLICATION

Publish date:	2012-05-07	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-05-01-PM-07
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
03	Mr. Joe King	AAA Electric	812-208-0464	N/A [Part time]
04	Mr. David Valentine	Charah	502-548-6449	dvalentine@charah.com
05	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com
04	Mr. John Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
07	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
08	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
09	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-05-01	OPEN - no issues. AAA electric to be on site 05-01 to go over EWO details.
2012-04-24	OPEN - no issues. AAA electric to be on site 04-24 again to review electric MCC/switch gear room.
2012-04-17	OPEN - no issues. AAA electric to be on site 04-17 to review electric switch gear room.

03 EMPLOYEE DRUG TESTING

2012-05-01	OPEN - no issues. Illini Drilled 2x workers to be scheduled for 05-07.
2012-04-24	OPEN - no issues. Koberstein 5x workers to be scheduled for 04-27.
2012-04-17	OPEN - no issues. AMS worker scheduled for 04-18. Belt Construction 1x 04-17. Daylight Farms 3x 04-16. M. Wagstaff indicated drug testing cost is borne by the subcontractors, notes in specifications.

04 AMS SAFETY

2012-05-01	OPEN - no issues. M. Wagstaff requested [in EWO] 'stop log" adjustments in Pond A and Pond B. AMS workers will receive water training for this work. Next week is the monthly safety luncheon.
2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. Next Safety Luncheon scheduled for 04-08.

05 HOUSEKEEPING

2012-05-01	OPEN - no issues. AMS policy all workers drug test before on AMS site. J. Tasich to set up site in Robinson, IL. Nomenclature for drug testing is such that a positive result = bad [drugs found] whereas a negative result = good [no drugs found].
2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. AMS to reinstall caution tape on south berm where wind blew down.

06 PLANT ACCESS - CBT BADGE

2012-05-01	OPEN - no issues. Badges [consultant] switch over no-issue. J. Denham requested AER provide gate log once a month.
2012-04-24	OPEN - no issues. AMS received AER consultant badges.
2012-04-17	OPEN - no issues. M. Wagstaff to investigate AMS consultant badges.

07 VEHICLES ON SITE

2012-05-01	OPEN - no issues
2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues

08 OSHA LOG - WORK HOURS

2012-05-01	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 04-30
1,327.00	RT
0,000.00	OT
1,327.00	TOTAL
2012-04-24	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 04-23
1,051.50	RT
0,000.00	OT
1,051.50	TOTAL
2012-04-17	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday]
0,746.00	RT
0,000.00	OT
0,746.00	TOTAL

06 MANPOWER

01 CREW SIZE

2012-05-01 OPEN - AMS and Belt Construction on site. Koberstein declined. Corrected count for 04-24 below.

Current
[01] Geotechnology
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
[08] Total

2012-04-24 OPEN - AMS and Belt Construction on site. Project addition of Koberstein next week.

Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
~~[04] Operators~~ [05] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
~~[06] Total~~ [07] Total

	2012-04-17	OPEN - AMS and Belt Construction on site. Project addition of 1x Laborer and 1x Operator next week.
	Current	Addition of CM/GEO
	[00] Pipe	
	[00] Mechanical	
	[00] Electrical	
	[00] Cement	
	[01] Laborers	
	[05] Operators	
	[01] Teamsters	
	[00] Survey	
	[01] CM/GEO	
	[01] Foreman	[Full time]
	[09] Total	

02	**WORK HOURS**	
	2012-05-01	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Corrected time below.
	2012-04-24	OPEN - Standard hours - 7:00 AM CT to 3:30~~ AM CT~~ PM CT
	2012-04-17	OPEN - Standard hours
03	**OVER TIME**	
	2012-05-01	OPEN - None projected.
	2012-04-24	OPEN - Referencing 04-17 commentary, current production is 100 FT/D and is good rate, no OT projected.
	2012-04-17	OPEN - If rains first week of long boom operation, will work OT second week - at AMS cost.
04	**TRAILER [AND GENERAL CONDITIONS]**	
	2012-05-01	OPEN - no issues.
	2012-04-24	OPEN - no issues.
	2012-04-17	OPEN - no issues. Communication line dead.

07 PREVIOUS

01	**SUBCONTRACTS**	
	2012-05-01	OPEN - no issues. Koberstein declined. Replacement subcontractor in review - BT Drainage.
	2012-04-24	OPEN - no issues. Koberstein in progress.
	2012-04-17	OPEN - no issues. Koberstein in progress.
02	**SUBMITTALS**	
	2012-05-01	OPEN - no issues. In progress - M. Wagstaff request mechanical submittal be checked for missing pump information. AER has returned mechanical, electrical, and liner submittals.
	2012-04-24	OPEN - no issues. In progress - liner sample tests results from TRI under review by GEO
	2012-04-17	OPEN - no issues. In progress, J. Cravens and P. Zinsious to meet after the progress meeting. Resubmit with [corrected] specification numbers.

08 MATERIAL

01	**GENERAL**	
	20120-05-01	OPEN - no issues. All HDPE liner on site [72 rolls] as of 05-01.
	20120-04-24	OPEN - [ref. Item No. 07.02-2012-04-24 above].
	20120-04-17	OPEN - Liner sample tests not back from TRI.

09 ADJACENT PROPERTIES AND PCP LINE

01	**GENERAL**	
	2012-05-01	OPEN - BT Drainage [01] Deepest projected part of excavation is 22-23 FT. [02] J. Denham indicated the rock may not dig, requested AER consider raising the line above the bedrock line.
	2012-04-24	OPEN - no issues. Excavation plan submitted by Koberstein [part time at meeting]. [01] General discussion trench width. [02] Stockpile top soil. [03] 80 FT/D production rate. Duration of work projected 50D. [04] Pump groundwater to Pond A or Pond B. [05] Alignment of pipe is flexible [for filed conditions]. Curve or "angle" OK. [06] KCI recommended double cleanouts for ease. AER indicated single [as designed] OK. [07] AER reviewed pipe can go directly into the manhole [shown on drawings as adjacent]. [08] Spoils can be "lost" on the berm embankments.
	2012-04-17	OPEN - no issues. Excavation plan in progress.

10 QUALITY CONTROL

01 GENERAL

2012-05-01	OPEN - no issues
2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues

02 ASH

2012-05-01	OPEN - no issues. On going process.
2012-04-24	OPEN - no quality issues. R. Porter report the wet ash in the east area of the pond is going to require 2-3 days [stacked] to drain the water off. J. boone indicated this area of pond is further away from the discharge inlet, thus reason for the fines [not settle out in other areas of the pond]. The wet ash is being stacked and spread out to dry.
2012-04-17	OPEN - no quality issues. Ash proctors have been received. J. Cravens to review how to match results as one of the three has different characteristics.

03 CLAY

2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. [added entry for this date]

11 SCHEDULE REVIEW

01 SCHEDULE

2012-05-01	OPEN - Review of schedule 04-30. [01] Schedule critical path and look ahead reviewed. [02] Actual percent completion on ash pond sectors: A = 90%, B = 70%, C = 90%, D = 75%. [03] Activity No. 106 cap vents still scheduled for 05-14 as shown on 04-30 schedule. [04] Compaction testing for ash and surveying to be coordinated for same time if possible. Surveyor can come out twice. [05] Build pads for cap vent drill rig. [06] Discussion on the liner schedule and Memorial Day holiday. Verify day after the holiday.
2012-04-24	OPEN - Review of schedule 04-18. [01] Schedule to be adjusted and corrected for end date calculations. [02] 05-02 - Pipe relocation start. [03] 05-04 - Massmann to survey. [04] 05-07 - Begin demolition outfall structure. AMS to set scrap steel in plant yard. Duration 2D include flowable fill. [05] 05-07 - Illini Drilled to mob to site for cap vents. [06] 05-29 - Projected start date for the PCP. End date projection 09-11.
2012-04-17	OPEN - Review of schedule with actuals dates, activity look-ahead for two weeks, and critical path. [01] 04-16 - documented rain date. [02] 04-18 - silt fence installation. [03] 05-01 - two weeks estimated ash placement complete. [04] Outfall manhole access - AER permission to cut lock if no key provided.

02 TIME AND MATERIAL

2012-05-01	OPEN - no issues
2012-04-24	OPEN - no issues
2012-04-17	OPEN - no issues

03 COORDINATION

2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues. Signs on site [ref. Item No. 14.20-2012-04-24 below].
2012-04-17	OPEN - no issues

12 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues.
2012-04-17	OPEN - no issues. AMS to provide credit from AAA Electric on EWO-01.

02 AMS PAY APPLICATION

2012-05-01	OPEN - M. Wagstaff indicated signed off with AER, should be reviewed by EOW. Invoice for stored materials on the HDPE liner.
2012-04-24	OPEN - M. Wagstaff indicated 10% will be held at the end on the job. AMS no issue. CLOSED
2012-04-17	OPEN - M. Wagstaff indicated 10% will be held at the end on the job.

03 EWO-02 - ASH PLACEMENT - CAP MODIFICATIONS

2012-05-01	OPEN - In progress. Spoils can go into Ash Pond D, and on the slopes as clean. Material opt be monitored by GEO and AMS. Consensus is the ash will balance.
2012-04-24	OPEN - AER to provide interim e-mail stating approval for this work to AMS.
2012-04-17	OPEN - M. Wagstaff has under review. Work is soft are will be long boom excavator on matts. Area will be 35 FT wide swath first week. Standard boom excavator for back fill. The cut from the clay berm will be pushed into the are of the soft ash excavation to bridge the area.

04	**EWO-03 - COAL PILE**	
	2012-05-01	OPEN - Work completed. Area to be observed for drainage. Date corrected below 04-24.
	2012-04-24	OPEN - Work completed. Some areas graded to "original soil" under coal pile. AMS will wait for rain to determine location of the drainage trenches. AER to provide interim e-mail stating approval for this work to AMS.
	2012-04-17	OPEN - M. Wagstaff to forward EWO.
05	**EWO-04 - PIPE RELOCATION**	
	2012-05-01	OPEN - In progress. Pipe is exposed, and ready to begin lowering. AMS recommending removal of the pipe to be demolished and filled
	2012-04-24	OPEN - M. Wagstaff published elevations. [Current progress: pipe exposed along the south and at turn of east side pond.] AER to provide interim e-mail stating approval for this work to AMS.
	2012-04-17	OPEN - M. Wagstaff approved orally. AMS reports there are tow lines in the berm, one to be relocated, and the other portions of previous line left in the berm when replaced earlier. M. Wagstaff will provide elevations at specific stations on the line for relocation. Some of the pipe has been backfilled with bottom ash, and the old line has areas encased in concrete. Areas encased in concrete to remain in place. AMS indicated the new culvert at the road crossing [between Pond A and Pond D] will be lowered [field elevations] to get underneath pipe line. Pipe may create voids if buried in the ash pond, so it was determined to dispose of the pipe removed off-site, and estimated 6-7 dumpsters for pipe disposal, also approved. Short piece of pipe from the AER yard will be connected to the manhole with a repair-type mechanical compression clamp.
06	**EWO-05 - ELECTRICAL REVISION**	
	2012-05-01	OPEN - in progress. Meeting after progress meeting with AAA Electric.
	2012-04-24	OPEN - in progress. AAA to be on site to inspect MCC /switchgear room. Meeting after [part of] this progress meeting.
	2012-04-17	OPEN - in progress

13	ACTION ITEMS - AER
01	**AMEREN [AER]**
	2012-05-01
	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]
	[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp. [CLOSED - reminder site cleared 5th of month by AER]
	2012-04-24
	[03] Fire protection [CLOSED - Old switchgear room will be emergency shelter. J. Tasich ahs supplies to set in place 04-24]. Signs will be posted, and a plan will be finalized.
	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]
	[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp.
	2012-04-17
	[03] Fire protection [OPEN - pumps off in plant so cannot use basements - team to review pit next to coal pile "push wall". The gathering place is guard shack by the trailers. [OPEN - J. Tasich described area and supplies for emergency shelter in old switchgear room - in progress]
	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]
	[23] NEW - M. Wagstaff to provide drawings for the existing MCC.

14	ACTION ITEMS - AMS
01	**ASH MANAGEMENT [AMS]**
	2012-05-01
	None
	2012-04-24
	[20] [REOPEN] P. Zinsious to provide draft. CLOSED - signs on site, ready to be installed].
	2012-04-17
	[06] RFI-01 roadway clarification [CLOSED - correct RFI No. 9]
	[20] [REOPEN] P. Zinsious to provide draft.

15	PRODUCTION	
01	**GENERAL**	
	2012-05-01	OPEN - no issues
	2012-04-24	OPEN - no issues
	2012-04-17	OPEN - no issues
02	**ASH**	
	2012-05-01	OPEN - no issues. Estimated 70,988 CY EOD 04-30.
	2012-04-24	OPEN - no issues. Estimated 55,452 CY EOD 04-23. General discussion CY are estimates and more than likely under-reported. AER inquired how AMS plan ash to grade - projection is site may possibly balance. M. Wagstaff concern ash placement may not make schedule.
	2012-04-17	OPEN - no issues. Estimated 38,996 CY EOD 04-16.
03	**CLAY**	
	2012-05-01	OPEN - no issues - this activity not begun.
	2012-04-24	OPEN - no issues - this activity not begun.
	2012-04-17	OPEN - no issues - this activity not begun.

16 DOCUMENTS TRANSMITTED

2012-05-01	[01] AMS - Schedule dated 04-30 - critical path
	[02] AMS - Schedule dated 04-30 - look ahead
	[03] AMS - Schedule dated 04-30 - full
	[03] AMS - Value Engineering Submittal VES-01 - Bentonite cap option
	[04] AMS - Contact list HUT-APD-CON-2012-04-30
2012-04-24	[01] AMS - Electrical drawing package [1x copy 23 x 36] to AAA
	[02] AMS - Schedule dated 04-18
	[03] AMS - Koberstein [1x copy] to AER "Excavation Plan"
	[04] AMS - Contact list HUT-APD-CON-2012-04-24
2012-04-17	[01] AMS - Contact List HUT-APD-CON-20120-04-17

17 DOCUMENTS REVIEW ONLY

2012-05-01	None
2012-04-24	None
2012-04-17	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, May 08, 2012 at Hutsonville [safety luncheon]

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTO LOG

Electronic Filing: Received, Clerk's Office 09/28/2020



Photograph 1 - 40 mil HDPE geomembrane delivery facing south



Photograph 2 - Unloading 40 mil HDPE geomembrane facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

JRC

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Photograph 3 - Example of dimple in roll facing east



Photograph 4 - Geomembrane storage area facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

JRC



Photograph 5 - Quadrant A facing southeast



Photograph 6 - Grading Quadrant B facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

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Photograph 7 - Removing gate adjacent to box culvert facing southeast



Photograph 8 - Wet ash along northeast embankment facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

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Photograph 9 - Overview of Ash Pond D facing southeast



Photograph 10 - Overview of Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

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Photograph 11 - Overview of Ash Pond D facing east



Photograph 12 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

JRC

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Photograph 13 - Overview of Ash Pond D facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between April 30 and May 4, 2012

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: May 15, 2012

SUBJECT: Weekly Summary Report for May 7, 2012 to May 11, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally cloudy with periods of rain. Temperature (°F) lows ranged from 50 to 70°F, and temperature highs ranged from 72 to 78°F. The rain caused production delays on May 7, 2012.

Construction Activities

Ash grading, undercutting of soft areas, trenching through Ash Pond A and 18-inch HDPE gravity drainage pipe relocation occurred this week. Ash and embankment grading occurred in all quadrants of Ash Pond D. Compaction occurred on the west half of Ash Pond D. This area was tested for moisture and density on May 10 and May 11, 2012. Refer to compaction field forms for additional information. Soft areas continue to be cut and material spread to dry. A trench was dug through Ash Pond A for drainage. The 18-inch HDPE gravity drainage pipe was relocated to the new grade.

Equipment and Personnel On-Site

2-CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Hyundai 290 LC-9 Long Reach Excavator
Sky Track 6036 Forklift
Wacker RT Trench Roller
Water Truck

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Anthony Driver, and James Marks
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, and Marc Downs
Charah – Joe Tasich
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, May 8, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash and embankment material within the footprint of Ash Pond D (quadrants A, B, C, and D) was graded.

Testing/Sampling

Moisture and density testing occurred on May 10 and May 11, 2012. Refer to compaction field forms for additional information.

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Calibration Records

Calibration information was obtained for equipment from Massmann Surveying this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13792

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/7/12

TIME: Arrive: 6:30 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.25 hrs (0.25 hr for lunch)
Weather: Cloudy, 70° AM, 78° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 325C Excavator, 290LC-9 Excavator
Site Activities / Observations / Contacts / Notes:

Rain Day: No significant production in Ash Pond D. (EWO and Random Work).

The 290LC-9 dug the trench in Ash Pond A, from the north side of Pond A within the geotubes, to the south side of Pond A next to the weir (outfall), per EWO-06. The 325C cut the geotubes (SE corner) in Pond A and spread out Ash. The stoplogs and aluminum guard were placed in the Pond A outfall structure. Until water training is completed, the stoplogs cannot be placed in the Pond B outfall structure.

The 325C cut into the south embankment in Pond D, and pushed a hole through, underneath the HDPE pipe to allow the water to drain that was ponded along the cut embankment. Then, the 325C had to remove some of the ADS pipe out of the dumpsters so they could be legally hauled off. Last, the 325C dug a hole in the SW corner of Section C to bury fill that was piled next to the fence line on the west side of Section C. However, as digging continued, more and more fill was uncovered. This will create a problem when digging for the Gutter and Anchor Trench in this area. The fill that was already dug up was buried, but the open hole created from digging up the fill was left open for Mike to see. It appears the fill continues into the gravel roadway. Fill consists of concrete, rebar, steel plates, and clay bricks.

Belt had another D6N delivered, totalling 3 Dozers on site. Anthony Driver (AMS Focus) was here to train with Randy. Jared and Nick did maint. on their equipment. They will begin HDPE pipe relocation tomorrow.

Additional Comments:

Randy Pretec — Contractor Representative — AMS — Company
Signature — 5-7-12 — Date
Anna Sajdak — Geotechnology, Inc — 5-14-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13793

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 5/8/12

TIME: Arrive: 6:30 AM | Depart: 4:45 PM | Travel: 1.0 hr | Total: 10.75 hrs (0.5 hr for lunch)
Weather: Sunny, 60°AM, 73°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, D6H Dozer, 325C Excavator, 290 LC-9 Excavator
Site Activities / Observations / Contacts / Notes:

The 325C began digging the new grade for the existing 18" HDPE Gravity Drainage Pipe. Pipe Slope: from ≈26+75 to 23+00 is 1.67%. Pipe Slope: from 23+00 to 11+00 is 0.42%. Total pipe relocation length = 1575'. James Marks checked the grades within the trench with a sewer laser. The D6N (Jared Belt) continued grading Section B. The D6N (Brad Bolenbaugh) regraded the coal yard to promote drainage. The D6H (Nick Walker) continued grading Section D. In the PM, the D6H was parked and Nick took over the D6N because Brad had a Dr. Appt. The D6N (Nick Walker) continued grading Section B. The 290 LC-9 continued grading, moving, and undercutting ash in Section B. Once all of the new grade for the HDPE pipe is completed, the pipe will be moved as a whole into the graded trench.

Anthony Driver will remain on site to train with Randy for ≈ 2 months. He is also a pipe specialist and will be good to have his expertise when laying the PCP. AMS had a 2nd pickup truck delivered on site for Anthony's use.

The 9520 was not in use today (too wet to be efficient). This is the last week the 290LC-9 will be on site. It is unknown if Marc Downs will remain as an operator.

Ryan Clark (Chesapeake Containment Systems, Inc.) and Bill (Illini Drilled Foundations, Inc.) joined the Progress Meeting to discuss the liner and cap vents, respectively. Cap Vent Drilling will begin next Monday (5/14/12). A dumptruck will be required for the fill found in Section C, and dig tests will be performed to determine the extent of the fill along the fence.

Additional Comments: EWO-05 and EWO-07 will be combined.

Randy Poetker — Contractor Representative — AMS — Company — 5-8-12 — Date
Signature
Anna Sandon — Geotechnology, Inc — 5-14-12 — Date
Engineer's Signature

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No. A 13794

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 5/9/12

TIME: Arrive: 6:30 AM Depart: 4:45 PM Travel: 1.0 hr Total: 11.0 hrs (0.25 hr for lunch)
Weather: Sunny, 58°AM, 72°PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, D6H Dozer, 325C Excavator, 9520 Tractor, 1-1812C Pan, Water Truck, 290 LC-9 Excavator
Site Activities / Observations / Contacts / Notes:

The D6N (Brad) performed finish grading in Section C. The D6N (Jared) performed finish grading in Section A. The D6H continued grading Section B. The 325C continued cutting the new grade for the 18" HDPE Gravity Drainage Pipe. James Marks checked grade with a sewer and rotating laser, and Anthony Driver supervised. The 9520 performed cutting and filling in Section B. The 290LC-9 continued undercutting wet ash and moving ash and embankment material in Section B.

The 9520 with one (1) full pan will be rolling the west side of the pond to be tested for compaction tomorrow morning. Stakes within this perimeter will be removed.

Austin (Lamac) will be here Friday to stake the cap vent locations with offsets.

The new grade for the HDPE pipe should completed tomorrow, and they will begin moving the pipe to its new grade. Before the 18" HDPE pipe is moved, they will uncover and dispose of the existing drainage pipe between the outfall structure and the MH in Section B. After removal of the pipe, they will brake the entry of the 18" HDPE into the MH so this end will be free for the pipe relocation. Once the pipe is at its new grade, it will be directed into the MH in the same hole where the drainage pipe from the outfall structure entered the MH. Sometime during this process, the outfall structure will be demolished and buried, except for the steel which will be taken out of the pond.

Additional Comments: Compaction testing will begin tomorrow - 5/10/12.

Randy Porter
Contractor Representative
Company
Signature
Date 5-9-12
Anna Saindon
Geotechnology, Inc.
Date 5-14-12
Engineer's Signature

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No. A 13795

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens / Ron Williams Project No.: J019896.01 Task: 2370
Equipment & ID No.: – Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 Zone: – Client: Ameren ER Date: 5/10/12

TIME: Arrive: 6:30 AM Depart: 1545 Travel: 1.0 hr Total: 10.25
Weather: Sunny, 58°AM, 75°PM Contractor: AMS Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, 325C Excavator, 9520 Tractor, 1-1812C Pan, Water Truck,
Site Activities / Observations / Contacts / Notes: 290 LC-9 Excavator

The D6N (Jared) continued finish grading in Section A and B. The D6N (Brad) continued finish grading Section A and B, and grading Section D. The 325C continued digging the new grade for the 18" HDPE Pipe, with James checking grade with a sewer and rotating laser, with Anthony supervising. The 9520 began rolling the west side of the pond in Section A and C with one full pan and a drag blade. The Water Truck went in front of the tractor to wet the ash for better compaction. The 290 LC-9 continued moving undercut ash to dry in Section B. The 325 C had a hydraulic hose break. While Jared left to get a new hose, Kevin operated the D6N in the meantime. Since Randy is already Water-Trained, he went ahead and put the stoplogs in Pond B, which completes EWO-06. Lamac will now survey the Cap Vents on 5/18/12, and Illini Drilling will begin on 5/21/12 due to material delivery. Tim Wilson arrived today to begin compaction testing in Section A. Up until I left, his readings were all over 100% for the grid points tested. Ron Williams arrived today as well to take my place tomorrow. I familiarized him with the site, personnel, and duties. – JRC

D6N (JARED) AND D6N (BRAD) AND 9520 (NICK) CONTINUED EXCAVATION AND MATERIAL REMOVAL/PLACEMENT; WATER TRUCK CONTINUED TO HYDRATE SUBGRADE IN AREAS A & C; 325 C (KEVIN) REMOVED OUTFALL DRAIN PIPE AT MANHOLE (TO BE MODIFIED) AT BASE INGRESS POSITION AND EXPOSED REMNANT BELLED PIPE END – UPPER CORRUGATED PIPE BREACHED DURING THIS EXCAVATION PROCEDURE AND WATER FLOW CONTAINED IN ADJACENT, EXCAVATED END-OF-TRENCH POSITION; FOUR DIGIPHOTOS. TWENTY-ONE COMPACTION TESTS ACCOMPLISHED RANGING FROM 99% TO 114% OF MAX STANDARD PROCTOR (35 SHEETS); 1 DIGIPHOTO STEEL WALKWAY & PLATFORM REMOVED FROM OUTFALL STRUCTURE. – REW

Additional Comments: COMPACTION TESTING TO CONTINUE DURING NEXT SHIFT

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
5-10-12 — Date
Anna Spindon — Geotechnology, Inc.
5-14-12 — Date
[signature] — Engineer's Signature

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No. A 13796

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: RON WILLIAMS
Project No.: J019896.01 Task: 2370
Equipment & ID No.: —
Project Name: HUTSONVILLE ASH POND D CLOSURE
Vehicle: 4103 Zone: —
Client: AMEREN ER Date: 05/11/2012

TIME: Arrive: 0645 Depart: 1545 Travel: 4.0 Total: 12.5
Weather: SUNNY, 50°- Contractor: AMS Subcontr./Supplier: BELT CONSTRUCTION
Equipment Working: TWO D6N DOZERS, 325C EXCAVATOR, 9520 TRACTOR, 1-1812C PAN, WATER TRUCK, 290LC-9 EXCAVATOR
Site Activities / Observations / Contacts / Notes: THE 9520 CONTINUED EXCAVATION, REMOVAL, AND PLACEMENT GRADING FOR SECTIONS B AND D, D6N IS CONTINUED FINISH GRADING IN SECTIONS C AND D AND BOTH MOVED TO NORTHEAST PERIMETER/SECTION B AND STARTED/CONTINUED FINAL GRADING TOWARD & ADJACENT TO 290LC-9 EXCAVATOR WHICH CONTINUED TO REMOVE AND STOCKPILE FROM SECTION B; ALL SECTION B WORK SOUTH AND WEST OF OUTFALL STRUCTURE. 325C EXCAVATOR: MANHOLE AND HDPE AND FLEXPLASTIC PIPE CONCRETE UNION BLOCK FOR PIPES WAS DEMOLISHED SUCH THAT PIPES @ UNION REMOVED, SPLCE REMOVED, AND HDPE PIPE LIFTED VIA STRAP AND PLACE INTO ADJACENT TRENCH, THEN PROCEED TO REMOVE HDPE FROM ORIGINAL BENCHED POSITION AND TRANSFERED INTO EXCAVATED TRENCH FOR FULL LENGTH - PERIMETERS OF SECTION B TO SECTION D TO SECTION C, SLACK REMOVED AND HDPE CENTER +/- IN TRENCH ALIGNMENT (15 DIGIFOTOS). ABOVE GRADE COVER & CONCRETE PAD PULLED FROM MONITORING WELL AND RISER PIPE EXPOSED (2 DIGIFOTOS). EXCAVATION AND REMOVAL OF OUTFALL STRUCTURE - TO - MANHOLE (+/-) CLAY PIPE ACCOMPLISHED AND NORTH SIDE OF OUTFALL STRUCTURE EXPOSED (3 DIGIFOTOS). CONTINUED EXCAVATING AROUND OUTFALL STRUCTURE AND CLAY PIPE TRENCH ALIGNMENT TO FACILITATE DEMOLITION/REMOVAL/BURIAL FOR REMNANT DEBRIS (3 DIGIFOTOS). LAMAC ENG/SURVEYING SHOOTS TOP OF HDPE PIPE FOR AS-BUILT DRAWING: NUMEROUS POINTS ON ALIGNMENT TO END NEAR MANHOLE [TO BE MODIFIED] AND ON FLOWLINE OF BELL INGRESS INTO MANHOLE. D6N AND 325C PLACING AND TRACKING SOIL ONTO EXPOSED ASH SURFACE GENERALLY SOUTH AND EAST OF REMNANT OUTFALL STRUCTURE/DEBRIS AS 290LC-9 CONTINUES TO EXCAVATE AND STOCKPILE SATURATED ASH MATERIAL IN SECTION B. TWO DIGIFOTOS FROM TOP OF WATER STORAGE TANK. NOTE THIS ITEM: APPROXIMATELY 1 FOOT OF REMNANT CONCRETE TO BE REMOVED FROM EXPOSED TOP OF OUTFALL STRUCTURE DEBRIS DIGIFOTOS #384 - #386

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
Randy Porter — Signature
5-11-12 — Date
Anna Saindon — Geotechnology, Inc.
5-14-12 — Date
Anna Saindon — Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 8 Minutes
Tuesday, May 8, 2012

01 PUBLICATION

Publish date:	2012-05-09	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-05-08-PM-08
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com	
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com	
03	Ms. Anna Saindon	Geotechnology	314-581-6286	a_saindon@geotechnology.com	
04	Mr. Ryan Clark	Chesapeake	410-913-3390	rclark@ccsliners.com	
05	Mr. Bill Kelly	Illini Drilled	217-304-1521	bill@illinidrilling.com	[part time after]
06	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com	
07	Mr. Anthony Driver	AMA - Focus	502-448-4463	adriver@ashmanagementservices.com	
08	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com	
09	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com	
10	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com	

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EAP	Emergency Action Plan
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues.

02	**WORKER PROTECTION ASSURANCE**	
	2012-05-08	OPEN - no issues.
	2012-05-01	OPEN - no issues. AAA electric to be on site 05-01 to go over EWO details.
	2012-04-24	OPEN - no issues. AAA electric to be on site 04-24 again to review electric MCC/switch gear room.
03	**EMPLOYEE DRUG TESTING**	
	2012-05-08	OPEN - no issues. Illini Drilled 1x workers to be scheduled for 05-08. AER to schedule 1x worker for Massmann and 2x TSI workers by EOM.
	2012-05-01	OPEN - no issues. Illini Drilled 2x workers to be scheduled for 05-07.
	2012-04-24	OPEN - no issues. Koberstein 5x workers to be scheduled for 04-27.
04	**AMS SAFETY**	
	2012-05-08	OPEN - no issues. Water training to take place today for work on Pond A and B [some work already completed before water in the areas of work on Pond A]. J. Tasich reported on site specific emergency action plan [EAP]: [01] Shelter areas has supplies. [02] AMS will have cleaned out [dirt from varmints, etc...]. [03] Signs will be posted by next week. [04] EAP will be reviewed at the safety luncheon [today]. AMS stepped out of meeting for a corporate "all-hands" safety conference call commemorating the following: [01] Charah/AMS 2,000,000 [two million] man-hours without lost time milestone. [02] Mine Safety Health Administration [MSHA] Sentinel of Safety Award for no lost time incidents in 2010 at Charah' s Brickey's limestone grinding facility [we are supplier to Ameren Missouri]. [03] North Carolina Department of Labor Gold Level Safety Achievement Award for the Charah Roxboro site [a large site where Charah manages fly ash, bottom ash, gypsum, and landfill projects].
	2012-05-01	OPEN - no issues. M. Wagstaff requested [in EWO] 'stop log" adjustments in Pond A and Pond B. AMS workers will receive water training for this work. Next week is the monthly safety luncheon.
	2012-04-24	OPEN - no issues.
05	**HOUSEKEEPING**	
	2012-05-08	OPEN - no issues.
	2012-05-01	OPEN - no issues. AMS policy all workers drug test before on AMS site. J. Tasich to set up site in Robinson, IL. Nomenclature for drug testing is such that a positive result = bad [drugs found] whereas a negative result = good [no drugs found].
	2012-04-24	OPEN - no issues.
06	**PLANT ACCESS - CBT BADGE**	
	2012-05-08	OPEN - no issues. M. Wagstaff e-mailed 6x WKS gate log to J. Denham, and he requested every 2x WKS. M. Wagstaff inquired on CC - for now J. Denham and P. Zinsious.
	2012-05-01	OPEN - no issues. Badges [consultant] switch over no-issue. J. Denham requested AER provide gate log once a month.
	2012-04-24	OPEN - no issues. AMS received AER consultant badges.
07	**VEHICLES ON SITE**	
	2012-05-08	OPEN - no issues. GEO to bring "gator" [utility vehicle] on site. AMS to bring second pick up truck on site for A. Driver. AMS will provide safety flags for both vehicles.
	2012-05-01	OPEN - no issues
	2012-04-24	OPEN - no issues
08	**OSHA LOG - WORK HOURS**	
	2012-05-08	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-07
	1,555.50	RT
	0,000.00	OT
	1,555.50	TOTAL
	2012-05-01	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 04-30
	1,327.00	RT
	0,000.00	OT
	1,327.00	TOTAL
	2012-04-24	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 04-23
	1,051.50	RT
	0,000.00	OT
	1,051.50	TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-05-08 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current Correction in crew size for 05-01 below [not discussed at the meeting]
[01] Geotechnology [work hours not
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[10] Total

2012-05-01 OPEN - AMS and Belt Construction on site. Koberstein declined. Corrected count for 04-24 below.
Current
[01] Geotechnology
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
~~[00] Laborers~~ [01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
~~[08] Total~~ [09] Total

2012-04-24 OPEN - AMS and Belt Construction on site. Project addition of Koberstein next week.
Current
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[00] Laborers
~~[04] Operators~~ [05] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
~~[06] Total~~ [07] Total

02 WORK HOURS

2012-05-08 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Chesapeake may work extended hours.
2012-05-01 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Corrected time below.
2012-04-24 OPEN - Standard hours - 7:00 AM CT to 3:30~~ AM CT~~ PM CT

03 OVER TIME

2012-05-08 OPEN - None projected at this time. Referencing Item No. 06.02-2012-05-07 above - Chesapeake may have OT.
2012-05-01 OPEN - None projected.
2012-04-24 OPEN - Referencing 04-17 commentary, current production is 100 FT/D and is good rate, no OT projected.

04 TRAILER [AND GENERAL CONDITIONS]

2012-05-08 OPEN - no issues.
2012-05-01 OPEN - no issues.
2012-04-24 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-05-08 OPEN - no issues. BT Drainage in progress.
2012-05-01 OPEN - no issues. Koberstein declined. Replacement subcontractor in review - BT Drainage.
2012-04-24 OPEN - no issues. Koberstein in progress.

02	**SUBMITTALS**	
	2012-05-08	OPEN - no issues. In progress - P. Zinsious to revise log information by EOW and review mechanical.
	2012-05-01	OPEN - no issues. In progress - M. Wagstaff request mechanical submittal be checked for missing pump information. AER has returned mechanical, electrical, and liner submittals.
	2012-04-24	OPEN - no issues. In progress - liner sample tests results from TRI under review by GEO

08 MATERIAL

01	**GENERAL**	
	20120-05-01	OPEN - no issues. See below for meetings.
	20120-05-01	OPEN - no issues. All HDPE liner on site [72 rolls] as of 05-01.
	20120-04-24	OPEN - [ref. Item No. 07.02-2012-04-24 above].
02	**GEOMEMBRANE PRE-CON MEETING**	
	20120-05-08	NEW - Meeting during Progress Meeting with Mr. Ryan Clark - Chesapeake Containment [CCS]. [01] 05-29 first day of deployment. [02] Mobilization will take place prior to first day of deployment. Badges, drug testing, and safety training required before. [03] Safety glasses to have foam gasket. [04] CCS discussed proposed panel layout and Geotechnology agreed that given the low slope (5%) that downslope orientation is not as critical. CCS to provide revised proposed panel layout. [05] All CCS vehicles will need magnetic signage. [06] CCS trailer can be left on-site. [07] AMS to provide operator for deployment. [08] AMS lag from liner start to clay placement is about 6 days. [09] CCS will have tensiometer certifications on-site and provided to Geotechnology. [10] All pipe boots are to be welded to HDPE gas vent pipe as shown in detail. [11] There are some repairs needed in the existing HDPE lined ponds. CCS will patch while on-site. [12] CCS [NMA] site extension has been filed, process of finalize site meeting and agreement with local labor union. [13] Expected manpower on-site is 12x workers working 10 hours+/- per day, 6x days a week with 7th day as a make-up day. [14] Any disturbed are requiring re-compaction to be looked at on case-by-case basis with GEO/AER. [15] Mr. Matt Garland - CCS General Superintendent will be coordinating the final schedule. [16] R. Clark will go out to pond to inspect progress and check on condition of delivered materials.
03	**CAP VENT PRE-CON MEETING**	
	20120-05-08	NEW - Meeting after Progress Meeting with Mr. Bill Kelly - Illini Drilled Foundations [IDF]. [01] 05-14 first day of deployment. [02] Discussion of submittal and installation of the cap vents. [03] IDF will have different size spacers on site to accommodate change in the bore hole size. [04] Drill rig will have approximately 50 FT tall mast. [05] IDF can adjust mast a few degrees to accommodate for the slope on the ash pond. If required AMS will level out area. [06] Any disturbed are requiring re-compaction to be looked at on case-by-case basis with GEO/AER. [07] Duration estimated at 3x days for all cap vents. [08] Safety glasses to have foam gasket. [09] B. Kelly will go out to pond to inspect progress and check slope.

09 ADJACENT PROPERTIES AND PCP LINE

01	**GENERAL**	
	2012-05-08	OPEN - [01] Excavation plan is to be prepared by professional engineer. [02] VES-01 for Bentonite M. Wagstaff indicated is approved [reference 12.1.09-2012-05-08 EWO-09 below]. [03] P. Zinsious indicated manhole as shown on drawings not a standard size. Brief discussion - M. Wagstaff indicated any [close] standard size is acceptable if the buoyancy calculations are approved. [04] Review of process if the rock is not "dig-able". M. Wagstaff indicated that Hanson understands the rock may not "dig". Once work begins, and if the rock does not "dig", the PCP can be raised [partially] or all the way out of he rock and set on the rock. Elevation [and alignment] can be made in the field. Pump structure can be made in sorter ring height to accommodate the change in elevations if necessary.
	2012-05-01	OPEN - BT Drainage [01] Deepest projected part of excavation is 22-23 FT. [02] J. Denham indicated the rock may not dig, requested AER consider raising the line above the bedrock line.

	2012-04-24	OPEN - no issues. Excavation plan submitted by Koberstein [part time at meeting]. [01] General discussion trench width. [02] Stockpile top soil. [03] 80 FT/D production rate. Duration of work projected 50D. [04] Pump groundwater to Pond A or Pond B. [05] Alignment of pipe is flexible [for filed conditions]. Curve or "angle" OK. [06] KCI recommended double cleanouts for ease. AER indicated single [as designed] OK. [07] AER reviewed pipe can go directly into the manhole [shown on drawings as adjacent]. [08] Spoils can be "lost" on the berm embankments.

10 QUALITY CONTROL

01 GENERAL

2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues
2012-04-24	OPEN - no issues

02 ASH

2012-05-08	OPEN - no issues. On going process. Compaction testing possibly scheduled for 05-09.
2012-05-01	OPEN - no issues. On going process.
2012-04-24	OPEN - no quality issues. R. Porter report the wet ash in the east area of the pond is going to require 2-3 days [stacked] to drain the water off. J. boone indicated this area of pond is further away from the discharge inlet, thus reason for the fines [not settle out in other areas of the pond]. The wet ash is being stacked and spread out to dry.

03 CLAY

2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-05-08	OPEN - Review of schedule to date. [01] Documented rain days: 05-04 and 05-07. P. Zinsious published e-mail with dates [on 05-07 shows total 5x days so far]. [02] Actual percent completion on ash pond sectors: A = 95%, B = 75%, C = 95%, D = 80% [03] 05-08 - Geomembrane Pre-Con Meeting [with AER and GEO during the Charah/AMS conference call]. [04] 05-10 - projected date for GEO compaction testing. [05] 05-11 - J. Cravens off-site. GEO to have 2x men: Tim and Ron. [06] 05-14 - Massmann on site to survey ash cap certification and fence alignment for AER. [07] 05-14 - Lamac on site to survey/locate cap vents. [08] 05-29 - Chesapeake to begin work.
2012-05-01	OPEN - Review of schedule 04-30. [01] Schedule critical path and look ahead reviewed. [02] Actual percent completion on ash pond sectors: A = 90%, B = 70%, C = 90%, D = 75%. [03] Activity No. 106 cap vents still scheduled for 05-14 as shown on 04-30 schedule. [04] Compaction testing for ash and surveying to be coordinated for same time if possible. Surveyor can come out twice. [05] Build pads for cap vent drill rig. [06] Discussion on the liner schedule and Memorial Day holiday. Verify day after the holiday.
2012-04-24	OPEN - Review of schedule 04-18. [01] Schedule to be adjusted and corrected for end date calculations. [02] 05-02 - Pipe relocation start. [03] 05-04 - Massmann to survey. [04] 05-07 - Begin demolition outfall structure. AMS to set scrap steel in plant yard. Duration 2D include flow able fill. [05] 05-07 - Illini Drilled to mob to site for cap vents. [06] 05-29 - Projected start date for the PCP. End date projection 09-11.

02 TIME AND MATERIAL

2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues
2012-04-24	OPEN - no issues

03 COORDINATION

2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues. Signs on site [ref. Item No. 14.20-2012-04-24 below].

12.0 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-05-08	OPEN - EWO list reviewed, numbers and descriptions to be corrected in minutes.
2012-05-01	OPEN - no issues.
2012-04-24	OPEN - no issues.

02 AMS PAY APPLICATION

2012-05-08	OPEN - M. Wagstaff approved the draft pay-app for submittal as invoice. AMS to send copy of draft to J. Cravens.
2012-05-01	OPEN - M. Wagstaff indicated signed off with AER, should be reviewed by EOW. Invoice for stored materials on the HDPE liner.
2012-04-24	OPEN - M. Wagstaff indicated 10% will be held at the end on the job. AMS no issue. CLOSED

12.1 EXTRA WORK ORDERS

01 EWO-01 ELECTRIC TEMPORARY

2012-05-08	Work is completed. Cost was audited with subcontractor, AMS to provide partial credit [reference EWO-08 below].

02 EWO-02 ASH PLACEMENT - CAP MODIFICATIONS

2012-05-08	OPEN - In progress. Spoils can go into Ash Pond D, and on the slopes as clean. Material opt be monitored by GEO and AMS. Consensus is the ash will balance.
2012-05-01	OPEN - In progress. Spoils can go into Ash Pond D, and on the slopes as clean. Material opt be monitored by GEO and AMS. Consensus is the ash will balance.
2012-04-24	OPEN - AER to provide interim e-mail stating approval for this work to AMS.

03 EWO-03 COAL PILE

2012-05-08	OPEN - Work completed [05-08 dozer working to fine grade area], final grade for drainage to be finished.
2012-05-01	OPEN - Work completed. Area to be observed for drainage. Date corrected below 04-24.
2012-04-24	OPEN - Work completed. Some areas graded to "original soil" under coal pile. AMS will wait for rain to determine location of the drainage trenches. AER to provide interim e-mail stating approval for this work to AMS.

04 EWO-04 PIPE RELOCATION

2012-05-08	OPEN - work in progress. AMS briefly described process of moving pipe from existing elevation into the new trench. Pipe will be slinger on the end at current elevation and at the new elevation. Connector fitting for the manhole fitting on site 05-08.
2012-05-01	OPEN - In progress. Pipe is exposed, and ready to begin lowering. AMS recommending removal of the pipe to be demolished and filled with
2012-04-24	OPEN - M. Wagstaff published elevations. [Current progress: pipe exposed along the south and at turn of east side pond.] AER to provide interim e-mail stating approval for this work to AMS.

05 EWO-05 ELECTRIC FEEDER

2012-05-08	OPEN - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.
2012-05-01	OPEN - in progress. Meeting after progress meeting with AAA Electric.
2012-04-24	OPEN - in progress. AAA to be on site to inspect MCC /switchgear room. Meeting after [part of] this progress meeting.

06 EWO-06 POND A TRENCH

2012-05-08	NEW - Work completed for trench excavation. The weir structure "stop logs" are to be installed in Pond A and Pond B.

07 EWO-07 ELECTRIC OVERHEAD

2012-05-08	NEW - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.

08 EWO-08 CREDIT TO EWO-01

2012-05-08	NEW - In progress [reference above].

09 EWO-09 BENTONITE VES-01

2012-05-08	NEW - M. Wagstaff indicated approval. Hanson has provided submittal review, and AMS in process of reply.

10 EWO-10 FLOW-ABLE FILL CREDIT

2012-05-08	NEW - Discussed previously [reference Item No. 09.01-2012-04-24 No. 07] pipe can be removed and go direct to manhole, eliminating the flow-able fill.

11 EWO-11 BUILDING SPOILS REMOVAL

2012-05-08	NEW - Excavation along Station 29+00 at fence line uncovered building spoil material within limits of the ash pond. M. Wagstaff requested exploratory holes dug along the fence line to determine the extent of the foreign material. AMS will dig holes at 100 FT intervals, and if something is uncovered will go to 50 FT intervals to determine the extent of the material. AMS will excavate the material to a predetermined depth by GEO/AER. Material excavated out will be disposed of within the ash pond, in the are east section where lower elevations are still being worked. A dump truck will have to be used to transport the material within the pond. Material adjacent to the pond that extends under the road is to remain in place and not to be disturbed.

13 ACTION ITEMS - AER

01 AMEREN [AER]

2012-05-08

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

2012-05-01

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp. [CLOSED - reminder site cleared 5th of month by AER]

2012-04-24

[03] Fire protection [CLOSED - Old switchgear room will be emergency shelter. J. Tasich ahs supplies to set in place 04-24]. Signs will be posted, and a plan will be finalized.

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp.

14 ACTION ITEMS - AMS

01 ASH MANAGEMENT [AMS]

2012-05-08

None

2012-05-01

None

2012-04-24

[20] [REOPEN] P. Zinsious to provide draft. CLOSED - signs on site, ready to be installed].

15 PRODUCTION

01 GENERAL

2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues
2012-04-24	OPEN - no issues

02 ASH

2012-05-08	OPEN - no issues. Estimated 77,320 CY EOD 05-07.
2012-05-01	OPEN - no issues. Estimated 70,988 CY EOD 04-30.
2012-04-24	OPEN - no issues. Estimated 55,452 CY EOD 04-23. General discussion CY are estimates and more than likely under-reported. AER inquired how AMS plan ash to grade - projection is site may possibly balance. M. Wagstaff concern ash placement may not make schedule.

03 CLAY

2012-05-08	OPEN - no issues - this activity not begun.
2012-05-01	OPEN - no issues - this activity not begun.
2012-04-24	OPEN - no issues - this activity not begun.

16 DOCUMENTS TRANSMITTED

2012-05-08	None
2012-05-01	[01] AMS - Schedule dated 04-30 - critical path [02] AMS - Schedule dated 04-30 - look ahead [03] AMS - Schedule dated 04-30 - full [03] AMS - Value Engineering Submittal VES-01 - Bentonite cap option [04] AMS - Contact list HUT-APD-CON-2012-04-30
2012-04-24	[01] AMS - Electrical drawing package [1x copy 23 x 36] to AAA [02] AMS - Schedule dated 04-18 [03] AMS - Koberstein [1x copy] to AER "Excavation Plan" [04] AMS - Contact list HUT-APD-CON-2012-04-24

17 DOCUMENTS REVIEW ONLY

2012-05-08	None
2012-05-01	None
2012-04-24	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, May 15, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTO LOG

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Photograph 1 - Digging trench in Ash Pond A facing west



Photograph 2 - Trench completed in Ash Pond A facing northwest

Photographs taken by Joseph Cravens (May 7-10, 2012) and Ron Williams (May 10-11, 2012) of Geotechnology, Inc.

JRC



Photograph 3 - Digging new grade for 18" HDPE pipe facing east



Photograph 4 - Grading Quadrant B facing southeast

Photographs taken by Joseph Cravens (May 7-10, 2012) and Ron Williams (May 10-11, 2012) of Geotechnology, Inc.

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Photograph 5 - Final grading Quadrant A facing east



Photograph 6 - Placing stop logs in Ash Pond B outfall facing southwest

Photographs taken by Joseph Cravens (May 7-10, 2012) and Ron Williams (May 10-11, 2012) of Geotechnology, Inc.

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Photograph 7 - Rolling Quadrants A and C facing south



Photograph 8 - Compaction testing facing east

Photographs taken by Joseph Cravens (May 7-10, 2012) and Ron Williams (May 10-11, 2012) of Geotechnology, Inc.

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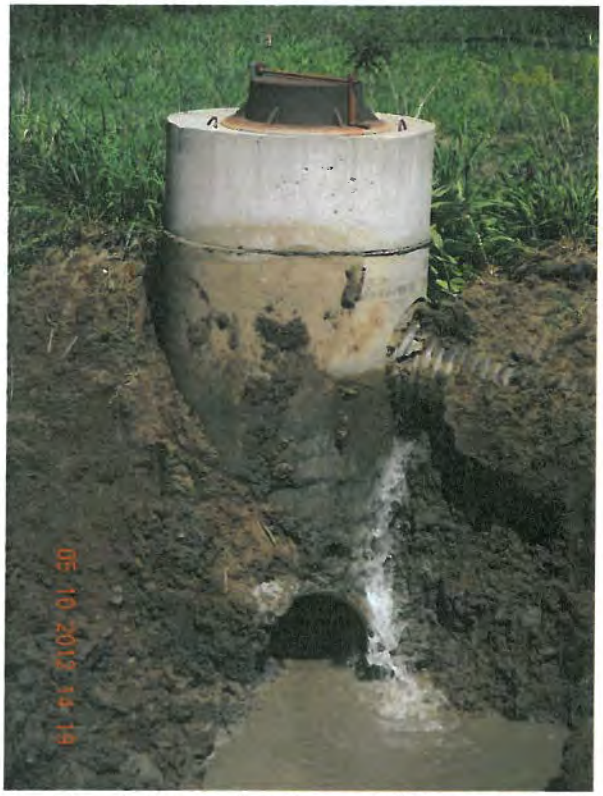

Photograph 9 - Removing drainage pipe from outfall structure facing northeast



Photograph 10 - 18" HDPE pipe relocation facing southeast

Photographs taken by Joseph Cravens (May 7-10, 2012) and Ron Williams (May 10-11, 2012) of Geotechnology, Inc.

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Photograph 11 - Overview of Ash Pond D facing southeast



Photograph 12 - Overview of Ash Pond D facing east

Photographs taken by Joseph Cravens (May 7-10, 2012) and Ron Williams (May 10-11, 2012) of Geotechnology, Inc.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: May 21, 2012

SUBJECT: Weekly Summary Report for May 14, 2012 to May 18, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 55 to 70°F, and temperature highs ranged from 76 to 84°F. Weather delays did not occur this week.

Construction Activities

Ash grading, 18-inch HDPE gravity drainage pipe relocation, compaction testing, and surveying, and west fence line cleanup occurred this week. Ash and embankment grading occurred generally on the eastern half of Ash Pond D. Compaction testing generally occurred on the eastern half of Ash Pond D on May 16 and May 17, 2012. Refer to compaction field forms for additional information. Massmann Surveying surveyed ash grade on the western portion of Ash Pond D. Lamac Engineering Co. surveyed the seven cap vent locations. The 18-inch HDPE gravity drainage pipe was backfilled at its new grade, except for the last 50 ft. of pipe besides the manhole. This section of pipe was left uncovered until the manhole ingress is completed. The fill that was found along the west fence line in Quadrant C, consisting of concrete, brick, rebar, and steel plates, was excavated and buried in the center, eastern half of the pond. Approx. 1 ft. of ash and remaining vegetation was removed along the west fence line, and was replaced with embankment material. The box culvert connecting Pond D and Pond C was cleaned, and the proposed rip rap pad and slopes were roughed in at the box culvert egress. More of the old ADS corrugated pipe was removed and disposed of throughout the perimeter of the pond.

Equipment and Personnel On-Site

2-CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
John Deere 9520 Tractor with 2-1812C John Deere Scrapers (Pans)
Hyundai 290 LC-9 Long Reach Excavator (demobilized on May 15, 2012)
Sky Track 6036 Forklift
Wacker RT Trench Roller
Water Truck
Watson 1500 Drill Rig (Illini Drilling)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Jimmy Boone, Robert Dunkley, Anthony Driver, and James Marks
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, Brad Bolenbaugh, and Shelby Belt
Charah, Inc. – Joe Tasich
Massmann Surveying – Gary Delf and Rick Koeac
Lamac Engineering Co. – Jake Lewis and John Porter
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, May 15, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash and embankment material within the footprint of Ash Pond D on the eastern half was graded.

Testing/Sampling

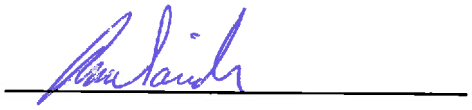
Moisture and density testing occurred on May 16 and May 17, 2012. Refer to compaction field forms for additional information. Survey of the ash pond grade on the western half of Ash Pond D occurred May 14, 2012. Survey of the cap vent locations occurred May 17, 2012.

Calibration Records

Calibration information was not obtained for equipment this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13797

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/14/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 10.75 hrs (0.25 hr for lunch)
Weather: Sunny, 65°AM, 80°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, 9520 Tractor, 1-1812C Pan, 290 LC-9 Excavator, Water Truck, 325C Excavator
Site Activities / Observations / Contacts / Notes:

The D6N (Brad) backfilled the relocated 18" HDPE Pipe along the south embankment in Section C, spread out cut embankment material for the scraper to pick up in Section B, and performed finish grading in Section D. The D6N (Jared) graded Section B, and performed finish grading in Section D. The 9520 cut ash and embankment material in Section B, and moved the cut material to the last major fill area located at the center axis of all the Sections. The 9520 also began cutting material in Section D. The 290 LC-9 (Kevin) moved the remaining wet ash in Section B for decanting. The 325C began backfilling the relocated 18" HDPE Pipe along the south embankment in Section D.

Gary and Rick with Massmann Surveying were here to survey (check) the grid points that were tested for compaction on the west side of the Pond in Section A and C.

Anthony and James checked PGL grades with a rotating laser in Section B and D, where the PGL stakes were offset.

The entire 18" HDPE Pipe has been relocated and the slope was checked by Lamac. The entire pipe has a positive fall towards the manhole. The materials for ingress into the manhole should be here Thursday. The old ADS pipe still remains in the east embankment.

Marc Downs was laid off last Friday (5/11/12) and the 290 LC-9 will leave tomorrow (5/15/12).

Additional Comments: The old pipe for the MW was cut off, capped, and buried 3' under grade.

Randy Potter — Contractor Representative — AMS — Company — 5-14-12 — Date
Signature
Anna Saindon — Geotechnology, Inc — 5-21-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13798

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 5/15/12

TIME: Arrive: 6:30 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 70° AM, 82° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, 325C Excavator, 9520 Tractor, 1-815C Pan, Water Truck
Site Activities / Observations / Contacts / Notes:

The D6N (Brad) graded Section B, and performed finish grading in Section D. The D6N (Jared) graded Section B, performed finish grading in Section D, and graded the embankment material over the backfilled relocated 18" HDPE Pipe along the south and east berms in Section C and D. The grades along the embankment were checked by Randy and James with a rotating laser. The 325C finished backfilling the 18" HDPE Pipe and leveling the stockpiled berm material, as well as ripping out the old ADS Drainage Pipe that remained in the east embankment. The last 50' of HDPE Pipe was left open towards the manhole in Section B to allow the pipe to be moved, if needed, when sealing the pipe into the manhole occurs. The 9520 continued cutting embankment material in Section C and D, and filling the major fill area along the Section B and D axis, or border. James cleaned the 290LC-9 and it was hauled off site. Joko and Randy setup the signs for the emergency shelter.

Steve Bluemner was here with Mike, and we gave Steve a tour of the site, as well as inspected Ponds B, C, and D, and the Bottom Ash Pond. I had a meeting with Paul to discuss edits for current submittals and dates for future submittals, and went over AAA's bid changes for the overhead electric and electric feeders. This will be relayed onto Mike when determining if the bid will be accepted or not. John Boyer's (BTD) bid was accepted. However, all HDPE Piping might be switched to DR PVC pipe due to the excavation conditions. *Field Adjustment: the ash grade was left 6" high between Sta. 22+00 and 23+00 in order to cover the relocated HDPE Pipe. The slope in this area was adjusted accordingly. For the rest of this week,

Additional Comments: Belt is working 10 hour days in order to complete ash placement by Friday.

Randy Prater — Contractor Representative — AMS — Company
Signature — 5-15-12 — Date
Anna Saindon — Geotechnology, Inc. — 5-21-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13799

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 5/16/12

TIME: Arrive: 6:30 AM | Depart: 6:15 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 70°AM, 80° PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, 325C Excavator, 9520 Tractor, 1-815C Pan, Water Truck
Site Activities / Observations / Contacts / Notes:

The D6N (Brad) continued grading Section B. The D6N (Jared) continued grading Section B, and performed finish grading in Section D and along the south and east embankments. The D6N also cleaned up excess material along the west fence line. The 9520 continued filling the major fill area along Section B and D axis, and performed cutting in Section B, NE embankment, south embankment, and along the west fence line. After cutting 1.0' along the fence line, the 9520 filled the cut area with embankment material. The 325C completed cutting the NE embankment, and spreading out piled ash in Section B. All embankments surrounding the Pond are now to grade. The 325C removed the remaining concrete casing beside the manhole in Section B and buried it in the major fill area. The 325C ripped out the remaining old ADS Pipe in the SW corner in Section C. It was removed up to 2.5' from the gate in the fence. The two full dumpsters were hauled off and a third dumpster was brought in. The 325C filled it with ADS Pipe. The 325C went along the south embankment, smoothing out the crest and the slope with a crane mat. The 325C dug test holes along the west fenceline to determine the volume of fill that was found, consisting of concrete, bricks, steel plates, and rebar. Once the perimeter of the fill was determined, it was dug out and piled in Section C. A dumptruck was brought in and the 325C loaded the fill. The dumptruck dumped the fill in the major fill area. After the fill was moved, the 9520 piled embankment material beside the hole to be filled. It will be filled tomorrow morning. James, Randy, and Anthony checked PGL grades with the laser. Tim Wilson was here for compaction testing.
Note: Samples were taken from the CBS for physical and chemical testing on Monday.

Additional Comments: Randy will be off the next 2 days. Jimmy Boone to replace him.

Randy Porter — Contractor Representative — AMS — Company
Signature — 5-16-12 — Date
Anna Saindon — Geotechnology, Inc. — 5-21-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13800

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 5/17/12

TIME: Arrive: 6:30 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 55°AM, 76°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, 325C Excavator, 9520 Tractor, 1-1812C Pan, Water Truck
Site Activities / Observations / Contacts / Notes: Jimmy Boone as Site Supervisor for Randy. The D6H still remains on the site, but it hasn't been used and is parked in the const. yard. The D6N (Brad) continued grading Section B. The D6N (Jared) continued finish grading Section D, grading Section B, and cleaned up more excess material along the west fence line. The 325C filled the excavated hole beside the west fence line in Section C with embankment material, and leveled the placed embankment material along the entire fence line with a crane mat. The 325C also removed the additional precast box connected to the box culvert on the west side of the pond, and dug a 6'x6' pad in front of the box culvert, with 1:1 slopes, for riprap. At lunch, the 325C moved remaining crane mats in the pond to the construction yard and parked the equipment. Kevin Flynn (Belt) was laid off afterwards (not enough excavator work left). The 9520 finished scraping and filling along the west fence line, continued cutting high spots in Section B, cutting stockpiled embankment material outside of the pond, and filling the major fill area along Section B and D axis.

Remaining Personnel:
Jared Belt (Belt) - D6N
Nick Walker (Belt) - 9520
Brad Bolenbaugh (Belt) - D6N
Robert Dunkley (AMS) - Teamster
James Marks (AMS) - Laborer

Lamac staked the cap vent locations with 25' offsets. Tim Wilson finished 2nd Phase of Compaction Testing. There are approx. 40 points left to test. Illini Drilling had their drill rig delivered - Watson 1500. Illini will drill the dewatering wells for BTD next week after the cap vents. Shelby Belt was here to meet with AMS. Anthony Driver will be leaving this job site after this week. Johnny Mcgrew trained with Joko - new AMS operator for the CBS.

Additional Comments: James picked up remaining debris along the west fence line.

Anthony Driver — Contractor Representative — A.M.S. — Company
Signature — 5-17-12 — Date
Anna Saindon — Geotechnology Inc. — 5-21-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 13801

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/18/12

TIME: Arrive: 6:30 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 9.75 hrs (0.25 hr for lunch)
Weather: Sunny, 55°AM, 84°PM | Contractor: AMS | Subcontr./Supplier: Belt Construction
Equipment Working: 2-D6N Dozers, 9520 Tractor, 1-1812C Pan, Water Truck
Site Activities / Observations / Contacts / Notes:

All equipment focused their work in Section B. Both D6N Dozers performed finish grading in Section B. The 9520 continued cutting high spots in B, and filling the major fill area on the Section B and D border. James Marks cleaned the 325C and D6H in the yard. Robert Dunkley focused Dust Control in Section B.

Jimmy Boone didn't come to the site today; Anthony Driver was the temporary Super.

No additional visitors, deliveries, schedule updates, or work items.

The Pond should be to grade by Monday or Tuesday.

Additional Comments:

Anthony Driver — AMS
Contractor Representative — Company
Signature — 5-18-12 Date
Anna Saindon — 5-21-12 Date
Geotechnology, Inc.
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 9 Minutes
Tuesday, May 15, 2012

01 PUBLICATION

Publish date:	2012-05-18	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-05-15-PM-08
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
03	Mr. Steve Bluemner	Ameren	314-972-4160	sbluemner@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
04	Mr. John Boyer	BT Drainage	217-822-6593	john@btdrainage.com
06	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com
08	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
09	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
10	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EAP	Emergency Action Plan
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-05-15	OPEN - no issues.
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-05-15	OPEN - no issues. None projected for 2x week look ahead or for Illini Drilled [IDF].
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues. AAA electric to be on site 05-01 to go over EWO details.

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-05-15 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[04] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[09] Total

2012-05-08 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current Correction in crew size for 05-01 below [not discussed at the meeting]
[01] Geotechnology [work hours not
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[10] Total

2012-05-01 OPEN - AMS and Belt Construction on site. Koberstein declined. Corrected count for 04-24 below.
Current
[01] Geotechnology
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
~~[00] Laborers~~ [01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
~~[08] Total~~ [09] Total

02 WORK HOURS

2012-05-15 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt to work 4x D 10x HRS due to dry weather [internal cost to AMS]. When Chesapeake comes on board, they may work 12x HRS a day maximum due to instrumentation calibration procedures required in the specifications.

2012-05-08 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Chesapeake may work extended hours.

2012-05-01 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Corrected time below.

03 OVER TIME

2012-05-15 OPEN - Belt has projected OT per Item No. 06.02-2012-0515 above.

2012-05-08 OPEN - None projected at this time. Referencing Item No. 06.02-2012-05-07 above - Chesapeake may have OT.

2012-05-01 OPEN - None projected.

04 TRAILER [AND GENERAL CONDITIONS]

2012-05-15 OPEN - no issues.

2012-05-08 OPEN - no issues.

2012-05-01 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-05-15 OPEN - no issues. BT Drainage by EOW.

2012-05-08 OPEN - no issues. BT Drainage in progress.

2012-05-01 OPEN - no issues. Koberstein declined. Replacement subcontractor in review - BT Drainage.

[13] Dewatering will be by well point. Illini Drilled will drill well points [next week].
[14] Issue of water volume from the dewatering operation. Could possibly be millions of gallons. J. Boyer indicated amount not known, but possibly the areas of the bedrock in a "valley" might be able to be pumped down, but this depends on the length of the "valley". Pumps in the well points will operate 24/7, in any order, one or more at a time. In the beginning all pumps will be operating. This may create an issue for the adjacent property owner [farmer] who pumps ground water for irrigation.

[15] Issue of water volume disposal into the ponds. M. Wagstaff will research what is required for pumping into the ponds and what is required for the pond elevation relative sampling of the discharge by AER [and paid for by AER].
[16] The well point will pump system will have safety fence, light, and the power cord above ground in a conduit.
[17] Delivery of the dewatering sump structures are 2 WKS [after approval].
[18] Discussion of the diameter and the thickness of the manhole barrel. M .Wagstaff indicated as long as buoyancy [reference item NO. 09.01-2012-05-08-03 below] good, alternates will be acceptable. Possible options are larger base and matt [concrete] at base such as a 4 FT DIA MH with larger base [J. Boyer indicated may install larger base for BTD insurance].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-05-15	OPEN - [01] See Item No. 08.04-2012-05-15 for PCP Pre-Con Meeting and submission of the Excavation Plan. [02] Corrected ring description below in body of text. [03] No tax exemption if materials not purchased in Illinois.
2012-05-08	OPEN - [01] Excavation plan is to be prepared by professional engineer. [02] VES-01 for Bentonite M. Wagstaff indicated is approved [reference 12.1.09-2012-05-08 EWO-09 below]. [03] P. Zinsious indicated manhole as shown on drawings not a standard size. Brief discussion - M. Wagstaff indicated any [close] standard size is acceptable if the buoyancy calculations are approved. [04] Review of process if the rock is not "dig-able". M. Wagstaff indicated that Hanson understands the rock may not "dig". Once work begins, and if the rock does not "dig", the PCP can be raised [partially] or all the way out of he rock and set on the rock. Elevation [and alignment] can be made in the field. Pump structure can be made in ~~sorter~~ shorter ring height to accommodate the change in elevations if necessary.
2012-05-01	OPEN - BT Drainage [01] Deepest projected part of excavation is 22-23 FT. [02] J. Denham indicated the rock may not dig, requested AER consider raising the line above the bedrock line.

10 QUALITY CONTROL

01 GENERAL

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues

02 ASH

2012-05-15	OPEN - no issues. J. Cravens Section A and C approximately 50 point for ash compaction density tests have been performed to date. All test have to date have passed in the range of 99% to 114% compaction. GEO technician Mr. Tim Wilson will be back on site tomorrow [05-16]. Massmann is to download files for GEO locations.
2012-05-08	OPEN - no issues. On going process. Compaction testing possibly scheduled for 05-09.
2012-05-01	OPEN - no issues. On going process.

03 CLAY

2012-05-15	OPEN - no issues. Samples taken yesterday [05-14]. The physical analysis will be by Holcomb and the chemical analysis will be by ARDL. Results should be in by next mid-week or before.
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-05-15	OPEN - Review of schedule to date. M .Wagstaff on vacation 05-15 to 05-22. [01] Actual percent completion on ash pond sectors: A = 100%, B = 90%, C = 100%, D = 85% [02] 05-11 - Lamac survey for "as-built" [record drawings] of the pipe relocation. [03] 05-29 - BTD start date projection for PCP. [04] Brief discussion electrical [AAA] and mechanical [FWI] scope.
2012-05-08	OPEN - Review of schedule to date. [01] Documented rain days: 05-04 and 05-07. P. Zinsious published e-mail with dates [on 05-07 shows total 5x days so far]. [02] Actual percent completion on ash pond sectors: A = 95%, B = 75%, C = 95%, D = 80% [03] 05-08 - Geomembrane Pre-Con Meeting [with AER and GEO during the Charah/AMS conference call]. [04] 05-10 - projected date for GEO compaction testing.

06	EWO-06	POND A TRENCH	
	2012-05-15	No issues. Work 100% complete.	
	2012-05-08	NEW - Work completed for trench excavation. The weir structure "stop logs" are to be installed in Pond A and Pond B.	
07	EWO-07	ELECTRIC OVERHEAD	
	2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.	
	2012-05-08	NEW - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.	
08	EWO-08	CREDIT TO EWO-01	
	2012-05-15	OPEN - in progress.	
	2012-05-08	NEW - In progress [reference above].	
09	EWO-09	BENTONITE VES-01	
	2012-05-15	OPEN - in progress. M. Wagstaff indicated that yesterday [05-14] Hanson approved the AMS response comments to the Hanson submittal review. GSE to provide pricing and AMS to calculate EWO.	
	2012-05-08	NEW - M. Wagstaff indicated approval. Hanson has provided submittal review, and AMS in process of reply.	
10	EWO-10	FLOW-ABLE FILL CREDIT	
	2012-05-15	OPEN - in progress.	
	2012-05-08	NEW - Discussed previously [reference Item No. 09.01-2012-04-24 No. 07] pipe can be removed and go direct to manhole, eliminating the flow-able fill.	
11	EWO-11	BUILDING SPOILS REMOVAL	
	2012-05-15	OPEN - in progress. AMS to dig test holes by EOW.	
	2012-05-08	NEW - Excavation along Station 29+00 at fence line uncovered building spoil material within limits of the ash pond. M. Wagstaff requested exploratory holes dug along the fence line to determine the extent of the foreign material. AMS will dig holes at 100 FT intervals, and if something is uncovered will go to 50 FT intervals to determine the extent of the material. AMS will excavate the material to a predetermined depth by GEO/AER. Material excavated out will be disposed of within the ash pond, in the are east section where lower elevations are still being worked. A dump truck will have to be used to transport the material within the pond. Material adjacent to the pond that extends under the road is to remain in place and not to be disturbed.	

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-05-15

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [CLOSED - drawing issued]

[24] Research with Hanson PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].

[25] Research with Hanson alignment of the discharge piping structure at the outfall man hole. AER original design took into consideration a "mixing zone". R. Porter indicated since the line pipe relocation alignment can be direct. Discussion of the grade to be field adjusted around the box if new location is approved.

2012-05-08

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

2012-05-01

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp. [CLOSED - reminder site cleared 5th of month by AER]

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-05-15

[21] BTD/AMS VES-02 for PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].

2012-05-08

None

2012-05-01

None

15 PRODUCTION

01 GENERAL

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 9 Minutes
Tuesday, May 15, 2012

01 PUBLICATION

Publish date:	2012-05-18	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-05-15-PM-08
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

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03	Mr. Steve Bluemner	Ameren	314-972-4160	sbluemner@ameren.com
02	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
04	Mr. John Boyer	BT Drainage	217-822-6593	john@btdrainage.com
06	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com
08	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
09	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
10	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EAP	Emergency Action Plan
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-05-15	OPEN - no issues.
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-05-15	OPEN - no issues. None projected for 2x week look ahead or for Illini Drilled [IDF].
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues. AAA electric to be on site 05-01 to go over EWO details.

03 EMPLOYEE DRUG TESTING

2012-05-15	OPEN - no issues. J. Boone indicated Chesapeake Containment will have list by next Progress Meeting. Some workers will already have AER badges in good standing. BT Drainage will have projection today [05-15]. The borrow site [CBS] will not require AER badge/CBT/DT, only AMS safety training.
2012-05-08	OPEN - no issues. Illini Drilled 1x workers to be scheduled for 05-08. AER to schedule 1x worker for Massmann and 2x TSI workers by EOM.
2012-05-01	OPEN - no issues. Illini Drilled 2x workers to be scheduled for 05-07.

04 AMS SAFETY

2012-05-15	OPEN - no issues. J. Tasich reported on site specific emergency action plan [EAP]: [01] Shelter area to be cleaned today [05-15], and will be on going procedure. [02] Water training was completed for installation of the "stop logs". [03] Refining Item No. 05.05-2012-05-15 below, bees swarming on GEO trailer, have been sprayed. Workers for AMS are to note on their new employee form allergies such as to bee stings. The employee is required to notify the Site Manager of such allergies. In the case of a bee [or insect sting], each worker is responsible to carry their own medication, such as an "epi-pen" [Epinephrine Auto-Injectors] accordingly.
2012-05-08	OPEN - no issues. Water training to take place today for work on Pond A and B [some work already completed before water in the areas of work on Pond A]. J. Tasich reported on site specific emergency action plan [EAP]: [01] Shelter areas has supplies. [02] AMS will have cleaned out [dirt from varmints, etc...]. [03] Signs will be posted by next week. [04] EAP will be reviewed at the safety luncheon [today]. AMS stepped out of meeting for a corporate "all-hands" safety conference call commemorating the following: [01] Charah/AMS 2,000,000 [two million] man-hours without lost time milestone. [02] Mine Safety Health Administration [MSHA] Sentinel of Safety Award for no lost time incidents in 2010 at Charah' s Brickey's limestone grinding facility [we are supplier to Ameren Missouri]. [03] North Carolina Department of Labor Gold Level Safety Achievement Award for the Charah Roxboro site [a large site where Charah manages fly ash, bottom ash, gypsum, and landfill projects].
2012-05-01	OPEN - no issues. M. Wagstaff requested [in EWO] 'stop log" adjustments in Pond A and Pond B. AMS workers will receive water training for this work. Next week is the monthly safety luncheon.

05 HOUSEKEEPING

2012-05-15	OPEN - See Item No. 05.04-2012-05-15 above regarding bees swarming at GEO trailer.
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues. AMS policy all workers drug test before on AMS site. J. Tasich to set up site in Robinson, IL. Nomenclature for drug testing is such that a positive result = bad [drugs found] whereas a negative result = good [no drugs found].

06 PLANT ACCESS - CBT BADGE

2012-05-15	OPEN - no issues. Projection 1x to 2x at EOW, possibly 10x for BTD. M. Wagstaff to issue gate log again. P. Zinsious request copy [not received].
2012-05-08	OPEN - no issues. M. Wagstaff e-mailed 6x WKS gate log to J. Denham, and he requested every 2x WKS. M. Wagstaff inquired on CC - for now J. Denham and P. Zinsious.
2012-05-01	OPEN - no issues. Badges [consultant] switch over no-issue. J. Denham requested AER provide gate log once a month.

07 VEHICLES ON SITE

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues. GEO to bring "gator" [utility vehicle] on site. AMS to bring second pick up truck on site for A. Driver. AMS will provide safety flags for both vehicles.
2012-05-01	OPEN - no issues

08 OSHA LOG - WORK HOURS

2012-05-15	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-014
No incidents or accidents.	
1,945.50	RT
0,000.00	OT
1,945.50	TOTAL
2012-05-08	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-07
1,555.50	RT
0,000.00	OT
1,555.50	TOTAL
2012-05-01	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 04-30
1,327.00	RT
0,000.00	OT
1,327.00	TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-05-15 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[04] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[09] Total

2012-05-08 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current Correction in crew size for 05-01 below [not discussed at the meeting]
[01] Geotechnology [work hours not
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[10] Total

2012-05-01 OPEN - AMS and Belt Construction on site. Koberstein declined. Corrected count for 04-24 below.
Current
[01] Geotechnology
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
~~[00] Laborers~~ [01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[01] Foreman [Full time]
~~[08] Total~~ [09] Total

02 WORK HOURS

2012-05-15 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt to work 4x D 10x HRS due to dry weather [internal cost to AMS]. When Chesapeake comes on board, they may work 12x HRS a day maximum due to instrumentation calibration procedures required in the specifications.

2012-05-08 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Chesapeake may work extended hours.

2012-05-01 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Corrected time below.

03 OVER TIME

2012-05-15 OPEN - Belt has projected OT per Item No. 06.02-2012-0515 above.

2012-05-08 OPEN - None projected at this time. Referencing Item No. 06.02-2012-05-07 above - Chesapeake may have OT.

2012-05-01 OPEN - None projected.

04 TRAILER [AND GENERAL CONDITIONS]

2012-05-15 OPEN - no issues.

2012-05-08 OPEN - no issues.

2012-05-01 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-05-15 OPEN - no issues. BT Drainage by EOW.

2012-05-08 OPEN - no issues. BT Drainage in progress.

2012-05-01 OPEN - no issues. Koberstein declined. Replacement subcontractor in review - BT Drainage.

02 SUBMITTALS

2012-05-15	OPEN - no issues. In progress - P. Zinsious to meet with J. Cravens today [05-15] to review log. Pump information to be re-submitted [again] due to identification.
2012-05-08	OPEN - no issues. In progress - P. Zinsious to revise log information by EOW and review mechanical.
2012-05-01	OPEN - no issues. In progress - M. Wagstaff request mechanical submittal be checked for missing pump information. AER has returned mechanical, electrical, and liner submittals.

08 MATERIAL

01 GENERAL

20120-05-15	OPEN - R. Porter reports pipe ordered for relocation connection to the manhole. Details in Item No. 12.1.04-2012-05-15 below.
20120-05-08	OPEN - no issues. See below for meetings. [date corrected]
20120-05-01	OPEN - no issues. All HDPE liner on site [72 rolls] as of 05-01.

02 GEOMEMBRANE PRE-CON MEETING

20120-05-15	OPEN - no issues.
20120-05-08	NEW - Meeting during Progress Meeting with Mr. Ryan Clark - Chesapeake Containment [CCS]. [01] 05-29 first day of deployment. [02] Mobilization will take place prior to first day of deployment. Badges, drug testing, and safety training required before. [03] Safety glasses to have foam gasket. [04] CCS discussed proposed panel layout and Geotechnology agreed that given the low slope (5%) that downslope orientation is not as critical. CCS to provide revised proposed panel layout. [05] All CCS vehicles will need magnetic signage. [06] CCS trailer can be left on-site. [07] AMS to provide operator for deployment. [08] AMS lag from liner start to clay placement is about 6 days. [09] CCS will have tensiometer certifications on-site and provided to Geotechnology. [10] All pipe boots are to be welded to HDPE gas vent pipe as shown in detail. [11] There are some repairs needed in the existing HDPE lined ponds. CCS will patch while on-site. [12] CCS [NMA] site extension has been filed, process of finalize site meeting and agreement with local labor union. [13] Expected manpower on-site is 12x workers working 10 hours+/- per day, 6x days a week with 7th day as a make-up day. [14] Any disturbed are requiring re-compaction to be looked at on case-by-case basis with GEO/AER. [15] Mr. Matt Garland - CCS General Superintendent will be coordinating the final schedule. [16] R. Clark will go out to pond to inspect progress and check on condition of delivered materials.

03 CAP VENT PRE-CON MEETING

20120-05-15	OPEN - Mobilization date moved to 05-21.
20120-05-08	NEW - Meeting after Progress Meeting with Mr. Bill Kelly - Illini Drilled Foundations [IDF]. [01] 05-14 first day of deployment. [02] Discussion of submittal and installation of the cap vents. [03] IDF will have different size spacers on site to accommodate change in the bore hole size. [04] Drill rig will have approximately 50 FT tall mast. [05] IDF can adjust mast a few degrees to accommodate for the slope on the ash pond. If required AMS will level out area. [06] Any disturbed are requiring re-compaction to be looked at on case-by-case basis with GEO/AER. [07] Duration estimated at 3x days for all cap vents. [08] Safety glasses to have foam gasket. [09] B. Kelly will go out to pond to inspect progress and check slope.

04 PERFORATED COLLECTOR PIPE [PCP] PRE-CON MEETING

20120-05-15	NEW - Meeting after Progress Meeting with Mr. John Boyer - B&T Drainage [BTD] [01] M. Wagstaff inquired as to small business status. J. Boyer indicated no, as past 3x years BTD did under $ 28M. [02] Presentation of the "Excavation Work Plan for the Perforated Collector Pipe". [03] General review by all. [04] Plan to be edited for GCL. Was not presented as GCL, as not approved. [05] M .Wagstaff indicated alignment of PCP is flexible. [06] PCP can go direct into the Dewatering Sumps, "A-Lock" type seal with clamp. [07] J. Boyer concerned over Monitoring Well No. 2 [MW-2]. AER indicated see when get to that point if demo. [08] Spoils transfer by "tag-team" excavators. However, there may be no spoils above the GCL elevation. [09] General discussion that welding HDPE inside the trench boxes is a safety issue due to small work area, water, and access. J. Boyer proposed a PVC pipe option. The focus for this alternate is safety, but there is a possible cost savings as well. The pipe thickness could be an DR 14 [approximate thickness 3/4 IN] or DR 18 [approximate thickness 1/2 IN] per J. Boyer. There is flexibility in the shorter pieces of pipe, the mechanical connections, primarily her would be "bell and spigot". BTD to research price for PVC, and AER to review with Hanson. [10] If the bedrock cannot dug with and excavator, then pipeline can be raised. This creates issue with the manholes [dewatering sumps - reference Item No. 09.01-2012-05-08 below] height. If they cannot be adjusted with the ring[s], then area they protrude above the plan grade can be adjusted in the field. Barrel heights come in 16 IN, 32 IN, or 48 IN heights. [11] Projected manpower is 3x Operators [or more] and 3x Laborers. [12] Duration is approximately 30x D.

[13] Dewatering will be by well point. Illini Drilled will drill well points [next week].
[14] Issue of water volume from the dewatering operation. Could possibly be millions of gallons. J. Boyer indicated amount not known, but possibly the areas of the bedrock in a "valley" might be able to be pumped down, but this depends on the length of the "valley". Pumps in the well points will operate 24/7, in any order, one or more at a time. In the beginning all pumps will be operating. This may create an issue for the adjacent property owner [farmer] who pumps ground water for irrigation.

[15] Issue of water volume disposal into the ponds. M. Wagstaff will research what is required for pumping into the ponds and what is required for the pond elevation relative sampling of the discharge by AER [and paid for by AER].
[16] The well point will pump system will have safety fence, light, and the power cord above ground in a conduit.
[17] Delivery of the dewatering sump structures are 2 WKS [after approval].
[18] Discussion of the diameter and the thickness of the manhole barrel. M .Wagstaff indicated as long as buoyancy [reference Item NO. 09.01-2012-05-08-03 below] good, alternates will be acceptable. Possible options are larger base and matt [concrete] at base such as a 4 FT DIA MH with larger base [J. Boyer indicated may install larger base for BTD insurance].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-05-15	OPEN - [01] See Item No. 08.04-2012-05-15 for PCP Pre-Con Meeting and submission of the Excavation Plan. [02] Corrected ring description below in body of text. [03] No tax exemption if materials not purchased in Illinois.
2012-05-08	OPEN - [01] Excavation plan is to be prepared by professional engineer. [02] VES-01 for Bentonite M. Wagstaff indicated is approved [reference 12.1.09-2012-05-08 EWO-09 below]. [03] P. Zinsious indicated manhole as shown on drawings not a standard size. Brief discussion - M. Wagstaff indicated any [close] standard size is acceptable if the buoyancy calculations are approved. [04] Review of process if the rock is not "dig-able". M. Wagstaff indicated that Hanson understands the rock may not "dig". Once work begins, and if the rock does not "dig", the PCP can be raised [partially] or all the way out of he rock and set on the rock. Elevation [and alignment] can be made in the field. Pump structure can be made in ~~sorter~~ shorter ring height to accommodate the change in elevations if necessary.
2012-05-01	OPEN - BT Drainage [01] Deepest projected part of excavation is 22-23 FT. [02] J. Denham indicated the rock may not dig, requested AER consider raising the line above the bedrock line.

10 QUALITY CONTROL

01 GENERAL

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues

02 ASH

2012-05-15	OPEN - no issues. J. Cravens Section A and C approximately 50 point for ash compaction density tests have been performed to date. All test have to date have passed in the range of 99% to 114% compaction. GEO technician Mr. Tim Wilson will be back on site tomorrow [05-16]. Massmann is to download files for GEO locations.
2012-05-08	OPEN - no issues. On going process. Compaction testing possibly scheduled for 05-09.
2012-05-01	OPEN - no issues. On going process.

03 CLAY

2012-05-15	OPEN - no issues. Samples taken yesterday [05-14]. The physical analysis will be by Holcomb and the chemical analysis will be by ARDL. Results should be in by next mid-week or before.
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-05-15	OPEN - Review of schedule to date. M .Wagstaff on vacation 05-15 to 05-22. [01] Actual percent completion on ash pond sectors: A = 100%, B = 90%, C = 100%, D = 85% [02] 05-11 - Lamac survey for "as-built" [record drawings] of the pipe relocation. [03] 05-29 - BTD start date projection for PCP. [04] Brief discussion electrical [AAA] and mechanical [FWI] scope.
2012-05-08	OPEN - Review of schedule to date. [01] Documented rain days: 05-04 and 05-07. P. Zinsious published e-mail with dates [on 05-07 shows total 5x days so far]. [02] Actual percent completion on ash pond sectors: A = 95%, B = 75%, C = 95%, D = 80% [03] 05-08 - Geomembrane Pre-Con Meeting [with AER and GEO during the Charah/AMS conference call]. [04] 05-10 - projected date for GEO compaction testing.

		[05] 05-11 - J. Cravens off-site. GEO to have 2x men: Tim and Ron. [06] 05-14 - Massmann on site to survey ash cap certification and fence alignment for AER. [07] 05-14 - Lamac on site to survey/locate cap vents. [08] 05-29 - Chesapeake to begin work.
	2012-05-01	OPEN - Review of schedule 04-30. [01] Schedule critical path and look ahead reviewed. [02] Actual percent completion on ash pond sectors: A = 90%, B = 70%, C = 90%, D = 75%. [03] Activity No. 106 cap vents still scheduled for 05-14 as shown on 04-30 schedule. [04] Compaction testing for ash and surveying to be coordinated for same time if possible. Surveyor can come out twice. [05] Build pads for cap vent drill rig. [06] Discussion on the liner schedule and Memorial Day holiday. Verify day after the holiday.

02 TIME AND MATERIAL

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues

03 COORDINATION

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues.
2012-05-01	OPEN - no issues.

12.0 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-05-15	OPEN - no issues.
2012-05-08	OPEN - EWO list reviewed, numbers and descriptions to be corrected in minutes.
2012-05-01	OPEN - no issues.

02 AMS PAY APPLICATION

2012-05-15	OPEN - AMS submitted pay application. M. Wagstaff indicated no issues, and that the revised AER PO is in process.
2012-05-08	OPEN - M. Wagstaff approved the draft pay-app for submittal as invoice. AMS to send copy of draft to J. Cravens.
2012-05-01	OPEN - M. Wagstaff indicated signed off with AER, should be reviewed by EOW. Invoice for stored materials on the HDPE liner.

12.1 EXTRA WORK ORDERS

01 EWO-01 ELECTRIC TEMPORARY

2012-05-15	No issues. 100% complete.
2012-05-08	Work is completed. Cost was audited with subcontractor, AMS to provide partial credit [reference EWO-08 below].

02 EWO-02 ASH PLACEMENT - CAP MODIFICATIONS

2012-05-15	No issues. In progress.
2012-05-08	OPEN - In progress. Spoils can go into Ash Pond D, and on the slopes as clean. Material opt be monitored by GEO and AMS. Consensus is the ash will balance.
2012-05-01	OPEN - In progress. Spoils can go into Ash Pond D, and on the slopes as clean. Material opt be monitored by GEO and AMS. Consensus is the ash will balance.
2012-04-24	OPEN - AER to provide interim e-mail stating approval for this work to AMS.

03 EWO-03 COAL PILE

2012-05-15	No issues. 100% complete.
2012-05-08	OPEN - Work completed [05-08 dozer working to fine grade area], final grade for drainage to be finished.
2012-05-01	OPEN - Work completed. Area to be observed for drainage. Date corrected below 04-24.

04 EWO-04 PIPE RELOCATION

2012-05-15	OPEN - work in progress. R. Porter reports pipe is ordered for the connection, and scheduled for installation next week on Monday [05-21]. The connection to the manhole will be a short piece of SDR 35 PVC pipe connected to the HDPE with a stainless steel repair coupling. The interior of the manhole will be patched with non-shrink grout, the exterior with the "A-Lock" ring and concrete. Details will be provided on the plan and profile record drawings for this line.
2012-05-08	OPEN - work in progress. AMS briefly described process of moving pipe from existing elevation into the new trench. Pipe will be slinger on the end at current elevation and at the new elevation. Connector fitting for the manhole fitting on site 05-08.
2012-05-01	OPEN - In progress. Pipe is exposed, and ready to begin lowering. AMS recommending removal of the pipe to be demolished and filled with

05 EWO-05 ELECTRIC FEEDER

2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.
2012-05-08	OPEN - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.
2012-05-01	OPEN - in progress. Meeting after progress meeting with AAA Electric.

06	EWO-06	POND A TRENCH	
	2012-05-15	No issues. Work 100% complete.	
	2012-05-08	NEW - Work completed for trench excavation. The weir structure "stop logs" are to be installed in Pond A and Pond B.	
07	EWO-07	ELECTRIC OVERHEAD	
	2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.	
	2012-05-08	NEW - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.	
08	EWO-08	CREDIT TO EWO-01	
	2012-05-15	OPEN - in progress.	
	2012-05-08	NEW - In progress [reference above].	
09	EWO-09	BENTONITE VES-01	
	2012-05-15	OPEN - in progress. M. Wagstaff indicated that yesterday [05-14] Hanson approved the AMS response comments to the Hanson submittal review. GSE to provide pricing and AMS to calculate EWO.	
	2012-05-08	NEW - M. Wagstaff indicated approval. Hanson has provided submittal review, and AMS in process of reply.	
10	EWO-10	FLOW-ABLE FILL CREDIT	
	2012-05-15	OPEN - in progress.	
	2012-05-08	NEW - Discussed previously [reference Item No. 09.01-2012-04-24 No. 07] pipe can be removed and go direct to manhole, eliminating the flow-able fill.	
11	EWO-11	BUILDING SPOILS REMOVAL	
	2012-05-15	OPEN - in progress. AMS to dig test holes by EOW.	
	2012-05-08	NEW - Excavation along Station 29+00 at fence line uncovered building spoil material within limits of the ash pond. M. Wagstaff requested exploratory holes dug along the fence line to determine the extent of the foreign material. AMS will dig holes at 100 FT intervals, and if something is uncovered will go to 50 FT intervals to determine the extent of the material. AMS will excavate the material to a predetermined depth by GEO/AER. Material excavated out will be disposed of within the ash pond, in the are east section where lower elevations are still being worked. A dump truck will have to be used to transport the material within the pond. Material adjacent to the pond that extends under the road is to remain in place and not to be disturbed.	

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-05-15

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [CLOSED - drawing issued]

[24] Research with Hanson PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].

[25] Research with Hanson alignment of the discharge piping structure at the outfall man hole. AER original design took into consideration a "mixing zone". R. Porter indicated since the line pipe relocation alignment can be direct. Discussion of the grade to be field adjusted around the box if new location is approved.

2012-05-08

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

2012-05-01

[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

[23] NEW - M. Wagstaff to provide drawings for the existing MCC. [OPEN - drawings received. AAA may require additional drawings. M. Wagstaff offered to post on ftp. [CLOSED - reminder site cleared 5th of month by AER]

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-05-15

[21] BTD/AMS VES-02 for PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].

2012-05-08

None

2012-05-01

None

15 PRODUCTION

01 GENERAL

2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues
2012-05-01	OPEN - no issues

02	**ASH**	
	2012-05-15	OPEN - no issues. Estimated 89,098 CY EOD 05-14
	2012-05-08	OPEN - no issues. Estimated 77,320 CY EOD 05-07.
	2012-05-01	OPEN - no issues. Estimated 70,988 CY EOD 04-30.
03	**CLAY**	
	2012-05-15	OPEN - no issues - this activity not begun.
	2012-05-08	OPEN - no issues - this activity not begun.
	2012-05-01	OPEN - no issues - this activity not begun.

16 DOCUMENTS TRANSMITTED

2012-05-15	[01] BTD - Excavation Work Plan for the Perforated Collector Pipe [5x to 6x copies] [02] BTD - Certification [for above].
2012-05-08	None
2012-05-01	[01] AMS - Schedule dated 04-30 - critical path [02] AMS - Schedule dated 04-30 - look ahead [03] AMS - Schedule dated 04-30 - full [03] AMS - Value Engineering Submittal VES-01 - Bentonite cap option [04] AMS - Contact list HUT-APD-CON-2012-04-30

17 DOCUMENTS REVIEW ONLY

2012-05-15	None
2012-05-08	None
2012-05-01	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, May 22, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTO LOG



Photograph 1 - Relocated 18" HDPE pipe facing east



Photograph 2 - Relocated 18" HDPE pipe facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

JRC



Photograph 3 - Backfilling relocated 18" HDPE pipe facing west



Photograph 4 - Final grading Quadrant D facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

JRC



Photograph 5 - Massmann surveying grid points facing northwest



Photograph 6 - Abandoning monitoring well facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

JRC



Photograph 7 ⮝ - Cutting south embankment facing northeast



Photograph 8 ⮝ - Water seeps in Quadrant D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

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Photograph 9 ⮝ - Removing concrete casing by manhole facing east



Photograph 10 ⮝ - Moisture/density testing facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

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Photograph 11 - Preparing box culvert pad facing north



Photograph 12 - Watson 1500 drill rig facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

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Photograph 13 - Sewer pipe for manhole ingress facing northwest



Photograph 14 - Final grading Quadrant B facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

JRC



Photograph 15 ⮝ - Overview Ash Pond D facing southeast



Photograph 16 ⮝ - Overview Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 14 and May 18, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: May 29, 2012

SUBJECT: Weekly Summary Report for May 21, 2012 to May 25, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 55 to 76°F, and temperature highs ranged from 73 to 92°F. Weather delays did not occur this week.

Construction Activities

Ash grading, cap vent installation, dewatering well installation, pipe relocation with manhole ingress, compaction testing, and surveying occurred this week. Ash and embankment finish grading occurred on the eastern half of Ash Pond D. After grading was completed, Ash Pond D was smooth drum rolled in preparation for the geomembrane placement. The pipe and fittings for the relocated HDPE pipe and manhole ingress were installed, concrete was placed over the connections and ingress, and the remainder of the exposed HDPE pipe was backfilled, completing EWO-04. Compaction testing generally occurred on the eastern half of Ash Pond D on May 23, 2012. Refer to compaction field forms for additional information. Massmann Surveying surveyed final ash grade on the eastern portion of Ash Pond D on May 23, 2012. Every grid point tested and surveyed was approved, and Ash Management Services, LLC was given the notice-to-proceed to begin the geomembrane placement. Lamac Engineering Co. surveyed the location for the perforated collector pipe (PCP). Seven cap vents were installed by Illini Drilled Foundations, Inc. on May 21 and May 22, 2012. Refer to Daily Reports for more information. Illini also installed four dewatering wells for the PCP; two wells south of Pond A, and two wells south of Pond D.. Refer to Daily Reports for more information. B&T Drainage began pumping well number two, discharging groundwater into Ash Pond B.

Equipment and Personnel On-Site

2-CAT D6N Bulldozer
CAT D6H Bulldozer
CAT 325C Excavator
CAT 330D Excavator
CAT 613C Water Truck
John Deere 9520 Tractor with 2-1812C John Deere Scraper (Pan)
Sky Track 6036 Forklift
Wacker RT Trench Roller
John Deere 410J Backhoe
Case 580 Backhoe
Ingersoll Rand SD-122DX Roller
Watson 1500 Drill Rig (Illini Drilling)
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens, Tim Wilson, Anna Saindon
Ash Management Services, LLC (AMS) – Randy Porter, Jon Dietzel, Jimmy Boone, Robert Dunkley, James Marks, Shawn McClaskey, Brad Bolenbaugh, and Johnny McGrew
Belt Construction, Inc. – Jared Belt, Nick Walker, Kevin Flynn, and Shelby Belt
Charah, Inc. – Joe Tasich
Massmann Surveying – Gary Delf and Rick Koeac
Lamac Engineering Co. – Jake Lewis
Illini Drilled Foundations, Inc. – Nick Roberts, Ernie Thomas, Troy Harwood, and Chuck Hines
B&T Drainage – John Boyer, Chase Boyer, and Eric Blankenship
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, May 22, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Ash and embankment material within the footprint of Ash Pond D on the eastern half was graded.

Testing/Sampling

Moisture and density testing occurred on May 23, 2012. Refer to compaction field forms for additional information. Survey of the final ash pond grade on the eastern half of Ash Pond D occurred May 23, 2012. Survey of the PCP location occurred May 22, 2012.

Calibration Records

Calibration information was not obtained for equipment this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13802

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 5/21/12

TIME: Arrive: 6:30 AM | Depart: 6:30 PM | Travel: 1.0 hr | Total: 12.75 hr (0.25 hr for lunch)
Weather: Partly Cloudy, 68° AM, 73° PM | Contractor: AMS | Subcontr./Supplier: Belt/Illini/BTD
Equipment Working: 2-D6N Dozers, 9520 Tractor, 1-1812C Pan, 325C Excavator, Water Truck,
Site Activities / Observations / Contacts / Notes: 1500 Watson Drill Rig, 410J Backhoe

Belt Construction/AMS:

The D6N (Brad) continued finish grading Section B. The D6N (Jared) continued finish grading Section B and D, and graded the stockpiled embankment material to allow the scraper to pick it up, as well as performed embankment restoration. The 9520 cut embankment material outside the Pond along the south and east embankments, and moved it to the major fill area along the axis of Section B and D. The 325C (Johnny Mcgrew) assisted with moving the 18" HDPE Pipe and the SDR-35 PVC Pipe for the manhole ingress. The HDPE and PVC pipes had to be cut to adjust the alignment of the PVC Pipe and to make the 90° fitting work. The stainless steel/rubber water main fitting was too small for the HDPE Pipe. A Fern Co. coupling was ordered and the manhole ingress and pipe relocation will be completed tomorrow. James Marks, Randy Porter, and Jonathan Dietzel assisted with the pipe. Jon Dietzel is with AMS's focus group and will be working under Randy for the next 2-8 weeks.

Illini Drilled Foundations/B&T Drainage:

BTD (John Boyer and Eric Blankenship) brought a John Deere 410J Backhoe to assist Illini since they will be drilling the dewatering wells. The 410J (Eric) moved Illini's cuttings to the major fill area, and moved/poured the rock for the cap vents. Illini - Troy Harwood (Field Operations Manager), Nick Roberts (Driller), Ernie Thomas (Helper). The HDPE Pipe (4" perforated), filter sock, and centralizers, did not arrive till this afternoon. Therefore, all holes (7 cap vents) were drilled first. Two of the holes stayed open without casing, so they used an 18" Auger. All other holes required casing, so they used a 24" Auger. Two loads of rock was delivered for the backfill. Four of the seven cap vents completed (#1, 2, 4, and 5).

Additional Comments: Will copy all the Driller's records tomorrow for details.

Randy Porter — Contractor Representative — AMS — Company — 5-21-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 5-28-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13803

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/22/12

TIME: Arrive: 6:30 AM | Depart: 7:15 PM | Travel: 1.0 hr | Total: 13.75 hrs (no lunch)
Weather: Sunny, 55°AM, 78°PM | Contractor: AMS | Subcontr./Supplier: Belt/Illini/BTD/Lamac
Equipment Working: 1-D6N Dozer, 9520 Tractor, 1-1812C Pan, 325C Excavator, Water Truck, Sky Trak
Site Activities / Observations / Contacts / Notes: 6036 Forklift, 1500 Watson Drill Rig, 410J Backhoe

Belt Construction/AMS:

The D6N (Jared) continued grading the stockpiled embankment material outside the Pond along the east embankment to allow the material to be picked up by the scraper. The D6N also performed embankment restoration, finish grading in the last fill area along the axis of Section B and D, and covered the 18" HDPE Pipe to the fitting connecting the SDR 35 PVC Pipe. The 9520 finished cutting the material along the east embankment, filling the last fill area, and graded the entire pond with the drag blade.* Ash placement and finish grading has been completed. The only remaining earthwork consists of the remaining work around the manhole. The 325C (Brad) assisted with the HDPE Pipe manhole ingress by lifting pipes when necessary. The 6036 (Brad) also assisted with the ingress by hauling materials including concrete bags and fittings. Randy, James, and Jared put on the new pipe fitting (force main coupling), hooked up pipes, and poured the concrete collar around the SDR 35 ingress into the manhole. James put up orange fence around the box culvert. The concrete collar around the coupling and 45° fitting will be completed tomorrow, as well as backfilling the pipes. AMS hired another laborer - Shawn McClaskey. He did CBT training with Joko and was badged at Newton. James and Shawn began taking down the mesh on the west side fence.

Lamac Engineering:

Jake Lewis staked the locations for the PCP every 50', with 30' offsets. On the east end, south of Pond D, the PCP was too close to the wood line. Therefore, on the west end of Pond D, the PCP was offset 10' north at the kink, and the PCP was offset 20' north on the east side of Pond D at the end of pipe. The PCP location in between these points was adjusted accordingly. An as-built will be produced.

Additional Comments: 1 of 2 Next Page

Randy Porter — Contractor Representative — AMS — Company — 5-22-12 — Date
Signature
Anna Saunders — Geotechnology, Inc. — 5-25-12 — Date
Engineer's Signature

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(1 of 2)

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13805

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 5/22/12

TIME: Arrive: | Depart: | Travel: | Total:
Weather: | Contractor: | Subcontr./Supplier:
Equipment Working: REFER TO PAGE ONE (1)

Site Activities / Observations / Contacts / Notes:

Illini Drilled Foundations / BTD:

All 7 cap vents have been drilled and installed. The driller's records were copied, which contain the shaft depths, diameters, and numbers. The filter socks on the 4" HDPE vents covered all of the perforations, with the centralizers acting as clamps. River rock was used to backfill the vents. The top cap vent assemblies came pre-fabricated per detail 5 of sheet 10 of drawing 5-386 (Rev. G), except for the top threaded cap and mesh strainer cap. These will be shipped and installed tomorrow. The assemblies were welded to the top of the vents with a McElroy Pit Bull 14 Fusion Machine. The 410.1 (Eric) removed the auger cuttings, backfilled the cap vents, and assisted with moving drilling equipment. John Boyer delivered 4 slotted 18" casings for the dewatering wells. Illini drilled 3 dewatering wells and installed the casings. Dewatering Wells: 2 wells south of Pond A and 2 wells south of Pond D. The cuttings from the most eastern well (next to Wabash River) consisted of clayey material. The cuttings from the other 2 western wells were sandy material. The casings were backfilled with pea gravel up to 10', and the upper 10' with river rock. All wells were drilled to bedrock. Wells were drilled with a 30" and/or 36" Auger. Illini will return on Friday to drill the last well. BTD will install the pumps next week, and they will have to be monitored daily. The water will be pumped into Ash Pond B, as long as it can keep up with drainage.

Misc.:

Wacker RT Trench Roller picked up (never used). Delivered: Ingersoll Rand (IR) SD-122DX Steel Drum Roller and CAT 613C Water Truck to assist Roller. Jon Dietzal and Johnny at CBS today. As of today, Brad Bolenbaugh is now an AMS operator. Belt will begin demobilizing the rest of the week, but will leave a D6N Dozer.

Additional Comments: AAA's Overhead and Feeder Bid is still under review for acceptance.

Randy Poston — Contractor Representative — AMS — Company
Randy Poston — Signature — 5-22-12 — Date
Anna Sgindon — Geotechnology, Inc. — 5-28-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13806

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/23/12

TIME: Arrive: 6:30 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 63°AM, 80°PM | Contractor: AMS | Subcontr./Supplier: Lamac/Massmann
Equipment Working: D6N Dozer, 325C Excavator, 6036 Forklift, SD-122DX Roller, 613C Water Truck,
Site Activities / Observations / Contacts / Notes: Water Truck (Dust Control)

AMS:

The 325C (Brad) placed rock around the remainder of the exposed 18" HDPE pipe. The 6036 (Brad) used the bucket attachment for mixing concrete for the pipe fillings. Randy, Jon, James, and Shawn mixed and placed a thick collar of concrete around the manhole ingress and the pipe fitting/coupling (HDPE to PVC). The D6N (Brad) backfilled the remaining exposed pipes and graded around the manhole, completing EWO-04. The D6N also smoothed out the remaining wet area in Section B. The 325C removed remaining materials off the pond and mobilized outside the embankment to finish disposing of the remaining ADS pipe when another dumpster arrives. The SD-122DX (Brad) began rolling Pond D, while the 613C (Johnny) watered ahead of the roller. James and Shawn continued removing the mesh on the west fence, pulled the remaining grade stakes in the Pond, cleaned around each cap vent, and walked the Pond picking up visible debris. Randy and Jon put back all the PGL stakes from their offsets. The old ingress hole on the manhole was blocked off and filter fabric was used to prevent sediment from entering the manhole.

Lamac:

Jake Lewis finished staking the PCP every 50', with 30' offsets.

Massman:

Gary and Rick completed surveying the ash grade points.

Compaction:

Tim Wilson completed compaction testing.

Misc:

Anna Saindon (CQA Officer) will inspect site tomorrow.

Additional Comments: Currently, CCS is scheduled to work 6 days/week, considering no delays.

Randy Porter — Contractor Representative — AMS — Company — 5-23-12 — Date
Signature — Anna Saindon — Geotechnology, Inc — 5-23-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13807

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 5/24/12

TIME: Arrive: 6:30 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12 hrs (0.25 hr for lunch)
Weather: Sunny, 62° AM, 92° PM | Contractor: AMS | Subcontr./Supplier: Illini/BTD/Belt
Equipment Working: D6N Dozer, 410J Backhoe, 6036 Lift, SD-122DX Roller, 613C Water Truck,
Site Activities / Observations / Contacts / Notes: Water Truck (Dust Control), 330D Excavator, Watson 1500

Illini Drilled Foundations / BTD:
Driller - Chuck Hines, Helper - Troy Harwood. They drilled the fourth well, most western well, south of Pond A. They had to drill a few trial holes with the Watson 1500 to get to the desired depth, passed the cut of the PCP. Dewatering Wells (west to east): D1, D2, D3, D4, with D1 and D2 south of Pond A, and D3 and D4 south of Pond D. D3 was moved across the gravel road and re-drilled to achieve greater depth. 330D (John Boyer - BTD) dug a test pit before drilling D3 to ensure bedrock was at a greater depth. Well Depths: D1 = 16', D2 = 29', D3 = 16', D4 = 22'. When re-drilling D3, a 8"-12" ductile iron pipe was punctured, but it was an abandoned water line to the SE Deep Well. The 410J (John Boyer and Chase Boyer) backfilled the well casings with pea gravel and backfilled test pits. Illini hauled off all parts and equipment except for the drill rig, which was parked in the yard and will be picked up later. Illini will abandon and re-drill MW2 at a later date. After drilling was completed, the 330D (John) dug more test pits south of Pond A to determine depth of rock, and the water table. Rock ranged from 7.5' to 11.0', the soil was generally clay overlying sand, and there was minimal water. The 410J (Chase) filled in these test pits. BTD brought in a CAT XQ0 Generator and a 7.5HP TSURUMI Pump with a 4" discharge. The pump was placed in D2 and was discharged into Pond B. The pump will remain on until tomorrow to determine its affect on the GWT.

AMS: D6N (Brad) and 6036 (Johnny) smoothed out rough areas in Pond D. SD-122DX (Brad) continued rolling Pond D and the 613C (Johnny) continued watering. Shawn continued taking down the fence and flagged the cap vents. James was off today. A 4th dumpster was brought in, and the 3rd one was hauled off.

Additional Comments: Belt demobilized 1-D6N and D6H.
Rolling to be completed tomorrow.

Randy Foster — Contractor Representative — AMS — Company
Signature — 5-24-12 — Date
Anna Saindon — Geotechnology, Inc. — 5-28-12 — Date
Engineer's Signature

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Anna Saindon (CQA officer, Geotechnology) onsite inspection.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13808

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/25/12

TIME: Arrive: 6:30 AM | Depart: 12:45 PM | Travel: 1.0 hr | Total: 7.25 hrs (no lunch)
Weather: Partly cloudy, 76°AM, 90°PM | Contractor: AMS | Subcontr./Supplier: BTD
Equipment Working: 325C Excavator, SD-122DX Roller, 6036 Forklift, Water Truck (Dust Control)
Site Activities / Observations / Contacts / Notes: CCS and GEO to be on site next week. An additional ≈ 15 personnel.

BTD:
Chase Boyer checked groundwater levels in the Wells and fueled the generator to continue pumping. AMS will shut the pump off at the end of the day.

AMS:
Shawn and James filled in Pond around the cap vents and finished taking down the west fence line. SD-122DX (Brad) completed rolling Pond D. The 6036 (Brad) helped Ameren load equipment and materials. The 325C (Brad) partially loaded the dumpster with ADS pipe. Johnny was off today. Randy left early and Jon Dietzel stayed the whole day. The parts from the west fence line will be moved to the construction yard.

Demobilized:
325C, 2-1812C Scrapers, SD-122DX, Watson 1500 Drill Rig
Delivery:
Yesterday - BTD 330D Excavator, Today - AMS Case 580 Backhoe

Equipment and Personnel Update:
AMS - 6036 Forklift, Water Truck, D6N Dozer, 613C Water Truck, 580 Backhoe
Randy, Jon, James, Shawn, Johnny, Brad, Robert
BTD - 330D Excavator, 410J Backhoe
John and Chase

Additional Comments: Yesterday Shawn and Johnny re-fenced generator/pump and provided lights, fire ext., and spill kit.

Jon Dietzel — Contractor Representative — AMS — Company
Signature — 25 May 2012 — Date
Anna Saindon — Geotechnology, Inc. — 5-28-12 — Date
Engineer's Signature

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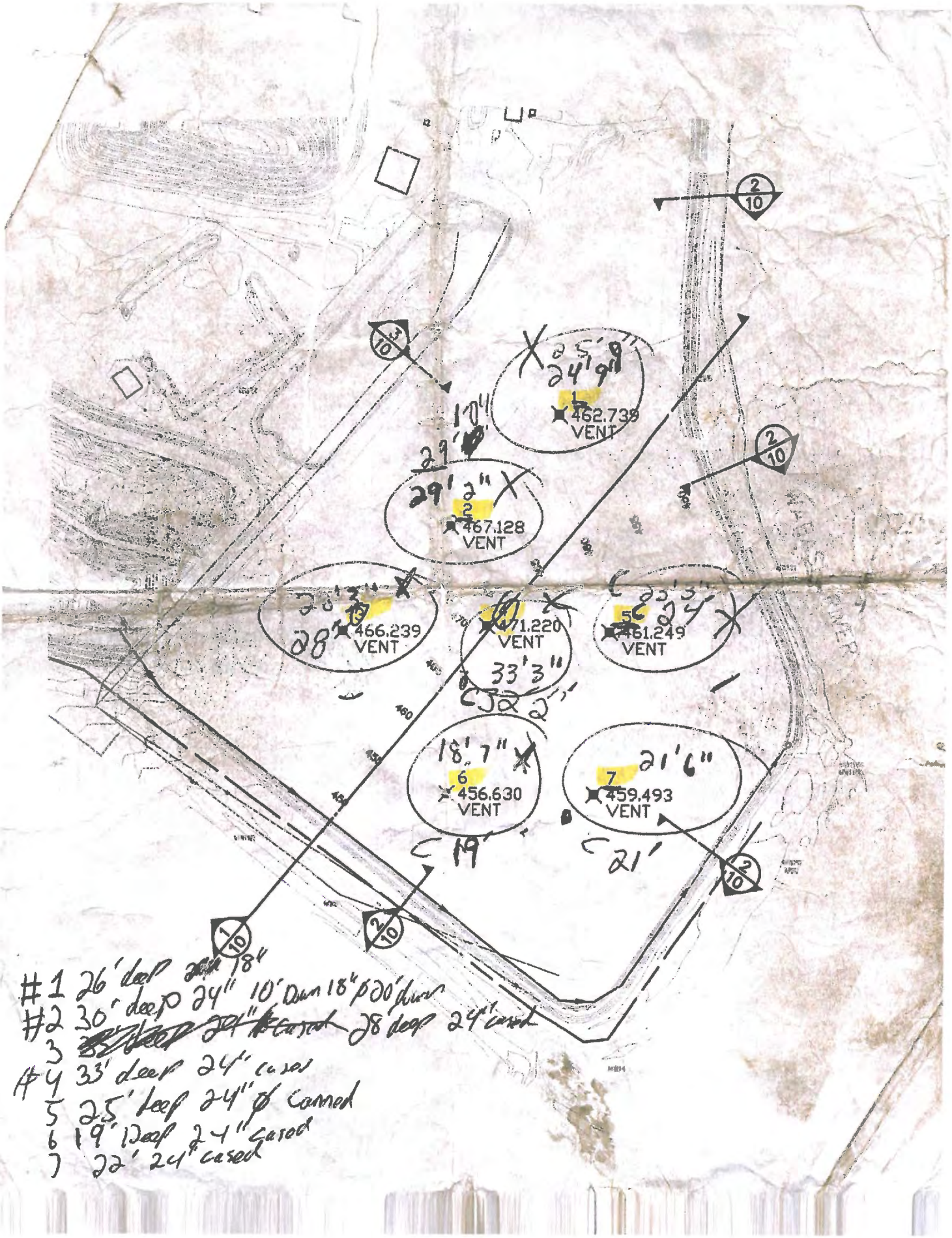
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461.249
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#1 26' deep 18"
#2 30' deep 24" 10' Down 18" ø 20' down
3 28' deep 24" cased
#4 33' deep 24" cased
5 25' deep 24" ø Cased
6 19' Deep 24" Cased
7 22' 24" cased

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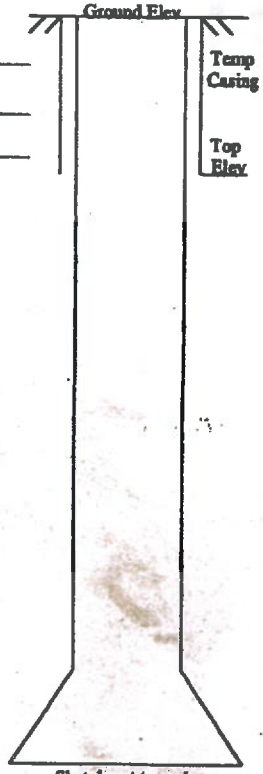
CAISSON FIELD RECORD

Project 1249 Superintendent
Address Foreman
Date Equipment 1500
This report by: Ernie in copies
Caisson location 1 Caisson mark
Date started 5-21 Date finished 5-22
Date bottom observed 5-22 Date concrete placed

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-26'
Caisson Length		26'
Shaft Diameter		24"
Bell Diameter		-
Concrete Volume		-
Grout Volume		-
Lin. Ft. Rock Drilled		26'
Total Depth Drilled		

Field Engineer
General Contractor Rudolph
Remarks:



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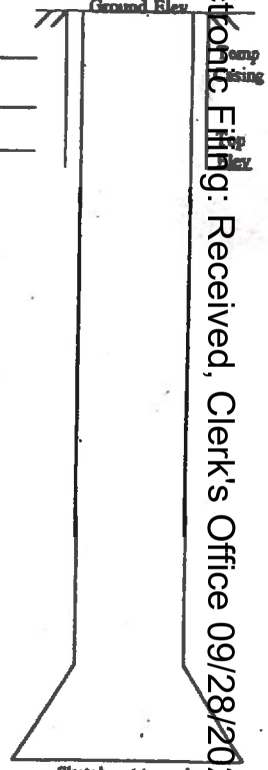
CAISSON FIELD RECORD

Project 12-19 Superintendent
Address Foreman
Date Eqaipment 1500
This report by: Ernie in copies
Caisson location 2 Caisson mark
Date started 5-21 Date finished 5-22
Date bottom observed 5-22 Date concrete placed —

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-30'
Caisson Length		30'
Shaft Diameter		24"
Bell Diameter		—
Concrete Volume		—
Grout Volume		—
Lin. Ft. Rock Drilled		—
Total Depth Drilled		30'

Field Engineer
General Contractor Rudolph
Remarks:



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CAISSON FIELD RECORD

Project _____ Superintendent _____

Address _____ Foreman _____

Date 5-22 Equipment 1500

This report by: Ernie in _____ copies

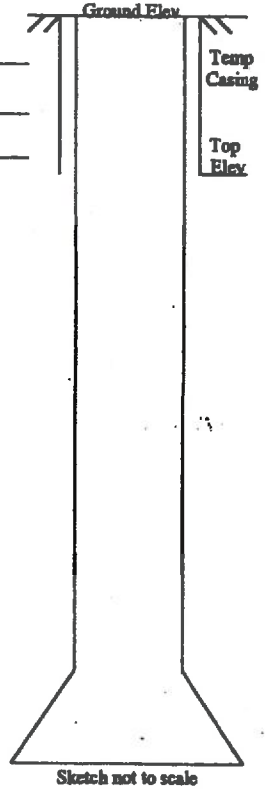
Caisson location 3 Caisson mark _____

Date started 5-21 Date finished 5-22

Date bottom observed 5-22 Date concrete placed —

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-28'
Caisson Length		28'
Shaft Diameter		24"
Bell Diameter		—
Concrete Volume		—
Grout Volume		—
Lin. Ft. Rock Drilled		—
Total Depth Drilled		28'
Field Engineer		
General Contractor		

Remarks:



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CAISSON FIELD RECORD

Project _____ Superintendent _____

Address _____ Foreman _____

Date 5-22 Equipment 1500

This report by: Ernie in _____ copies

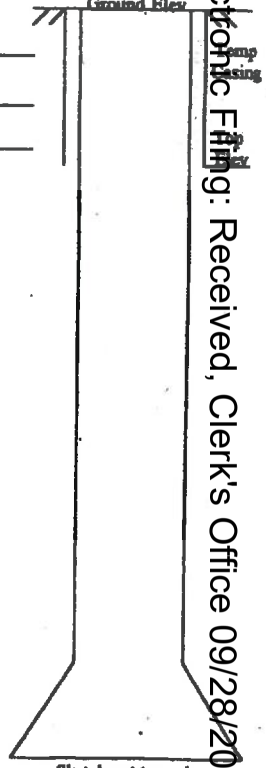
Caisson location 4 Caisson mark _____

Date started 5-21 Date finished 5-22

Date bottom observed 5-22 Date concrete placed —

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-33'
Caisson Length		33'
Shaft Diameter		24"
Bell Diameter		—
Concrete Volume		—
Grout Volume		—
Lin. Ft. Rock Drilled		—
Total Depth Drilled		33'
Field Engineer		
General Contractor		

Remarks:



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CAISSON FIELD RECORD

Project _____ Superintendent _____

Address _____ Foreman _____

Date 5-22 Equipment 1500

This report by: Ernie in _____ copies

Caisson location 5 Caisson mark _____

Date started 5-21 Date finished 5-22

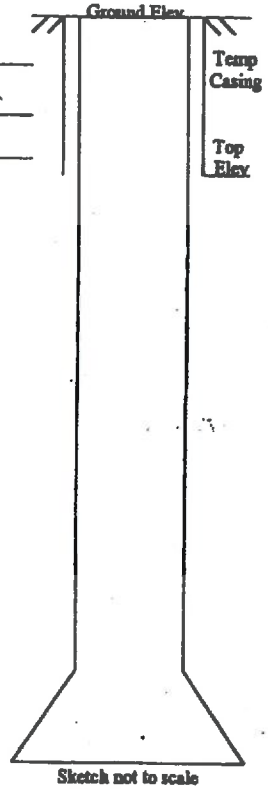
Date bottom observed 5-22 Date concrete placed —

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-25'
Caisson Length		25'
Shaft Diameter		24"
Bell Diameter		—
Concrete Volume		—
Grout Volume		—
Lin. Ft. Rock Drilled		—
Total Depth Drilled		25'

Field Engineer _____

General Contractor Rudy K

Remarks:



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CAISSON FIELD RECORD

Project _____ Superintendent _____

Address _____ Foreman _____

Date _____ Equipment _____

This report by: Ernie in _____ copies

Caisson location 6 Caisson mark _____

Date started 5-21 Date finished 5-22

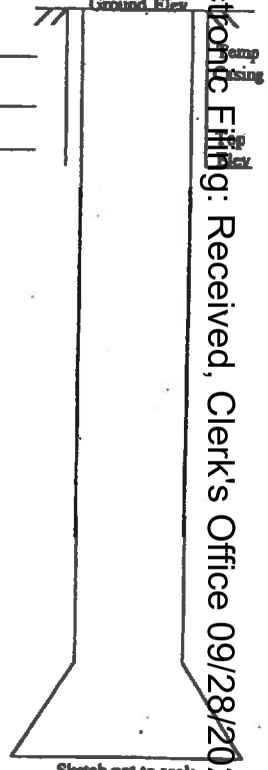
Date bottom observed 5-22 Date concrete placed —

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-19'
Caisson Length		19'
Shaft Diameter		24"
Bell Diameter		—
Concrete Volume		—
Grout Volume		—
Lin. Ft. Rock Drilled		—
Total Depth Drilled		19'

Field Engineer _____

General Contractor Rudy K

Remarks:



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CAISSON FIELD RECORD

Project _____ Superintendent _____

Address _____ Foreman _____

Date 5-20 Equipment 1500

This report by: Ernie in _____ copies

Caisson location 7 Caisson mark _____

Date started 5-21 Date finished 5-22

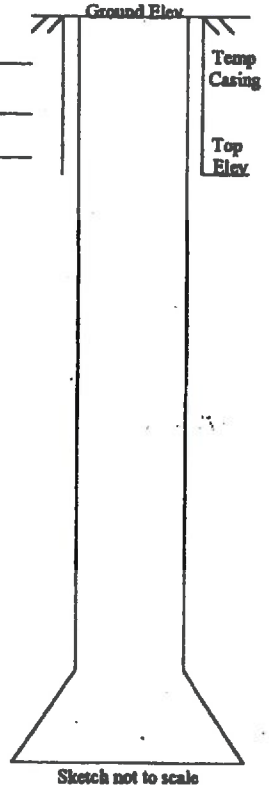
Date bottom observed 5-22 Date concrete placed —

	Design Measurements	Field Measurements
Top Elevation		0
Bottom Elevation		-22'
Caisson Length		22'
Shaft Diameter		24"
Bell Diameter		—
Concrete Volume		—
Grout Volume		—
Lin. Ft. Rock Drilled		—
Total Depth Drilled		22'

Field Engineer _____

General Contractor _____

Remarks:



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CAISSON FIELD RECORD

Project _____ Superintendent _____

Address _____ Foreman _____

Date _____ Equipment _____

This report by: _____ in _____ copies

Caisson location _____ Caisson mark _____

Date started _____ Date finished _____

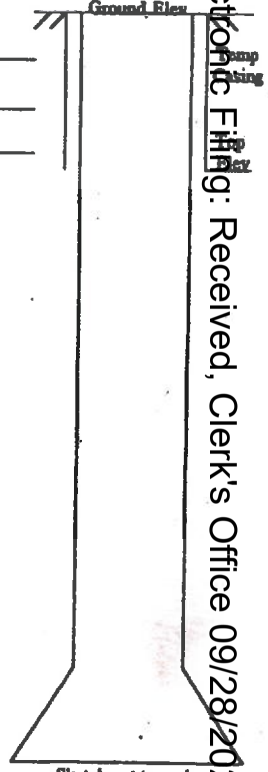
Date bottom observed _____ Date concrete placed _____

	Design Measurements	Field Measurements
Top Elevation		
Bottom Elevation		
Caisson Length		
Shaft Diameter		
Bell Diameter		
Concrete Volume		
Grout Volume		
Lin. Ft. Rock Drilled		
Total Depth Drilled		

Field Engineer _____

General Contractor _____

Remarks:



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MEETING MINUTES

AMS
Ash Management Services

Hutsonville Power Station - Ash Pond D closure
Progress Meeting No. 10 Minutes
Tuesday, May 22, 2012

01 PUBLICATION

Publish date:	2012-05-28	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-05-22-PM-10
AER PO:	567523 R2	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com	
02	Mr. Michael Bollinger	Ameren	314-554-3652	mbollinger@ameren.com	
03	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com	
04	Mr. John Boyer	BT Drainage	217-822-6593	john@btdrainage.com	
05	Mr. Jake Lewis	Lamac Engineering	618-263-8285	jlewis@lamac.net	[part time]
06	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com	
07	Mr. John Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com	
08	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com	
09	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com	
10	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com	

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EAP	Emergency Action Plan
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-05-22	OPEN - no issues.
2012-05-15	OPEN - no issues.
2012-05-08	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-05-22	OPEN - no issues. None projected for 2x week look ahead. Chesapeake Containment [CCS] will use generators.
2012-05-15	OPEN - no issues. None projected for 2x week look ahead or for Illini Drilled [IDF].
2012-05-08	OPEN - no issues.

03	**EMPLOYEE DRUG TESTING**	
	2012-05-22	OPEN - no issues. BT Drainage count in progress. 1x AMS yesterday DT at Robinson [05-21] and 1x AMS today [05-22].
	2012-05-15	OPEN - no issues. J. Boone indicated Chesapeake Containment will have list by next Progress Meeting. Some workers will already have AER badges in good standing. BT Drainage will have projection today [05-15]. The borrow site [CBS] will not require AER badge/CBT/DT, only AMS safety training.
	2012-05-08	OPEN - no issues. Illini Drilled 1x workers to be scheduled for 05-08. AER to schedule 1x worker for Massmann and 2x TSI workers by EOM.
04	**AMS SAFETY**	
	2012-05-22	OPEN - no issues. Next safety luncheon is 06-12. [01] J. Tasich briefing on glove usage for material handling and look out for insects/varmints. [02] Bees at trailer are eradicated. [03] J. Denham briefing on cooling stations, 2x will be set up. [04] Brief discussion on hydrating. Energy drinks not encouraged due to caffeine content. [05] Review of Charah/AMS safety awards [ref. Item No. 05.04-2012-05-08.01,02,03 below]. [06] No cooling station at CBS as workers [operators] in equipment with **AC.**
	2012-05-15	OPEN - no issues. J. Tasich reported on site specific emergency action plan [EAP]: [01] Shelter area to be cleaned today [05-15], and will be on going procedure. [02] Water training was completed for installation of the "stop logs". [03] Refining Item No. 05.05-2012-05-15 below, bees swarming on GEO trailer, have been sprayed. Workers for AMS are to note on their new employee form allergies such as to bee stings. The employee is required to notify the Site Manager of such allergies. In the case of a bee [or insect sting], each worker is responsible to carry their own medication, such as an "epi-pen" [Epinephrine Auto-Injectors] accordingly.
	2012-05-08	OPEN - no issues. Water training to take place today for work on Pond A and B [some work already completed before water in the areas of work on Pond A]. J. Tasich reported on site specific emergency action plan [EAP]: [01] Shelter areas has supplies. [02] AMS will have cleaned out [dirt from varmints, etc...]. [03] Signs will be posted by next week. [04] EAP will be reviewed at the safety luncheon [today]. AMS stepped out of meeting for a corporate "all-hands" safety conference call commemorating the following: [01] Charah/AMS 2,000,000 [two million] man-hours without lost time milestone. [02] Mine Safety Health Administration [MSHA] Sentinel of Safety Award for no lost time incidents in 2010 at Charah' s Brickey's limestone grinding facility [we are supplier to Ameren Missouri]. [03] North Carolina Department of Labor Gold Level Safety Achievement Award for the Charah Roxboro site [a large site where Charah manages fly ash, bottom ash, gypsum, and landfill projects].
05	**HOUSEKEEPING**	
	2012-05-22	OPEN - No issues. M. Wagstaff inquire about CCS and liner material. CCS will have dumpster and AMS will help keep clean.
	2012-05-15	OPEN - See Item No. 05.04-2012-05-15 above regarding bees swarming at GEO trailer.
	2012-05-08	OPEN - no issues.
06	**PLANT ACCESS - CBT BADGE**	
	2012-05-22	OPEN - no issues. M .Wagstaff to issue gate log. DT info listed above. Item No. 05.03.
	2012-05-15	OPEN - no issues. Projection 1x to 2x at EOW, possibly 10x for BTD. M. Wagstaff to issue gate log again. P. Zinsious request copy [not received].
	2012-05-08	OPEN - no issues. M. Wagstaff e-mailed 6x WKS gate log to J. Denham, and he requested every 2x WKS. M. Wagstaff inquired on CC - for now J. Denham and P. Zinsious.
07	**VEHICLES ON SITE**	
	2012-05-22	OPEN - no issues. Brief review of workers bused to ash pond work site by **AMS.**
	2012-05-15	OPEN - no issues
	2012-05-08	OPEN - no issues. GEO to bring "gator" [utility vehicle] on site. AMS to bring second pick up truck on site for A. Driver. AMS will provide safety flags for both vehicles.
08	**OSHA LOG - WORK HOURS**	
	2012-05-22	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-21
	No incidents or accidents.	
	0,0000.00	RT
	0,000.00	OT
	2,347.50	TOTAL [time not split out RT/OT]
	2012-05-15	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-014
	No incidents or accidents.	
	1,945.50	RT
	0,000.00	OT
	1,945.50	TOTAL
	2012-05-08	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-07
	1,555.50	RT
	0,000.00	OT
	1,555.50	TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-05-22 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[03] Laborers
[05] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project].
[12] Total

2012-05-15 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[04] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[09] Total

2012-05-08 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current Correction in crew size for 05-01 below [not discussed at the meeting]
[01] Geotechnology [work hours not
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[05] Operators
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[10] Total

02 WORK HOURS

2012-05-22 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt started to work 10x HRS [internal cost to AMS] last Tuesday [05-15] and will continue until finished. CCS still on track for OT. No work on site Memorial Day holiday [observed Monday 05-28].

2012-05-15 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt to work 4x D 10x HRS due to dry weather [internal cost to AMS]. When Chesapeake comes on board, they may work 12x HRS a day maximum due to instrumentation calibration procedures required in the specifications.

2012-05-08 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Chesapeake may work extended hours.

03 OVER TIME

2012-05-22 OPEN - Belt has projected OT per Item No. 06.02, and will de-mob on Friday [05-25].

2012-05-15 OPEN - Belt has projected OT per Item No. 06.02-2012-0515 above.

2012-05-08 OPEN - None projected at this time. Referencing Item No. 06.02-2012-05-07 above - Chesapeake may have OT.

04 TRAILER [AND GENERAL CONDITIONS]

2012-05-22 OPEN - no issues.

2012-05-15 OPEN - no issues.

2012-05-08 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-05-22	OPEN - no issues. BT Drainage has contract [CLOSED].
2012-05-15	OPEN - no issues. BT Drainage by EOW.
2012-05-08	OPEN - no issues. BT Drainage in progress.

02 SUBMITTALS

2012-05-22	OPEN - no issues. In progress - P. Zinsious submitted to J. Cravens today updated cover sheets and log.
2012-05-15	OPEN - no issues. In progress - P. Zinsious to meet with J. Cravens today [05-15] to review log. Pump information to be re-submitted [again] due to identification.
2012-05-08	OPEN - no issues. In progress - P. Zinsious to revise log information by EOW and review mechanical.

08 MATERIAL

01 GENERAL

20120-05-22	OPEN - R. Porter reports all material in, however bands too long [will resolve].
20120-05-15	OPEN - R. Porter reports pipe ordered for relocation connection to the manhole. Details in Item No. 12.1.04-2012-05-15 below.
20120-05-08	OPEN - no issues. See below for meetings. [date corrected]

02 GEOMEMBRANE PRE-CON MEETING

20120-05-22	OPEN - no issues. GEO inspection on Thursday [05-24].
20120-05-15	OPEN - no issues.
20120-05-08	NEW - Meeting during Progress Meeting with Mr. Ryan Clark - Chesapeake Containment [CCS]. [01] 05-29 first day of deployment. [02] Mobilization will take place prior to first day of deployment. Badges, drug testing, and safety training required before. [03] Safety glasses to have foam gasket. [04] CCS discussed proposed panel layout and Geotechnology agreed that given the low slope (5%) that downslope orientation is not as critical. CCS to provide revised proposed panel layout. [05] All CCS vehicles will need magnetic signage. [06] CCS trailer can be left on-site. [07] AMS to provide operator for deployment. [08] AMS lag from liner start to clay placement is about 6 days. [09] CCS will have tensiometer certifications on-site and provided to Geotechnology. [10] All pipe boots are to be welded to HDPE gas vent pipe as shown in detail. [11] There are some repairs needed in the existing HDPE lined ponds. CCS will patch while on-site. [12] CCS [NMA] site extension has been filed, process of finalize site meeting and agreement with local labor union. [13] Expected manpower on-site is 12x workers working 10 hours+/- per day, 6x days a week with 7th day as a make-up day. [14] Any disturbed are requiring re-compaction to be looked at on case-by-case basis with GEO/AER. [15] Mr. Matt Garland - CCS General Superintendent will be coordinating the final schedule. [16] R. Clark will go out to pond to inspect progress and check on condition of delivered materials.

03 CAP VENT PRE-CON MEETING

20120-05-22	OPEN - Drilling completed on Monday [05-21].
20120-05-15	OPEN - Mobilization date moved to 05-21.
20120-05-08	NEW - Meeting after Progress Meeting with Mr. Bill Kelly - Illini Drilled Foundations [IDF]. [01] 05-14 first day of deployment. [02] Discussion of submittal and installation of the cap vents. [03] IDF will have different size spacers on site to accommodate change in the bore hole size. [04] Drill rig will have approximately 50 FT tall mast. [05] IDF can adjust mast a few degrees to accommodate for the slope on the ash pond. If required AMS will level out area. [06] Any disturbed are requiring re-compaction to be looked at on case-by-case basis with GEO/AER. [07] Duration estimated at 3x days for all cap vents. [08] Safety glasses to have foam gasket. [09] B. Kelly will go out to pond to inspect progress and check slope.

04 PERFORATED COLLECTOR PIPE [PCP] PRE-CON MEETING

20120-05-22	OPEN - Meeting during Progress Meeting with Mr. John Boyer. [01] Open discussion of safety concern due to wet/damp installation and welding of HDPE in the trench. [02] M. Wagstaff indicated Hanson concern damage of pipe when installed. [03] AMS to provide PVC Value Engineering Submittal [substitution]. J. Boyer indicated cost estimated at $ 500 more. [04] P. Zinsious indicated pipe will not be damaged. J. Boyer stated can run "mandrel test" after pipe installation. [05] Existing Ameren MW-2 probably not able to be saved,
20120-05-15	NEW - Meeting after Progress Meeting with Mr. John Boyer - B&T Drainage [BTD] [01] M. Wagstaff inquired as to small business status. J. Boyer indicated no, as past 3x years BTD did under $ 28M. [02] Presentation of the "Excavation Work Plan for the Perforated Collector Pipe". [03] General review by all. [04] Plan to be edited for GCL. Was not presented as GCL, as not approved. [05] M .Wagstaff indicated alignment of PCP is flexible.

[06] PCP can go direct into the Dewatering Sumps, "A-Lock" type seal with clamp.
[07] J. Boyer concerned over Monitoring Well No. 2 [MW-2]. AER indicated see when get to that point if demo.
[08] Spoils transfer by "tag-team" excavators. However, there may be no spoils above the GCL elevation.
[09] General discussion that welding HDPE inside the trench boxes is a safety issue due to small work area, water, and access. J. Boyer proposed a PVC pipe option. The focus for this alternate is safety, but there is a possible cost savings as well. The pipe thickness could be an DR 14 [approximate thickness 3/4 IN] or DR 18 [approximate thickness 1/2 IN] per J. Boyer. There is flexibility in the shorter pieces of pipe, the mechanical connections, primarily her would be "bell and spigot". BTD to research price for PVC, and AER to review with Hanson.

[10] If the bedrock cannot dug with and excavator, then pipeline can be raised. This creates issue with the manholes [dewatering sumps - reference Item No. 09.01-2012-05-08 below] height. If they cannot be adjusted with the ring[s], then area they protrude above the plan grade can be adjusted in the field. Barrel heights come in 16 IN, 32 IN, or 48 IN heights.
[11] Projected manpower is 3x Operators [or more] and 3x Laborers.
[12] Duration is approximately 30x D.
[13] Dewatering will be by well point. Illini Drilled will drill well points [next week].
[14] Issue of water volume from the dewatering operation. Could possibly be millions of gallons. J. Boyer indicated amount not known, but possibly the areas of the bedrock in a "valley" might be able to be pumped down, but this depends on the length of the "valley". Pumps in the well points will operate 24/7, in any order, one or more at a time. In the beginning all pumps will be operating. This may create an issue for the adjacent property owner [farmer] who pumps ground water for irrigation.

[15] Issue of water volume disposal into the ponds. M. Wagstaff will research what is required for pumping into the ponds and what is required for the pond elevation relative sampling of the discharge by AER [and paid for by AER].
[16] The well point will pump system will have safety fence, light, and the power cord above ground in a conduit.
[17] Delivery of the dewatering sump structures are 2 WKS [after approval].
[18] Discussion of the diameter and the thickness of the manhole barrel. M .Wagstaff indicated as long as buoyancy [reference Item NO. 09.01-2012-05-08-03 below] good, alternates will be acceptable. Possible options are larger base and matt [concrete] at base such as a 4 FT DIA MH with larger base [J. Boyer indicated may install larger base for BTD insurance].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-05-22	OPEN - [01] P. Zinsious reported Mr. Wampler [Wampler Farms]. [02] Open discussion of License Agreement and boundary line alignment off approximately 80FT. [03] M. Wagstaff indicated no issue. AMS to show on drawing.
2012-05-15	OPEN - [01] See Item No. 08.04-2012-05-15 for PCP Pre-Con Meeting and submission of the Excavation Plan. [02] Corrected ring description below in body of text. [03] No tax exemption if materials not purchased in Illinois.
2012-05-08	OPEN - [01] Excavation plan is to be prepared by professional engineer. [02] VES-01 for Bentonite M. Wagstaff indicated is approved [reference 12.1.09-2012-05-08 EWO-09 below]. [03] P. Zinsious indicated manhole as shown on drawings not a standard size. Brief discussion - M. Wagstaff indicated any [close] standard size is acceptable if the buoyancy calculations are approved. [04] Review of process if the rock is not "dig-able". M. Wagstaff indicated that Hanson understands the rock may not "dig". Once work begins, and if the rock does not "dig", the PCP can be raised [partially] or all the way out of he rock and set on the rock. Elevation [and alignment] can be made in the field. Pump structure can be made in ~~sorter~~ shorter ring height to accommodate the change in elevations if necessary.

10 QUALITY CONTROL

01 GENERAL

2012-05-22	OPEN - no issues
2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues

02 ASH

2012-05-22	OPEN - no issues. All ash compaction density test have passed [over 90% density], some areas at PGL have to be tested. GEO to issue report. Mr. Tim Wilson [GEO] and Massmann to be on site 05-22. Ash pond elevations at 98% to grade [as determined by the 02-06 drawings], some spots high. General discussion "zig" [valley] in final grade per plan.
2012-05-15	OPEN - no issues. J. Cravens Section A and C approximately 50 point for ash compaction density tests have been performed to date. All test have to date have passed in the range of 99% to 114% compaction. GEO technician Mr. Tim Wilson will be back on site tomorrow [05-16]. Massmann is to download files for GEO locations.
2012-05-08	OPEN - no issues. On going process. Compaction testing possibly scheduled for 05-09.

03 CLAY

2012-05-22	OPEN - no issues - sample analysis submitted.
2012-05-15	OPEN - no issues. Samples taken yesterday [05-14]. The physical analysis will be by Holcomb and the chemical analysis will be by ARDL. Results should be in by next mid-week or before.
2012-05-08	OPEN - no issues.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-05-22	OPEN - Review of schedule to date. [01] Actual percent completion on ash pond sectors: A = 100%, B = 98%, C = 100%, D = 98% [02] 05-22 cap vents projected to 05-25. [03] 05-29 - BTD start date projection for PCP. [04] 05-21 - BTD to begin drilling de-watering wells. Pumping possibly 24/7 if required. [05] 05-22 - AMS to begin removing fencing along ash pond leaving poles. [06] 05-26 - Smooth drum roll ash placement ,no vibration, and addition of water for moisture content. [07] Box culvert demolition complete.
2012-05-15	OPEN - Review of schedule to date. M .Wagstaff on vacation 05-15 to 05-22. [01] Actual percent completion on ash pond sectors: A = 100%, B = 90%, C = 100%, D = 85% [02] 05-11 - Lamac survey for "as-built" [record drawings] of the pipe relocation. [03] 05-29 - BTD start date projection for PCP. [04] Brief discussion electrical [AAA] and mechanical [FWI] scope.
2012-05-08	OPEN - Review of schedule to date. [01] Documented rain days: 05-04 and 05-07. P. Zinsious published e-mail with dates [on 05-07 shows total 5x days so far]. [02] Actual percent completion on ash pond sectors: A = 95%, B = 75%, C = 95%, D = 80% [03] 05-08 - Geomembrane Pre-Con Meeting [with AER and GEO during the Charah/AMS conference call]. [04] 05-10 - projected date for GEO compaction testing. [05] 05-11 - J. Cravens off-site. GEO to have 2x men: Tim and Ron. [06] 05-14 - Massmann on site to survey ash cap certification and fence alignment for AER. [07] 05-14 - Lamac on site to survey/locate cap vents. [08] 05-29 - Chesapeake to begin work.

02 TIME AND MATERIAL

2012-05-22	OPEN - no issues
2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues

03 COORDINATION

2012-05-22	OPEN - no issues. R. Porter to get with G. Musch to fill the water tank.
2012-05-15	OPEN - no issues
2012-05-08	OPEN - no issues.

12.0 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-05-22	OPEN - no issues.
2012-05-15	OPEN - no issues.
2012-05-08	OPEN - EWO list reviewed, numbers and descriptions to be corrected in minutes.

02 AMS PAY APPLICATION

2012-05-22	OPEN - no issues.
2012-05-15	OPEN - AMS submitted pay application. M. Wagstaff indicated no issues, and that the revised AER PO is in process.
2012-05-08	OPEN - M. Wagstaff approved the draft pay-app for submittal as invoice. AMS to send copy of draft to J. Cravens.

12.1 EXTRA WORK ORDERS

01 EWO-01 ELECTRIC TEMPORARY

2012-05-22	Deferred.
2012-05-15	No issues. 100% complete.
2012-05-08	Work is completed. Cost was audited with subcontractor, AMS to provide partial credit [reference EWO-08 below].

02 EWO-02 ASH PLACEMENT - CAP MODIFICATIONS

2012-05-22	Deferred.
2012-05-15	No issues. In progress.
2012-05-08	OPEN - In progress. Spoils can go into Ash Pond D, and on the slopes as clean. Material opt be monitored by GEO and AMS. Consensus is the ash will balance.

03 EWO-03 COAL PILE

2012-05-22	Deferred.
2012-05-15	No issues. 100% complete.
2012-05-08	OPEN - Work completed [05-08 dozer working to fine grade area], final grade for drainage to be finished.

04	EWO-04	PIPE RELOCATION	
	2012-05-22	Deferred.	
	2012-05-15	OPEN - work in progress. R. Porter reports pipe is ordered for the connection, and scheduled for installation next week on Monday [05-21]. The connection to the manhole will be a short piece of SDR 35 PVC pipe connected to the HDPE with a stainless steel repair coupling. The interior of the manhole will be patched with non-shrink grout, the exterior with the "A-Lock" ring and concrete. Details will be provided on the plan and profile record drawings for this line.	
	2012-05-08	OPEN - work in progress. AMS briefly described process of moving pipe from existing elevation into the new trench. Pipe will be slinger on the end at current elevation and at the new elevation. Connector fitting for the manhole fitting on site 05-08.	
05	EWO-05	ELECTRIC FEEDER	
	2012-05-22	Deferred.	
	2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.	
	2012-05-08	OPEN - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.	
06	EWO-06	POND A TRENCH	
	2012-05-22	Deferred.	
	2012-05-15	No issues. Work 100% complete.	
	2012-05-08	NEW - Work completed for trench excavation. The weir structure "stop logs" are to be installed in Pond A and Pond B.	
07	EWO-07	ELECTRIC OVERHEAD	
	2012-05-22	Deferred.	
	2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.	
	2012-05-08	NEW - in progress. AMS setting up meeting to audit price with AAA Electric. M. Wagstaff request combine EWO with EWO-07.	
08	EWO-08	CREDIT TO EWO-01	
	2012-05-22	Deferred.	
	2012-05-15	OPEN - in progress.	
	2012-05-08	NEW - In progress [reference above].	
09	EWO-09	BENTONITE VES-01	
	2012-05-22	Deferred.	
	2012-05-15	OPEN - in progress. M. Wagstaff indicated that yesterday [05-14] Hanson approved the AMS response comments to the Hanson submittal review. GSE to provide pricing and AMS to calculate EWO.	
	2012-05-08	NEW - M. Wagstaff indicated approval. Hanson has provided submittal review, and AMS in process of reply.	
10	EWO-10	FLOW-ABLE FILL CREDIT	
	2012-05-22	Deferred.	
	2012-05-15	OPEN - in progress.	
	2012-05-08	NEW - Discussed previously [reference Item No. 09.01-2012-04-24 No. 07] pipe can be removed and go direct to manhole, eliminating the flow-able fill.	
11	EWO-11	BUILDING SPOILS REMOVAL	
	2012-05-22	Deferred. No other issues, test holes revealed.	
	2012-05-15	OPEN - in progress. AMS to dig test holes by EOW.	
	2012-05-08	NEW - Excavation along Station 29+00 at fence line uncovered building spoil material within limits of the ash pond. M. Wagstaff requested exploratory holes dug along the fence line to determine the extent of the foreign material. AMS will dig holes at 100 FT intervals, and if something is uncovered will go to 50 FT intervals to determine the extent of the material. AMS will excavate the material to a predetermined depth by GEO/AER. Material excavated out will be disposed of within the ash pond, in the are east section where lower elevations are still being worked. A dump truck will have to be used to transport the material within the pond. Material adjacent to the pond that extends under the road is to remain in place and not to be disturbed.	

13	ACTION ITEMS - AER [25]	
01	AMEREN [AER]	
	2012-05-22	Discussion of collection box pipe alignment direct to the manhole.
	2012-05-15	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [CLOSED - drawing issued] [24] Research with Hanson PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09]. [25] Research with Hanson alignment of the discharge piping structure at the outfall man hole. AER original design took into consideration a "mixing zone". R. Porter indicated since the line pipe relocation alignment can be direct. Discussion of the grade to be field adjusted around the box if new location is approved.
	2012-05-08	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [OPEN - Hanson to provide revised drawing - in progress]

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-05-22 In progress.

2012-05-15

[21] BTD/AMS VES-02 for PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].

2012-05-08

None

15 PRODUCTION

01 GENERAL

2012-05-22 OPEN - no issues

2012-05-15 OPEN - no issues

2012-05-08 OPEN - no issues

02 ASH

2012-05-22 OPEN - no issues. Estimated 101,074 CY EOD 05-21

2012-05-15 OPEN - no issues. Estimated 89,098 CY EOD 05-14

2012-05-08 OPEN - no issues. Estimated 77,320 CY EOD 05-07.

03 CLAY

2012-05-22 OPEN - no issues - this activity not begun.

2012-05-15 OPEN - no issues - this activity not begun.

2012-05-08 OPEN - no issues - this activity not begun.

16 DOCUMENTS TRANSMITTED

2012-05-15 [01] BTD - AMS - Contact list HUT-APD-CON-2012-05-21

2012-05-15 [01] BTD - Excavation Work Plan for the Perforated Collector Pipe [5x to 6x copies]
[02] BTD - Certification [for above].

2012-05-08 None

17 DOCUMENTS REVIEW ONLY

2012-05-22 Large format drawing for alignment review of PCP.

2012-05-08 None

2012-05-08 None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, May 29, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Fill in Quadrant B facing southeast



Photograph 2 - Drilling cap vents facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 21 and May 25, 2012

JRC



Photograph 3 - Cap vent filter sock and centralizer facing northeast



Photograph 4 - Installing cap vent facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 21 and May 25, 2012

JRC



Photograph 5 - Connecting HDPE pipe to PVC pipe facing northeast



Photograph 6 - Compaction testing facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 21 and May 25, 2012

JRC



Photograph 7 - Rolling Ash Pond D facing north



Photograph 8 - Manhole inlet facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 21 and May 25, 2012

JRC



Photograph 9 - Monitoring Well 2 – to be moved, facing north



Photograph 10 - Cap vent facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 21 and May 25, 2012

JRC



Photograph 11 - Overview of Ash Pond D facing southeast



Photograph 12 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 21 and May 25, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: June 6, 2012

SUBJECT: Weekly Summary Report for May 29, 2012 to June 2, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 51 to 70°F, and temperature highs ranged from 61 to 85°F. Weather delay due to rain occurred on May 31, 2012.

Construction Activities

Anchor trench construction and 40 mil HDPE geomembrane installation occurred this week. The anchor trench has been excavated along the northern half of Quadrant A, all of Quadrant B, and the eastern side of Quadrant D. IDOT FA-01 sand for anchor trench backfill, and 4-inch double walled, HDPE perforated pipe with most of the associated pipe materials for anchor trench drainage was delivered to the site. Part of the anchor trench in Quadrant A, with the 4-inch HDPE pipe, had been backfilled. Chesapeake Containment Systems, Inc. installed 40 mil HDPE geomembrane liner in parts of Quadrants A, B, and C. Geotechnology, Inc. observed quality control of the installation. Refer to geomembrane documentation for more details. Dewatering for the proposed perforated collector pipe excavation continues in well number 1 and 2, located south of Ash Pond A.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT 330D Excavator
CAT 613C Water Truck
CAT 279C Skid Steer (rubber track)
John Deere 624H Front End Loader
John Deere 9520 Tractor
John Deere 6430 Tractor
Sky Track 6036 Forklift
John Deere 410J Backhoe
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens, Tim Wilson, Steve Graham, and Anna Saindon
Ash Management Services, LLC (AMS) – Randy Porter, Jon Dietzel, Jimmy Boone, Robert Dunkley, James Marks, Shawn McClaskey, Brad Bolenbaugh, and Johnny McGrew
Charah, Inc. – Joe Tasich
Chesapeake Containment Systems, Inc – Jose Valverde, Barbarito Flores, Daniel Gonzales, Leroy Smith, Phet Vongkhamchanh, Jose Flores, Alberto Ortiz, Manuel Gonzales, Israel Gonzales, Erik Sefton, Blake Bunting, Matthew Watts, and Ryan Clark
Daylight Land Management – Adam Ziliak and Billy Georges
B&T Drainage – John Boyer and Chase Boyer
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, May 29, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

40 mil HDPE geomembrane was installed on site. Materials for the 4-inch HDPE double walled pipe and IDOT FA-01 sand was delivered on site for the anchor trench.

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Testing/Sampling

Geomembrane destructive and non-destructive testing and sampling occurred this week. Refer to geomembrane documentation for additional details.

Calibration Records

Calibration information was obtained for Chesapeake's tensiometer this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13809

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 5/29/12

TIME: Arrive: 6:30 AM | Depart: 6:45 PM | Travel: 1.0 hr | Total: 13.25 hrs (no lunch)
Weather: Sunny, 70°AM, 85°PM | Contractor: AMS | Subcontr./Supplier: CCS/BTD
Equipment Working: 6036 Forklift, 580 Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
The 6036 loaded the remaining ADS Pipe in the dumpster, moved the remaining west fence parts to the construction yard, and loaded the crane mats on site to be taken to the CBS. The two laborers assisted the 6036 and setup the temporary snow fence south of Ash Pond B for the construction easement. The 580 began digging the anchor trench in the NW corner of Section A in Pond D. Any ash spoils from the trench will be dumped into Pond A. Personnel on site: Brad, Shawn, James, and Robert. Jon and Johnny worked at the CBS today.

BTD:
Chase Boyer came in to check the groundwater levels and fuel the generator. Delivery – John Deere 624H Front End Loader. BTD will use PVC instead of HDPE for the PCP.

CCS:
Chesapeake Containment Systems, Inc. arrived on site and received CBT and badges from Newton. Personnel began loading sandbags, preparing testing appartus, and preparing materials. They will begin laying geomembrane rolls, or panels, tomorrow. They plan to work 6-10's. Personnel on Site: Jose Valverde (Super), Barbarito Flores (QC), Daniel Gonzales, Leroy Smith, Phet Vongkhamchanh, Jose Flores, Alberto Ortiz, Manuel Gonzales, Israel Gonzales, Erik Sefton, Blake Bunting, Matthew Watts.

Misc:
MW2 will be drilled and installed next week by a local drilling company. The existing MW2 will be torn out during the PCP excavation. Personnel from Geotechnology on site this week: Anna Saindon, Tim Wilson, Steve Graham.

Additional Comments:

Randy Poetic — Contractor Representative — AMS — Company
Signature — 5-29-12 — Date
Anna Saindon — Geotechnology, Inc. — 6-4-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 13810

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 5/30/12

TIME: Arrive: 6:30 AM | Depart: 6:30 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 62°AM, 81°PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO
Equipment Working: 6036 Forklift, 580 Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 continued digging the anchor trench for the geomembrane in Section A. The 6036 was used for deploying the liner rolls for geomembrane placement, as well as staging liner rolls. The laborers setup cooling stations for CCS, cleaned out debris in the anchor trench, checked grade in the anchor trench, and took down an additional section of the west fence line.

CCS:

The panel layout was changed: Full length rolls (750') will be used across the entire south end of the Pond, running south/north. The remaining north end of the Pond will have panels running south/north, and will be cut to fit as required to cover the northern portion. CCS estimates this will save two days worth of seaming. They began placing panels in the northern portion of the Pond in Section A, and run parallel to the west fence line. All seams are hot wedge double track fusion welds, welded by an automatic fusion welder. Extrusion welding is only performed where fusion welding is not possible, such as pipe penetrations, patches, and repairs. The site was very dusty and it was difficult keeping the seams clean. Therefore, the Water Truck was used to suppress the dust as the liner was being placed.

GEO (Geotechnology):

Steve went to the Newton Power Station for a CBT refresher, his drug testing was current. Both Steve and Tim will overlook CCS's QC for geomembrane placement, panel numbering, length, and area, extrusion and double fusion seaming (welding), shear and peel testing, air and vacuum testing, etc. Geotechnology will keep records of all mentioned items on a daily basis, as well as collect destruct samples for archive.

Additional Comments: Additional Personnel on-site: Jon (AMS) and Johnny (AMS).

Randy Porter — Contractor Representative — AMS — Company
Signature — 5-30-12 — Date
Anna Saindon — Geotechnology Inc. — 6-4-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13811

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 5/31/12

TIME: Arrive: 6:30 AM | Depart: 3:45 PM | Travel: 1.0 hr | Total: 10 hrs (0.25 hr for lunch)
Weather: Sunny, 54° AM, Cloudy/Rain 67° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO
Equipment Working: 6036 Forklift, 580 Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
The 580 continued digging the anchor trench in Section B and D. The 6036 continued deploying liner rolls for geomembrane placement, and staged liner rolls for the southern half of the pond. The laborers continued checking grade in the anchor trench.

CCS:
The partial panels for the northern portion of Pond D have been placed. CCS made up more sand bags, began air testing on the west side of the northern portion heading east, and cleaned up excess material. They will begin placing full length panels (750') in the southern portion of the pond tomorrow. They were rained out and could not complete a full day. Note: All seam overlaps are shingled in the direction of the downslope.

Misc.:
The local Pit Run Sand does not meet the specifications for oversized particles. Therefore, the washed, fine sand used to fill the sand bags will be used for the anchor trench fill.

Refer to Geotechnology's Data Sheets for geomembrane details.

Additional Comments:

Randy Poetker — Contractor Representative — AMS — Company
Signature — 5-31-12 — Date
Anna Sainolon — Geotechnology Inc. — 6-4-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13812

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/1/12

TIME: Arrive: 6:30 AM | Depart: 6:45 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.5 hr for lunch)
Weather: Cloudy, L. Rain, 54°AM, 61°PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO/BTD/DLM
Equipment Working: 6036 Forklift, 580 Backhoe, 330D Excavator, 6430 Tractor
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 finished digging the anchor trench on the east side of Section B and D, and the south, west side of Section A. The remaining anchor trench to be dug is located in Section C, and the south side of Section D. The 580 also pulled the west fence posts in Section A, and they were taken to the construction yard. The 6036 staged liner rolls and sand bags across Pond D. Delivery: 3500' of 4" double wall pipe (AASHTO M252 S) with Class II perforations and filter sock, with 4" snap tees and end caps. The pipe was unloaded with the 6036 and staged in Pond D. The 4" perforated pipe will be placed in the anchor trench. The solid wall pipe for the 4" tees have not been delivered yet. A CAT 279C skid steer (rubber track) was also delivered and will be used to backfill the anchor trench. 10 loads of FA-01 sand was delivered for anchor trench. The laborers assisted with the anchor trench, pulling fence posts, and removed snow fence in temp. easement.

CCS:

It was too windy to deploy panels today. However, sand bags were made, air testing was completed in the northern section of panels (P1-P45), and they began patching/repairing areas in the northern section by extrusion welding. Destruct samples were cut and they began shear and peel testing. GEO took care of archive and lab samples. Refer to Geotech. data sheets for details. Note: spark testing will be performed for the cap vent boots, and they will patch holes in Pond A and Pond B.

BTD:

John and Chase Boyer installed another pump in dewatering well 1. Both pumps are now being discharged into Pond A. Well 1 dropped water level in a matter of minutes. Therefore, only well 2 will be pumped 24/7, and well 1 pumped only as needed. Well 2 was shut off briefly, but the water level rose quickly, and, therefore, will remain on.

Additional Comments: DLM: Adam Zilick and Billy Georges unloaded 40 bales of hay with a John Deere 6430 Tractor.

Randy Porter — Contractor Representative — AMS — Company
Signature — 6-1-12 — Date
Anna Samdon — Geotechnology, Inc. — 6-4-12 — Date
Engineer's Signature

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No. A 13813

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 6/2/12

TIME: Arrive: 6:30 AM Depart: 5:00 PM Travel: 1.0 hr Total: 11.25 hrs (0.25 hr for lunch)
Weather: Sunny, 51° AM, 70° PM Partly Cloudy Contractor: AMS Subcontr./Supplier: CCS/GEO
Equipment Working: 6036 Forklift, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
The 6036 continued deploying liner rolls for geomembrane placement. The 4" perforated pipe for the anchor trench was staged along the northern section of geomembrane panels. Each snap coupling was duck taped to insure integrity when placing pipe in the trench. After the tape, the filter socks were overlapped and zip tied. Any holes found in the filter socks were also duck taped to prevent sediment from entering the perforations. Part of the pipe was laid in the trench from Sta. 37+50 to Sta. 40+00. The 279C backfilled the trench in the west end of Section A with FA-01 sand.

CCS:
CCS began deploying panels in the southern section of Pond D. There was a misunderstanding of the length of the geomembrane rolls, and when they began deploying panels in the southern section, they were 50' short of reaching the PGL on the south end of the pond, thinking the rolls were 750', but they are 700'. Therefore, there will be a 50' strip on the south end of the pond that needs to be covered. It was too windy in the PM to deploy panels, so they continued double fusion seaming, air testing, shear and peel testing on destructs, patching, and clean up. GEO will be mailing the first set destructs to the TRI Lab in Austin, TX this weekend. Ryan Clark (VP) was here to observe site activities.

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
6-2-12 — Date
Anna Saindon — Geotechnology, Inc.
6-4-12 — Date
[signature] — Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 11 Minutes
Tuesday, May 29, 2012

01 PUBLICATION

Publish date:	2012-06-04	Submitted by:	P. Zinsious
Distribution:	E-mail only	Notes taken by:	P. Zinsious
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-05-29-PM-11
AER PO:	567523 R3	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES

01	Mr. Mike Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
02	Ms. Anna Saindon	Geotechnology	314-997-7440	a_saindon@geotechnology.com
03	Mr. Joe Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
04	Mr. Bret Brown	Charah	812-454-5603	bbrown@charah.com
05	Mr. Joko Tasich	Charah	502-649-7633	jtasich@charah.com
06	Mr. John Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
07	Mr. Jimmy Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
08	Mr. Randy Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
09	Mr. Paul Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com

03 ABBREVIATIONS

AER	Ameren Energy Resources
AMS	Ash Management Services
BNSF	Burlington
CBT	Computer Based Training
EAP	Emergency Action Plan
EOD	End of [the] Day
EOM	End of [the] month
EOW	End of [the] week
EDTS	Energy Delivery Transmission Services
EDC	Estimated Date [of] Completion
EWO	Extra Work Order
HDPE	High Density Polyethylene
HRS	Hours
LOTO	Lock Out Tag Out
NMA	National Maintenance Agreement
OSHA	Occupational Safety Health Administration
PCP	Perforated Collector Pipe
PO	Purchase Order
RHOM	Routine Handling, Operation, and Maintenance
SPOC	Single Point of Contact
T/M	Time and Materials
TBD	To Be Determined
TD	Transmission Dispatch
WPA	Worker Protection Assurance

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-05-29	OPEN - no issues.
2012-05-22	OPEN - no issues.
2012-05-15	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-05-29	OPEN - no issues. None projected for 2x week look ahead.
2012-05-22	OPEN - no issues. None projected for 2x week look ahead. Chesapeake Containment [CCS] will use generators.
2012-05-15	OPEN - no issues. None projected for 2x week look ahead or for Illini Drilled [IDF].

03	**EMPLOYEE DRUG TESTING**	
	2012-05-29	OPEN - no issues. P. Zinsious reports that Jasper County Health has been good to work with, very flexible. CCS has 12x and BTD 3x workers at Newton today [05-29]. A. Saindon reports 1x worker from TSI to schedule TBD.
	2012-05-22	OPEN - no issues. BT Drainage count in progress. 1x AMS yesterday DT at Robinson [05-21] and 1x AMS today [05-22].
	2012-05-15	OPEN - no issues. J. Boone indicated Chesapeake Containment will have list by next Progress Meeting. Some workers will already have AER badges in good standing. BT Drainage will have projection today [05-15]. The borrow site [CBS] will not require AER badge/CBT/DT, only AMS safety training.
04	**AMS SAFETY**	
	2012-05-29	OPEN - no issues. [01] J. Tasich briefing heat exhaustion and dehydration. [02] J. Tasich review of insects. [03] J. Denham briefing schedule cooling stations when work is begun 05-30 - 2x 10 FT x 10 FT for CCS and 1x 10 FT x 10 FT general. [04] Next safety luncheon is 06-12. M. Wagstaff will not be able to attend.
	2012-05-22	OPEN - no issues. Next safety luncheon is 06-12. [01] J. Tasich briefing on glove usage for material handling and look out for insects/varmints. [02] Bees at trailer are eradicated. [03] J. Denham briefing on cooling stations, 2x will be set up. [04] Brief discussion on hydrating. Energy drinks not encouraged due to caffeine content. [05] Review of Charah/AMS safety awards [ref. Item No. 05.04-2012-05-08.01,02,03 below]. [06] No cooling station at CBS as workers [operators] in equipment with AC.
	2012-05-15	OPEN - no issues. J. Tasich reported on site specific emergency action plan [EAP]: [01] Shelter area to be cleaned today [05-15], and will be on going procedure. [02] Water training was completed for installation of the "stop logs". [03] Refining Item No. 05.05-2012-05-15 below, bees swarming on GEO trailer, have been sprayed. Workers for AMS are to note on their new employee form allergies such as to bee stings. The employee is required to notify the Site Manager of such allergies. In the case of a bee [or insect sting], each worker is responsible to carry their own medication, such as an "epi-pen" [Epinephrine Auto-Injectors] accordingly.
05	**HOUSEKEEPING**	
	2012-05-29	OPEN - Dumpster for CCS - P. Zinsious to investigate.
	2012-05-22	OPEN - No issues. M. Wagstaff inquire about CCS and liner material. CCS will have dumpster and AMS will help keep clean.
	2012-05-15	OPEN - See Item No. 05.04-2012-05-15 above regarding bees swarming at GEO trailer.
06	**PLANT ACCESS - CBT BADGE**	
	2012-05-29	OPEN - R. Porter reports getting difficult to monitor the gate with both himself and Joe on the site. AER requires frequent access to the substation. Sometimes the entities accessing the site do not have proper PPE or identification signs on their vehicles. R. Porter also reports they are not calling the numbers on the entrance sign and at the trailers to access the site. There has also been unknown vehicle accessing the site. M. Wagstaff indicated that re-activation of the gate is an option. General discussion that gate is good idea, but does not prevent access to the plant. Consensus is that using the gate when no one is at the trailers will at least force direction of traffic around to where vehicles can be seen from the work site.
	2012-05-22	OPEN - no issues. M .Wagstaff to issue gate log. DT info listed above. Item No. 05.03.
	2012-05-15	OPEN - no issues. Projection 1x to 2x at EOW, possibly 10x for BTD. M. Wagstaff to issue gate log again. P. Zinsious request copy [not received].
07	**VEHICLES ON SITE**	
	2012-05-29	OPEN - no issues.
	2012-05-22	OPEN - no issues. Brief review of workers bused to ash pond work site by AMS.
	2012-05-15	OPEN - no issues
08	**OSHA LOG - WORK HOURS**	
	2012-05-29	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-28 No incidents or accidents. 2,255.50 RT 0,168.00 OT 2,423.50 TOTAL
	2012-05-22	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-21 No incidents or accidents. 0,0000.00 RT 0,000.00 OT 2,347.50 TOTAL [time not split out RT/OT]
	2012-05-15	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-014 No incidents or accidents. 1,945.50 RT 0,000.00 OT 1,945.50 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-05-29 AMS, Chesapeake Containment [CCS], and BT Drainage [BTD] on site.
Belt Construction [BCI] and Illini Drilled [IDF] have demobilized.
[04] Geotechnology [work hours not included in OSHA Log above - 2x this AM, 4x by EOD]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[15] Laborers [BTD 1x, AMS 2x, IDF 2x, CCS 11x]
[04] Operators [BTD 1x, AMS 2x, IDF 2x]
[01] Teamsters
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[27] Total

2012-05-22 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[03] Laborers
[05] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project].
[12] Total

2012-05-15 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[01] Laborers
[04] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time]
[09] Total

02 WORK HOURS

2012-05-29	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT. No work Memorial Day holiday [Monday 05-28].
2012-05-22	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt started to work 10x HRS [internal cost to AMS] last Tuesday [05-15] and will continue until finished. CCS still on track for OT. No work on site Memorial Day holiday [observed Monday 05-28].
2012-05-15	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt to work 4x D 10x HRS due to dry weather [internal cost to AMS]. When Chesapeake comes on board, they may work 12x HRS a day maximum due to instrumentation calibration procedures required in the specifications.

03 OVER TIME

2012-05-29	OPEN - CCS work hours 7:00 AM CT to 5:30 PM CT.
2012-05-22	OPEN - Belt has projected OT per Item No. 06.02, and will de-mob on Friday [05-25].
2012-05-15	OPEN - Belt has projected OT per Item No. 06.02-2012-0515 above.

04 TRAILER [AND GENERAL CONDITIONS]

2012-05-29	OPEN - no issues.
2012-05-22	OPEN - no issues.
2012-05-15	OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-05-29	OPEN - no issues.
2012-05-22	OPEN - no issues. BT Drainage has contract [CLOSED].
2012-05-15	OPEN - no issues. BT Drainage by EOW.

02 SUBMITTALS

20120-05-29	Submittal log as published by GEO on 05-25 distributed. General discussion. [01] Submittal log copies distributed. [02] Submittal log last two on list review by AER. [03] Seed/mulch submittal under review by AER. [04] VES-01 to be returned by AER. [05] VES-02 M. Wagstaff orally approved. [06] SWP3 for APD submitted by AMS as matter of record. [07] AMS to submit dewatering sump 05-30. [08] J. Denham and P. Zinsious overview of submittals not required at this time, some at the end of the project. [08] Massmann to certify subgrade and set spots to patch. [09] Discussion liner anchor trench.
2012-05-22	OPEN - no issues. In progress - P. Zinsious submitted to J. Cravens today updated cover sheets and log.
2012-05-15	OPEN - no issues. In progress - P. Zinsious to meet with J. Cravens today [05-15] to review log. Pump information to be re-submitted [again] due to identification.

08 MATERIAL

01 GENERAL

20120-05-29	OPEN - R. Porter reports all material in, for pipe relocation connection and complete. [CLOSED]
20120-05-22	OPEN - R. Porter reports all material in, however bands too long [will resolve].
20120-05-15	OPEN - R. Porter reports pipe ordered for relocation connection to the manhole. Details in Item No. 12.1.04-2012-05-15 below.

02 GEOMEMBRANE PRE-CON MEETING

20120-05-29	OPEN - J .Denham indicated certifications required for fork lift drivers. R. Porter reports has certifications, same as when unloading the liner.
20120-05-22	OPEN - no issues. GEO inspection on Thursday [05-24].
20120-05-15	OPEN - no issues.

03 CAP VENT PRE-CON MEETING

20120-05-29	OPEN - Everything complete except the strainers, which will be installed after the clay cap.
20120-05-22	OPEN - Drilling completed on Monday [05-21].
20120-05-15	OPEN - Mobilization date moved to 05-21.

04 PERFORATED COLLECTOR PIPE [PCP] PRE-CON MEETING

20120-05-29	OPEN - Discussion during Progress Meeting: [01] M. Wagstaff reports sequence for new monitoring well: [01] Install new monitoring well next week 06-04 by local subcontractor Todd Skinner [worked at Newton]. [02] Will not require safety training by AMS. Will wear PPE, and sign in. [03] New well depth 15 FT to 18 FT. [04] When well is developed in 2x weeks, EC Lab will sample both wells. [05] When samples approved, old well can be abandoned. [06] AMS to remove when excavating the PCP, projected 06-18. No impact to schedule. [02] Water from dewatering well [points] discharged into Pond B. R. Porter indicated Pond A has 3 FT freeboard, concerned with stirring up [ash] and Pond A being full. [03] M. Wagstaff indicated Pond A is where discharge is to go, take advantage of delay in sampling.
20120-05-22	OPEN - Meeting during Progress Meeting with Mr. John Boyer. [01] Open discussion of safety concern due to wet/damp installation and welding of HDPE in the trench. [02] M. Wagstaff indicated Hanson concern damage of pipe when installed. [03] AMS to provide PVC Value Engineering Submittal [substitution]. J. Boyer indicated cost estimated at $ 500 more. [04] P. Zinsious indicated pipe will not be damaged. J. Boyer stated can run "mandrel test" after pipe installation. [05] Existing Ameren MW-2 probably not able to be saved,
20120-05-15	NEW - Meeting after Progress Meeting with Mr. John Boyer - B&T Drainage [BTD] [01] M. Wagstaff inquired as to small business status. J. Boyer indicated no, as past 3x years BTD did under $ 28M. [02] Presentation of the "Excavation Work Plan for the Perforated Collector Pipe". [03] General review by all. [04] Plan to be edited for GCL. Was not presented as GCL, as not approved. [05] M .Wagstaff indicated alignment of PCP is flexible. [06] PCP can go direct into the Dewatering Sumps, "A-Lock" type seal with clamp. [07] J. Boyer concerned over Monitoring Well No. 2 [MW-2]. AER indicated see when get to that point if demo. [08] Spoils transfer by "tag-team" excavators. However, there may be no spoils above the GCL elevation. [09] General discussion that welding HDPE inside the trench boxes is a safety issue due to small work area, water, and access. J. Boyer proposed a PVC pipe option. The focus for this alternate is safety, but there is a possible cost savings as well. The pipe thickness could be an DR 14 [approximate thickness 3/4 IN] or DR 18 [approximate thickness 1/2 IN] per J. Boyer. There is flexibility in the shorter pieces of pipe, the mechanical connections, primarily her would be "bell and spigot". BTD to research price for PVC, and AER to review with Hanson. [10] If the bedrock cannot dug with and excavator, then pipeline can be raised. This creates issue with the manholes [dewatering sumps - reference Item No. 09.01-2012-05-08 below] height. If they cannot be adjusted with the ring[s], then area they protrude above the plan grade can be adjusted in the field. Barrel heights come in 16 IN, 32 IN, or 48 IN heights.

[11] Projected manpower is 3x Operators [or more] and 3x Laborers.
[12] Duration is approximately 30x D.
[13] Dewatering will be by well point. Illini Drilled will drill well points [next week].
[14] Issue of water volume from the dewatering operation. Could possibly be millions of gallons. J. Boyer indicated amount not known, but possibly the areas of the bedrock in a "valley" might be able to be pumped down, but this depends on the length of the "valley". Pumps in the well points will operate 24/7, in any order, one or more at a time. In the beginning all pumps will be operating. This may create an issue for the adjacent property owner [farmer] who pumps ground water for irrigation.

[15] Issue of water volume disposal into the ponds. M. Wagstaff will research what is required for pumping into the ponds and what is required for the pond elevation relative sampling of the discharge by AER [and paid for by AER].
[16] The well point will pump system will have safety fence, light, and the power cord above ground in a conduit.
[17] Delivery of the dewatering sump structures are 2 WKS [after approval].
[18] Discussion of the diameter and the thickness of the manhole barrel. M .Wagstaff indicated as long as buoyancy [reference Item NO. 09.01-2012-05-08-03 below] good, alternates will be acceptable. Possible options are larger base and matt [concrete] at base such as a 4 FT DIA MH with larger base [J. Boyer indicated may install larger base for BTD insurance].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-05-29	OPEN - Review of Lamac drawing of PCP alignment survey. [01] West area by License Agreement offset mover 80 FT due to coordination with boundary line/survey/drawings. [02] East area by License Agreement offset mover 80 FT. [03] East portion of PCP moved 10 FT to 20 FT due to trees and berm area. [04] M. Wagstaff only concerns are depth to remain and pond embankment global stability during excavation. [05] M. Wagstaff no issue with overall plan, but requested submit in a **RFI.**
2012-05-22	OPEN - [01] P. Zinsious reported Mr. Wampler [Wampler Farms]. [02] Open discussion of License Agreement and boundary line alignment off approximately 80FT. [03] M. Wagstaff indicated no issue. AMS to show on drawing.
2012-05-15	OPEN - [01] See Item No. 08.04-2012-05-15 for PCP Pre-Con Meeting and submission of the Excavation Plan. [02] Corrected ring description below in body of text. [03] No tax exemption if materials not purchased in Illinois.

10 QUALITY CONTROL

01 GENERAL

2012-05-29	OPEN - no issues. Poor material form areas at anchor trench excavation can be disposed of in Pond A.
2012-05-22	OPEN - no issues
2012-05-15	OPEN - no issues

02 ASH

2012-05-29	OPEN - work complete. P. Zinsious request copy of Massmann survey files. AER indicated by EOW.
2012-05-22	OPEN - no issues. All ash compaction density test have passed [over 90% density], some areas at PGL have to be tested. GEO to issue report. Mr. Tim Wilson [GEO] and Massmann to be on site 05-22. Ash pond elevations at 98% to grade [as determined by the 02-06 drawings], some spots high. General discussion "zig" [valley] in final grade per plan.
2012-05-15	OPEN - no issues. J. Cravens Section A and C approximately 50 point for ash compaction density tests have been performed to date. All test have to date have passed in the range of 99% to 114% compaction. GEO technician Mr. Tim Wilson will be back on site tomorrow [05-16]. Massmann is to download files for GEO locations.

03 CLAY

2012-05-29	OPEN - Borrow material analysis submitted show acceptable as both clay cover and vegetative material. Clay projected 06-11.
2012-05-22	OPEN - no issues - sample analysis submitted.
2012-05-15	OPEN - no issues. Samples taken yesterday [05-14]. The physical analysis will be by Holcomb and the chemical analysis will be by ARDL. Results should be in by next mid-week or before.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-05-29	OPEN - Review of schedule 06-01 handed out and 2 WK Look Ahead. [01] 06-05 - BTD to possibly begin. [02] 06-11 - Clay projected. [03] CBS Grubbing and road work this week. [04] During clay placement cap vents will be beamed and flagged. [05] License agreement "snow fence" installation. [06] Remove AER fence last minute for security. [07] Liner installation projected to progress at 8D duration, about 2D per 25% of area. [08] Activity No. 174 change to 05-29. [09] Dewatering progressing. [10] Ash Pond D 100% rolled and ready.

	2012-05-22	OPEN - Review of schedule to date. [01] Actual percent completion on ash pond sectors: A = 100%, B = 98%, C = 100%, D = 98% [02] 05-22 cap vents projected to 05-25. [03] 05-29 - BTD start date projection for PCP. [04] 05-21 - BTD to begin drilling de-watering wells. Pumping possibly 24/7 if required. [05] 05-22 - AMS to begin removing fencing along ash pond leaving poles. [06] 05-26 - Smooth drum roll ash placement ,no vibration, and addition of water for moisture content. [07] Box culvert demolition complete.
	2012-05-15	OPEN - Review of schedule to date. M .Wagstaff on vacation 05-15 to 05-22. [01] Actual percent completion on ash pond sectors: A = 100%, B = 90%, C = 100%, D = 85% [02] 05-11 - Lamac survey for "as-built" [record drawings] of the pipe relocation. [03] 05-29 - BTD start date projection for PCP. [04] Brief discussion electrical [AAA] and mechanical [FWI] scope.
02	**TIME AND MATERIAL**	
	2012-05-29	OPEN - no issues
	2012-05-22	OPEN - no issues
	2012-05-15	OPEN - no issues
03	**COORDINATION**	
	2012-05-29	OPEN - no issues. R. Porter to get with G. Musch to fill the water tank this week.
	2012-05-22	OPEN - no issues. R. Porter to get with G. Musch to fill the water tank.
	2012-05-15	OPEN - no issues

12.0 COST AND BUDGET

01	**CHANGE REQUEST ISSUES**	
	2012-05-29	OPEN - no issues.
	2012-05-22	OPEN - no issues.
	2012-05-15	OPEN - no issues.
02	**AMS PAY APPLICATION**	
	2012-05-29	OPEN - no issues.
	2012-05-22	OPEN - no issues.
	2012-05-15	OPEN - AMS submitted pay application. M. Wagstaff indicated no issues, and that the revised AER PO is in process.

12.1 EXTRA WORK ORDERS

01	**EWO-01**	**ELECTRIC TEMPORARY**
	2012-05-29	No issues. Work 100% complete.
	2012-05-22	Deferred.
	2012-05-15	No issues. 100% complete.
02	**EWO-02**	**ASH PLACEMENT - CAP MODIFICATIONS**
	2012-05-29	No issues. Work completing. AMS to include in draft of pay-app on 06-05.
	2012-05-22	Deferred.
	2012-05-15	No issues. In progress.
03	**EWO-03**	**COAL PILE**
	2012-05-29	No issues. Work 100% complete.
	2012-05-22	Deferred.
	2012-05-15	No issues. 100% complete.
04	**EWO-04**	**PIPE RELOCATION**
	2012-05-29	No issues. Work 100% complete.
	2012-05-22	Deferred.
	2012-05-15	OPEN - work in progress. R. Porter reports pipe is ordered for the connection, and scheduled for installation next week on Monday [05-21]. The connection to the manhole will be a short piece of SDR 35 PVC pipe connected to the HDPE with a stainless steel repair coupling. The interior of the manhole will be patched with non-shrink grout, the exterior with the "A-Lock" ring and concrete. Details will be provided on the plan and profile record drawings for this line.
05	**EWO-05**	**ELECTRIC FEEDER**
	2012-05-29	OPEN - in progress. M. Wagstaff review and will have list of questions 05-29.
	2012-05-22	Deferred.
	2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.
06	**EWO-06**	**POND A TRENCH**
	2012-05-29	No issues. Work 100% complete.
	2012-05-22	Deferred.
	2012-05-15	No issues. Work 100% complete.

07	**EWO-07**	**ELECTRIC OVERHEAD**
	2012-05-29	OPEN - in progress. M. Wagstaff review and will have list of questions ~~05~~ 29.
	2012-05-22	Deferred.
	2012-05-15	OPEN - in progress. AMS and AAA meeting yesterday [05-14], review after Progress Meeting.
08	**EWO-08**	**CREDIT TO EWO-01**
	2012-05-29	OPEN - in progress.
	2012-05-22	Deferred.
	2012-05-15	OPEN - in progress.
09	**EWO-09**	**BENTONITE VES-01**
	2012-05-29	OPEN - in progress. Approved. AMS to provide cost account.
	2012-05-22	Deferred.
	2012-05-15	OPEN - in progress. M. Wagstaff indicated that yesterday [05-14] Hanson approved the AMS response comments to the Hanson submittal review. GSE to provide pricing and AMS to calculate EWO.
10	**EWO-10**	**FLOW-ABLE FILL CREDIT**
	2012-05-29	OPEN - in progress. Work in area complete. AMS to provide cost account.
	2012-05-22	Deferred.
	2012-05-15	OPEN - in progress.
11	**EWO-11**	**BUILDING SPOILS REMOVAL**
	2012-05-29	OPEN - in progress. No further spoils found, AMS to provide cost account.
	2012-05-22	Deferred. No other issues, test holes revealed.
	2012-05-15	OPEN - in progress. AMS to dig test holes by EOW.

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-05-29	Pipe alignment direct to the manhole M. Wagstaff indicated discussion with Hanson and no issues with alignment and connection proposed by AMS. Work is considered a field change and no RFI required, only show final layout of Record Drawings. M. Wagstaff requested Lamac shoot final elevations.
	2012-05-22	Discussion of collection box pipe alignment direct to the manhole.
	2012-05-15	
	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [CLOSED - drawing issued]	
	[24] Research with Hanson PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].	
	[25] Research with Hanson alignment of the discharge piping structure at the outfall man hole. AER original design took into consideration a "mixing zone". R. Porter indicated since the line pipe relocation alignment can be direct. Discussion of the grade to be field adjusted around the box if new location is approved.	

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT [AMS]**	
	2012-05-29	In progress.
	2012-05-22	In progress.
	2012-05-15	
	[21] BTD/AMS VES-02 for PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].	

15 PRODUCTION

01	**GENERAL**	
	2012-05-29	OPEN - no issues
	2012-05-22	OPEN - no issues
	2012-05-15	OPEN - no issues
02	**ASH**	
	2012-05-29	OPEN - no issues. Estimated 101,938 CY EOD 05-22 [completion date CY based on load count, not an actual measurement]
	2012-05-22	OPEN - no issues. Estimated 101,074 CY EOD 05-21
	2012-05-15	OPEN - no issues. Estimated 89,098 CY EOD 05-14
03	**CLAY**	
	2012-05-29	OPEN - no issues - this activity not begun.
	2012-05-22	OPEN - no issues - this activity not begun.
	2012-05-15	OPEN - no issues - this activity not begun.

16 DOCUMENTS TRANSMITTED

2012-05-29	[01] AMS - Contact list HUT-APD-CON-2012-05-29
	[02] AMS - Schedule dated 05-25 - critical Path
	[03] AMS - Schedule dated 05-25 - full
	[04] GEO - Submittal Log [previous issue via e-mail 05-25]
	[05] LEC - drawing "Revision to Collection Layout"
2012-05-~~15~~ 22	[01] ~~BTD -~~ AMS - Contact list HUT-APD-CON-2012-05-21 [Corrected 05-29]

2012-05-15	[01] BTD - Excavation Work Plan for the Perforated Collector Pipe [5x to 6x copies]
	[02] BTD - Certification [for above].

17 DOCUMENTS REVIEW ONLY

2012-05-29	None
2012-05-22	Large format drawing for alignment review of PCP.
2012-05-08	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, June 5, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Geomembrane anchor trench facing west



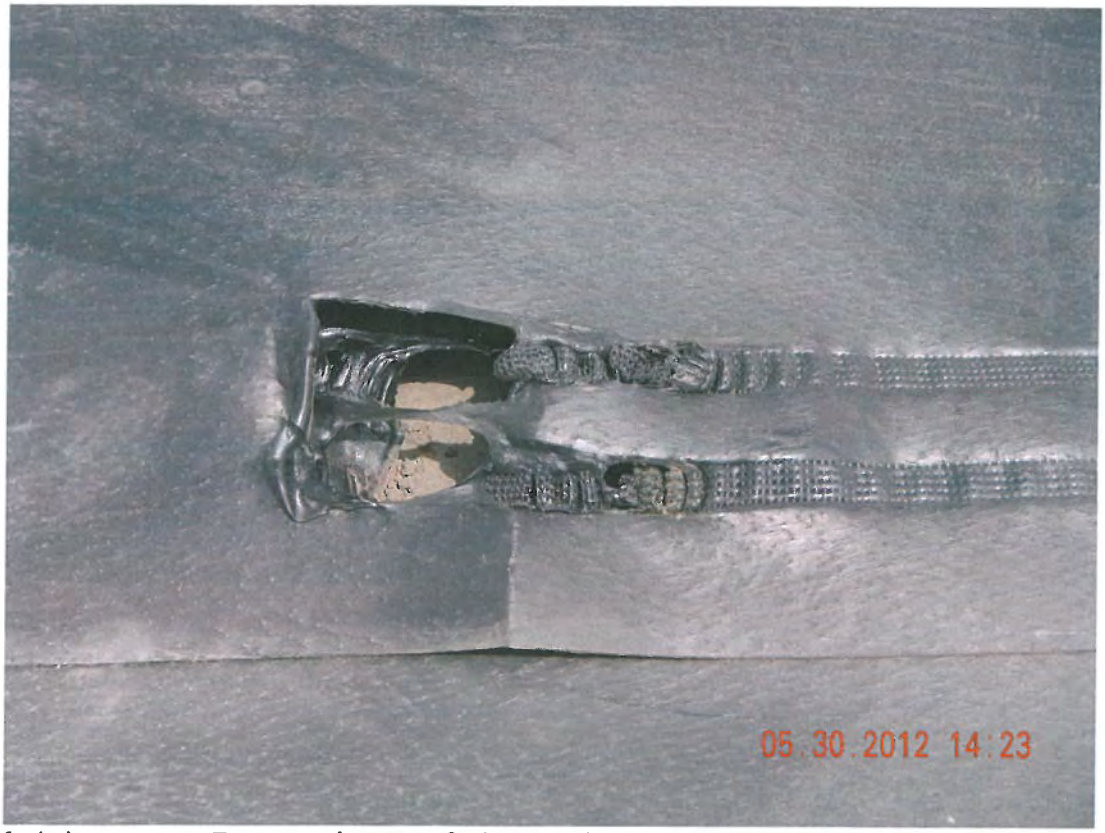
Photograph 2 - Geomembrane installation facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

JRC



Photograph 3 - Double wedge seaming facing northeast



Photograph 4 - Burn out in seam facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

JRC



Photograph 5 - Geomembrane installation facing north



Photograph 6 - Air testing seam facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

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Photograph 7 ⮝ - Perforated 4" drainage pipe for anchor trench facing northwest



Photograph 8 ⮝ - FA-01 sand for anchor trench facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

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Photograph 9 - Typical geomembrane repair facing south



Photograph 10 - Peel testing on destructs facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

JRC



Photograph 11 - Tacking patch to geomembrane with a lyster facing south



Photograph 12 - Grinding edge of patch for good deal facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

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Photograph 13 - Extrusion welding repair facing east



Photograph 14 - Destruct testing, archiving and shipping facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

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Photograph 15 - Backfilling anchor trench facing northwest



Photograph 16 - Backfilling anchor trench with drainage pipe facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

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Photograph 17 ⮝ - Overview Ash Pond D facing east



Photograph 18 ⮝ - Overview Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between May 29 and June 2, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: June 12, 2012

SUBJECT: Weekly Summary Report for June 4, 2012 to June 9, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 54 to 72°F, and temperature highs ranged from 66 to 88°F. Weather delay did not occur this week.

Construction Activities

Anchor trench construction and 40 mil HDPE geomembrane installation occurred this week. The remainder of the anchor trench has been excavated, excluding the outlet drainage trenches. Part of the anchor trench in Quadrant A and B, containing the 4-inch HDPE perforated drainage pipe, has been backfilled with IDOT FA-01 sand. Chesapeake Containment Systems, Inc. completed installation of the 40 mil HDPE geomembrane liner in all quadrants of Ash Pond D. Typical repairs on the geomembrane liner continue. Geotechnology, Inc. observed quality control of the installation. Refer to geomembrane documentation for more details. Dewatering for the proposed perforated collector pipe excavation continues in well number 2, located south of Ash Pond A. The replacement monitoring well MW-2R, was installed on June 4, 2012 by Skinner Limited. See daily reports for additional information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT 330D Excavator
CAT 613C Water Truck
CAT 279C Skid Steer (rubber track)
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 9520 Tractor
John Deere 410J Backhoe
Sky Track 6036 Forklift
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens, Tim Wilson, Steve Graham, and Anna Saindon
Ash Management Services, LLC (AMS) – Randy Porter, Jon Dietzel, Jimmy Boone, Robert Dunkley, James Marks, Shawn McClaskey, Brad Bolenbaugh, Greg Siverly, and Jeremy Shorter
Charah, Inc. – Joe Tasich
Chesapeake Containment Systems, Inc – Jose Valverde, Barbarito Flores, Daniel Gonzales, Phet Vongkhamchanh, Jose Flores, Alberto Ortiz, Manuel Gonzales, Israel Gonzales, Erik Sefton, Blake Bunting, and Matthew Watts
Daylight Land Management – Adam Ziliak and Billy Georges
B&T Drainage – John Boyer and Chase Boyer
Skinner Limited – Todd Skinner, Adam Bruce, Allan Denk, and Jeff Walsh
Visitors –Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, June 5, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

40 mil HDPE geomembrane was installed on site. Additional IDOT FA-01 sand and 4-inch HDPE drainage pipe was delivered on site for the anchor trench.

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Testing/Sampling

Geomembrane destructive and non-destructive testing and sampling occurred this week. Refer to geomembrane documentation for additional details.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



DAILY REPORTS

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13814

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 6/4/12

TIME: Arrive: 6:30 AM Depart: 6:30 PM Travel: 1.0 hr Total: 12.75 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 60°AM, Rain 66°PM Contractor: AMS Subcontr./Supplier: CCS/GEO/DLM/Skinner
Equipment Working: 6036 Forklift, Water Truck, CME 550 Drill Rig, 6430 Tractor
Site Activities / Observations / Contacts / Notes:

AMS:
The 6036 continued deploying liner rolls on the southern section of the pond. Due to the recent rain events, the entire eastern anchor trench is filled with water. They began pumping the water from the trench into the Water Truck, and using it for dust control on the pond. Johnny McGrew is no longer an AMS operator. 10 more loads of FA-01 sand was delivered.

CCS:
They continued placing geomembrane panels on the southern section of the pond, double fusion seaming (welding), and conducting peel and shear tests on destructs. No air testing or extrusion welding performed today. Refer to Geotechnology's data sheets for more information. Leroy Smith is no longer working on the job site.

Skinner, Ltd.:
Skinner Limited drilled and installed MW-2R. Personnel- Todd Skinner (driller), Adam Bruce, Allan Denk, Jeff Walsh. MW-2R is located 13' north of MW-2, and approx. 19'-20' south of Ash Pond A's embankment toe. The well was drilled to 18' and was continuously sampled with a split-spoon. The subsurface generally consisted of sand (0-17.5'), overlying glacial till. The well was drilled with 4¼" H.S. augers, and standard AWJ rods. Well Installation: 0-3' concrete, 3-5' bentonite seal (chips), 5'-7' sand, 7'-18' screen (11.0'). The well stickup has a casing and is surrounded by 3 bollards. The well was not able to be developed due to the adjacent dewatering wells.

DLM: Adam Ziliak and Billy Georges delivered more hay and demobilized their John Deere 6430 Tractor.

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
6-4-12 — Date
Anna Sandin — Geotechnology, Inc.
6-10-12 — Date
[signature] — Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13815

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/5/12

TIME: Arrive: 6:30 AM | Depart: 5:00 PM | Travel: 1.0 hr | Total: 11.25 hrs (0.25 hr for lunch)
Weather: Sunny, 65° AM, 77° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO
Equipment Working: 6036 Forklift, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 6036 continued deploying liner rolls on the southern section of the pond, and staged more rolls on the east side of the pond. The 279C was used to move materials along the anchor trench. The laborers continued pumping water from the anchor trench on the east side, into the water truck, and discharged the water into Ash Pond C. They also assisted CCS for geomembrane placement. AMS trained two operators and they will begin work tomorrow.

CCS:

They continued deploying geomembrane panels on the southern section of the pond, double fusion seaming (welding), and staging sand bags. They deployed 12 rolls today, and approx. 50 rolls to date. There was no patching/repairing, extrusion welding, destructive testing, or non-destructive testing today. Refer to Geotechnology's data sheets for more information.

Misc.:

The details of the PCP should be worked out next week, and excavation should begin on 6/18/12. Clay placement should begin on 6/11/12, pending geomembrane certification.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Randy Porter — Signature — 6-5-12 — Date
Anna Saindon — Geotechnology, Inc. — 6-10-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13816

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/6/12

TIME: Arrive: 6:30 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12 hrs (0.25 hr for lunch)
Weather: Sunny, 54° AM, 78° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO
Equipment Working: 6036 Forklift, 580 Backhoe, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 6036 continued deploying liner rolls on the southern section of the pond, and staged liner rolls on the south end of the pond. The 580 began digging the anchor trench on the south end of the pond. The only part of the anchor trench that remains to be excavated is on the south and west end of Section C. The 279C placed sand bedding for the 4" perforated pipe in the NE portion of the anchor trench, forcing the remaining water in the trench towards the east. The laborers continued pumping water from the anchor trench on the east side of the pond into the water truck, and using it for dust control on the pond. Shawn McClaskey is no longer an AMS laborer. AMS's new operators are Greg Siverly and Jeremy Shorter.

CCS:

They finished deploying geomembrane panels on the southern section, going towards the east side of the pond. The areas left to cover are a 50' strip on the south and west end of the pond. All the panels placed have been seamed. No air testing took place today. They began vacuum testing repairs on the north side of the pond, and continued patching/repairing panels with extrusion welding. Three destructs were failed in the lab for peel incursion. DT-7, 12, and 19 were retested by cutting additional samples 10' on both sides of the original 1'x3' DT on the same seam. The retested samples passed in the field per GM19 requirements, and the lab samples were sent out. If lab results extend passed the weekend, only panels P-1 to P-9 will be allowed to be covered with vegetative cover, pending vacuum testing.

Additional Comments:

Randy Parker — Contractor Representative — AMS — Company
Signature — 6-6-12 — Date
Anna Saindon — Geotechnology, Inc. — 6-10-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13817

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/7/12

TIME: Arrive: 6:30 AM | Depart: 7:45 PM | Travel: 1.0 hr | Total: 14 hrs (0.25 hr for lunch)
Weather: Sunny, 59°AM, 80°PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO
Equipment Working: 6036 Forklift, 580 Backhoe, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 6036 continued deploying liner rolls on the south and west ends of the pond. The 279C removed anchor trench spoils on the northern end of Section A, and stockpiled the spoils outside the pond on the NW corner. The 580 finished digging the anchor trench on the south end of the pond, and began digging the anchor trench on the west side of Section C. The 580 also removed anchor trench spoils on the west end of Section A, and regraded the sloped pad in front of the box culvert before deploying geomembrane. The 4" solid-walled subdrainage pipe for the anchor trench cleanouts were delivered along with additional IDOT FA-01 Sand for the anchor trench backfill.

CCS:

They completed deploying geomembrane panels on Ash Pond D. All the panels deployed have been double fusion welded at the seams. After seaming, the panels were pulled back on the west side of Section C in order to complete the excavation of the anchor trench. Vacuum testing, patching and repairing, and extrusion welding continued on the northern section of panels. Air testing continued on the southern section of panels. After further review, it was found that destruct sample DS-2 did not meet GM19 requirements. Therefore, a new sample was cut, field tested, and sent to TRI labs. If the new sample does not have passing results, this will delay clay placement on 6/11/12. Currently, the date has not been changed.

Additional Comments: The date for PCP excavation has been moved up to 6/13/12.

Randy Porter — Contractor Representative — AMS — Company — 6-7-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 6-11-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13818

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 6/8/12

TIME: Arrive: 6:00 AM | Depart: 6:30 PM | Travel: 1.0 hr | Total: 13.25 hrs (0.25 hr for lunch)
Weather: Sunny, 70°AM, 88° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO/BTD
Equipment Working: 580 Backhoe, 279C Skid Steer, 624H Front End Loader
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 finished digging the anchor trench on the west side of Section C. The anchor trench excavation is now complete. The 279C began backfilling the anchor trench and 4" perforated drainage pipe on the north and northeast side of Section A with FA-01 sand. A plate compactor was delivered and used to compact the backfilled anchor trench. Joko was here and finished training the truckers for the CBS route. The following are potential drivers for next week: James Griffith, Robbx Sanders, Gary Lamb, James Urfer, Lee Edington, Kim Edington, James Elledge, Scotty Comer, Greg Lingorfelter, Frank Walton, Tom Sager, and Ralph McReynolds (12 Total).

CCS:

They continued patches/repairs and vacuum testing on the northern section of panels. Panels P-1 to P-17 (NW Section A) has been fully repaired and tested. This area was outlined with sand bags and is ready for clay placement, pending the approval of the results from DS-2 retest. Air testing was completed in the southern section. Air testing remaining: South and West strip. They began patches/repairs in the southern section and destructs were marked and cut.

BTD:

The 624H unloaded two trench boxes and John refueled the generator. A Bomag BW 172 PDB-2 single drum, pad foot roller with cutting blade was delivered.

Additional Comments:

Sandy Por — Contractor Representative — AMS — Company
Signature — 6-8-12 — Date
Anna Saindon — Geotechnology, Inc — 6-11-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13819

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/9/12

TIME: Arrive: 6:00 AM | Depart: 4:45 PM | Travel: 1.0 hr | Total: 11.0 hrs (0.75 hr for lunch)
Weather: Sunny, 72° AM, 88° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO
Equipment Working: 279C Skid Steer, 580 Backhoe, 6036 Forklift
Site Activities / Observations / Contacts / Notes:

AMS:

The 279C and 580 continued backfilling the anchor trench and 4" perforated drainage pipe on the NE side of Section A, and the north side of Section B. A plate compactor was used to compact the backfilled anchor trench. The 6036 staged drainage pipe around the anchor trench and removed excess materials outside the pond to the construction yard. PGL stakes with 3' marks, and grid stakes with 3' marks were placed in Section A for clay placement on Monday.

CCS:

Air testing has been completed and CCS continued repairing, vacuum testing, and testing destructs in the southern section of panels in the pond, and the west and south 50' strip of panels. DS-2 retest had passing results and panels P-1 to P-17 have been approved for clay placement. A CQA Certification form for panels P-1 to P-17 will be issued before clay placement.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 6-9-12 — Date
Anna Sawlon — Geotechnology, Inc. — 6-11-12 — Date
Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 12 Minutes
Tuesday, June 5, 2012

01 PUBLICATION

Publish date:	2012-06-11	Submitted by:	P. Zinsious		
Distribution:	E-mail only	Notes taken by:	P. Zinsious		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-06-05-PM-11		
AER PO:	567523 R3	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com
03	Mr.	Mike	Wagstaff	Ameren	618-343-7790	mwagstaff@ameren.com
04	Mr.	Jimmy	Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
05	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
06	Mr.	John	Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
07	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
08	Mr.	John	Boyer	B&T Drainage	217-822-6593	john@btdrainage.com
09	Mr.	Joko	Tasich	Charah	502-649-7633	jtasich@charah.com
10	Mr.	Mike	Burch	Freitag-Weinhardt	812-208-1771	mburch@freitaginc.com
11	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
12	Ms.	Anna	Saindon	Geotechnology	314-997-7440	a_saindon@geotechnology.com
13	Mr.	Travis	Hunt	S&T Construction	812-234-2243	stdirt1@hotmail.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past three weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN".

05 SAFETY - HOUSEKEEPING

01 ACCIDENTS OR INJURIES

2012-06-05	OPEN - no issues.
2012-05-29	OPEN - no issues.
2012-05-22	OPEN - no issues.

02 WORKER PROTECTION ASSURANCE

2012-06-05	OPEN - no issues. None projected for 2x week look ahead.
2012-05-29	OPEN - no issues. None projected for 2x week look ahead.
2012-05-22	OPEN - no issues. None projected for 2x week look ahead. Chesapeake Containment [CCS] will use generators.

03 EMPLOYEE DRUG TESTING

2012-06-05	OPEN - no issues. AMS has sent 2x employees. M. Wagstaff sent thank you e-mail to JCH. P. Zinsious suggested inviting them to a safety luncheon.
2012-05-29	OPEN - no issues. P. Zinsious reports that Jasper County Health has been good to work with, very flexible. CCS has 12x and BTD 3x workers at Newton today [05-29]. A. Saindon reports 1x worker from TSI to schedule TBD.
2012-05-22	OPEN - no issues. BT Drainage count in progress. 1x AMS yesterday DT at Robinson [05-21] and 1x AMS today [05-22].

04	**AMS SAFETY**	
	2012-06-05	OPEN - no issues. [01] J. Denham reported on 1x AMS operator who was not operating safety while operating the [all terrain] fork lift on 06-01. Worker was suspended for unsafe actions and not wearing a seat belt and is currently under review. AMS has a zero tolerance policy, and if the review proves accurate, the worker will be terminated. Official response and [incident] violation report should be ready by 06-06. [02] General discussion safety concerns for the vegetative cover hauling [soil materials form the borrow site]. P. Zinsious indicated signs will be placed on Illinois Route 1 northbound and southbound lanes where trucked entering the highway. Currently Illinois is working on the bridge deck that crosses over Raccoon Creek on the haul route. Truckers will not be allowed to deviate form the route and travel the "back way" into the borrow site to avoid the work at the bridge deck. Estimated time of this work on the bridge deck is 6x to 8x Wks. [03] B. Muesenfechter concern that open liner anchor trenches could be a potential tripping hazard and indicated previous issue at Coffeen [Ameren power plant]. M. Wagstaff indicated depends on trench. J. Denham indicated caution tape will be placed at trenches, on the exterior, as the interior has liner, and cannot penetrate the liner [with posts]. [04] Cooling stations are set up.
	2012-05-29	OPEN - no issues. [01] J. Tasich briefing heat exhaustion and dehydration. [02] J. Tasich review of insects. [03] J. Denham briefing schedule cooling stations when work is begun 05-30 - 2x 10 FT x 10 FT for CCS and 1x 10 FT x 10 FT general. [04] Next safety luncheon is 06-12. M. Wagstaff will not be able to attend.
	2012-05-22	OPEN - no issues. Next safety luncheon is 06-12. [01] J. Tasich briefing on glove usage for material handling and look out for insects/varmints. [02] Bees at trailer are eradicated. [03] J. Denham briefing on cooling stations, 2x will be set up. [04] Brief discussion on hydrating. Energy drinks not encouraged due to caffeine content. [05] Review of Charah/AMS safety awards [ref. Item No. 05.04-2012-05-08.01,02,03 below]. [06] No cooling station at CBS as workers [operators] in equipment with AC.
05	**HOUSEKEEPING**	
	2012-06-05	OPEN - M .Wagstaff concern regarding small pieces of liner. J. Boone indicated daily cleanup.
	2012-05-29	OPEN - Dumpster for CCS - P. Zinsious to investigate.
	2012-05-22	OPEN - No issues. M. Wagstaff inquire about CCS and liner material. CCS will have dumpster and AMS will help keep clean.
06	**PLANT ACCESS - CBT**	
	2012-06-05	OPEN - M .Wagstaff reports that Ameren [Services] will begin transmission line work [between Kansas and Illinois], and will be using the coal yard at the Hutsonville plant as storage. Ameren will provide a guard for 12 HR shifts. The contacts at Ameren as Mr. Jim Williams [over the GENCO division] and Mr. Bob Simmons who will be the site SPOC. Work to begin the middle of June 2012. J. Boone indicated concern over coordination of trucks hauling into the site, and M. Wagstaff said no issue, as the trucks can come in through the gate by the [west] PCP line.
	2012-05-29	OPEN - R. Porter reports getting difficult to monitor the gate with both himself and Joe on the site. AER requires frequent access to the substation. Sometimes the entities accessing the site do not have proper PPE or identification signs on their vehicles. R. Porter also reports they are not calling the numbers on the entrance sign and at the trailers to access the site. There has also been unknown vehicle accessing the site. M. Wagstaff indicated that re-activation of the gate is an option. General discussion that gate is good idea, but does not prevent access to the plant. Consensus is that using the gate when no one is at the trailers will at least force direction of traffic around to where vehicles can be seen from the work site.
	2012-05-22	OPEN - no issues. M .Wagstaff to issue gate log. DT info listed above. Item No. 05.03.
07	**VEHICLES ON SITE**	
	2012-06-05	OPEN - no issues. Both GEO and CCS have "gators" on site.
	2012-05-29	OPEN - no issues.
	2012-05-22	OPEN - no issues. Brief review of workers bused to ash pond work site by AMS.
08	**OSHA LOG - WORK HOURS**	
	2012-06-05	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-04.
	No incidents or accidents.	
	2,543.50	RT
	0,436.50	OT
	2,980.00	TOTAL
	2012-05-29	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-28
	No incidents or accidents.	
	2,255.50	RT
	0,168.00	OT
	2,423.50	TOTAL
	2012-05-22	OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 05-21
	No incidents or accidents.	
	0,0000.00	RT
	0,000.00	OT
	2,347.50	TOTAL [time not split out

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-06-05 AMS, Chesapeake Containment [CCS], and BT Drainage [BTD] on site.

[03] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[12] Laborers [AMS 2x, CCS 10x]
[02] Operators [AMS 2x]
[01] Teamsters
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[21] Total

2012-05-29 AMS, Chesapeake Containment [CCS], and BT Drainage [BTD] on site.
Belt Construction [BCI] and Illini Drilled [IDF] have demobilized.
[04] Geotechnology [work hours not included in OSHA Log above - 2x this AM, 4x by EOD]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[15] Laborers [BTD 1x, AMS 2x, IDF 2x, CCS 11x]
[04] Operators [BTD 1x, AMS 2x, IDF 2x]
[01] Teamsters
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[27] Total

2012-05-22 OPEN - AMS and Belt Construction on site. AMS Focus [training program] Site Manager Mr. Anthony Driver on site.
Current General discussion on what the AMS-Charah focus program is to train site Managers.
[01] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[03] Laborers
[05] Operators [long boom operator not required]
[01] Teamsters
[00] Survey
[02] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project].
[12] Total

02 WORK HOURS

2012-06-05 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT.

2012-05-29 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT. No work Memorial Day holiday [Monday 05-28].

2012-05-22 OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. Belt started to work 10x HRS [internal cost to AMS] last Tuesday [05-15] and will continue until finished. CCS still on track for OT. No work on site Memorial Day holiday [observed Monday 05-28].

03 OVER TIME

2012-05-29 OPEN - CCS work hours 6:00 AM CT to 4:30 to 6:30 PM CT

2012-05-22 OPEN - Belt has projected OT per Item No. 06.02, and will de-mob on Friday [05-25].

2012-05-15 OPEN - Belt has projected OT per Item No. 06.02-2012-0515 above.

04 TRAILER [AND GENERAL CONDITIONS]

2012-06-05 OPEN - no issues.

2012-05-29 OPEN - no issues.

2012-05-22 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-06-05 OPEN - no issues.

2012-05-29 OPEN - no issues.

2012-05-22 OPEN - no issues. BT Drainage has contract [CLOSED].

02	**SUBMITTALS**	
	20120-06-05	Submittal log as published by GEO on 06-2 distributed. General discussion. [01] Submittal log copies distributed. [02] Seed/mulch submittal under review by AER returned. [03] VES-01 to be returned by AER returned. [04] VES-02 M. Wagstaff orally approved returned. [05] SWP3 for APD submitted by AMS as matter of record original signed on 02-28. [06] AMS to submitted dewatering sump under AER review.
	20120-05-29	Submittal log as published by GEO on 05-25 distributed. General discussion. [01] Submittal log copies distributed. [02] Submittal log last two on list review by AER. [03] Seed/mulch submittal under review by AER. [04] VES-01 to be returned by AER. [05] VES-02 M. Wagstaff orally approved. [06] SWP3 for APD submitted by AMS as matter of record. [07] AMS to submit dewatering sump 05-30. [08] J. Denham and P. Zinsious overview of submittals not required at this time, some at the end of the project. [08] Massmann to certify subgrade and set spots to patch. [09] Discussion liner anchor trench.
	2012-05-22	OPEN - no issues. In progress - P. Zinsious submitted to J. Cravens today updated cover sheets and log.

08	MATERIAL	
01	**GENERAL**	
	20120-06-05	OPEN - no issues.
	20120-05-29	OPEN - R. Porter reports all material in, for pipe relocation connection and complete. [CLOSED]
	20120-05-22	OPEN - R. Porter reports all material in, however bands too long [will resolve].
02	**GEOMEMBRANE PRE-CON**	
	20120-06-05	Open - no issues. [01] A. Saindon reviewing tests, looks good. However test results for areas will not be ready until about 4:00 PM CT on 06-07. [02] Using stakes on positioned by sandbags and leaving the sandbags in place are acceptable per A. Saindon.
	20120-05-29	OPEN - J .Denham indicated certifications required for fork lift drivers. R. Porter reports has certifications, same as when unloading the liner.
	20120-05-22	OPEN - no issues. GEO inspection on Thursday [05-24].
03	**CAP VENT PRE-CON**	
	2012-06-05	OPEN - no issues. [corrected date errors of "20120" below]
	2012-05-29	OPEN - Everything complete except the strainers, which will be installed after the clay cap.
	2012-05-22	OPEN - Drilling completed on Monday [05-21].
04	**PERFORATED COLLECTOR PIPE [PCP] PRE-CON MEETING**	
	2012-06-05	OPEN - Discussion during Progress Meeting: [01] M. Wagstaff concern on the PCP alignment and liquefaction [due to seismic] of the soil near the pond berm. There was no specification provided by Ameren, and for now the alignment look good, will go with Hanson. [02] J. Boyer reports at area of DS-1 hit shallow sandstone, about 20 FT west from location. Will status once excavation begins if a new location or higher elevation will be required. [03] M .Wagstaff reports that new well MW-2R could not develop due to dewatering. [02] P. Zinsious reports that review of PCP alignment allow for power poles to stay in place [Ameren does not need to remove for now].
	20120-05-29	OPEN - Discussion during Progress Meeting: [01] M. Wagstaff reports sequence for new monitoring well: [01] Install new monitoring well next week 06-04 by local subcontractor Todd Skinner [worked at Newton]. [02] Will not require safety training by AMS. Will wear PPE, and sign in. [03] New well depth 15 FT to 18 FT. [04] When well is developed in 2x weeks, EC Lab will sample both wells. [05] When samples approved, old well can be abandoned. [06] AMS to remove when excavating the PCP, projected 06-18. No impact to schedule. [02] Water from dewatering well [points] discharged into Pond B. R. Porter indicated Pond A has 3 FT freeboard, concerned with stirring up [ash] and Pond A being full. [03] M. Wagstaff indicated Pond A is where discharge is to go, take advantage of delay in sampling.
	20120-05-22	OPEN - Meeting during Progress Meeting with Mr. John Boyer. [01] Open discussion of safety concern due to wet/damp installation and welding of HDPE in the trench. [02] M. Wagstaff indicated Hanson concern damage of pipe when installed. [03] AMS to provide PVC Value Engineering Submittal [substitution]. J. Boyer indicated cost estimated at $ 500 more. [04] P. Zinsious indicated pipe will not be damaged. J. Boyer stated can run "mandrel test" after pipe installation. [05] Existing Ameren MW-2 probably not able to be saved,

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-06-05	OPEN - Discussion during Progress Meeting: [01] J. Boone reports Mr. Duane Wampler has communicated not happy with fence alignment. [02] AMS has mover the fence back. J. Cravens has been in contact with Wampler. [03] J. Boyer indicated collector tile work in about two weeks [will need coordination with Mr. Wampler]. [04] J. Boyer reports only need in week in this area, as shallow. [05] M. Wagstaff will be in contact with Mr. Wampler to resolve.
2012-05-29	OPEN - Review of Lamac drawing of PCP alignment survey. [01] West area by License Agreement offset mover 80 FT due to coordination with boundary line/survey/drawings. [02] East area by License Agreement offset mover 80 FT. [03] East portion of PCP moved 10 FT to 20 FT due to trees and berm area. [04] M. Wagstaff only concerns are depth to remain and pond embankment global stability during excavation. [05] M. Wagstaff no issue with overall plan, but requested submit in a RFI.
2012-05-22	OPEN - [01] P. Zinsious reported Mr. Wampler [Wampler Farms]. [02] Open discussion of License Agreement and boundary line alignment off approximately 80FT. [03] M. Wagstaff indicated no issue. AMS to show on drawing.

10 QUALITY CONTROL

01 GENERAL

2012-06-05	OPEN - no issues
2012-05-29	OPEN - no issues. Poor material form areas at anchor trench excavation can be disposed of in Pond A.
2012-05-22	OPEN - no issues

02 ASH

2012-06-05	OPEN - Survey information sent to Lamac, for A. Ridgely to determine the delta.
2012-05-29	OPEN - work complete. P. Zinsious request copy of Massmann survey files. AER indicated by EOW.
2012-05-22	OPEN - no issues. All ash compaction density test have passed [over 90% density], some areas at PGL have to be tested. GEO to issue report. Mr. Tim Wilson [GEO] and Massmann to be on site 05-22. Ash pond elevations at 98% to grade [as determined by the 02-06 drawings], some spots high. General discussion "zig" [valley] in final grade per plan.

03 CLAY

2012-06-05	OPEN - no issues begin placement on 06-11.
2012-05-29	OPEN - Borrow material analysis submitted show acceptable as both clay cover and vegetative material. Clay projected 06-11.
2012-05-22	OPEN - no issues - sample analysis submitted.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-06-05	OPEN - Review of schedule 06-01 handed out [01] B. Muesenfechter presented "First Planner" . [02] Open discussion and review of "First Planner" process with the Build Team present. [03] Review of draft "First Planner" look-ahead. Individual activity review with modifications of dates and "Last Planner" assignments.
2012-05-29	OPEN - Review of schedule 06-01 handed out and 2 WK Look Ahead. [01] 06-05 - BTD to possibly begin. [02] 06-11 - Clay projected. [03] CBS Grubbing and road work this week. [04] During clay placement cap vents will be beamed and flagged. [05] License agreement "snow fence" installation. [06] Remove AER fence last minute for security. [07] Liner installation projected to progress at 8D duration, about 2D per 25% of area. [08] Activity No. 174 change to 05-29. [09] Dewatering progressing. [10] Ash Pond D 100% rolled and ready.
2012-05-22	OPEN - Review of schedule to date. [01] Actual percent completion on ash pond sectors: A = 100%, B = 98%, C = 100%, D = 98% [02] 05-22 cap vents projected to 05-25. [03] 05-29 - BTD start date projection for PCP. [04] 05-21 - BTD to begin drilling de-watering wells. Pumping possibly 24/7 if required. [05] 05-22 - AMS to begin removing fencing along ash pond leaving poles. [06] 05-26 - Smooth drum roll ash placement ,no vibration, and addition of water for moisture content. [07] Box culvert demolition complete.

02 TIME AND MATERIAL

2012-06-05	OPEN - no issues
2012-05-29	OPEN - no issues
2012-05-22	OPEN - no issues

03 COORDINATION

2012-06-05	OPEN - no issues
2012-05-29	OPEN - no issues. R. Porter to get with G. Musch to fill the water tank this week.
2012-05-22	OPEN - no issues. R. Porter to get with G. Musch to fill the water tank.

12.0 COST AND BUDGET

01 CHANGE REQUEST ISSUES

2012-06-05	OPEN - no issues.
2012-05-29	OPEN - no issues.
2012-05-22	OPEN - no issues.

02 AMS PAY APPLICATION

2012-06-05	OPEN - no issues, draft revised on 06-05 few items to revise.
2012-05-29	OPEN - no issues.
2012-05-22	OPEN - no issues.

12.1 EXTRA WORK ORDERS

01 EWO-01 ELECTRIC TEMPORARY

2012-06-05	CLOSE
2012-05-29	No issues. Work 100% complete.
2012-05-22	Deferred.

02 EWO-02 ASH PLACEMENT - CAP

2012-06-05	OPEN - ash placement work 100% complete.
2012-05-29	No issues. Work completing. AMS to include in draft of pay-app on 06-05.
2012-05-22	Deferred.

03 EWO-03 COAL PILE

2012-06-05	CLOSE
2012-05-29	No issues. Work 100% complete.
2012-05-22	Deferred.

04 EWO-04 PIPE RELOCATION

2012-06-05	CLOSE
2012-05-29	No issues. Work 100% complete.
2012-05-22	Deferred.

05 EWO-05 ELECTRIC FEEDER

2012-06-05	OPEN - in progress. AER and AAA review after Progress Meeting today [06-05].
2012-05-29	OPEN - in progress. M. Wagstaff review and will have list of questions 05-29.
2012-05-22	Deferred.

06 EWO-06 POND A TRENCH

2012-06-05	CLOSE
2012-05-29	No issues. Work 100% complete.
2012-05-22	Deferred.

07 EWO-07 ELECTRIC OVERHEAD

2012-06-05	OPEN - in progress. AER and AAA review after Progress Meeting today [06-05].
2012-05-29	OPEN - in progress. M. Wagstaff review and will have list of questions 05-29.
2012-05-22	Deferred.

08 EWO-08 CREDIT TO EWO-01

2012-06-05	CLOSE - include in pay-app.
2012-05-29	OPEN - in progress.
2012-05-22	Deferred.

09	**EWO-09**	**BENTONITE VES-01**
	2012-06-05	CLOSE - include in pay-app.
	2012-05-29	OPEN - in progress. Approved. AMS to provide cost account.
	2012-05-22	Deferred.
10	**EWO-10**	**FLOW-ABLE FILL CREDIT**
	2012-06-05	CLOSE - include in pay-app.
	2012-05-29	OPEN - in progress. Work in area complete. AMS to provide cost account.
	2012-05-22	Deferred.
11	**EWO-11**	**BUILDING SPOILS REMOVAL**
	2012-06-05	OPEN - in progress. No further spoils found, AMS to provide cost account.
	2012-05-29	OPEN - in progress. No further spoils found, AMS to provide cost account.
	2012-05-22	Deferred. No other issues, test holes revealed.
12	**EWO-12**	**PCP Survey**
	2012-06-05	NEW - AMS coordinate Lamac to survey "as-built" for the PCP installation.

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-06-05	CLOSE
	2012-05-29	Pipe alignment direct to the manhole M. Wagstaff indicated discussion with Hanson and no issues with alignment and connection proposed by AMS. Work is considered a field change and no RFI required, only show final layout of Record Drawings. M. Wagstaff requested Lamac shoot final elevations.
	2012-05-22	Discussion of collection box pipe alignment direct to the manhole.
	2012-05-15	
	[20] Drawing S-386 SHT 5 RF - the survey coordinates are reversed. [CLOSED - drawing issued]	
	[24] Research with Hanson PVC verses HDPE for the PCP [reference Item No. 08.04-2012-05-15-09].	
	[25] Research with Hanson alignment of the discharge piping structure at the outfall man hole. AER original design took into consideration a "mixing zone". R. Porter indicated since the line pipe relocation alignment can be direct. Discussion of the grade to be field adjusted around the box if new location is approved.	

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT [AMS]**	
	2012-06-05	In progress.
	2012-05-29	In progress.
	2012-05-22	In progress.

15 PRODUCTION

01	**GENERAL**	
	2012-06-05	OPEN - no issues
	2012-05-29	OPEN - no issues
	2012-05-22	OPEN - no issues
02	**ASH**	
	2012-06-05	OPEN - ash placement work 100% complete.
	2012-05-29	OPEN - no issues. Estimated 101,938 CY EOD 05-22 [completion date CY based on load count, not an actual measurement]
	2012-05-22	OPEN - no issues. Estimated 101,074 CY EOD 05-21
03	**CLAY**	
	2012-06-05	OPEN - no issues [projected start 06-11].
	2012-05-29	OPEN - no issues - this activity not begun.
	2012-05-22	OPEN - no issues - this activity not begun.

16	DOCUMENTS TRANSMITTED	
	2012-06-05	[01] AMS - Contact list HUT-APD-CON-2012-06-05
		[02] AMS - Schedule dated 06-01 - critical Path
		[03] AMS - Schedule dated 06-01 - data date
		[04] AMS - Schedule dated 06-01 - look ahead
		[05] AER - Last Planner presentation
		[06] AMS - last planner schedule draft
		[07] GEO - Submittal Log published 06-01
		[08] BTD - revised buoyancy calculations to Mr. Wagstaff only
	2012-05-29	[01] AMS - Contact list HUT-APD-CON-2012-05-29
		[02] AMS - Schedule dated 05-25 - critical Path
		[03] AMS - Schedule dated 05-25 - full
		[04] GEO - Submittal Log [previous issue via e-mail 05-25]
		[05] LEC - drawing "Revision to Collection Layout"
	2012-05-~~15~~ 22	[01] ~~BTD -~~ AMS - Contact list HUT-APD-CON-2012-05-21 [Corrected 05-29]

17	DOCUMENTS REVIEW ONLY	
	2012-06-05	None
	2012-05-29	None
	2012-05-22	Large format drawing for alignment review of PCP.

18	NEXT PROGRESS MEETING
	Next meeting will be held in one week - Tuesday, June 12, 2012 at Hutsonville

19	DISTRIBUTION - STANDARD
	AER
01	Mr. Mike Wagstaff
02	Mr. Mike Stewart
03	Mr. Bob Muesenfechter
	GEO
01	Ms. Anna Saindon
02	Mr. Eric Neuner
03	Mr. Joe Cravens
	AMS
01	Mr. Jimmy Boone
02	Mr. John Denham
03	Mr. Joko Tasich
04	Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG

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Photograph 1 - Installing geomembrane facing northeast



Photograph 2 - Installing monitoring well MW-2R facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

JRC

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Photograph 3 - Fusion seaming geomembrane facing southeast



Photograph 4 - Soil samples from monitoring well MW-2R facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

JRC



Photograph 5 - Installing monitoring well MW-2R facing northeast



Photograph 6 - Placing pipe bedding in anchor trench facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

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Photograph 7 - Vacuum testing extrusion welds facing southeast



Photograph 8 - Extrusion welding repairs facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

JRC



Photograph 9 - Air test on fusion weld facing west



Photograph 10 - Compaction in anchor trench facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

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Photograph 11 A - Overview of Ash Pond D facing southeast



Photograph 12 A - Overview of Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

JRC



Photograph 13 - Overview of Ash Pond D facing east



Photograph 14 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

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Photograph 15 A - Overview of Ash Pond D facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 4 and June 9, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: June 19, 2012

SUBJECT: Weekly Summary Report for June 11, 2012 to June 15, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 55 to 72°F, and temperature highs ranged from 75 to 88°F. A weather delay occurred on June 11, 2012 due to afternoon storms.

Construction Activities

Anchor trench construction, 40 mil HDPE geomembrane installation, groundwater collection system installation, and clay placement occurred this week. The anchor trench has been excavated, excluding the outlet drainage trenches. The 4-inch HDPE perforated drainage pipe placement within the anchor trench and backfilling of the drainage pipe and trench continue. The outlet drainage trench excavations begun. Chesapeake Containment Systems, Inc. (CCS) completed testing and repairs on the geomembrane liner, as well as liner repairs in Ash Pond A and B then demobilized. Geotechnology, Inc. observed quality control of the geomembrane work. Refer to geomembrane documentation for more details. B&T Drainage began construction of the groundwater collection system. This included the installation of dewatering sump DS-1, perforated collector pipe PCP-1, and clean out CO-1. Due to the variable bedrock elevations on the south end of the property, DS-1 was set approx. 9.0' higher than the original design and PCP-1 was installed at a +0.40% grade running from DS-1 to CO-1. Similar field adjustments are expected and were previously approved by Hanson Professional Services for the construction of the groundwater collection system. Lamac Engineering Co. surveyed portions of the groundwater collection system. Dewatering for the proposed PCP excavation continues in

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well number 2 and in the additional temporary well installed this week next to DS-1, located south of Ash Pond A. Fawn Lane Transit, Inc. and Belt Construction, Inc. began clay placement on the north portion of Quadrant A. Ten to 15 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to clay placement documentation for more details.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT 330D Excavator
CAT 613C Water Truck
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 9520 Tractor
John Deere 410J Backhoe
Sky Track 6036 Forklift
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens, Tim Wilson, Steve Graham, and Anna Saindon
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Jon Dietzel, Jimmy Boone, Robert Dunkley, James Marks, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. – Austin Ridgley
Charah, Inc. – Joe Tasich
Chesapeake Containment Systems, Inc. (CCS) – Jose Valverde, Barbarito Flores, Daniel Gonzales, Phet Vongkhamchanh, Jose Flores, Alberto Ortiz, Manuel Gonzales, Israel Gonzales, and Matt Watts
B&T Drainage (BTD) – John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, and Michael Dashiell
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Scott Comer, James Elledge, Frank Walton, Jim Urfer, Gary Lamb, Robbx Sanders, Greg Lingorfelter, Tom Sager, James Griffith, Eric Bierman, and Greg Cornwell
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, June 12, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

40 mil HDPE geomembrane was repaired on site. Clay for the vegetative layer, IDOT FA-01 sand, IDOT CA-7 aggregate, dewatering sump manhole base and sections, and 8-inch C900 DR18 PVC perforated pipe with filter sock and fittings were delivered.

Testing/Sampling

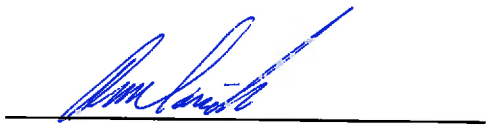
Geomembrane destructive and non-destructive testing and sampling was completed this week. Refer to geomembrane documentation for additional details.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13820

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/11/12

TIME: Arrive: 6:30 AM | Depart: 3:45 PM | Travel: 1.0 hr | Total: 10 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 72° AM, Rain 75° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO/TSI/FLT/Belt
Equipment Working: 580 Backhoe, D6N Dozer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
The 580 dug an outlet trench from the anchor trench at Sta. 8+00, and pulled the fence posts out on the west side of Section C and placed them in the construction yard. The 613C Water Truck was demobilized and mobilized to the CBS. As of 6/11/12, Matt Watts and Blake Bunting are no longer with CCS and are now AMS laborers.

CCS:
The destructive samples have been completed and mailed to TRI Labs. Patches and repairs continue.

Belt Construction:
Jared Belt began clay placement on the geomembrane liner with the D6N in the NW area of Section A. The clay is being placed with a 3' lift. Area Covered: P-1 to P-5, P-7, and P-9.

FLT (Fawn Lane Transit, Inc.):
They have 10 trucks cycling between the CBS and APD. Drivers: Kim Edington, Scott Comer, James Elledge, Frank Walton, Jim Urfer, Gary Lamb, Robbx Sanders, Greg Lingorfelter, Tom Sager, and James Griffith. 112 Loads Delivered - 11 cy/truck *

TSI:
Andrew DeClue arrived and is in charge of quality control of the clay placement.

Additional Comments: The site work ended at approx. 2:30 PM due to thunderstorms.

Randy Porter — Contractor Representative — AMS — Company — 6-11-12 — Date
Signature
Anna Saindon — Geotechnology Inc. — 6-18-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13830

FIELD OBSERVATION REPORT

Representative: Andrew DeClue. Project No.: J019896.01 Task: 2370

Equipment & ID No.: — Project Name: Hutsonville Ash Pond D Closure

Vehicle: #7 Zone: — Client: Geo-technology Date: 6-11-12

TIME: Arrive: 6:45 Depart: 2:45 Travel: 1.0 Total: 9.0 (.5hr. lunch)

Weather: 80's Contractor: AMS Subcontr./Supplier: —

Equipment Working: —

Site Activities / Observations / Contacts / Notes: Contracting using D6N to begin placing 3-Foot coverage layer over Panels: P-1 thru P-5, P-7, and P-9. Material placed was a silty to lean clay soil with roots. Soil was placed in such a way to prevent Geo-Membrane from wrinkling or being ripped or punctured. It began to rain at 2:00 PM, job was rained out at 2:30 PM.

Additional Comments:

Contractor Representative — Company: AMS

Signature — Date: 6-11-12

Geotechnology, Inc. — Date: 6/11/12

Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13821

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 6/12/12

TIME: Arrive: 6:30 AM Depart: 6:15 PM Travel: 1.0 hr Total: 12.25 hrs (0.5 hr for lunch)
Weather: Sunny, 71°AM, 83° PM Contractor: AMS Subcontr./Supplier: CCS/GEO/TSI/FLT/BCI
Equipment Working: 580 Backhoe, 6036 Forklift, D6N Dozer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Correction to yesterday's FOR - The 580 dug an outlet trench at Sta. 10+00, not 8+00. Today, the pipe was placed in the outlet trench and backfilled. An outlet trench was also dug at Sta. 14+00. The 580 finished backfilling the 4" drainage pipe in the anchor trench in Section B. The 6036 staged more drainage pipe around the anchor trench. 10 more loads of FA-01 sand were delivered. The 279C Skid Steer was demobilized. Matt Watts is no longer an AMS employee. Now, Blake Bunting and Eric Sefton are the new laborers.

CCS/GEO:
They continued vacuum testing, repairs, cleanup, and welded the cap vent boots. The boots will be spark tested tomorrow. TRI finished all the destructs. Failures: DT-34, 50, 72, and 84B. Samples will be retested and mailed off tomorrow. They will repair the holes in the liners of Pond A and B tomorrow. The 9 remaining liner rolls were hauled off site.

FLT/BCI/TSI:
Continue clay placement. They plan to add an additional 5 dump trucks to the cycle by the end of the week (15 total). Area = P-1 to P-10, Loads = 178

Misc.:
Miller Construction Co. will begin mobilizing equipment and materials to the coal yard and a guard will be on-site. This is an Ameren subcontractor and is not affiliated with the project; records will not be kept of their equip. or personnel.

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
6-12-11 — Date
Anna Saindon — Geotechnology, Inc.
6-18-12 — Date
[signature] — Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13831

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: #7 | Zone: — | Client: Geotechnology | Date: 6-12-12

TIME: Arrive: 6:45 | Depart: 5:30 | Travel: 1.0 | Total: 11.75 (.5 hr. lunch)
Weather: 70-90's Sunny | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continues to place 3' Fill over Geo-Membrane Panels with CCR. Soil is being trucked in from off site borrow Area. Material is a silty to lean clay with roots. Material is being placed in such away to prevent Geo-membrane from wrinkling and/or being ripped or punctured. Fill was placed on Panels P-1 thru P-10, with the main Focus on Filling towards North edge of Pond.

Additional Comments:

Contractor Representative — Company AMS
Signature — Date 6-12-12
Geotechnology, Inc. — Date 6/12/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13822

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/13/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 55° AM, 80° PM | Contractor: AMS | Subcontr./Supplier: BTD/CCS/GEO/TSI/FLT/BCI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450LC Excavator, 410J Backhoe, 624H F.E.L., Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 finished backfilling the anchor trench and the 4" drainage pipe on the east side of Section D, and began backfilling on the south side of Section D and the west side of Section C.

BTD:

Personnel - John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Michael Dashiell.
Delivery - John Deere 450 LC Excavator, IDOT CA-7 Aggregate, Precast Manhole, 8" Perforated DR18 water main pipe - PVC C900 1120 (bell and spigot) with filter sock and couplings. The pit for DS-2 was excavated. However, the pit repeatedly caved in due to the water rushing into the excavation. Therefore, the pit was backfilled and they will continue to dewater this area. The pit for DS-1 was excavated next. At approx 11.0', the GWT and the top of sandstone was encountered. The excavator ripped through approx. 2.0' of sandstone and encountered hard shale (not rippable). BTD is utilizing rock bucket teeth for the bedrock. A final depth of 13.23' was reached and the trench box (shoring) for the manhole was set. At this depth, this puts the flowline of the PCP at the surface of the sandstone, or 4" into the sandstone. Approval for this elevation did not come until late in the day and the shoring had to be taken out so the pit could be cleaned out again, and the shoring could be reset. For a shoring system, BTD is utilizing the drag-box excavation method to install the pipeline. Additionally, trenches will be sloped at 1.5:1 to 12' depth, then continued down with trench boxes. Boxes utilized (stackable): 8'x12' and 8'x20'. CA-7 backfill will be placed in 8" lifts.

CCS/GEO:

Finished cleanup, retesting destructs, mailing destructs, repairs, vacuum testing, and spark testing. Holes in Pond A and B liners were fixed and CCS demobilized; will return only if TRI fail more destructs.

FLT/BCI/TSI: Clay Placement -

Additional Comments: Area = P-1 to P-10, P-12, P-14, and P-15
Loads = 152

Randy Poeter — Contractor Representative — AMS — Company — 6-13-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 6-18-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13832

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019296.01 | Task: 0370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 6-13-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr lunch)
Weather: 50-80's Sunny | Contractor: AMS | Subcontr./Supplier: -
Equipment Working:
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 Foot of coverage Fill over Geo-Membrane. using D6 to place Fill in such a way to prevent Geo-Membrane from wrinkling and/or being ripped or torn. Material is a silty to lean clay with roots being hauled in from offsite borrow area. Fill is being placed on Panels: P-1 thru P-10, P-12, P-14, & P-15. After lunch they focused on filling towards North edge of Pond.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 6-13-12
Geotechnology, Inc. — Date: 6/13/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13823

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/14/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 55°AM, 82°PM | Contractor: AMS | Subcontr./Supplier: BTD/CCS/GEO/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450 LC Excavator, 410J Backhoe, BW 172 Roller,
Site Activities / Observations / Contacts / Notes: 624 H Front End Loader, Water Truck

AMS:

The 580 finished backfilling the anchor trench on the west side of Section A and C. The southern trench will be backfilled tomorrow. Additional IDOT FA-01 sand was delivered.

BTD:

The manhole shoring was reset in the pit for DS-1, and the manhole base and one precast section was installed. Approx. 8" of CA-7 stone was used for the manhole bedding. CA-7 was backfilled around the manhole to 1.0' above the inverts, and trench material was used for backfill to the ground surface. Refer to S-386, Sheet 12, Details 3 and 4 for the following approved deviations: the sump can be bedded in CA-7, not concrete-bridged to sandstone; since the manhole doesn't have a perforated base, it doesn't have to be wrapped with geotextile and the CA-7 pack also does not have to be wrapped with geotextile. An 8" slotted PVC pipe (vertical) was left next to DS-1 for necessary dewatering (casing for pump). The measured flowline and sump floor were 9.90' and 12.24', respectively, from the ground surface. Based on a surface elevation of 451.40, their elevations are 441.50 and 439.16, respectively. This makes the as-built and planned elevation difference to be 9.16'. The manhole, base, steps, and inverts comply with the specifications. They began construction for PCP-1, beginning at DS-1 running west to CO-1. Approx. 150' of 8" C900 was laid (halfway between DS-1 and CO-1). When they began running pipe from DS-1, the rock ledge dropped off and the sandstone was not encountered again untill approx 100' of pipe was laid. Water was pumped out of the trench as required as the trench progressed. Due to the elev. change of DS-1, the grade of the PCP between DS-1 and CO-1 changed as well. The PCP between DS-1 and CO-1 is being laid with a grade of 0.40% (std. minimum slope requirement for gravity fed lines). Refer to S-386, Sheet 8, for this grade change.

Additional Comments: Next Page

Randy Pate — Contractor Representative | AMS — Company
Signature | 6-14-12 — Date
Anna Saindon — Geotechnology, Inc. | 6-18-12 — Date
Engineer's Signature

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No. A 13824

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 6/14/12

TIME: Arrive: Depart: Travel: Total:
Weather: Contractor: Subcontr./Supplier:
Equipment Working:
Site Activities / Observations / Contacts / Notes:

REFER TO PAGE 1

BTD (cont.):
They are utilizing a sewer laser to run the PCP at 0.40%, beginning at the manhole invert. All pipe being laid contains perforations and filter sock. Besides the grade, the PCP installation, bedding, haunching, and backfills remain unchanged (refer to S-386, Sheet 12, Detail 8). Lamac will be on-site tomorrow to survey the PCP.

CCS/GEO:
The failed destruct was retested (DS-84B), repaired, extrusion welded, and vacuum tested.

FLT/BCI/TSI:
Clay Placement - the north tip of the pond has been covered and now the clay is being placed to the south along Section A. Area = P1-P16, Loads = 160. 11 Trucks are now utilized in the cycle. Additional Personnel (FLT): Eric Bierman

Additional Comments:

Randy Porter
Contractor Representative
AMS
Company
Signature
6-14-12
Date
Anna Saindon
Geotechnology, Inc.
6-18-12
Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13833

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hennepin Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 6-14-12

TIME: Arrive: 6:45 | Depart: 5:30 | Travel: 1.0 | Total: 11.75 (.5hr lunch)
Weather: 80-80's Sunny | Contractor: AMS | Subcontr./Supplier: —
Equipment Working:
Site Activities / Observations / Contacts / Notes: Belt construction continues to place 3 Feet of coverage Fill over Geo-Membrane. Material is a silt to lean clay with roots being hauled in from offsite borrow Area. Belt using D6 to place Fill in such a way that Geo-membrane doesn't wrinkle and/or become ripped/torn. Fill was placed on Panels: P-1 thru P-16. By noon they had Finished placing Fill to North edge of Pond. They then focused on heading Southward stringing on approved Panels.

Additional Comments:

Contractor Representative — Company
Signature — Date 6/14/12
Geotechnology, Inc. — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13825

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/15/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 61°AM, 88° PM | Contractor: AMS | Subcontr./Supplier: BTD/Lamac/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450LC Excavator, 410J Backhoe, BW 172 Roller, 624H Front End Loader, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 stockpiled the western anchor trench spoils on the NW corner of Pond D.

BTD/Lamac:

PCP-1 has been completed. The trench was excavated, bedded with CA-7, the 8" collector pipe with non-woven geotextile filter sock was installed, haunched with CA-7, and backfilled with CA-7 and trench material. CO-1 was installed (non-perforated) and has sufficient stickup with a water tight cap. Tyler Union 8" 90° Md fittings are used for the cleanout. The concrete slab and bollard will be installed towards completion (refer to S-386, Sheet 12, Detail 6). PCP-1 was laid at +0.40% from DS-1 invert to CO-1, and the section was compacted. The CO elevation shot with the grade laser is at 443.48. Lamac also shot in PCP-1 at the DS-1 invert, 150' west of DS-1, and at CO-1. BTD continues dewatering in well 2 and in the temporary well next to DS-1. They plan to install additional dewatering wells before DS-2 excavation. Additional 8" perforated DR-18, PVC C900 pipe was delivered. Length = 117'

FLT/BCI/TSI:

Clay Placement - Section A. Panels P-1 to P-45 (northern section) have now been approved for cover. Additional Personnel (FLT): Greg Cornwell; 12 trucks total. They plan to add 4 additional trucks to the cycle next week. The 9520 was demobilized. The excavator loading the trucks at the CBS broke down and FLT could not complete their 10 hour production. This will be fixed tomorrow. Area = P-3 to P-5, P-7, P-9, P-11, P-12, and P-14 to P-16. Loads = 144

Additional Comments:

Randy Tate — Contractor Representative — AMS — Company
Signature — 6-15-12 — Date
Anna Sanders — Geotechnology, Inc. — 6-18-12 — Date
Engineer's Signature

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No. A 13834

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeClue
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7
Zone: —
Client: Geotechnology
Date: 6-15-12

TIME: Arrive: 6:30 Depart: 4:00 Travel: 1.0 Total: 10.5 (½ hr. lunch)
Weather: 50-80's Sunny
Contractor: AMS
Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to Place 3 Foot of Coverage Fill over Geo-Membrane. Using D6 to push Fill (silt-Lean clay Material) being hauled in From Offsite Borrow area. Material is being placed in such a way as to prevent Geo-Membrane From wrinkling and/or ripped or torn. Material being placed on Panels P-3 thru P-5, P-7, 9, 11, 12, 14-16.

Additional Comments:

Contractor Representative: [signature] Company: AMS
Signature: [signature] Date: 6-15-12
Geotechnology, Inc.: [signature] Date: 6/15/12
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

AMS
Ash Management Services

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 13 Minutes
Tuesday, June 12, 2012

01 PUBLICATION

Publish date:	2012-06-18	Submitted by:	P. Zinsious		
Distribution:	E-mail only	Notes taken by:	P. Zinsious		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-06-12-PM-13		
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Steve	Bluemner	Ameren	314-972-4160	sbluemner@ameren.com
02	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com
03	Mr.	Bob	Simmons	Ameren	217-412-6384	rsimmons@ameren.com
04	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
07	Mr.	Austin	Ridgely	Lamac	618-263-8290	aridgley@lamac.net

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-06-12 OPEN - no issues. None projected for 2x week look ahead.

2012-06-05 OPEN - no issues. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-06-12 OPEN - no issues. AMS projects 2x teamsters [Fawn lane], 2x laborers [already have CBT - but AMS DT they will go to Robinson].

2012-06-05 OPEN - no issues. AMS has sent 2x employees. M. Wagstaff sent thank you e-mail to JCH. P. Zinsious suggested inviting them to a safety luncheon.

04 AMS SAFETY

20120-06-12 OPEN - no issues.

[01] 1x worker terminated and replaced an operator for safety concerns - AMS zero tolerance policy.

[02] Borrow haul route signage installed on roadway.

[03] Spotters for trucks on site, 1x to 2x laborers. Additional spotters if/as required.

[04] Cooling stations are set up.

[05] J. Tasich on site 06-11. Training 2x laborers today [06-12].

[06] Training tomorrow [06-13] for AMS site-specific.

2012-06-05 OPEN - no issues.
[01] J. Denham reported on 1x AMS operator who was not operating safety while operating the [all terrain] fork lift on 06-01. Worker was suspended for unsafe actions and not wearing a seat belt and is currently under review. AMS has a zero tolerance policy, and if the review proves accurate, the worker will be terminated. Official response and [incident] violation report should be ready by 06-06.
[02] General discussion safety concerns for the vegetative cover hauling [soil materials form the borrow site]. P. Zinsious indicated signs will be placed on Illinois Route 1 northbound and southbound lanes where trucked entering the highway. Currently Illinois is working on the bridge deck that crosses over Raccoon Creek on the haul route. Truckers will not be allowed to deviate form the route and travel the "back way" into the borrow site to avoid the work at the bridge deck. Estimated time of this work on the bridge deck is 6x to 8x Wks.
[03] B. Muesenfechter concern that open liner anchor trenches could be a potential tripping hazard and indicated previous issue at Coffeen [Ameren power plant]. M. Wagstaff indicated depends on trench. J. Denham indicated caution tape will be placed at trenches, on the exterior, as the interior has liner, and cannot penetrate the liner [with posts].
[04] Cooling stations are set up.

05 HOUSEKEEPING

2012-06-12 OPEN - AMS will have walk through today [06-12] for cleanup.

2012-06-05 OPEN - M .Wagstaff concern regarding small pieces of liner. J. Boone indicated daily cleanup.

06 PLANT ACCESS - CBT

20120-06-12 OPEN - B. Simmons Ameren services general discussion of plant access and projected work:
[01] Subcontractor [Miller] and Ameren will use entire coal yard.
[02] Possible set trailer next week, possible same electric service usage.
[03] Project is capacity and clearance scope until through EOY [Hutsonville, Palmyra to Indiana areas].
[04] Starting 06-14 guard form 6:00 AM CT to 6:30 PM CT, then 24/7 when conductors stored/staged on site.
[05] Parking on far west lost, up to 15x personal vehicles.
[06] Subcontractor will not have AER badges, guard will have list update for workers on project. They will only have to show driver's license.
[07] B. Simmons indicated workers not allowed beyond designated area, if caught outside area, will be terminated.
[08] M. Wagstaff is SPOC for this project to the APD project.
[09] Borrow haul traffic only concern.
[10] D. Curlin contact for Miller.

2012-06-05 OPEN - M .Wagstaff reports that Ameren [Services] will begin transmission line work [between Kansas and Illinois], and will be using the coal yard at the Hutsonville plant as storage. Ameren will provide a guard for 12 HR shifts. The contacts at Ameren as Mr. Jim Williams [over the GENCO division] and Mr. Bob Simmons who will be the site SPOC. Work to begin the middle of June 2012. J. Boone indicated concern over coordination of trucks hauling into the site, and M. Wagstaff said no issue, as the trucks can come in through the gate by the [west] PCP line.

08 OSHA LOG - WORK HOURS

2012-06-12 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-11.
No incidents or accidents.
3,304.00 RT
0,700.50 OT
4,004.50 TOTAL

2012-06-05 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-04.
No incidents or accidents.
2,543.50 RT
0,436.50 OT
2,980.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-06-12 AMS, Chesapeake Containment [CCS], BT Drainage [BTD], and returning Belt Construction [BCI] on site.

[04] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[09] Laborers [AMS 3x, CCS 6x]
[02] Operators [AMS 1x, BCI 1x]
[11] Teamsters [FLT 10x borrow haul trucking]
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[29] Total

2012-06-05 AMS, Chesapeake Containment [CCS], and BT Drainage [BTD] on site.

[03] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[12] Laborers [AMS 2x, CCS 10x]
[02] Operators [AMS 2x]
[01] Teamsters
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[21] Total

02 WORK HOURS AND OVERTIME

2012-06-12	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT. Fawn Lane trucking 10 HR.
2012-06-05	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-06-12	OPEN - no issues. GEO/CCS "gators" leaving this week.
2012-06-05	OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-06-12	OPEN - no issues.
2012-06-05	OPEN - no issues.

02 SUBMITTALS

20120-06-12	Submittal log as published by GEO on 06-09 distributed. General discussion. [01] Submittal log copies distributed. [02] Discussion CA-7 sample for PCP coarse aggregate. [03] No issues.
20120-06-05	Submittal log as published by GEO on 06-2 distributed. General discussion. [01] Submittal log copies distributed. [02] Seed/mulch submittal under review by AER returned. [03] VES-01 to be returned by AER returned. [04] VES-02 M. Wagstaff orally approved returned. [05] SWP3 for APD submitted by AMS as matter of record original signed on 02-28. [06] AMS to submitted dewatering sump under AER review.

08 MATERIAL

01 GENERAL

2012-06-12	OPEN - no issues. [corrected dates below 20120].
2012-06-05	OPEN - no issues.

02 GEOMEMBRANE PRE-CON

2012-06-12	OPEN - no issues.
2012-06-05	Open - no issues. [01] A. Saindon reviewing tests, looks good. However test results for areas will not be ready until about 4:00 PM CT on 06-07. [02] Using stakes on positioned by sandbags and leaving the sandbags in place are acceptable per A. Saindon.

03 CAP VENT PRE-CON

2012-06-12	OPEN - no issues.
2012-06-05	OPEN - no issues. [corrected date errors of "20120" below]

04 PERFORATED COLLECTOR PIPE [PCP] PRE-CON MEETING

2012-06-12	OPEN - Discussion during Progress Meeting: [01] Lamac to perform record drawing "as-built" survey for AER direct, instead of through AMS. [02] P. Zinsious presented M. Wagstaff concern over the global stability of the PCP trench and Hanson response that proposed new alignment is not acceptable due to the close proximity. [03] R. Porter indicated if higher elevation of excavation, the trench may not be as wide. General consensus of the team is a "wait-and-see" approach [due to the many factors involved]. [04] MW-2R remains undeveloped due to dewatering. [05] BTD to begin PCP on 06-13 in AM. Estimated production rates [provided by BTD for scheduling meeting at Ameren] are shallow = 40 FT/D, average 60 FT/D, and deep[er] = 80 FT/D.
2012-06-05	OPEN - Discussion during Progress Meeting: [01] M. Wagstaff concern on the PCP alignment and liquefaction [due to seismic] of the soil near the pond berm. There was no specification provided by Ameren, and for now the alignment look good, will go with Hanson. [02] J. Boyer reports at area of DS-1 hit shallow sandstone, about 20 FT west from location. Will status once excavation begins if a new location or higher elevation will be required. [03] M .Wagstaff reports that new well MW-2R could not develop due to dewatering. ~~[02]~~ [04] P. Zinsious reports that review of PCP alignment allow for power poles to stay in place [Ameren does not need to remove for now].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-06-12	OPEN - Discussion during Progress Meeting: [01] AMS has removed fencing for now. [02] M. Wagstaff will be in contact with Mr. Wampler to resolve.
2012-06-05	OPEN - Discussion during Progress Meeting: [01] J. Boone reports Mr. Duane Wampler has communicated not happy with fence alignment. [02] AMS has mover the fence back. J. Cravens has been in contact with Wampler. [03] J. Boyer indicated collector tile work in about two weeks [will need coordination with Mr. Wampler]. [04] J. Boyer reports only need in week in this area, as shallow. [05] M. Wagstaff will be in contact with Mr. Wampler to resolve.

10 QUALITY CONTROL

03 CLAY

2012-06-12	OPEN - Roots being pulled out of the material.
2012-06-05	OPEN - no issues begin placement on 06-11.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-06-12	OPEN - Review of schedule 06-07 handed out [01] B. Muesenfechter presented "First Planner" . [02] Open discussion and review of "First Planner" process with Lamac. [03] J. Cravens out 07-13, and P. Zinsious vacation 06-21 - 06-28. [04] Two critical work areas, the clay placement and the PCP. [05] Baseline SC changed to 10-11. Currently SC in projected 10-24. [06] P. Zinsious indicated AMS to increase trucks for borrow haul from 10x to 15x. [07] PCP projected now to start 06-13, will help schedule. [08] Weather days coded.
2012-06-05	OPEN - Review of schedule 06-01 handed out [01] B. Muesenfechter presented "First Planner" . [02] Open discussion and review of "First Planner" process with the Build Team present. [03] Review of draft "First Planner" look-ahead. Individual activity review with modifications of dates and "Last Planner" assignments.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-06-12	OPEN - no issues. AMS sent SOV to M. Wagstaff.
2012-06-05	OPEN - no issues, draft revised on 06-05 few items to revise.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS REMOVAL

2012-06-12	OPEN - in progress.
2012-06-05	OPEN - in progress. No further spoils found, AMS to provide cost account.

12 EWO-12 PCP Survey

2012-06-12	CLOSE - Lamac to go direct to AER.
2012-06-05	NEW - AMS coordinate Lamac to survey "as-built" for the PCP installation.

13 EWO-13 Electrical feeder/overhead

2012-06-12	NEW - combined EWO-05 and 07 per AER. AMS to have pricing in day or two.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-06-12	NONE
2012-06-05	CLOSE

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-06-12	NONE
2012-06-05	In progress.

15 PRODUCTION

03 CLAY

2012-06-12	OPEN - Trucks are hauling 11 CY. Currently 10x trucks. Placement as of 06-11 is 1,232 CY.
2012-06-05	OPEN - no issues [projected start 06-11].

16	DOCUMENTS TRANSMITTED	
	2012-06-12	[01] AMS - Contact list HUT-APD-CON-2012-06-12 [CORRECTION BELOW 06-05]
		[02] AMS - Schedule dated 06-07 - critical Path
		[03] AER - Schedule dated 06-07 - look ahead
		[04] AER - Last Planner presentation [to A. Ridgely from AMS only].
		[05] AMS - last planner schedule draft
		[06] GEO - Submittal Log published 06-09
	2012-06-05	[01] AMS - Contact list HUT-APD-CON-2012-06-05
		[02] AMS - Schedule dated 06-01 - critical Path
		[03] AMS - Schedule dated 06-01 - data date
		[04] AMS - Schedule dated 06-01 - look ahead
		[05] AER - Last Planner presentation
		[06] AMS - last planner schedule draft
		[07] GEO - Submittal Log published 06-01
		[08] BTD - revised buoyancy calculations to Mr. Wagstaff only
		[09] Fence layout option VES-03 [CORRECTION 06-12 added Item No. 09]

17	DOCUMENTS REVIEW ONLY	
	2012-06-12	None
	2012-06-05	None

18	NEXT PROGRESS MEETING
	Next meeting will be held in one week - Tuesday, June 19, 2012 at Hutsonville

19	DISTRIBUTION - STANDARD
	AER
01	Mr. Mike Wagstaff
02	Mr. Mike Stewart
03	Mr. Bob Muesenfechter
	GEO
01	Ms. Anna Saindon
02	Mr. Eric Neuner
03	Mr. Joe Cravens
	AMS
01	Mr. Jimmy Boone
02	Mr. John Denham
03	Mr. Joko Tasich
04	Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Root removal during clay placement facing west



Photograph 2 - Drainage pipe placement in anchor trench facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 3 - 8-inch perforated DR18 PVC C900 pipe for PCP facing northwest



Photograph 4 - Spark testing cap vent boots facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 5 - Clay placement in Quadrant A facing north



Photograph 6 - Manhole shoring at DS-1 facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 7 - Installing DS-1 manhole facing west



Photograph 8 - Installing PCP-1 facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC

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Photograph 9 - Manhole interior DS-1 facing southwest



Photograph 10 - Installing CO-1 facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC

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Photograph 11 - Overview of Ash Pond D facing southeast



Photograph 12 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: June 19, 2012

SUBJECT: Weekly Summary Report for June 11, 2012 to June 15, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 55 to 72°F, and temperature highs ranged from 75 to 88°F. A weather delay occurred on June 11, 2012 due to afternoon storms.

Construction Activities

Anchor trench construction, 40 mil HDPE geomembrane installation, groundwater collection system installation, and clay placement occurred this week. The anchor trench has been excavated, excluding the outlet drainage trenches. The 4-inch HDPE perforated drainage pipe placement within the anchor trench and backfilling of the drainage pipe and trench continue. The outlet drainage trench excavations begun. Chesapeake Containment Systems, Inc. (CCS) completed testing and repairs on the geomembrane liner, as well as liner repairs in Ash Pond A and B then demobilized. Geotechnology, Inc. observed quality control of the geomembrane work. Refer to geomembrane documentation for more details. B&T Drainage began construction of the groundwater collection system. This included the installation of dewatering sump DS-1, perforated collector pipe PCP-1, and clean out CO-1. Due to the variable bedrock elevations on the south end of the property, DS-1 was set approx. 9.0' higher than the original design and PCP-1 was installed at a +0.40% grade running from DS-1 to CO-1. Similar field adjustments are expected and were previously approved by Hanson Professional Services for the construction of the groundwater collection system. Lamac Engineering Co. surveyed portions of the groundwater collection system. Dewatering for the proposed PCP excavation continues in

well number 2 and in the additional temporary well installed this week next to DS-1, located south of Ash Pond A. Fawn Lane Transit, Inc. and Belt Construction, Inc. began clay placement on the north portion of Quadrant A. Ten to 15 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to clay placement documentation for more details.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT 330D Excavator
CAT 613C Water Truck
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 9520 Tractor
John Deere 410J Backhoe
Sky Track 6036 Forklift
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens, Tim Wilson, Steve Graham, and Anna Saindon
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Jon Dietzel, Jimmy Boone, Robert Dunkley, James Marks, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. – Austin Ridgley
Charah, Inc. – Joe Tasich
Chesapeake Containment Systems, Inc. (CCS) – Jose Valverde, Barbarito Flores, Daniel Gonzales, Phet Vongkhamchanh, Jose Flores, Alberto Ortiz, Manuel Gonzales, Israel Gonzales, and Matt Watts
B&T Drainage (BTD) – John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, and Michael Dashiell
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Scott Comer, James Elledge, Frank Walton, Jim Urfer, Gary Lamb, Robbx Sanders, Greg Lingorfelter, Tom Sager, James Griffith, Eric Bierman, and Greg Cornwell
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, June 12, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

40 mil HDPE geomembrane was repaired on site. Clay for the vegetative layer, IDOT FA-01 sand, IDOT CA-7 aggregate, dewatering sump manhole base and sections, and 8-inch C900 DR18 PVC perforated pipe with filter sock and fittings were delivered.

Testing/Sampling

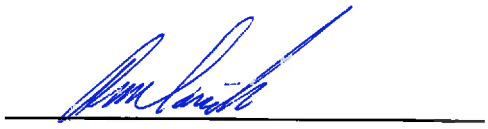
Geomembrane destructive and non-destructive testing and sampling was completed this week. Refer to geomembrane documentation for additional details.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13820

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/11/12

TIME: Arrive: 6:30 AM | Depart: 3:45 PM | Travel: 1.0 hr | Total: 10 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 72° AM, Rain 75° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO/TSI/FLT/Belt
Equipment Working: 580 Backhoe, D6N Dozer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
The 580 dug an outlet trench from the anchor trench at Sta. 8+00, and pulled the fence posts out on the west side of Section C and placed them in the construction yard. The 613C Water Truck was demobilized and mobilized to the CBS. As of 6/11/12, Matt Watts and Blake Bunting are no longer with CCS and are now AMS laborers.

CCS:
The destructive samples have been completed and mailed to TRI Labs. Patches and repairs continue.

Belt Construction:
Jared Belt began clay placement on the geomembrane liner with the D6N in the NW area of Section A. The clay is being placed with a 3' lift. Area Covered: P-1 to P-5, P-7, and P-9.

FLT (Fawn Lane Transit, Inc.):
They have 10 trucks cycling between the CBS and APD. Drivers: Kim Edington, Scott Comer, James Elledge, Frank Walton, Jim Urfer, Gary Lamb, Robbx Sanders, Greg Lingorfelter, Tom Sager, and James Griffith. 112 Loads Delivered - 11 cy/truck *

TSI:
Andrew DeClue arrived and is in charge of quality control of the clay placement.

Additional Comments: The site work ended at approx. 2:30 PM due to thunderstorms.

Randy Porter — Contractor Representative — AMS — Company
Signature — 6-11-12 — Date
Anna Saindon — Geotechnology, Inc. — 6-18-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13821

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/12/12

TIME: Arrive: 6:30 AM | Depart: 6:15 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.5 hr for lunch)
Weather: Sunny, 71°AM, 83° PM | Contractor: AMS | Subcontr./Supplier: CCS/GEO/TSI/FLT/BCI
Equipment Working: 580 Backhoe, 6036 Forklift, D6N Dozer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

Correction to yesterday's FOR - The 580 dug an outlet trench at Sta. 10+00, not 8+00. Today, the pipe was placed in the outlet trench and backfilled. An outlet trench was also dug at Sta. 14+00. The 580 finished backfilling the 4" drainage pipe in the anchor trench in Section B. The 6036 staged more drainage pipe around the anchor trench. 10 more loads of FA-01 sand were delivered. The 279C Skid Steer was demobilized. Matt Watts is no longer an AMS employee. Now, Blake Bunting and Eric Sefton are the new laborers.

CCS/GEO:

They continued vacuum testing, repairs, cleanup, and welded the cap vent boots. The boots will be spark tested tomorrow. TRI finished all the destructs. Failures: DT-34, 50, 72, and 84B. Samples will be retested and mailed off tomorrow. They will repair the holes in the liners of Pond A and B tomorrow. The 9 remaining liner rolls were hauled off site.

FLT/BCI/TSI:

Continue clay placement. They plan to add an additional 5 dump trucks to the cycle by the end of the week (15 total). Area = P-1 to P-10, Loads = 178

Misc.:

Miller Construction Co. will begin mobilizing equipment and materials to the coal yard and a guard will be on-site. This is an Ameren subcontractor and is not affiliated with the project; records will not be kept of their equip. or personnel.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 6-12-11 — Date
Anna Sanderson — Geotechnology, Inc — 6-18-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13822

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/13/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 55° AM, 80° PM | Contractor: AMS | Subcontr./Supplier: BTD/CCS/GEO/TSI/FLT/BCI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450LC Excavator, 410J Backhoe, 624H F.E.L., Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 finished backfilling the anchor trench and the 4" drainage pipe on the east side of Section D, and began backfilling on the south side of Section D and the west side of Section C.

BTD:

Personnel - John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Michael Dashiell.
Delivery - John Deere 450 LC Excavator, IDOT CA-7 Aggregate, Precast Manhole, 8" Perforated DR18 water main pipe - PVC C900 1120 (bell and spigot) with filter sock and couplings. The pit for DS-2 was excavated. However, the pit repeatedly caved in due to the water rushing into the excavation. Therefore, the pit was backfilled and they will continue to dewater this area. The pit for DS-1 was excavated next. At approx 11.0', the GWT and the top of sandstone was encountered. The excavator ripped through approx. 2.0' of sandstone and encountered hard shale (not rippable). BTD is utilizing rock bucket teeth for the bedrock. A final depth of 13.23' was reached and the trench box (shoring) for the manhole was set. At this depth, this puts the flowline of the PCP at the surface of the sandstone, or 4" into the sandstone. Approval for this elevation did not come until late in the day and the shoring had to be taken out so the pit could be cleaned out again, and the shoring could be reset. For a shoring system, BTD is utilizing the drag-box excavation method to install the pipeline. Additionally, trenches will be sloped at 1.5:1 to 12' depth, then continued down with trench boxes. Boxes utilized (stackable): 8'x12' and 8'x20'. CA-7 backfill will be placed in 8" lifts.

CCS/GEO:

Finished cleanup, retesting destructs, mailing destructs, repairs, vacuum testing, and spark testing. Holes in Pond A and B liners were fixed and CCS demobilized; will return only if TRI fail more destructs.

FLT/BCI/TSI: Clay Placement -

Additional Comments: Area = P-1 to P-10, P-12, P-14, and P-15
Loads = 152

Randy Poetter — Contractor Representative — AMS — Company — 6-13-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 6-18-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13823

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/14/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 55°AM, 82°PM | Contractor: AMS | Subcontr./Supplier: BTD/CCS/GEO/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450 LC Excavator, 410J Backhoe, BW 172 Roller, 624 H Front End Loader, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

The 580 finished backfilling the anchor trench on the west side of Section A and C. The southern trench will be backfilled tomorrow. Additional IDOT FA-01 sand was delivered.

BTD:

The manhole shoring was reset in the pit for DS-1, and the manhole base and one precast section was installed. Approx. 8" of CA-7 stone was used for the manhole bedding. CA-7 was backfilled around the manhole to 1.0' above the inverts, and trench material was used for backfill to the ground surface. Refer to S-386, Sheet 12, Details 3 and 4 for the following approved deviations: the sump can be bedded in CA-7, not concrete-bridged to sandstone; since the manhole doesn't have a perforated base, it doesn't have to be wrapped with geotextile and the CA-7 pack also does not have to be wrapped with geotextile. An 8" slotted PVC pipe (vertical) was left next to DS-1 for necessary dewatering (casing for pump). The measured flowline and sump floor were 9.90' and 12.24', respectively, from the ground surface. Based on a surface elevation of 451.40, their elevations are 441.50 and 439.16, respectively. This makes the as-built and planned elevation difference to be 9.16'. The manhole, base, steps, and inverts comply with the specifications. They began construction for PCP-1, beginning at DS-1 running west to CO-1. Approx. 150' of 8" C900 was laid (halfway between DS-1 and CO-1). When they began running pipe from DS-1, the rock ledge dropped off and the sandstone was not encountered again until approx 100' of pipe was laid. Water was pumped out of the trench as required as the trench progressed. Due to the elev. change of DS-1, the grade of the PCP between DS-1 and CO-1 changed as well. The PCP between DS-1 and CO-1 is being laid with a grade of 0.40% (std. minimum slope requirement for gravity fed lines). Refer to S-386, Sheet 8, for this grade change.

Additional Comments: Next Page

Randy Pate — Contractor Representative — AMS — Company — 6-14-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 6-18-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13824

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 6/14/12

TIME: Arrive: _____ Depart: _____ Travel: _____ Total: _____
Weather: REFER TO PAGE 1 Contractor: _____ Subcontr./Supplier: _____
Equipment Working: _____
Site Activities / Observations / Contacts / Notes: _____

BTD (cont.):
They are utilizing a sewer laser to run the PCP at 0.40%, beginning at the manhole invert. All pipe being laid contains perforations and filter sock. Besides the grade, the PCP installation, bedding, haunching, and backfills remain unchanged (refer to S-386, Sheet 12, Detail 8). Lamac will be on-site tomorrow to survey the PCP.

CCS/GEO:
The failed destruct was retested (DS-84B), repaired, extrusion welded, and vacuum tested.

FLT/BCI/TSI:
Clay Placement - the north tip of the pond has been covered and now the clay is being placed to the south along Section A. Area = P1-P16, Loads = 160. 11 Trucks are now utilized in the cycle. Additional Personnel (FLT): Eric Bierman

Additional Comments: _____

Randy Prater — AMS
Contractor Representative — Company
Signature — 6-14-12 Date
Hung Saindon — 6-18-12 Date
Geotechnology, Inc.
Engineer's Signature

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No. A 13825

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 6/15/12

TIME: Arrive: 6:00 AM Depart: 5:30 PM Travel: 1.0 hr Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 61°AM, 88° PM Contractor: AMS Subcontr./Supplier: BTD/Lamac/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450LC Excavator, 410J Backhoe, BW 172 Roller, 624H Front End Loader, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
The 580 stockpiled the western anchor trench spoils on the NW corner of Pond D.

BTD/Lamac:
PCP-1 has been completed. The trench was excavated, bedded with CA-7, the 8" collector pipe with non-woven geotextile filter sock was installed, haunched with CA-7, and backfilled with CA-7 and trench material. CO-1 was installed (non-perforated) and has sufficient stickup with a water tight cap. Tyler Union 8" 90° MJ fittings are used for the cleanout. The concrete slab and bollard will be installed towards completion (refer to S-386, Sheet 12, Detail 6). PCP-1 was laid at +0.40% from DS-1 invert to CO-1, and the section was compacted. The CO elevation shot with the grade laser is at 443.48. Lamac also shot in PCP-1 at the DS-1 invert, 150' west of DS-1, and at CO-1. BTD continues dewatering in well 2 and in the temporary well next to DS-1. They plan to install additional dewatering wells before DS-2 excavation. Additional 8" perforated DR-18, PVC C900 pipe was delivered. Length = 117'

FLT/BCI/TSI:
Clay Placement - Section A. Panels P-1 to P-45 (northern section) have now been approved for cover. Additional Personnel (FLT): Greg Cornwell; 12 trucks total. They plan to add 4 additional trucks to the cycle next week. The 9520 was demobilized. The excavator loading the trucks at the CBS broke down and FLT could not complete their 10 hour production. This will be fixed tomorrow. Area = P-3 to P-5, P-7, P-9, P-11, P-12, and P-14 to P-16. Loads = 144

Additional Comments:

Randy Foster — Contractor Representative
AMS — Company
[signature] — Signature
6-15-12 — Date
Anney Saindon — Geotechnology, Inc.
6-18-12 — Date
[signature] — Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13830

FIELD OBSERVATION REPORT

Representative: Andrew DeClue. Project No.: J019896.01 Task: 2370

Equipment & ID No.: — Project Name: Hutsonville Ash Pond D Closure

Vehicle: #7 Zone: — Client: Geo-technology Date: 6-11-12

TIME: Arrive: 6:45 Depart: 2:45 Travel: 1.0 Total: 9.0 (.5hr. lunch)

Weather: 80's Contractor: AMS Subcontr./Supplier: —

Equipment Working: —

Site Activities / Observations / Contacts / Notes: Contracting using D6N to begin placing 3-foot coverage layer over Panels: P-1 thru P-5, P-7, and P-9. Material placed was a silty to lean clay soil with roots. Soil was placed in such a way to prevent Geo-Membrane from wrinkling or being ripped or punctured. It began to rain at 2:00 PM, job was rained out at 2:30 PM.

Additional Comments:

Contractor Representative — Company

Signature — Date 6-11-12

Geotechnology, Inc. — Date 6/11/12

Engineer's Signature 6/18/12

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13831

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: #7 | Zone: — | Client: Geotechnology | Date: 6-12-12

TIME: Arrive: 6:45 | Depart: 5:30 | Travel: 1.0 | Total: 11.75 (.5 hr. lunch)
Weather: 70-90s Sunny | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3' Fill over Geo-Membrane Panels with CA-6. Soil is being trucked in From OFF site borrow Area. Material is a silty to lean clay with roots. Material is being placed in such away to prevent Geo-membrane From wrinkling and/or being ripped or punctured. Fill was placed on Panels P-1 thru P-10, with the main Focus on Filling towards North edge of Pond.

Additional Comments:

Contractor Representative — Company
Signature — Date 6-12-12
Geotechnology, Inc — Date 6/12/12
Engineer's Signature 6/18/12

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13832

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 0370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond 1 closure
Vehicle: 7 | Zone: – | Client: Geotechnology | Date: 6-13-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr. lunch)
Weather: 50-80's Sunny | Contractor: AMS | Subcontr./Supplier: –
Equipment Working: –
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 foot of coverage fill over Geo-membrane. Using D6 to place fill in such a way to prevent Geo-Membrane from wrinkling and/or being ripped or torn. Material is a silty to lean clay with roots being hauled in from offsite borrow area. Fill is being placed on Panels: P-1 thru P-10, P-12, P-14, & P-15. After lunch they focused on filling towards North edge of Pond.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 6-13-12
Geotechnology, Inc. — Date: 6/13/12
Engineer's Signature — 6/18/12

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13833

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019816.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hennepin Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 6-14-12

TIME: Arrive: 6:45 | Depart: 5:30 | Travel: 1.0 | Total: 11.75 (.5hr lunch)
Weather: 50-80's Sunny | Contractor: AMS | Subcontr./Supplier: —
Equipment Working:
Site Activities / Observations / Contacts / Notes: Belt construction continues to place 3 Feet of coverage Fill over Geo-Membrane. Material is a silt to lean clay with roots being hauled in from offsite borrow Area. Belt using D6 to place Fill in such a way that Geo-membrane doesnt wrinkle and/or become ripped/torn. Fill was placed on Panels: P-1 thru P-16. By noon they had Finished placing Fill to North edge of Pond. They then Forward on heading Southward staging on approved Panels.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 6/14/12
Geotechnology Inc. — Date
Engineer's Signature: 6/18/12

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 13834

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeClue
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D closure
Vehicle: 7
Zone: —
Client: Geotechnology
Date: 6-15-12

TIME: Arrive: 6:30 Depart: 4:00 Travel: 1.0 Total: 10.5 (½ hr. lunch)
Weather: 50-80's Sunny
Contractor: AMS
Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to Place 3 Foot of Coverage Fill over Geo-Membrane. Using D6 to push Fill (silt-loam clay material) being hauled in From Offsite Borrow area. Material is being placed in such a way as to prevent Geo-Membrane From wrinkling and/or ripped or torn. Material being placed on Panels P-3 thru P-5, P-7, 9, 11, 12, 14-16.

Additional Comments:

Contractor Representative: [signature] Company: AMS
Signature: [signature] Date: 6-15-12
Geotechnology, Inc.: [signature] Date: 6/15/12
Engineer's Signature: [signature] 6/18/12

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 13 Minutes
Tuesday, June 12, 2012

01 PUBLICATION

Publish date:	2012-06-18	Submitted by:	P. Zinsious		
Distribution:	E-mail only	Notes taken by:	P. Zinsious		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-06-12-PM-13		
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Steve	Bluemner	Ameren	314-972-4160	sbluemner@ameren.com
02	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com
03	Mr.	Bob	Simmons	Ameren	217-412-6384	rsimmons@ameren.com
04	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
07	Mr.	Austin	Ridgely	Lamac	618-263-8290	aridgley@lamac.net

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-06-12	OPEN - no issues. None projected for 2x week look ahead.
2012-06-05	OPEN - no issues. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-06-12	OPEN - no issues. AMS projects 2x teamsters [Fawn lane], 2x laborers [already have CBT - but AMS DT they will go to Robinson].
2012-06-05	OPEN - no issues. AMS has sent 2x employees. M. Wagstaff sent thank you e-mail to JCH. P. Zinsious suggested inviting them to a safety luncheon.

04 AMS SAFETY

20120-06-12 OPEN - no issues.

[01] 1x worker terminated and replaced an operator for safety concerns - AMS zero tolerance policy.
[02] Borrow haul route signage installed on roadway.
[03] Spotters for trucks on site, 1x to 2x laborers. Additional spotters if/as required.
[04] Cooling stations are set up.
[05] J. Tasich on site 06-11. Training 2x laborers today [06-12].
[06] Training tomorrow [06-13] for AMS site-specific.

2012-06-05 OPEN - no issues.
[01] J. Denham reported on 1x AMS operator who was not operating safety while operating the [all terrain] fork lift on 06-01. Worker was suspended for unsafe actions and not wearing a seat belt and is currently under review. AMS has a zero tolerance policy, and if the review proves accurate, the worker will be terminated. Official response and [incident] violation report should be ready by 06-06.
[02] General discussion safety concerns for the vegetative cover hauling [soil materials form the borrow site]. P. Zinsious indicated signs will be placed on Illinois Route 1 northbound and southbound lanes where trucked entering the highway. Currently Illinois is working on the bridge deck that crosses over Raccoon Creek on the haul route. Truckers will not be allowed to deviate form the route and travel the "back way" into the borrow site to avoid the work at the bridge deck. Estimated time of this work on the bridge deck is 6x to 8x Wks.
[03] B. Muesenfechter concern that open liner anchor trenches could be a potential tripping hazard and indicated previous issue at Coffeen [Ameren power plant]. M. Wagstaff indicated depends on trench. J. Denham indicated caution tape will be placed at trenches, on the exterior, as the interior has liner, and cannot penetrate the liner [with posts].
[04] Cooling stations are set up.

05 HOUSEKEEPING

2012-06-12 OPEN - AMS will have walk through today [06-12] for cleanup.

2012-06-05 OPEN - M .Wagstaff concern regarding small pieces of liner. J. Boone indicated daily cleanup.

06 PLANT ACCESS - CBT

20120-06-12 OPEN - B. Simmons Ameren services general discussion of plant access and projected work:
[01] Subcontractor [Miller] and Ameren will use entire coal yard.
[02] Possible set trailer next week, possible same electric service usage.
[03] Project is capacity and clearance scope until through EOY [Hutsonville, Palmyra to Indiana areas].
[04] Starting 06-14 guard form 6:00 AM CT to 6:30 PM CT, then 24/7 when conductors stored/staged on site.
[05] Parking on far west lost, up to 15x personal vehicles.
[06] Subcontractor will not have AER badges, guard will have list update for workers on project. They will only have to show driver's license.
[07] B. Simmons indicated workers not allowed beyond designated area, If caught outside area, will be terminated.
[08] M. Wagstaff is SPOC for this project to the APD project.
[09] Borrow haul traffic only concern.
[10] D. Curlin contact for Miller.

2012-06-05 OPEN - M .Wagstaff reports that Ameren [Services] will begin transmission line work [between Kansas and Illinois], and will be using the coal yard at the Hutsonville plant as storage. Ameren will provide a guard for 12 HR shifts. The contacts at Ameren as Mr. Jim Williams [over the GENCO division] and Mr. Bob Simmons who will be the site SPOC. Work to begin the middle of June 2012. J. Boone indicated concern over coordination of trucks hauling into the site, and M. Wagstaff said no issue, as the trucks can come in through the gate by the [west] PCP line.

08 OSHA LOG - WORK HOURS

2012-06-12 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-11.
No incidents or accidents.
3,304.00 RT
0,700.50 OT
4,004.50 TOTAL

2012-06-05 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-04.
No incidents or accidents.
2,543.50 RT
0,436.50 OT
2,980.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-06-12 AMS, Chesapeake Containment [CCS], BT Drainage [BTD], and returning Belt Construction [BCI] on site.

[04] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[09] Laborers [AMS 3x, CCS 6x]
[02] Operators [AMS 1x, BCI 1x]
[11] Teamsters [FLT 10x borrow haul trucking]
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[29] Total

2012-06-05 AMS, Chesapeake Containment [CCS], and BT Drainage [BTD] on site.

[03] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[12] Laborers [AMS 2x, CCS 10x]
[02] Operators [AMS 2x]
[01] Teamsters
[00] Survey
[03] Foreman [Full time] [Mr. John Dietzel new Charah/AMS Focus Site Manager on project] [CCS 1x]
[21] Total

02 WORK HOURS AND OVERTIME

2012-06-12	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT. Fawn Lane trucking 10 HR.
2012-06-05	OPEN - Standard hours - 7:00 AM CT to 3:30 PM CT. CCS still on track for OT.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-06-12	OPEN - no issues. GEO/CCS "gators" leaving this week.
2012-06-05	OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-06-12	OPEN - no issues.
2012-06-05	OPEN - no issues.

02 SUBMITTALS

20120-06-12	Submittal log as published by GEO on 06-09 distributed. General discussion. [01] Submittal log copies distributed. [02] Discussion CA-7 sample for PCP coarse aggregate. [03] No issues.
20120-06-05	Submittal log as published by GEO on 06-2 distributed. General discussion. [01] Submittal log copies distributed. [02] Seed/mulch submittal under review by AER returned. [03] VES-01 to be returned by AER returned. [04] VES-02 M. Wagstaff orally approved returned. [05] SWP3 for APD submitted by AMS as matter of record original signed on 02-28. [06] AMS to submitted dewatering sump under AER review.

08 MATERIAL

01 GENERAL

2012-06-12	OPEN - no issues. [corrected dates below 20120].
2012-06-05	OPEN - no issues.

02 GEOMEMBRANE PRE-CON

2012-06-12	OPEN - no issues.
2012-06-05	Open - no issues. [01] A. Saindon reviewing tests, looks good. However test results for areas will not be ready until about 4:00 PM CT on 06-07. [02] Using stakes on positioned by sandbags and leaving the sandbags in place are acceptable per A. Saindon.

03 CAP VENT PRE-CON

2012-06-12	OPEN - no issues.
2012-06-05	OPEN - no issues. [corrected date errors of "20120" below]

04 PERFORATED COLLECTOR PIPE [PCP] PRE-CON MEETING

2012-06-12	OPEN - Discussion during Progress Meeting: [01] Lamac to perform record drawing "as-built" survey for AER direct, instead of through AMS. [02] P. Zinsious presented M. Wagstaff concern over the global stability of the PCP trench and Hanson response that proposed new alignment is not acceptable due to the close proximity. [03] R. Porter indicated if higher elevation of excavation, the trench may not be as wide. General consensus of the team is a "wait-and-see" approach [due to the many factors involved]. [04] MW-2R remains undeveloped due to dewatering. [05] BTD to begin PCP on 06-13 in AM. Estimated production rates [provided by BTD for scheduling meeting at Ameren] are shallow = 40 FT/D, average 60 FT/D, and deep[er] = 80 FT/D.
2012-06-05	OPEN - Discussion during Progress Meeting: [01] M. Wagstaff concern on the PCP alignment and liquefaction [due to seismic] of the soil near the pond berm. There was no specification provided by Ameren, and for now the alignment look good, will go with Hanson. [02] J. Boyer reports at area of DS-1 hit shallow sandstone, about 20 FT west from location. Will status once excavation begins if a new location or higher elevation will be required. [03] M .Wagstaff reports that new well MW-2R could not develop due to dewatering. ~~[02]~~ [04] P. Zinsious reports that review of PCP alignment allow for power poles to stay in place [Ameren does not need to remove for now].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-06-12	OPEN - Discussion during Progress Meeting: [01] AMS has removed fencing for now. [02] M. Wagstaff will be in contact with Mr. Wampler to resolve.
2012-06-05	OPEN - Discussion during Progress Meeting: [01] J. Boone reports Mr. Duane Wampler has communicated not happy with fence alignment. [02] AMS has mover the fence back. J. Cravens has been in contact with Wampler. [03] J. Boyer indicated collector tile work in about two weeks [will need coordination with Mr. Wampler]. [04] J. Boyer reports only need in week in this area, as shallow. [05] M. Wagstaff will be in contact with Mr. Wampler to resolve.

10 QUALITY CONTROL

03 CLAY

2012-06-12	OPEN - Roots being pulled out of the material.
2012-06-05	OPEN - no issues begin placement on 06-11.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-06-12	OPEN - Review of schedule 06-07 handed out [01] B. Muesenfechter presented "First Planner" . [02] Open discussion and review of "First Planner" process with Lamac. [03] J. Cravens out 07-13, and P. Zinsious vacation 06-21 - 06-28. [04] Two critical work areas, the clay placement and the PCP. [05] Baseline SC changed to 10-11. Currently SC in projected 10-24. [06] P. Zinsious indicated AMS to increase trucks for borrow haul from 10x to 15x. [07] PCP projected now to start 06-13, will help schedule. [08] Weather days coded.
2012-06-05	OPEN - Review of schedule 06-01 handed out [01] B. Muesenfechter presented "First Planner" . [02] Open discussion and review of "First Planner" process with the Build Team present. [03] Review of draft "First Planner" look-ahead. Individual activity review with modifications of dates and "Last Planner" assignments.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-06-12	OPEN - no issues. AMS sent SOV to M. Wagstaff.
2012-06-05	OPEN - no issues, draft revised on 06-05 few items to revise.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS REMOVAL

2012-06-12	OPEN - in progress.
2012-06-05	OPEN - in progress. No further spoils found, AMS to provide cost account.

12 EWO-12 PCP Survey

2012-06-12	CLOSE - Lamac to go direct to AER.
2012-06-05	NEW - AMS coordinate Lamac to survey "as-built" for the PCP installation.

13 EWO-13 Electrical feeder/overhead

2012-06-12	NEW - combined EWO-05 and 07 per AER. AMS to have pricing in day or two.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-06-12	NONE
2012-06-05	CLOSE

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-06-12	NONE
2012-06-05	In progress.

15 PRODUCTION

03 CLAY

2012-06-12	OPEN - Trucks are hauling 11 CY. Currently 10x trucks. Placement as of 06-11 is 1,232 CY.
2012-06-05	OPEN - no issues [projected start 06-11].

16 DOCUMENTS TRANSMITTED

2012-06-12	[01] AMS - Contact list HUT-APD-CON-2012-06-12 [CORRECTION BELOW 06-05]
	[02] AMS - Schedule dated 06-07 - critical Path
	[03] AER - Schedule dated 06-07 - look ahead
	[04] AER - Last Planner presentation [to A. Ridgely from AMS only].
	[05] AMS - last planner schedule draft
	[06] GEO - Submittal Log published 06-09
2012-06-05	[01] AMS - Contact list HUT-APD-CON-2012-06-05
	[02] AMS - Schedule dated 06-01 - critical Path
	[03] AMS - Schedule dated 06-01 - data date
	[04] AMS - Schedule dated 06-01 - look ahead
	[05] AER - Last Planner presentation
	[06] AMS - last planner schedule draft
	[07] GEO - Submittal Log published 06-01
	[08] BTD - revised buoyancy calculations to Mr. Wagstaff only
	[09] Fence layout option VES-03 [CORRECTION 06-12 added Item No. 09]

17 DOCUMENTS REVIEW ONLY

2012-06-12	None
2012-06-05	None

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, June 19, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG

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Photograph 1 - Root removal during clay placement facing west



Photograph 2 - Drainage pipe placement in anchor trench facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 3 - 8-inch perforated DR18 PVC C900 pipe for PCP facing northwest



Photograph 4 - Spark testing cap vent boots facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 5 - Clay placement in Quadrant A facing north



Photograph 6 - Manhole shoring at DS-1 facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 7 - Installing DS-1 manhole facing west



Photograph 8 - Installing PCP-1 facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 9 - Manhole interior DS-1 facing southwest



Photograph 10 - Installing CO-1 facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC



Photograph 11 - Overview of Ash Pond D facing southeast



Photograph 12 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 11 and June 15, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: July 5, 2012

SUBJECT: Weekly Summary Report for June 25, 2012 to June 29, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 52 to 77°F, and temperature highs ranged from 86 to 108°F. Weather delays did not occur this week.

Construction Activities

Anchor trench construction, groundwater collection system installation, fence removal, anchor trench spoil transportation, embankment grading, and clay placement occurred this week. Anchor trench construction included riprap splash pads and rodent guards for the anchor trench outlet toe drains along the northeast and east embankments of Ash Pond D. B&T Drainage continued construction of the groundwater collection system. This included the completion of dewatering sump DS-2, perforated collector pipe PCP-2 and PCP-3, additional cleanout CO-1A and CO-1B, and dewatering. Grades for PCP-2 and PCP-3 were altered due to shallow bedrock. Refer to daily reports for additional information. Lamac Engineering Co. surveyed grades for the groundwater collection system. Ash Management Services, Inc. removed portions of the fence south of Ash Pond B for the temporary construction easement and transported anchor trench spoils from Ash Pond D to Ash Pond A. Fawn Lane Transit, Inc. and Belt Construction, Inc. continue clay placement in Quadrant A. Approximately 15-16 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to clay placement documentation for more details. Belt Construction, Inc. also

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performed clearing and grading on the northeast embankment of Ash Pond D, providing a more gradual slope and promoting surface drainage.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT 330D Excavator
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Matt Dishman, Robert Dunkley, James Marks, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. – Austin Ridgley and Steve Anderson
Charah, Inc. – Joe Tasich
B&T Drainage (BTD) – John Boyer, Scott Boyer, Chase Boyer, Colby Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, and Michael Dashiell
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gray Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, and Patrick Wente
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, June 26, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

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Materials

Clay for the vegetative layer, IDOT CA-7 aggregate, 3x6 riprap for anchor trench drains, and rodent guards were delivered.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14282

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/25/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 72°AM, Sunny, 95° PM | Contractor: AMS | Subcontr./Supplier: BTD/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450 LC Excavator, 624H F.E.L., Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

AMS continued removing the chain link fence and pulling posts south of Ash Pond B for the temporary construction easement for the PCP excavation. AMS has a new focus manager that will work at both the CBS and APD - Matt Dishman.

BTD:

The PCP-2 excavation, installation, and backfill continues from DS-2 to DS-1, currently still running at a 0.50% grade towards DS-1. Unless a rock ledge is reached, there will not be a cleanout required between DS-1 and DS-2. An additional pump was placed in the DS-2 manhole to aid dewatering south of Ash Pond A. Due to the significant amount of sand and water flowing into the trench box, the foundation is undercut and approx. 3.0' of CA-7 is being used for the pipe bedding. The pipe haunching and backfill remains the same. Refer to S-386, Sheet 12, Detail 8 for the pipe installation profile. Lamac will survey the PCP tomorrow, wherever the pipe is exposed, for as-built data. Length = 120'

FLT/BCI/TSI:

Clay Placement - South bound on Section A. Two Additional Trucks - Alan Ruholl and Patrick Wente. Area = P-23, 25, 26, 27, and 46 to 55. Loads = 227

Additional Comments:

Randy Porter — Contractor Representative | AMS — Company
Randy Porter — Signature | 6-25-12 — Date
Anna Saindon — Geotechnology Inc. | 7-5-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14283

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 6/26/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 61°AM, 86° PM | Contractor: AMS | Subcontr./Supplier: BTD/Lamac/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, BW172 Roller, Water Truck

AMS:

AMS completed removing the chain link fence south of Ash Pond B for the temporary construction easement for the PCP excavation. All the posts were pulled and the holes were backfilled.

BTD/Lamac:

The PCP-2 excavation and installation was completed. The rest of the PCP-2 backfill and compaction should be completed tomorrow. Field Change: due to the field adjusted DS-1 elevation, the PCP-2 grade had to be field adjusted as well. There was also a shale rock ledge encountered and a cleanout (CO-1A) was installed between DS-1 and DS-2. PCP-2 runs west from DS-2 as follows: DS-2, 150' @ +0.50%, 3' @ 0.50%, 22.5° fitting → 14' → 22.5° fitting, 3' @ 0.50%, tee for CO-1A, and then the rest of the pipe ran +0.50% to DS-1 from the tee. Austin Ridgley and Steve Anderson with Lamac surveyed the flowlines in DS-2, PCP-2 before and after the 22.5° fittings, and MW-2R. Additional IDOT CA-7 aggregate was delivered. Dewatering continues around DS-2 and PCP-3 will begin tomorrow. Length = 140'.

FLT/BCI/TSI:

Clay Placement - South bound on Section A. BCI began stripping the NE embankment on APD (extra work for Ameren) and it will be slightly cut to provide a more gradual slope. The riprap splash pads for the anchor trench outlet drains will begin to be constructed on the NE berm tomorrow. Area = P-46 to 61, and 95. Loads = 240

Misc.: The riprap splash pads for the anchor trench outlet drains will not be Class B2 as indicated on the plans. They will be made of 3x6 riprap (Ameren approved).

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 6-26-12 — Date
Anna Saunders — Geotechnology, Inc. — 7-5-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14284

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/27/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 52°AM, 98°PM | Contractor: AMS | Subcontr./Supplier: BTD/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450 LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, BW 172 Roller, Water Truck

AMS:

Delivery - loads of 3x6 riprap. AMS worked on constructing the riprap splash pads for the anchor trench outlet toe drains along the northeast and east embankments of Pond D. 3x6 riprap was used instead of Class B2 and the pads were constructed 2' wide by 7' long (1' above the drain) by 6" deep (cut into the embankment). The rodent guards for the drains have not been delivered yet.

BTD:

Delivery - more 8" perforated C900 DR18 PVC pipe. The pipe was staged south of Pond D. PCP-2 backfill and compaction was completed, excluding the area around the DS-2 manhole. BTD began PCP-3 excavation, installation, and backfill. PCP-3 grade began at 1.75% running east from the DS-2 manhole. At approx. 44' east of DS-2, a hard rock ledge was encountered, and the PCP had to come up to clear the ledge and begin a new grade. An additional cleanout was installed at the new grade (CO-1B). Field Change: PCP-3 runs east from DS-2 as follows: DS2, 44'@ +1.75%, 22.5° fitting → 13' → 22.5° fitting, 3'@ 0.50%, tee for CO-1B, and then continues +0.50% from tee. The majority of PCP-3 is keyed into sandstone. John Boyer shot various grades for the PCP and field tile. Lamac will survey the PCP tomorrow for the as-built. Length = 100'

FLT/BCI/TSI:

Clay Placement - South bound on Section A. BCI continued stripping and cutting the NE embankment on Pond D. FLT Additional Personnel: Bob Smithenry, this makes a total of 16 trucks cycling between CBS and APD. Area = P-46 to 61, and 9S. Loads = 235

Additional Comments:

Randy Poeter — Contractor Representative — AMS — Company
Signature — 6-27-12 — Date
Anna Sajnaga — Geotechnology, Inc. — 7-5-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14285

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 6/28/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 70°AM, 105° PM | Contractor: AMS | Subcontr./Supplier: BTD/Lamac/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450 LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, BW 172 Roller, Water Truck

AMS:

Delivery – Rodent Guards for the anchor trench outlet toe drains. The riprap splash pads for the anchor trench outlet toe drains were completed along the northeast and east embankments of Pond D. The riprap pads along the south embankment will be constructed at a later date. Sandbags were staged along the liner for both vegetative cover stakes and to hold it in place from contraction and expansion. The 580 cleaned all the paved roads (plant entrance to construction yard) and regraded the gravel plant entrance. The 580 also began moving the stockpiled anchor trench spoils from the northwest corner of Pond D to the southeast corner of the geotubes in Pond A.

BTD/Lamac:

Delivery – loads of IDOT CA-7 aggregate. BTD continued PCP-3 excavation, installation, backfill, and compaction. PCP-3 continues at a +0.50% grade running east from CO-1B. The PCP was laid until the first kink was reached located southwest of Pond B. The dewatering wells (pumps and slotted casings) and manhole shoring were removed from around DS-2. BTD began backfilling around the DS-2 manhole. More sections of the manhole will be installed tomorrow. Currently, there is no dewatering south of Pond A. Austin and Steve with Lamac surveyed the additional cleanout CO-1B and points along PCP-3. Length = 200'.

FLT/BCI/TSI:

Clay Placement – South bound on Section A. BCI completed stripping and grading, producing a more gradual slope, the northeast embankment on Pond D. Area = P-46 to 61, and 95. Loads = 226

Additional Comments:

Randy Poetker — Contractor Representative — AMS — Company
Signature — 6-28-19 — Date
Anna Sinda — Geotechnology, Inc. — 7-5-12 — Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14286

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 6/29/12

TIME: Arrive: 6:30 AM | Depart: 2:00 PM | Travel: 1.0 hr | Total: 8.5 hrs (no lunch)
Weather: Sunny, 77°AM, 108° PM | Contractor: AMS | Subcontr./Supplier: BTD/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330D Excavator, 450 LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, BW 172 Roller, D5G Dozer, Water Truck

AMS:
The rodent guards for the anchor trench outlet toe drains were installed on the NE and E berms. The 580 continued moving the stockpiled anchor trench spoils from the NW corner of APD to the SE corner of the geotubes in APA.

BTD:
Delivery - CAT D5G Dozer. Chase Boyer on-site today. Two manhole sections were added to DS-2 and the manhole top was placed. DS-2 backfill was completed. BTD began finish grading PCP-1, 2, and 3. No pipe was laid today.

FLT/BCI/TSI:
Clay Placement - South bound Section A. Another entrance to the Pond was added on the west side along the Section A and C boundary line.
Area = P-46 to 61, and 95.
Loads = 148

Additional Comments:

Randy Poetker — Contractor Representative — AMS — Company — 6-29-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 7-5-12 — Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13840

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 0370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 6-25-12

TIME: Arrive: 6:45 | Depart: 5:00 | Travel: 1.0 | Total: 10.75 (½hr. lunch)
Weather: 60-80's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3Foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill is placed in such a way to prevent Geo-Membrane from wrinkling and/or being punctured or torn. Fill is Placed on Panels. P- 23, 25 thru 27, 46-55.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 6-25-12
Geotechnology, Inc. — Date: 6/25/12
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13841

FIELD OBSERVATION REPORT

Representative: Andrew DeClue Project No.: J019896.00 Task: 2370

Equipment & ID No.: — Project Name: Hutsonville Ash Pond D closure

Vehicle: 7 Zone: — Client: Geotechnology Date: 6-26-12

TIME: Arrive: 7:00 Depart: 5:15 Travel: 1.0 Total: 10.75 (½ hr. lunch)

Weather: 60-80's Contractor: AMS Subcontr./Supplier: —

Equipment Working: —

Site Activities / Observations / Contacts / Notes: Belt Construction continues to place 3 foot coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in From offsite Borrow Area. Fill is being placed in such a way to prevent Geo-membrane From wrinkling and/or being punctured or ripped. Fill was placed on Panels: P-46-61, 95.

Additional Comments:

Contractor Representative — Company

Signature — Date 6-26-12

Geotechnology Inc. — Date 6/26/12

Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13842

FIELD OBSERVATION REPORT

Representative: Andrew DeClue Project No.: J019896.00 Task: 2370
Equipment & ID No.: - Project Name: Hutsonville Ash Pond D closure
Vehicle: 7 Zone: - Client: Geotechnology Date: 6-27-12

TIME: Arrive: 6:45 Depart: 5:15 Travel: 1.0 Total: 11.50 (½hr lunch)
Weather: 50-80's Contractor: AMS Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place fill of minimum 3Feet over Geo-membrane. using OB to spread Fill being hauled in from offsite Borrow area. Fill is being placed in such a way to prevent Geo-membrane from wrinkling and/or being ripped or pinched. Fill being placed on Panels P-46 thru 61,95.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 6-27-12
Geotechnology Inc. — Date: 6/27/12
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13843

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.00 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 2 Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 6-28-12

TIME: Arrive: 6:45 | Depart: 5:00 | Travel: 1.0 | Total: 11.25 (½hr lunch)
Weather: 70-100's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3foot Coverage. Fill over Geo-Membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from being wrinkled and/or being ripped or punctured. Fill being placed on Panels: P-46 thru 61, 95.

Additional Comments:

Contractor Representative: [signature] | Company: AMS
Signature: [signature] | Date: 6-28-12
Geotechnology, Inc.: [signature] | Date: 6/28/12
Engineer's Signature: [signature]

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13844

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.00 | Task: 230
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 1 Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 6-29-12

TIME: Arrive: 7:00 | Depart: 1:30 | Travel: 1.0 | Total: 7.5
Weather: 70-100 | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —

Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot minimum coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite Borrow area. Fill is being placed in such a way to prevent Geo-Membrane From wrinkling and/or torn or punctured. Fill placed on Panels: P-46 thru 61, 95

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 6-29-12
Geotechnology, Inc. — Date: 6/29/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 15 Minutes
Tuesday, June 26, 2012

01 PUBLICATION

Publish date:	2012-07-02	Submitted by:	JRD		
Distribution:	E-mail only	Notes taken by:	JRD		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-06-26-PM-15-JRD		
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
02	Mr.	Jimmy	Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
03	Mr.	John	Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
04	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr.	Matt	Dishman	Charah - FOCUS	502-287-9163	jdishman@charah.com
06	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-06-26 OPEN - no issues. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-06-26 OPEN - R. Porter scheduled two drivers for Fawn Lane Trucking at Newton.

04 AMS SAFETY

20120-06-26 [01] AER has FWI confined Space plan under review. J. Cravens to monitor confined space for AER, FWI responsible for safety.
[02] B & T has corrected safety glasses.
[03] General safety discussion. Keeping hydrated was discuused.
[04] Joko Taisch on site Monday 6-25 and Friday 6-29.

05 HOUSEKEEPING

2012-06-26 OPEN - No issues.
[01] One dumpster will remain onsite until it is full and then it will be removed.

06 PLANT ACCESS - CBT

20120-06-26 OPEN
[01] Guard on site has been directed not to track/document/work for any of APD project. Guard has been directed to leave the site and lock the gate when AMS SM leaves. Guard will wait outside of gate if still on duty.
[02] M. Wagstaff to confirm new agreements with a Ms. Holly and check on issue with locks.

08 OSHA LOG - WORK HOURS

2012-06-26 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-25.
No incidents or accidents.
4,268.00 RT
912 OT
5,185.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-06-26 AMS, BT Drainage [BTD], Belt Construction [BCI] on site.
[02] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[05] Laborers [AMS 3x, BTD 2x]
[04] Operators [AMS 1x, BCI 1x, BTD 2x]
[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]
[00] Survey
[02] Foreman [Full time] [2x]
[29] TOTAL

02 WORK HOURS AND OVERTIME

2012-06-26 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Project will be shut down Wednesday 7-4 for the for the 4th of July Holiday.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-06-26 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-06-26 OPEN - no issues.

02 SUBMITTALS

20120-06-26 Submittal log as published by GEO on 06-21 distributed.
[01] Submittal log copies distributed by e-mail, but no copy at meeting.
[02] Frietag submittal on Control Panel needed asap, due to required delivery lead time.

08 MATERIAL

01 GENERAL

2012-06-26 OPEN
[01] Some HDPE Liner was returned.
[02] Structures and stone need to be completed and submitted.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-06-26 OPEN - Discussion during Progress Meeting:
[01] MW-2 has been removed.
[02] Pipe installation is going well, with no current issues.
[03] No snow fence to be installed per Wampler, to help with irrigation.
[04] J. Boyer indicated working directly for Wampler to make field tile connections.
[08] Existing conflicting power/light poles have been removed, except for one.

10 QUALITY CONTROL

03 CLAY

2012-06-26 OPEN - Roots being pulled out of the material as necessary.
[01] Section A should be completed 2-3 days ahead of chedule.
[02] AMS has changed schedule to begin clay placement in Area C in lieu of Section B, after Section A is complete.
[03] Belt to bring second dozer onsite around 7/9 to begin fine grading.

11 SCHEDULE REVIEW

01 SCHEDULE

2012-06-26 OPEN - Review of Last Planner schedule 06-19 handed out
[01] AMS will change the next area of clay placement to Area C, in lieu of Area B as originally scheduled.
[02] AMS intends to begin concrete work ahead of schedule. This is the main reason for changing the area of clay placement on Pond D.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-06-26 OPEN - M. Wagstaff reports pay-app "signed off" for May.
[01] MW has furnished backup information for revised P.O. to AMS. AMS to review and execute if correct.
[02] AMS to submit June Draft Pay Request at next meeting 7-3.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS REMOVAL

2012-06-26 OPEN - AMS to investigate including the spoils [ash material] from the liner anchor trench excavation. JD & MW to review costs.

13 EWO-13 Electrical feeder/overhead

2012-06-26 OPEN - AMS presented hard copy of EWO for AER to review; MW evaluating.

14 EWO-14 FIELD TILE LOCATION

2012-06-26 Tiles to be field located between B&T and Wampler. Geotechnology and Ameren to approve proposed locations.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-06-26 OPEN
[1] MW to complete submittal reviews; electrical

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-06-26 OPEN
[1] Concrete submittals needed asap.

15 PRODUCTION

03 CLAY

2012-06-26 OPEN - Trucks are hauling 11 CY. Currently 15x trucks. Placement as of 06-25 is 21,318 CY.

16 DOCUMENTS TRANSMITTED

2012-06-26 [01] AMS - Last Planner schedule dated 06-19.
[02] GEO - Submittal Log published 06-21.

17 DOCUMENTS REVIEW ONLY

2012-06-26 NONE

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, July 3, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - PCP-2 excavation facing west



Photograph 2 - Fence removal for temporary construction easement facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 25 and June 29, 2012

JRC



Photograph 3 - Clay placement facing northwest



Photograph 4 - PCP-2 excavation facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 25 and June 29, 2012

JRC



Photograph 5 - Survey of PCP-2 facing northeast



Photograph 6 - PCP-2 installation facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 25 and June 29, 2012

JRC



Photograph 7 - DS-2 manhole interior facing southwest



Photograph 8 - Riprap splash pad for anchor trench drains facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 25 and June 29, 2012

JRC



Photograph 9 ⮝ - PCP-3 compaction facing north



Photograph 10 ⮝ - Clay placement facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 25 and June 29, 2012

JRC



Photograph 11 - Grade work on PCP-1, PCP-2 and PCP-3 facing southeast



Photograph 12 - Overview of Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between June 25 and June 29, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: July 11, 2012

SUBJECT: Weekly Summary Report for July 2, 2012 to July 6, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 72 to 79°F, and temperature highs ranged from 95 to 106°F. Weather delays did not occur this week. July 4, 2012 was taken as a holiday.

Construction Activities

Groundwater collection system installation, excavation of test pits, and clay placement occurred this week. B&T Drainage continued construction of the groundwater collection system. This included the completion of dewatering sump DS-3, beginning dewatering sump DS-4, perforated collector pipe PCP-3 and PCP-4, and dewatering. The location of the DS-3 manhole was offset west due to shallow bedrock. Grades for PCP-3 and PCP-4 were altered due to shallow bedrock. Test pits were excavated along the PCP-4 alignment to determine the depth of bedrock. Refer to daily reports for additional information. Lamac Engineering Co. surveyed grades for the groundwater collection system. Fawn Lane Transit, Inc. and Belt Construction, Inc. completed clay placement in Quadrant A and began clay placement in Quadrant C. Approximately 15-16 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to clay placement documentation for more details.

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Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT 330D Excavator
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, James Marks, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. – Jake Lewis and Steve Anderson
Charah, Inc. – Joe Tasich
B&T Drainage (BTD) – John Boyer, Scott Boyer, Colby Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Michael Dashiell, and Eric Blankenship
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gray Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Patrick Wente, and Frank Draper
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, July 3, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer was delivered.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14287

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 7/2/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 72° AM, 98° PM | Contractor: AMS | Subcontr./Supplier: BTD/Lamac/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330D Excavator, 450 LC Excavator, 624H Front End Loader, 410J
Site Activities / Observations / Contacts / Notes: Backhoe, BW172 Roller, D5G Dozer, Water Truck

AMS:
Performed housekeeping in construction yard and in trailer lot. Most of the personnel worked at the CBS. Matt Dishman is on vacation this week.

BTD/Lamac:
The DS-2 manhole had to be pumped to dewater the open trench for PCP-3. PCP-3 excavation, backfill, installation, compaction, and finish grading continues. The first and second kink (22.5° fittings) were installed southwest of Pond B. The kinks were moved 80' east per Lamac's revised drawings and to conform to the construction easement. This run of PCP continues at +0.50% towards CO-2, and is currently being placed 3' into the sandstone at the location of the kinks. The PCP-3 excavation ended at the 2nd kink southwest of Pond B. DS-3 excavation and PCP-4 excavation will begin before PCP-3 is completed. It is planned to run the PCP and 12" ADS tile at the same time, south of Pond B. Jake Lewis and Steve Anderson with Lamac surveyed PCP-3 before and after the kinks. Colby Boyer hauled off well casings and pumps. Length = 110'

FLT/BCI/TSI:
Clay Placement - Section A was completed and Section C was started.
Area = P-46 to 61, and 95
Loads = 228

Additional Comments:

Randy Proctor — Contractor Representative — AMS — Company
Signature — 7-2-12 — Date
Anna Saindon — Geotechnology, Inc — 7-9-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14288

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 7/3/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.0 hrs (0.5 hr for lunch)
Weather: Sunny, 75° AM, 95° PM | Contractor: AMS | Subcontr./Supplier: BTD/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330D Excavator, 450LC Excavator, 624H Front End Loader, 410J
Site Activities / Observations / Contacts / Notes: Backhoe, BW 172 Roller, D5G Dozer, Water Truck

AMS:
All personnel worked at the CBS.

BTD:
Pumps and hoses were setup for dewatering south of Pond D. The dewatering was setup to discharge into Pond B. After dewatering began, all the water was pumped out of the wells in a matter of minutes, with very little excess water entering the wells. Therefore, dewatering ceased and will only be performed as needed south of Pond D. PCP pipe was staged and socked south of Pond D. Finish Grading and compaction occured on PCP-1, 2, and 3. No pipe laid.

FLT/BCI/TSI:
Clay Placement – Southbound Section C. A ≈200' strip will be placed on the west side of Section C first to allow the construction of the paved gutter to begin.
Area = P-47 to 52, 95 to 98, and 103.
Loads = 238

Additional Comments:

Randy Porter — AMS
Contractor Representative — Company
Signature — 7-3-12 Date
Geotechnology Inc. — 7-3-12 Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14289

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 7/5/12

TIME: Arrive: 6:00 AM Depart: 5:45 PM Travel: 1.0 hr Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 73°AM, 101°PM Contractor: AMS Subcontr./Supplier: BTD/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330 D Excavator, 450 LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, Water Truck

AMS:
All personnel worked at the CBS.

BTD:
The excavation for DS-3 was started and completed. Shallow sandstone was encountered and, therefore, DS-3 was offset approx. 10' west where the rock ledge dropped off. Manhole shoring was set and a slotted PVC pipe was placed in the shoring with CA-7 pack for dewatering. The DS-3 manhole base, and two sections were set and CA-7 was placed around the base for a drainage pack. The manhole is within ≈ 2' of grade. Lamac will survey tomorrow, PCP-4 excavation, installation, and backfill began. PCP-4 is run at +0.5% from DS-3 to CO-2. If rock is encountered, the grade will be adjusted accordingly. Length = 70'

FLT/BCI/TSI:
Clay Placement – Southbound Section C.
Area = P-47 to 52, and 95 to 98.
Loads = 186.

Additional Comments:

Randy Porter
Contractor Representative
AMS
Company
Signature
7-5-12
Date
Anna Saindon
Geotechnology, Inc.
7-9-12
Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14290

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 7/6/12

TIME: Arrive: 6:00 AM | Depart: 3:45 PM | Travel: 1.0 hr | Total: 10.5 hrs (0.25 hr for lunch)
Weather: Sunny, 79°AM, 106°PM | Contractor: AMS | Subcontr./Supplier: BTD/Lamac/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330D Excavator, 450LC Excavator, 624H Front End Loader, 410J
Site Activities / Observations / Contacts / Notes: Backhoe, BW172 Roller, D5G Dozer, Water Truck

AMS:
All personnel worked at the CBS.

BTD/Lamac:
Continued PCP-4 Excavation, Installation, Backfill, and Compaction. Test pits were excavated between the SW corner of Pond D and the SE corner of Pond B. Bedrock depths varied from 5' to 7'. Therefore, PCP-4 will be adjusted accordingly to compensate for the shallow bedrock depths. 70' west of DS-3, PCP-4 is bedded into sandstone anywhere from 6" to 3'. Excavation of the rock became difficult and the grade of PCP-4 was adjusted. PCP-4 runs as follows: DS-3, 70' west at +0.5%, 60' west with a gradual raise of 8.13', back to +0.5% to Kink southwest of Pond D, and now at a +2.5% to Kink southeast of Pond B. The PCP-4 trench is being left open to a depth of ≈5' for the placement of the GCL. Steve Anderson and Jake Lewis with Lamac surveyed the flowlines in DS-3 and PCP-4 70' west of DS-3. Eric Blankenship took Michael Doshiell's spot for BTD. Length = 150'

FLT/BCI/TSI:
Clay Placement - Southbound Section C (reached the SW corner of Section C).
New Trucker - Frank Draper
Area = P-47 to 52, and 95 to 98.
Loads = 169

Additional Comments:

Randy Porter — AMS
Contractor Representative — Company
Signature — 7-6-12 Date
Anna Sandoz — 7-9-12
Geotechnology, Inc. — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13845

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 0370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geo-technology | Date: 7-2-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 70-100's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place minimum 3Foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite borrow Area. Fill is being placed in such a way to prevent Geo-Membrane From wrinkling and/or being ripped or punctured. Fill being placed on Panels: P-46 thru 61, 95.

Additional Comments:

Contractor Representative — Company: 7-2-12
Signature — Date: 7-2-12
Geotechnology Inc. — Date: 7/2/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13846

FIELD OBSERVATION REPORT

Representative: Andrew DeCle | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond 0 Closure
Vehicle: 7 | Zone: – | Client: Geotechnology | Date: 7-3-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 60-100s | Contractor: AMS | Subcontr./Supplier: –
Equipment Working: –
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 Foot Minimum Coverage Fill over Geo-Membrane. Using D6 to place Fill being hauled in from offsite Borrow area. Fill being placed in such a way to prevent Geo-membrane from wrinkling and/or being torn or punctured. Fill being placed on Panels: P-47 thru 52, 95 thru 98, 103.

Additional Comments:

Contractor Representative — AMS (Company) — 7-3-12 (Date)
Signature
Geotechnology, Inc. — 7/3/12 (Date)
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13847

FIELD OBSERVATION REPORT

Representative: Andrew DeCke | Project No.: J019866.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-5-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 70-100 | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place Minimum of 3Foot Coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite Borrow area. Fill being placed in such a way to prevent Geo-Membrane From being wrinkled and/or being torn or punctured. Fill being placed on Panels: P-47thru 52, 95 thru 98.

Additional Comments:

Contractor Representative — Company
Signature — Date 7-5-12
Geotechnology, Inc. — Date 7/5/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13848

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 0 Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-6-12

TIME: Arrive: 6:45 | Depart: 3:30 | Travel: 1.0 | Total: 9.75 (½hr lunch)
Weather: 80-100 | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —

Site Activities / Observations / Contacts / Notes: Belt construction continuing to place minimum 3 foot coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from wrinkling and/or being punctured or torn. Fill placed on Panels: P-47 thru 52, 95-98

Additional Comments:

Randy Cook — AMS
Contractor Representative — Company

Signature — 7-6-12 Date

Geotechnology, Inc. — 7/6/12 Date

Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 16 Minutes
Tuesday, July 3, 2012

01 PUBLICATION

Publish date:	2012-07-09	Submitted by:	PHZ
Distribution:	E-mail only	Notes taken by:	PHZ
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-07-03-PM-16
AER PO:	567523 R4	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
02	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com
03	Mr.	Jimmy	Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
04	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr.	Scott	Boyer	B&T Drainage	217-822-8373	N/A
07	Mr.	Joko	Tasich	Charah	502-649-7633	jtasich@charah.com
08	Mr.	Mike	Burch	Freitag	812-208-1771	mburch@freitaginc.com
09	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-07-03	OPEN - no issues. None projected for 2x week look ahead.
2012-06-26	OPEN - no issues. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-07-03	OPEN - Freitag to schedule worker at Newton.
2012-06-26	OPEN - R. Porter scheduled two drivers for Fawn Lane Trucking at Newton.

04 AMS SAFETY

20120-07-03
[01] Cooling stations in good order [as weather has been hot and dry].
[02] J. Tasich schedule today 07-03 on site, possible return on 07-06.
[03] Safety luncheon scheduled for next Progress Meeting on 07-10.
[04] Discussion on Charah/AMS policy to disable AM/FM radios is equipment to prevent distractions.
[05] Discussion on Charah/AMS policy for backing equipment, and incident at another Charah site.
[06] Discussion on Charah/AMS policy for cell phones [and associated electronics] for non-essential use to be kept is safe place, as electronics will not be allowed in the equipment.
[07] Barricade areas to have either yellow or red tape with notification/identification tag.
[08] BTD to tag/post confined spaces [4x DS, 1x MH, and 1x CB - collector box]
[09] M. Wagstaff indicated Newton Plant has confined space signs for use on this project.

20120-06-26 [01] AER has FWI confined Space plan under review. J. Cravens to monitor confined space for AER, FWI responsible for safety.
[02] B & T has corrected safety glasses.
[03] General safety discussion. Keeping hydrated was discussed.
[04] Joko Tasich on site Monday 6-25 and Friday 6-29.

05 HOUSEKEEPING

2012-07-03 OPEN - No issues.

2012-06-26 OPEN - No issues.
[01] One dumpster will remain onsite until it is full and then it will be removed.

06 PLANT ACCESS - CBT

20120-07-03 OPEN
[01] General discussion security guard. M. Wagstaff indicated that guard can leave anytime.
[02] R. Porter indicated no issues with the lock [Decatur Alarm?].

20120-06-26 OPEN
[01] Guard on site has been directed not to track/document/work for any of APD project. Guard has been directed to leave the site and lock the gate when AMS SM leaves. Guard will wait outside of gate if still on duty.
[02] M. Wagstaff to confirm new agreements with a Ms. Holly and check on issue with locks.

08 OSHA LOG - WORK HOURS

2012-07-03 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-02.
No incidents or accidents.
4,701.00 RT
1,006.50 OT
5,707.40 TOTAL

2012-06-26 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 06-25.
No incidents or accidents.
4,268.00 RT
912 OT
5,185.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-07-03 AMS, BT Drainage [BTD], Belt Construction [BCI] on site.
[02] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[03] Laborers [AMS 1x, BTD 2x]
[03] Operators [AMS 0x, BCI 1x, BTD 2x]
[15] Teamsters [FLT 14x borrow haul trucking, AMS 1x]
[00] Survey
[02] Foreman [Full time] [AMS 1x, BTD 1x]
[25] TOTAL

2012-06-26 AMS, BT Drainage [BTD], Belt Construction [BCI] on site.
[02] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[05] Laborers [AMS 3x, BTD 2x]
[04] Operators [AMS 1x, BCI 1x, BTD 2x]
[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]
[00] Survey
[02] Foreman [Full time] [2x]
[29] TOTAL

02 WORK HOURS AND OVERTIME

2012-07-03 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Project will be shut down Wednesday 7-4 for the for the 4th of July Holiday.

2012-06-26 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Project will be shut down Wednesday 7-4 for the for the 4th of July Holiday.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-07-03 OPEN - no issues.

2012-06-26 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-07-03 OPEN - no issues.

2012-06-26 OPEN - no issues.

02	**SUBMITTALS**	
	20120-07-03	No change to Submittal log as published by GEO. [01] AMS to submit the collector box structure. [01] AMS to submit the CA-6 stone. [03] FWI "Baro Diver" sensor discussion - resubmit correct unit. [04] FWI to submit J. Barrett as qualified/certified HDPE welder/installer. [05] AMS to review with FWI the scope of the handheld devise for the DS controls.
	20120-06-26	Submittal log as published by GEO on 06-21 distributed. [01] Submittal log copies distributed by e-mail, but no copy at meeting. [02] Freitag submittal on Control Panel needed asap, due to required delivery lead time.

08 MATERIAL

01	**GENERAL**	
	2012-07-03	Large boulders found in excavations to be returned to area.
	2012-06-26	OPEN [01] Some HDPE Liner was returned. [02] Structures and stone need to be completed and submitted.

09 ADJACENT PROPERTIES AND PCP LINE

01	**GENERAL**	
	2012-07-03	Field collector tile [01] Alignment and elevation issue. J. Cravens to provide sketch. Review of drawings by team.
	2012-06-26	OPEN - Discussion during Progress Meeting: [01] MW-2 has been removed. [02] Pipe installation is going well, with no current issues. [03] No snow fence to be installed per Wampler, to help with irrigation. [04] J. Boyer indicated working directly for Wampler to make field tile connections. [08] Existing conflicting power/light poles have been removed, except for one.

10 QUALITY CONTROL

03	**CLAY**	
	2012-07-03	NONE
	2012-06-26	OPEN - Roots being pulled out of the material as necessary. [01] Section A should be completed 2-3 days ahead of schedule. [02] AMS has changed schedule to begin clay placement in Area C in lieu of Section B, after Section A is complete. [03] Belt to bring second dozer onsite around 7/9 to begin fine grading.

11 SCHEDULE REVIEW

01	**SCHEDULE**	
	20102-07-03	OPEN. Review of last planner by B. Muesenfechter. [01] M. Wagstaff on vacation 07-04 through WE. [02] M. Wagstaff requested for time being [while subcontractors on look-ahead] to attend the progress meeting. [03] Negative float now shown due to re-schedule. [04] Feedback required from AAA on scope and approval for the electrical EWO's by AER. [05] B. Muesenfechter brief review of fragnets for EWO's. [06] S. Boyer indicated needed field tile submittal information. [07] General review and discussion of DS PCP progress.
	2012-06-26	OPEN - Review of Last Planner schedule 06-19 handed out [01] AMS will change the next area of clay placement to Area C, In lieu of Area B as originally scheduled. [02] AMS intends to begin concrete work ahead of schedule. This is the main reason for changing the area of clay placement on Pond D.

12.0 COST AND BUDGET

02	**AMS PAY APPLICATION - CHANGE REQUEST**	
	2012-07-03	OPEN - P. Zinsious to submit draft pay-app for M. Wagstaff to review. M. Wagstaff back-up documents for EWOs' to PO.
	2012-06-26	OPEN - M. Wagstaff reports pay-app "signed off" for May. [01] MW has furnished backup information for revised P.O. to AMS. AMS to review and execute if correct. [02] AMS to submit June Draft Pay Request at next meeting 7-3.

12.1 EXTRA WORK ORDERS

11	**EWO-11**	**BUILDING SPOILS REMOVAL**
	2012-07-03	OPEN - AMS moving spoils materials as "fill-in" type work. Utilizing existing backhoe on site.
	2012-06-26	OPEN - AMS to investigate including the spoils [ash material] from the liner anchor trench excavation. JD & MW to review costs.
13	**EWO-13**	**Electrical feeder/overhead**
	2012-07-03	OPEN - M. Wagstaff reports Hanson has under review, and should have design drawing at EOW.
	2012-06-26	OPEN - AMS presented hard copy of EWO for AER to review; MW evaluating.

14	**EWO-14**	**FIELD TILE LOCATION**
	2012-07-03	Elevation could be an issues. M. Wagstaff indicated possible change in elevation no-issue. Team to review.
		AER not to pay for removal of shale. Elevation of field tile in lower than the PCP.
	2012-06-26	Tiles to be field located between B&T and Wampler. Geotechnology and Ameren to approve proposed locations.

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-07-03	[01] M. Wagstaff to complete submittal reviews; electrical
	2012-06-26	OPEN
		[1] MW to complete submittal reviews; electrical

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT [AMS]**	
	2012-07-03	[01] Concrete submittals ASAP - P. Zinsious to review.
	2012-06-26	OPEN
		[1] Concrete submittals needed asap.

15 PRODUCTION

03	**CLAY**	
	2012-07-03	OPEN - Trucks are hauling 11 CY. Currently 15x trucks. Placement as of 07-02 is 33,165 CY. R. Porter presented sketch M/U.
	2012-06-26	OPEN - Trucks are hauling 11 CY. Currently 15x trucks. Placement as of 06-25 is 21,318 CY.

16 DOCUMENTS TRANSMITTED

2012-07-03	[01] AER - Last Planner schedule dated 06-29.
	[02] AMS - Critical Path schedule dated 06-29
2012-06-26	[01] AMS - Last Planner schedule dated 06-19.
	[02] GEO - Submittal Log published 06-21.

17 DOCUMENTS REVIEW ONLY

2012-07-03	[01] SK-HUT-APD-006-R0 "Groundwater Collection - Section Breakouts"
	[02] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-06-26	NONE

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, July 10, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Salndon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - PCP-3 compaction facing north



Photograph 2 - PCP-3 installation facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 2 and July 6, 2012

JRC



Photograph 3 - Clay placement facing north



Photograph 4 - Clay placement facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 2 and July 6, 2012

JRC



Photograph 5 - DS-3 installation facing southwest



Photograph 6 - PCP-4 installation facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 2 and July 6, 2012

JRC



Photograph 7 - Clay placement facing southwest



Photograph 8 - PCP-4 excavation facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 2 and July 6, 2012

JRC



Photograph 9 - Overview of Ash Pond D facing south



Photograph 10 - Overview of Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 2 and July 6, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: July 16, 2012

SUBJECT: Weekly Summary Report for July 9, 2012 to July 13, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 70 to 75°F, and temperature highs ranged from 90 to 98°F. Weather delays did not occur this week.

Construction Activities

Groundwater collection system installation, remote vent and sump discharge pipe installation, electrical conduit installation, manhole coring, paved gutter excavation, electrical layout, and clay placement occurred this week. B&T Drainage continued construction of the groundwater collection system. This included work at dewatering sump DS-3 and DS-4, perforated collector pipe PCP-4, PCP-5, PCP-6, and dewatering. The collector trench was excavated south of Ash Pond A. The remote vents, sump discharge pipe, electrical feeder conduit, and the high and low voltage conduit were installed within the collector trench. DS-1 and DS-2 manholes were cored for the remote vents and the sump discharge pipe. Sump discharge pipe was welded before installation. The paved gutter excavation began and ash spoils excavated were transported to Ash Pond A. Lamac Engineering Co. surveyed grades for the groundwater collection system, paved gutter, and began staking slope diversion berms in Quadrant A. Fawn Lane Transit, Inc. and Belt Construction, Inc. continues clay placement in Quadrant C. Approximately 12 to 16 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT 330D Excavator
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens, Steve Graham, and Anna Saindon
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Matt Dishman, Robert Dunkley, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. (LEC) – Jake Lewis and Steve Anderson
B&T Drainage (BTD) – John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Michael Dashiell, and Eric Blankenship
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gray Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Patrick Wente, and Frank Draper
Freitag-Weinhardt, Inc. (FWI) – Mike Burch, Scott Burch, and Jarrod Barrett
AAA Electric, Inc. (AAA) – Joe King and Kyle Davidson
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, July 10, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

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Materials

Clay for the vegetative layer, manhole base and sections for DS-4, 3-inch HDPE DR11 for sump discharge, 1-inch HDPE pipe for remote vents, HDPE fittings, 2-inch schedule 80 stainless steel discharge pipe for sumps, 2-inch schedule 40 PVC conduit for high and low voltage junction box feed, 2-1/2 inch schedule 40 PVC conduit for the electrical feeder, welded wire fabric W1.4xW1.4 for the paved gutter, and IDOT CA-7 aggregate was delivered.

Testing/Sampling

Two samples of the clay vegetative layer on-site were obtained for analytical and geotechnical testing.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14291

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/9/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 72°AM, 90°PM | Contractor: AMS | Subcontr./Supplier: BTD/LEC/FLT/BCI/TSI/FWI
Equipment Working: D6N Dozer, 330D Excavator, 450 LC Excavator, 624H Front End Loader, BW172
Site Activities / Observations / Contacts / Notes: Roller, D5G Dozer, Water Truck

AMS:

All personnel worked at the CBS. James Marks is no longer working for AMS. Matt Dishman is back on-site, temporarily full time.

BTD/LEC:

The excavation, installation, backfill, and compaction of PCP-4 continued. PCP-4 continues at a +2.5% from the Kink southwest of APD towards the Kink southeast of APB. After the Kink southeast of APB was reached, PCP-4 was ceased and will not continue until the 12" ADS Tile is delivered and can be ran parallel with PCP-3 and PCP-4 south of APB. Jake Lewis and Steve Anderson with LEC surveyed PCP-4 between the Kinks. PCP-5 excavation, installation, and backfill began. PCP-5 is being run at a +0.5% grade from DS-3 towards CO-3. Another section was added to DS-3 and DS-3 backfill continued. Dewatering was also setup in the DS-3 manhole and in the temporary casing adjacent to DS-3. A test pit was excavated at the location of CO-2 to determine the depth of bedrock for both the PCP and ADS Tile. The difference between the ADS flowline in the grade inlet southwest of DS-1 and the bedrock at CO-2 is 0.55', with the rock being the lower elevation. Rock breaking/ripping will be required. Delivery - MH base with sections and additional CA-7. Eric Blankenship is still here for Mike Dashiell. PCP-4 Length = 160', PCP-5 Length = 40', Total = 200'

FWI:

Freitag-Weinhardt, Inc. mobilized. Personnel - Scott Burch and Jarrod Barrett.

FLT/BCI/TSI:

Clay Placement - Southbound Section C.
Area = P-46 to P-49, and P-53 to P-59. Loads = 151

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Randy Porter — Signature — 7-9-12 — Date
Anna Sanders — Geotechnology, Inc. — 7-16-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14292

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 7/10/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.5 hr for lunch)
Weather: Sunny, 70°AM, 94°PM | Contractor: AMS | Subcontr./Supplier: BTD/LEC/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330D Excavator, 450 LC Excavator, 624H Front End Loader, BW 172
Site Activities / Observations / Contacts / Notes: Roller, 410J Backhoe, D5G Dozer, Water Truck

AMS:

All personnel worked at the CBS.

BTD:

The excavation, installation, backfill, and compaction to GCL cap of PCP-5 continued. PCP-5 continues at a +0.5% grade from DS-3 to CO-3. Water has been an issue in the trench south of APD and dewatering continues in DS-3 manhole and adjacent to DS-3 manhole. The boulders excavated south of APA were buried in the PCP-5 backfill. The backfill around DS-1 and DS-2 manholes was excavated to allow access for FWI to begin work. Length = 90'

LEC:

Lamac surveyed PCP-5 and staked out the ℄ for the Paved Gutter with 25' %s on the west side of APD, and began staking slope diversion berms in Section A.

FWI:

Delivery - 6000' of 3" HDPE DR11 for sump discharge, 1000' of 1" HDPE pipe for remote vents, HDPE fittings, 2" Sch. 80 stainless steel discharge pipe for sumps, 2 generators, and a job box (Konex). They will begin butt fusion welding tomorrow.

FLT/BCI/TSI:

Clay Placement - Southbound Section C.
Area = P-46 to P-62, and P-99 to P-102. Loads = 229

Misc.:

Collector conduit will be %s 10' north of the as-built PCP for its entire length. PCS west poles will be %s 5' south of the embankment toe.

Additional Comments:

Randy Foster — Contractor Representative — AMS — Company
Signature — Date: 7-10-12
Anna Spindon — Geotechnology, Inc. — Date: 7-16-12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14293

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 7/11/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 74° AM, 95° PM | Contractor: AMS | Subcontr./Supplier: BTD/LEC/FWI/FLT/BCI/TSI
Equipment Working: 580 Backhoe, D6N Dozer, 330 D Excavator, 450 LC Excavator, BW 172 Roller,
Site Activities / Observations / Contacts / Notes: 624H Front End Loader, 410J Backhoe, Water Truck

AMS:
The 580 graded the plant entrance and roadways. All other work performed at the CBS.

BTD:
PCP-5 excavation, installation, backfill, and compaction to GCL Cap was completed; Length = 113'. PCP-5 has a consistent grade of +0.5% from DS-3 to CO-3. CO-3 will be installed after completing PCP-6. Additional boulders from the west side of the PCP excavation were buried in PCP-5 excavation. The excavation of DS-4 began. The manhole shoring was set, and dewatering was setup inside the shoring, and adjacent to DS-4. BTD's new schedule: DS-4, PCP-6, CO-3, PCP-7, CO-4, GCL Cap, PCP-4/Tile, PCP-3/Tile, and CO-2 south of APB. Mike Dashiell is back on-site and John Boyer was here. The 410J Backhoe was demobilized. Field Change: The paved gutter on the west side of APD will now be a V-bottom. The flowline and top of slope elevations will remain the same. Refer to S-386, Sheet No. 11, Detail 2.

LEC:
The PCP-5 and additional slope diversion berms were surveyed.

FWI:
Two holes were cored in DS-1 and DS-2 manholes. The first hole is for the 1" HDPE pipe for the remote vents, and the second hole is for the 3" HDPE DR-11 for the sump discharge. The 1" and 3" holes are 1' and 3' below the ground surface, respectively. They began butt fusion welding the 3" HDPE DR-11. A McElroy No. 14 PitBull is being utilized for the butt fusion. (1" IPS - 4" DIPS pipe for the PitBull.). Length Fused = 200'.

FLT/BCI/TSI:
Clay Placement - Southbound Section C.

Additional Comments: Area = P-46 to P-62, 92, 93, 94, 99-102.
Loads = 261

Randy Porter — Contractor Representative — AMS — Company — 7-11-12 — Date
Signature — Geotechnology, Inc. — 7-16-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14294

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/12/12

TIME: Arrive: 6:00 AM | Depart: 5:30 | Travel: 1.0 hr | Total: 12 (.5 hr lunch)
Weather: Sunny, 72° AM, 98° PM | Contractor: AMS | Subcontr./Supplier: AAA/FWI/BTD/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330D Excavator, 450 LC Excavator, BW 172 Roller, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, L245DT Tractor, D5G Dozer, Water Truck

AMS:
Assisted BTD and performed work at the CBS.

AAA:
Joe King staked the layout for the 10 power poles for the overhead electric running from the MCC to APD, and the location of the west pump control panel. Tomorrow the west control panel rack assembly will be installed and they will begin the conduit for the electric feeder.

FWI:
Butt fusion welding 3" HDPE DR11 continued. Length Fused = 800'.

BTD:
DS-4 excavation was completed. The DS-4 manhole base and two sections were set and partially backfilled. PCP-6 excavation, installation, and backfill was started. PCP-6 runs at +3.5% from DS-4 towards CO-3. They began grading the paved gutter on the west side of APD. New Equipment: Kubota L245DT Tractor and another 410J Backhoe. Tomorrow they will begin excavating the conduit collector trench south of APA. Length = 60' feet

FLT/BCI/TSI:
Clay Placement - Southbound Section C.
Area = P-54 → 60 and P92 → 94
Loads = 256

Additional Comments: Note: Paved Gutter Ash Spoils are dumped in Pond A.

Randy Patel — Contractor Representative — AMS — Company
Signature — 7-12-12 — Date
Anna Saindon — Geotechnology, Inc. — 7-16-12 — Date
Engineer's Signature

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No. A 14295

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: STEPHEN GRAHAM Project No.: J019896.01 Task: 2370
Equipment & ID No.: – Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4116 Zone: – Client: Ameren ER Date: 7/13/12

TIME: Arrive: 6:30 AM Depart: 5:15 Travel: 4.0 Total: 15.75 (1/2 lunch.)
Weather: 75° clear AM Contractor: AMS Subcontr./Supplier: AAA/TSI/BTD/FWI/FLT/BCI
Equipment Working: D6N Dozer, 330 D Excavator, 450 LC Excavator, BW 172 Roller, 624 H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410 J Backhoe, L245 DT Tractor, D5G Dozer, Water Truck.

AMS:
Assisted BTD and performed work at the CBS

AAA:
Joe King has a new helper Kyle Davidson. They brought in a trailer load of electrical Conduit. Conduit was welded with polymer and set in conduit Collector Trench Excavation South of Ash Pond A. Conduit extends from DS1 to first kink and to rack assembly for west Pump Control Panel. power cables not fed through Conduit. Electricians left site after 8 hours. (1400)

FWI:
Butt fusion welding 3" HDPE DR11 Continue. HDPE remove vents and DR11 Set in trench and Layed in DS1 and DS2, however not adhered to concrete. DR11 and remote vents run in trench from DS1 to first kink and to rack assembly for pump control panel. FWI left site after 8 hours (1400)

BTD: No activity in PCP-6 area. A/C on 450 LC Excavator being serviced and recharged. Excavation of Conduit Collector trench South of APA Complete including trench to west Pump Control panel. Trench Complete between DS1 and first Kink. -Paved gutter Excavation complete and final grade achieved using Kubota L245DT tractor. excess ash transported to APA. Paved gutter excavated between Control point 138 to 143. wire mesh grids are delivered on site to be installed next week for concrete pour in paved gutter

FLT/BCI/TSI:
Clay Placement - Southbound Section C. Area = Panels P57-62 total soil loads: 231

Additional Comments:

Contractor Representative: Randy Pond ~~Total loads~~ = AMS
Company
Signature: [signature] Date: 7-13-12
Geotechnology Inc: Anna Saindon Date: 7-16-12
Engineer's Signature: [signature]

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13849

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 8370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 1 closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7/9/12

TIME: Arrive: 6:30 | Depart: 5:15 | Travel: 1.0 | Total: 11.75 (½ hr. lunch)
Weather: 70-90s | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot coverage Fill over Geo-Membrane. One to rain that site got over weekend, D6 spent 30-45 minutes skimming top inch or two off of Fill area. Then D6 spreading Fill being hauled in From offsite Borrow Area. Fill is being placed in such a way to prevent Geo-Membrane From being wrinkled and/or ripped or punctured. Fill placed on Panels P-46 thru 49, 53 thru 59.

Additional Comments:

Contractor Representative — Company: AMS — Date: 7/9/12
Signature — Date: 7/9/12
Geotechnology, Inc.
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13850

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 7/10/10

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr lunch)
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in from Offsite Borrow area. Fill is being placed in such a way to prevent Geo-membrane from being wrinkled and/or being ripped or punctured. Fill is placed on Panels P-46 thru 62, 99 thru 102.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-10-10
Geotechnology, Inc. — Date: 7/10/10
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13851

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-11-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr lunch)
Weather: 60-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From off-site borrow area. Fill is placed in such a way to prevent Geo-Membrane From being wrinkled and/or being ripped or punctured. Fill is placed on Panels: P-46 thru 62, 92 thru 94, 99 thru 102.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-11-12
Geotechnology, Inc — Date: 7/11/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 13852

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeClue
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7
Zone: —
Client: Geotechnology
Date: 7/12/12

TIME: Arrive: 6:45 Depart: 5:15 Travel: 1.0 Total: 11.5 (½ hr. lunch)
Weather: 60-90's Contractor: AMS Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot of coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from being wrinkled and/or torn or punctured. Fill being placed on panels: P-54 thru 60, 92 thru 94.

Additional Comments:

Randy Porter — Contractor Representative
AMS — Company
Signature
7-12-12 — Date
Geotechnology, Inc.
7/15/12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13853

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: JO19896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7/13/12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot coverage Fill over Geo-Membrane, using D6 to spread Fill being hauled in from offsite borrow Area. Fill is placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or ripped or punctured. Fill being placed on Panels: P-57 thru 62

Additional Comments:

Contractor Representative — Company AMS
Signature — Date 7/13/12
Geotechnology, Inc — Date 7/15/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 17 Minutes
Tuesday, July 10, 2012

01 PUBLICATION

Publish date:	2012-07-16	Submitted by:	PHZ		
Distribution:	E-mail only	Notes taken by:	PHZ		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-07-10-PM-17		
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com
04	Mr.	Steve	Bluemner	Ameren	314-972-4160	sbluemner@ameren.com
05	Mr.	Matt	Dishman	AMS - Focus	502-287-9163	mdishman@charah.com
06	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
07	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
08	Mr.	Scott	Boyer	B&T Drainage	217-822-8373	N/A
09	Mr.	Mike	Burch	Freitag	812-208-1771	mburch@freitaginc.com
10	Ms.	Anna	Saindon	Geotechnology	314-997-7440	a_saindon@geotechnology.com
11	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com
12	Mr.	Travis	Hunt	S&T Construction	812-208-1150	stdirt1@hotmail.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-07-10	OPEN - no issues. None projected for 2x week look ahead.
2012-07-03	OPEN - no issues. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-07-10	OPEN - Freitag to schedule worker at Newton.
2012-07-03	OPEN - Freitag to schedule worker at Newton.

04 AMS SAFETY

2012-07-10 [01] Safety luncheon today. General topics per Charah/AMS policies as noted below on 07-03 Items no. 04, 06, and 06.
[02] AMS to pick up confined space signs.
[03] General safety discussion.
[04] Joko Tasich schedule TBD.

~~20120-07-03~~ [01] Cooling stations in good order [as weather has been hot and dry].
2012-07-03 [02] J. Tasich schedule today 07-03 on site, possible return on 07-06.
[03] Safety luncheon scheduled for next Progress Meeting on 07-10.
[04] Discussion on Charah/AMS policy to disable AM/FM radios is equipment to prevent distractions.
[05] Discussion on Charah/AMS policy for backing equipment, and incident at another Charah site.
[06] Discussion on Charah/AMS policy for cell phones [and associated electronics] for non-essential use to be kept is safe place, as electronics will not be allowed in the equipment.
[07] Barricade areas to have either yellow or red tape with notification/identification tag.
[08] BTD to tag/post confined spaces [4x DS, 1x MH, and 1x CB - collector box]
[09] M. Wagstaff indicated Newton Plant has confined space signs for use on this project.

05 HOUSEKEEPING

2012-07-10 OPEN - No issues.

2012-07-03 OPEN - No issues.

06 PLANT ACCESS - CBT

20120-07-10 OPEN
[01] General discussion - no issues.
[02] R. Porter clarified issue was with the lock and access by G. Musch.

20120-07-03 OPEN
[01] General discussion security guard. M. Wagstaff indicated that guard can leave anytime.
[02] R. Porter indicated no issues with the lock [Decatur Alarm?].

08 OSHA LOG - WORK HOURS

2012-07-10 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-09.
No incidents or accidents.
4,992.00 RT
1,046.50 OT
6,038.50 TOTAL

2012-07-03 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-02.
No incidents or accidents.
4,701.00 RT
1,006.50 OT
5,707.40 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-07-10 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI] on site. Introduction M. Dishman Charah/AMS FOCUS Site Manager.
[02] Geotechnology [work hours not included in OSHA Log above]
[02] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[04] Laborers [AMS 2x, BTD 2x]
[03] Operators [BCI 1x, BTD 2x]
[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]
[00] Survey
[03] Foreman [AMS 2x - Full time] [BTD 1x]
[30] TOTAL

2012-07-03 AMS, BT Drainage [BTD], Belt Construction [BCI] on site.
[02] Geotechnology [work hours not included in OSHA Log above]
[00] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[03] Laborers [AMS 1x, BTD 2x]
[03] Operators [AMS 0x, BCI 1x, BTD 2x]
[15] Teamsters [FLT 14x borrow haul trucking, AMS 1x]
[00] Survey
[02] Foreman [Full time] [AMS 1x, BTD 1x]
[25] TOTAL

02 WORK HOURS AND OVERTIME

2012-07-10	OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT.
2012-07-03	OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Project will be shut down Wednesday 7-4 for the for the 4th of July Holiday.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-07-10	OPEN - no issues.
2012-07-03	OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-07-10	OPEN - no issues. J. Griffith [Fawn Lane Trucking] partner stroke this week.
2012-07-03	OPEN - no issues.

02 SUBMITTALS

20120-07-10	Submittal log as published by GEO on 06-23 distributed. [01] Submittal log review, and general conversation of codes. [02] S. Boyer need field tile and submittal to continue. M. Wagstaff indicated that if pipe same as drawings [12 In AASHTO], proceed. P. Zinsious to investigate status of submittal. Sand is same as before FA-1. [03] M. Burch hand unit issue, P. Zinsious to review after PM. Baro driver submittal. [04] AAA to submit same requirements [AER/AMS] for pole subcontractor [Plant Brothers] to AMS. [05] AAA submit lift plan [form subcontractor] for crane for pole installation. [06] AER review of FWI confined space plan in progress. [07] FWI and BTD to review water removal form DS after PM.
20120-07-03	No change to Submittal log as published by GEO. [01] AMS to submit the collector box structure. [01] AMS to submit the CA-6 stone. [03] FWI "Baro Diver" sensor discussion - resubmit correct unit. [04] FWI to submit J. Barrett as qualified/certified HDPE welder/installer. [05] AMS to review with FWI the scope of the handheld devise for the DS controls.

08 MATERIAL

01 GENERAL

2012-07-10	General discussion City of Robinson not give the tax COE an extension as plant closing is not providing jobs. P. Zinsious indicated no impact to cost at this time, and will keep AER posted.
2012-07-03	Large boulders found in excavations to be returned to area.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-07-10	OPEN - Discussion during Progress Meeting: [01] S. Boyer indicated that bedrock should not be an issue for field tile installation. Requires submittals [see submittals]. J. cravens indicate elevation delta only about 0.55 FT to date. [02] Pipe installation is going well, with no current issues. Discussed sequence [see schedule section].
2012-07-03	Field collector tile [01] Alignment and elevation issue. J. Cravens to provide sketch. Review of drawings by team.

10 QUALITY CONTROL

03 CLAY

2012-07-10	No issue. A. Saindon indicated that clay samples will be taken on site today for chemical and physical analysis.
2012-07-03	NONE

11 SCHEDULE REVIEW

01 SCHEDULE

2012-07-10	OPEN. Review of last planner by B. Muesenfechter. [01] General discussion introduction Last Planner: sequence, remaining duration units [RDU], and constraints. Last Planner provides a look ahead, engages field supervision, fosters team involvement, commitments and accountability. [02] Substantial completion is 09-28. Clay placement progressing early. [03] Progress has improved two weeks in a row. [04] General review and discussion of DS PCP progress.

~~20102-07-03~~	OPEN. Review of last planner by B. Muesenfechter.
2012-07-03	[01] M. Wagstaff on vacation 07-04 through WE. [02] M. Wagstaff requested for time being [while subcontractors on look-ahead] to attend the progress meeting. [03] Negative float now shown due to re-schedule. [04] Feedback required from AAA on scope and approval for the electrical EWO's by AER. [05] B. Muesenfechter brief review of fragnets for EWO's. [06] S. Boyer indicated needed field tile submittal information. [07] General review and discussion of DS PCP progress.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-07-10	OPEN - M. Wagstaff indicated pay-app no issue.
2012-07-03	OPEN - P. Zinsious to submit draft pay-app for M. Wagstaff to review. M. Wagstaff back-up documents for EWOs' to PO.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS REMOVAL

2012-07-10	OPEN - AMS moving spoils materials as "fill-in" continues in progress.
2012-07-03	OPEN - AMS moving spoils materials as "fill-in" type work. Utilizing existing backhoe on site.

13 EWO-13 Electrical feeder/overhead

2012-07-10	OPEN - Final plans by EOW. M. Wagstaff has approved the EWO.
2012-07-03	OPEN - M. Wagstaff reports Hanson has under review, and should have design drawing at EOW.

14 EWO-14 FIELD TILE LOCATION

2012-07-10	Non-issue. Reference Item No. 09.01 2012-07 above.
2012-07-03	Elevation could be an issues. M. Wagstaff indicated possible change in elevation no-issue. Team to review. AER not to pay for removal of shale. Elevation of field tile in lower than the PCP.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-07-10	[01] Fencing VES and/or alignment options. [02] Electrical submittals under review.
2012-07-03	[01] M. Wagstaff to complete submittal reviews; electrical.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT

2012-07-10	[01] Concrete submittals in progress. P. Zinsious to meet with T. Hunt after PM.
2012-07-03	[01] Concrete submittals ASAP - P. Zinsious to review.

15 PRODUCTION

03 CLAY

2012-07-10	OPEN - Trucks are hauling 11 CY. Currently 15x trucks. Placement as of 07-09 is 42,489 CY. R. Porter presented sketch M/U. LEC performed topographic outline survey to check clay placement estimation. AMS calculated [at time of the survey] 3,608 LD at 11 CY/LD = 39,688 CY. LEC survey area measured by 3 FT THK average calculated to 38,143 CY. This is a delta of only 1,545 CY, and the LD haul rate is agreed will continue to be 11 CY per truck.
2012-07-03	OPEN - Trucks are hauling 11 CY. Currently 15x trucks. Placement as of 07-02 is 33,165 CY. R. Porter presented sketch M/U.

16 DOCUMENTS TRANSMITTED

2012-07-10	[01] AMS - Last Planner schedule dated 07-06. [02] AMS- Remaining Work schedule dated 07-06. [03] GEO - Submittal Log published 06-23.
2012-07-03	[01] AER - Last Planner schedule dated 06-29. [02] AMS - Critical Path schedule dated 06-29

17 DOCUMENTS REVIEW ONLY

2012-07-10	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-07-03	[01] SK-HUT-APD-006-R0 "Groundwater Collection - Section Breakouts"
	[02] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, July 17, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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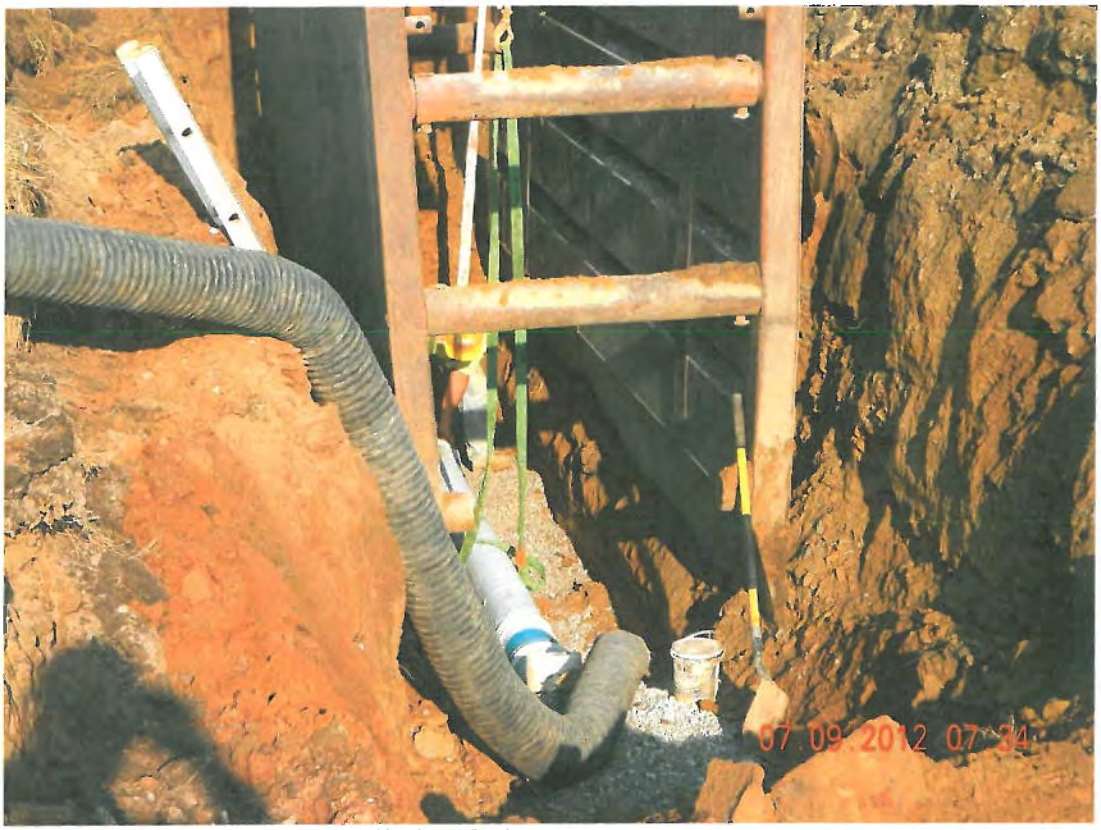
PHOTOGRAPH LOG



Photograph 1 - PCP-4 installation facing west



Photograph 2 - Clay placement facing north

All photographs taken by Joseph Cravens and Steve Graham of Geotechnology, Inc. between July 9 and July 13, 2012

JRC



Photograph 3 - Clay placement facing northeast



Photograph 4 - Compaction near PCP-4 facing southeast

All photographs taken by Joseph Cravens and Steve Graham of Geotechnology, Inc. between July 9 and July 13, 2012

JRC



Photograph 5 - Clay placement facing west



Photograph 6 - Grading paved gutter facing north

All photographs taken by Joseph Cravens and Steve Graham of Geotechnology, Inc. between July 9 and July 13, 2012

JRC

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Photograph 7 - Coring holes for sump discharge in DS-2 facing west



Photograph 8 - Typical HDPE pipe butt fusion weld facing south

All photographs taken by Joseph Cravens and Steve Graham of Geotechnology, Inc. between July 9 and July 13, 2012

JRC



Photograph 9 - Butt fusion welding 3-inch HDPE pipe facing west



Photograph 10 - Remote vent, sump discharge pipes, and electrical feeder conduit in collector trench facing west

All photographs taken by Joseph Cravens and Steve Graham of Geotechnology, Inc. between July 9 and July 13, 2012

JRC



Photograph 11 - Overview of collector trench south of Ash Pond A facing west



Photograph 12 - Overview of Ash Pond D facing south

All photographs taken by Joseph Cravens and Steve Graham of Geotechnology, Inc. between July 9 and July 13, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: July 24, 2012

SUBJECT: Weekly Summary Report for July 16, 2012 to July 20, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 75 to 80°F, and temperature highs ranged from 85 to 102°F. Weather delays occurred on July 18, 2012 from a storm event that occurred the previous evening.

Construction Activities

Groundwater collection system installation, remote vent and sump discharge pipe installation, butt fusion welding, electrical conduit installation, manhole coring, paved gutter construction, paved gutter culvert installation, west pump control panel installation, dewatering sump assembly, and clay placement occurred this week. B&T Drainage continued construction of the groundwater collection system. This included work at dewatering sump DS-3 and DS-4, perforated collector pipe PCP-4, PCP-5, PCP-6, and PCP-7, clean out CO-3 and CO-4, and dewatering. Freitag-Weinhardt, Inc. and AAA Electric, Inc. installed the remote vents, sump discharge pipes, electrical feeder conduit, and the high and low voltage conduit within the collector trench. DS-1 and DS-2 manholes were cored for the installation of junction boxes and conduit drain. The paved gutter excavation west of Ash Pond D was completed, ash spoils excavated were transported to Ash Pond A, and ST Construction, Inc. performed the concrete work. Concrete testing (including slump, air entrainment, and cylinders) was performed by Patriot Engineering, Inc. The southwest culvert for the paved gutter was installed. The west pump control panel rack was assembled and installed. Dewatering sump assembly began, including threading and welding pipe, assembling valves and flanges, and wiring. Lamac

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Engineering Co. surveyed grades for the groundwater collection system and the east paved ditch. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued clay placement in Quadrant B. Approximately 16 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT 330D Excavator
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Matt Dishman, Robert Dunkley, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. (LEC) – Jake Lewis
B&T Drainage (BTD) – John Boyer, Scott Boyer, Colby Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Michael Dashiell, and Eric Blankenship
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gray Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Patrick Wente, Frank Draper, and Jason Byers
Freitag-Weinhardt, Inc. (FWI) – Scott Burch, Clay Cochran, and Jarrod Barrett
AAA Electric, Inc. (AAA) – Joe King and Kyle Davidson
ST Construction, Inc. (STC) – John Maetin, Jackie Hoover, Gary Hedges, Scott Hilton, and Robert Pressley
Patriot Engineering, Inc. (PEI) – Brandon McDonald and Thad Simpson
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, July 17, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer, IDOT Class SI concrete, Seal Tight Deck-O-Foam expansion joint filler, Right Pointe White Water Wax curing compound, and Sonolastic NP-1 elastometric polyurethane joint sealant for the paved gutter, 12-inch ADS Pipe for paved gutter culvert and field tile, 12-inch flared-end sections, and dewatering sump assembly including four sump pumps and accessories. Refer to the submittals for the dewatering sump assembly models and specifications.

Testing/Sampling

Patriot Engineering, Inc. performed concrete testing, including slump and air entrainment testing. Four concrete cylinders were cast and retrieved for testing. Refer to the concrete testing records for additional information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14296

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/16/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 76° AM, 94° PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/AAA/FLT/BCI/TSI/STC
Equipment Working: D6N Dozer, 330D Excavator, 450LC Excavator, 624H Front End Loader, BW 172 Roller,
Site Activities / Observations / Contacts / Notes: 410J Backhoe, D5G Dozer, L245DT Tractor, Water Truck

AMS:
Assisted BTD, AAA, and performed work at the CBS.

BTD:
The excavation, installation, backfill, and compaction of PCP-6 was completed. PCP-6 runs as follows: DS-4, 60' west @ 3.5%, 80' west @ 3.0%, and @ 2.5% west to CO-3. The installation of CO-3 was completed. Clearing for PCP-7 excavation began. Paved Gutter excavation and grading on the west side of APD continues.

STC:
ST Construction, Inc. arrived on site. Personnel: John Maetin, Jackie Hoover, Gary Hedges, Scott Hilton, and Robert Pressley. The V-bottom gutter was formed on the SW side of APD, and the Welded Wire Fabric (6x6 W1.4xW1.4) was cut and will be floated in 2" from the subgrade during pouring. Field Change: The 1.0' minimum depth between the top of the slope and the flowline was approved not to be followed. Delivery - Seal Tight Deck-O-Foam ½" x 6" x 50' for expansion joint filler.

AAA:
Installed additional 2" and 2½" Schedule 40 PVC Conduit. The 2½" conduit will be the electric feeder to the west pump control panel. The 2" conduit will run from each manhole to the pump control panel, 2 lines per manhole. This will connect to the high and low voltage junction boxes attached to the manhole. Refer to S-386, Sheet 12, Detail 4.

FWI:
Continued butt fusion welding 3" HDPE discharge pipe. Length = 800'.

FLT/BCI/TSI: Additional truck - Jason Byers.

Additional Comments: Clay Placement - Section C was completed and began Section B. Loads = 219

Randy Peter — Contractor Representative — AMS — Company — 7-16-12 — Date
Signature
Geotechnology, Inc. — 7-23-12 — Date
Anna Sandon — Engineer's Signature

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ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14298

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 7/17/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.5 hrs (no lunch) /PEI
Weather: Sunny, 78° AM, Rain, 98° PM | Contractor: AMS | Subcontr./Supplier: BTD/STC/AAA/FWI/LEC/FLT/
Equipment Working: D6N Dozer, 330D Excavator, 450LC Excavator, 624H Front End Loader, BW 172 BCI/TSI
Site Activities / Observations / Contacts / Notes: Roller, 410J Backhoe, D5G Dozer, L245DT Tractor, Water Truck

AMS:
Delivery - Thompson Pump for dewatering DS-1 and DS-2 to set sumps. Assisted BTD and STC.

BTD:
The excavation, installation, backfill, and compaction of PCP-7 began. PCP-7 is being laid at a 0.90% grade heading east from DS-4. Paved Gutter excavation and grading continued on the west side of APD. Another section of the box culvered draining into APC will have to be removed to complete the gutter in this area. The excavation for the 12" ADS Culvert (w/ metal end sections) began which will drain the gutter on the SW corner of Section C. The 12" Culvert will be placed under the existing 18" HDPE drainage pipe and concrete casing. The manhole box around DS-4 was removed and DS-4 backfill began. An additional trench box was delivered to stack for the PCP-7 excavation. Dewatering continues adjacent to DS-4. Paved Gutter ash spoils dumping into APA continued. Note: detectable warning tape will not be required for the PCP. L = 110'

STC:
They began pouring the Paved Gutter on the west side of Section C. The concrete is being delivered from R&L Ready Mix Concrete, Inc. out of Robinson, IL. The concrete ordered is IDOT Class SI, 4000 psi, ±4" Slump, W/C of 0.4, with 5-7% air-entraining agent. The concrete finish is a smooth rubbed finish with broom. After finishing, Right Point White Water Wax Curing Compound was applied. Due to excessive heat, they began saw cutting contraction joints at 10' intervals (1½"-2" depth). Seal Tight Deck-O-Foam expansion joints were utilized (½" x 6"). In areas of the gutter where the thickness...

Additional Comments: NEXT PAGE

Randy Parker — Contractor Representative — AMS — Company
Signature — 7-17-12 — Date
Anna Sacheon — Geotechnology, Inc — 7-23-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14299

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: —
Client: Ameren ER
Date: 7/17/12

TIME: Arrive: Depart: Travel: Total:
Weather: Contractor: Subcontr./Supplier:
Equipment Working:

REFER TO PAGE 1

Site Activities / Observations / Contacts / Notes:

STC/PEI (cont.):
... is greater than 6", the expansion joints will be doubled to acheive the full depth of the slab. Both expansion and contraction joints will receive Sonolastic NP1 elastometric, gun-grade polyurethane joint sealant. Burlap will be used to cover the concrete to prevent excessive heat and cracking. Patriot Engineering, Inc. will be used as the testing agency for the concrete due short notice of the concrete placement. Test results will be sent to Ameren and/or the CQA Officer. Brandon McDonald with PEI took 4 cylinders, one slump test (4½"), one air test (5.2%), all at a temperature of 85°. Three trucks total delivery - 1(7 cy), 2(8 cy) and 3(6 cy), totalling 21 cy of concrete.

AAA:
The west pump control panel rack assembly was set in place. The 4" stainless steel conduit, to be used for electric feed from the MCC building to the overhead electric, was installed on the existing power pole beside the MCC building. No electric lines have been installed yet.

FWI:
Deliveries - The 4 sumps for the manholes have been delivered, including setup accessories such as the 12 float switches, 4 check valves, 4 flanged pitless adapters (tees), simplex controllers, 4 flow meters, 4 paddlewheel flow sensors, 4 transition reducers, and cables. Refer to project submittals for brands, models, and specifications. The Baro Diver level sensors and data loggers have not been received yet.

LEC: Surveyed flowlines in DS-4, CO-3, and PCP-7, along with the east Paved Ditch.

FLT/BCI/TSI:
Clay Placement - Eastbound on Section B.

Additional Comments: Area = P-29 to P-31, and 62 to 67.
Loads = 215

Contractor Representative: [signature] Company: AMS
Signature: [signature] Date: 7-17-12
Geotechnology, Inc.: Anna Sandon Date: 7-23-12
Engineer's Signature: [signature]

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14300

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 7/18/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.5 hrs (no lunch)
Weather: Sunny, 75° AM, 102° PM | Contractor: AMS | Subcontr./Supplier: BTD/STC/BCI/FWI/AAA
Equipment Working: D6N Dozer, 330 D Excavator, 450 LC Excavator, 624 H Front End Loader,
Site Activities / Observations / Contacts / Notes: 410 J Backhoe, D5G Dozer, Water Truck, 580 Backhoe

AMS:
The plant entrance and access roads were cleaned from the washout. The paved concrete gutter was re-covered with burlap and plastic; the cover had blown off from the storm. Silt fence was installed on the east side of the gutter to prevent further material washing down onto the gutter from the Pond. Housekeeping performed around job trailers.

BTD:
Setup numerous pumps in the PCP trench for dewatering due to the storm. The remaining dewatering wells were removed south of APD. The 12" ADS Culvert was installed on the SW corner of Section C. The flared end sections were installed on the culvert. Field Change: Plastic flared end sections were used instead of metal. The northern flared end will receive a concrete collar when the gutter is completed, and the southern flared end will drain into riprap which drains into the Paved Ditch. Delivery - 12" ADS Field Tile. The manhole boxes were taken apart and demobilized along with the slotted well casings.

STC:
Stripped gutter forms and saw cut contraction joints. Too wet to pour or form gutter. The curing compound was applied from the day before.

BCI:
Graded ash spoils dumped in APA to allow ash spoil dumping within the geotubes.

AAA: Cored DS-1 and DS-2 for the high and low voltage junction boxes, and the conduit drain. They also sized stainless steel fittings and link seals for the core holes.

FWI: The stainless steel (2") discharge pipe was threaded and the check valves were assembled. Clay Cochran established the

Additional Comments: confined space entry for the manholes.
FLT/TSI: No Production; Too Wet for Clay Placement.

Randy Porter — Contractor Representative — AMS — Company — 7-18-12
Signature — Date
Anna Saindon — Geotechnology, Inc — 7-23-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14301

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 7/19/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 80° AM, 101° PM | Contractor: AMS | Subcontr./Supplier: BTD/STC/FWI/LEC/PEI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 330 D Excavator, 450 LC Excavator, 624H Front End Loader, BW 172, 580, Roller, 410J Backhoe, D5G Dozer, L245DT Tractor, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Layout was added to the staked slope diversion berms in Section A and the plant access roads were graded. Assisted BTD, STC, and poured the posts for the west pump control panel.

BTD:
The excavation, installation, backfill to GCL cap, and compaction of PCP-7 was completed. PCP-7 runs from DS-4 east to CO-4 at a +0.9% grade. L=210'. CO-4 was installed and backfilled. The V-bottom paved gutter was regraded on the west side of Section A due to the storm. Paved gutter ash spoils were transported to Ash Pond A.

STC:
The paved gutter on the west side of Section C was poured, finished, and cured. A concrete collar was poured around the 12" ADS Culvert on the SW corner of Section C. Expansion joints were placed every 30' and contraction joints were saw cut every 10'. The forms were stripped in the PM. They began forming, pouring, finishing, and curing the paved gutter on the west side of Section A. The gutter was slightly offset to drain directly into the existing box culvert to prevent an additional precast box section from being taken out. Three concrete batches from R&L Ready Mix were poured: 1(8cy), 2(6.5cy) and 3(8cy) totalling 22.5 cy.

PEI:
Thad Simpson took 4 cylinders, one Slump-5", one Air-5.5% all at 78°.

LEC:
Jake Lewis surveyed PCP-7 during installation.

FWI: Placed link seals on the remote vents in DS-1 and DS-2 and Fused 800' 3" HDPE.

FLT/BCI/TSI: Clay Placement - Eastbound Section B

Additional Comments: Area = P-29 to 33 and 63 to 67. Loads AAA Electric had no production today. = 246

Randy Patel — Contractor Representative — AMS — Company
Signature — 7-19-12 — Date
Anna Saindon — Geotechnology, Inc. — 7-23-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14302

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 7/20/12

TIME: Arrive: 6:00 AM | Depart: 5:00 PM | Travel: 1.0 hr | Total: 11.75 hrs (0.25 hr for lunch)
Weather: Sunny, 76° AM, Cloudy 85° PM | Contractor: AMS | Subcontr./Supplier: BTD/STC/PEI/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 580 Backhoe, 330D Excavator, 450LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: BW172 Roller, 410J Backhoe, D5G Dozer, Water Truck

AMS:
Continued transporting anchor trench spoils from the NW corner of APD to APA.

BTD:
Manhole sections including tops were set on DS-3 and DS-4. DS-3 and DS-4 were backfilled to GCL cap. Note: All of the precast manhole tops do not have mastic joint sealant applied yet because they will be pulled during sump pump installation. Mastic will be applied to the tops following sump pump installation. They began finish compaction and grading for the GCL cap, 5' below the ground surface, along PCP-4, PCP-5, PCP-6, and PCP-7. At a depth of 5', the PCP trench will be cut back an additional foot for GCL coverage. Note: As-Built lengths for PCP-5 240', PCP-6 180', and PCP-7 330'. Colby Boyer was here to haul off pumps, hoses, shoring, and generators. Equipment and materials were staged along PCP-3 and PCP-4.

STC:
The paved gutter on the north end of the box culvert on the west side of Section A was poured, finished, cured, saw cut, and the forms were stripped. Contraction joints are every 10' and expansion joints are every 30'. Contractions are 1½"-2" deep, and expansions extend the full depth of the slab. Began forming gutter on the south end of the box culvert on the west side of Section A. Three concrete batches - 1(8cy), 2(8cy), 3(3cy) totalling 19 cy.

PEI:
Thad Simpson took 4 cylinders, one Slump - 4½", one Air - 6%, and a temperature of 77°.

FWI:
Continued staging and butt fusion welding 3" HDPE Sump Discharge. Length Fused = 960'

FLT/BCI/TSI: Section B, Area = 32 to 36, 66 to 69. L = 197

Additional Comments: All electrical conduit in collector trench will be spaced 12" and haunched with IDOT FA-01 Sand.

Randy Porter — Contractor Representative — AMS — Company — 7-20-12 — Date
Signature
Anna Saindon — Geotechnology, Inc — 7-23-12 — Date
Engineer's Signature

AAA had no production today.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13854

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-16-12

TIME: Arrive: 6:45 | Depart: 5:00 | Travel: 1.0 | Total: 11.25 (½ hr. lunch)
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot Coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill being placed in such a to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill placed on Panels: P-58 thru 62, 92 thru 94.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-16-12
Geotechnology, Inc. — Date: 7/16/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13855

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7/17/12

TIME: Arrive: 6:45 | Depart: 3:00 | Travel: 1.0 | Total: 9.25 (½hr. lunch)
Weather: 70-90s | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot Coverage Fill over Geo-Membrane. Using D-6 to spread Fill being hauled in From Offsite borrow areas. Fill is being placed in such a way to prevent Geo-Membrane From being wrinkled and/or being ripped or punctured. Fill placed on Panels P-29 thru 31, 62 thru 67.
Rain Out @ 3:00 PM

Additional Comments:

Contractor Representative — Company
Signature — Date 7-17-12
Geotechnology, Inc. — Date 7/17/12
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13856

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D closure
Vehicle: 7 | Zone: – | Client: Geotechnology | Date: 7/18/12

TIME: Arrive: 6:45 | Depart: 7:15 | Travel: 1.0 | Total: 1.5
Weather: 70-80s | Contractor: | Subcontr./Supplier:
Equipment Working:
Site Activities / Observations / Contacts / Notes: Arrived on site and spoke with Joe Cravens (Geotechnology) who said that AMS had called off clay placement due to amount of rain recieved yesterday.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-18-12
Geotechnology, Inc. — Date: 7/18/12
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13857

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7/19/12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr. lunch)
Weather: 70-100 | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot Coverage Fill of Geo-Membrane. Spent 30-40 minutes in morning to dress up road onto Fill For trucks. Using D6 to spread fill being hauled in from offsite borrow area. Fill being placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or being ripped or Punctured. Fill placed on Panels: P-29 thru 33, 63 thru 67.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7/19/12
Geotechnology, Inc. — Date: 7/19/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13858

FIELD OBSERVATION REPORT

Representative: Andrew De Clue | Project No.: J098896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-20-12

TIME: Arrive: 6:45 | Depart: 4:30 | Travel: 1.0 | Total: 10.75 (½hr. lunch)
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage Fill over Geo-Membrane. Using D6 to spread clay fill being hauled in from offsite borrow area. Fill being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill placed on Panels: P-32 thru 36, 66 thru 69.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-20-12
Geotechnology, Inc. — Date: 7/20/12
Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 18 Minutes
Tuesday, July 17, 2012

01 PUBLICATION

Publish date:	2012-07-18	Submitted by:	PHZ		
Distribution:	E-mail only	Notes taken by:	PHZ		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-07-17-PM-18		
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL	Column1
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com	
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com	
03	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com	
04	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com	
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com	
06	Mr.	Scott	Boyer	B&T Drainage	217-822-8373	N/A	
07	Mr.	Bret	Brown	Charah	812-454-5603	bbrown@charah.com	
08	Mr.	Scott	Burch	Freitag	812-208-1779	sburch@freitaginc.com	EM-TBD
09	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com	

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-07-17	OPEN - no issues. J. King indicated will be a while before access to MCC is required. None projected for 2x week look ahead.
2012-07-10	OPEN - no issues. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-07-17	OPEN - FWI had 1x at Newton on 07-16. STC had 5x on 07-16.
2012-07-10	OPEN - Freitag to schedule worker at Newton.

04 AMS SAFETY

2012-07-17 [01] J. Tasich on site 07-13. Schedule this week TBD.
[02] R. Porter indicated will pick up signs today for confined space, but further discussion, M. Wagstaff indicated R. Spurgeon [Newton Senior Safety Supervisor] can bring with him when on-site tomorrow [tentatively 10:00 AM CT] for FWI confined space entry review. M. Wagstaff to coordinate the meeting with Mr. Spurgeon.
[03] Relative the confined space entry for the DS, the lids will be removed on 07-17.
[04] B. Muesenfechter inquired about emergency response. S. Burch described details for response [i.e. call 911, he is an EMT, access tripods, 02 monitor 100% of the time, etc...].
[05] B. Muesenfechter inquired about barricade the PCP excavation. R. Porter reported this is dome every day at the end of the day. The barricade consists of either tape and or/berms.
[06] General comment on watching out for traffic as the site is very busy with trucks and the other Ameren contractors on site.

2012-07-10 [01] Safety luncheon today. General topics per Charah/AMS policies as noted below on 07-03 items no. 04, 06, and 06.
[02] AMS to pick up confined space signs.
[03] General safety discussion.
[04] Joko Tasich schedule TBD.

05 HOUSEKEEPING

2012-07-17 OPEN - No issues. M. Wagstaff indicated site is dusty. Traffic level is high [see above] due to truck and Ameren [line] subcontractor.

2012-07-10 OPEN - No issues.

06 PLANT ACCESS - CBT

20120-07-17 No issues.

20120-07-10 OPEN
[01] General discussion - no issues.
[02] R. Porter clarified issue was with the lock and access by G. Musch.

08 OSHA LOG - WORK HOURS

2012-07-17 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-02.
No incidents or accidents.
5,481.00 RT
1,174.00 OT
6,655.00 TOTAL

2012-07-10 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-09.
No incidents or accidents.
4,992.00 RT
1,046.50 OT
6,038.50 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-07-17 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI], and AAA Electric.
[02] Geotechnology [work hours not included in OSHA Log above]
[02] Pipe
[00] Mechanical
[02] Electrical
[00] Cement
[09] Laborers [AMS 2x, BTD 2x, STC 5x]
[04] Operators [AMS 0x, BCI 1x, BTD 3x]
[17] Teamsters [FLT 16x borrow haul trucking, AMS 1x]
[00] Survey
[03] Foreman [Full time] [AMS 2x, BTD 1x]
[39] TOTAL

2012-07-10 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI] on site. Introduction M. Dishman Charah/AMS FOCUS Site Manager.
[02] Geotechnology [work hours not included in OSHA Log above]
[02] Pipe
[00] Mechanical
[00] Electrical
[00] Cement
[04] Laborers [AMS 2x, BTD 2x]
[03] Operators [BCI 1x, BTD 2x]
[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]
[00] Survey
[03] Foreman [AMS 2x - Full time] [BTD 1x]
[30] TOTAL

02 WORK HOURS AND OVERTIME

2012-07-17	OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT - STC, FWI, and BTD.
2012-07-10	OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-07-17	OPEN - no issues.
2012-07-10	OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-07-17	OPEN - no issues. J. Griffith [Fawn Lane Trucking] update
2012-07-10	OPEN - no issues. J. Griffith [Fawn Lane Trucking] partner stroke this week.

02 SUBMITTALS

20120-07-17	[01] J. Cravens indicated will update 06-23 submittal log. [02] M. Wagstaff discussion about accelerated work and time for submittal requirements. Look ahead in Last Planner. [03] Field tile submittal P. Zinsious may have to resubmit. [04] M. Burch hand unit issue, P. Zinsious to review after PM. Baro driver submittal. In progress. [05] P. Zinsious indicated A. Saindon review of CA-6 submittal AASHTO qualification issue. [06] AAA submit lift plan [form subcontractor] for crane for pole installation. [07] AER review of FWI confined space plan in progress. [08] Water removal from DS will by AMS. BTD to provide four plugs. No submittal. [09] M. Wagstaff indicated AAA can submit the aluminum wire and the rest of the EWO as no major changes to design. The 3 Phase size for wire is OK. [10] J. King inquired about electrical hand-hold boxes if now required. M. Wagstaff review. [11] J. King indicated AAA to use link seal to seal conduit penetrations. [12] J. King review of location junction boxes - field locate. Orientation of DS [steps] varies per S. Boyer. [13] J. King indicated AAA provide detectable warning tape. BTD will not required as pipe is deep. [14] S. Burch inquired about DS pump control float elevation and weights. [15] S. Burch indicated only two remote vents located on the drawings. FWI will install remote vents on all at no charge. [16] S. Burch inquired about elevation of stand pipe for 2 IN discharge. [17] S. Burch inquired about elevation of stand pipe for 2 IN discharge. [18] Discussion of conduit and pipe above the GCL area. [19] R. Porter request 20OZ geotextile and RR-3 submittals [by AMS].

02 SUBMITTALS

20120-07-10	Submittal log as published by GEO on 06-23 distributed. [01] Submittal log review, and general conversation of codes. [02] S. Boyer need field tile and submittal to continue. M. Wagstaff indicated that if pipe same as drawings [12 In AASHTO], proceed. P. Zinsious to investigate status of submittal. Sand is same as before FA-1. [03] M. Burch hand unit issue, P. Zinsious to review after PM. Baro driver submittal. [04] AAA to submit same requirements [AER/AMS] for pole subcontractor [Plant Brothers] to AMS. [05] AAA submit lift plan [form subcontractor] for crane for pole installation. [06] AER review of FWI confined space plan in progress. [07] FWI and BTD to review water removal form DS after PM.

08 MATERIAL

01 GENERAL

2012-07-17	CLOSE - City of Robinson will not give the tax COE an extension.
2012-07-10	General discussion City of Robinson not give the tax COE an extension as plant closing is not providing jobs. P. Zinsious indicated no impact to cost at this time, and will keep AER posted.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-07-17	OPEN - Discussion during Progress Meeting: [01] S. Boyer confirmed bedrock should not be an issue for field tile installation. [02] Pipe installation is going well, with no current issues. Discussed sequence [see schedule section].
2012-07-10	OPEN - Discussion during Progress Meeting: [01] S. Boyer indicated that bedrock should not be an issue for field tile installation. Requires submittals [see submittals]. J. cravens indicate elevation delta only about 0.55 FT to date. [02] Pipe installation is going well, with no current issues. Discussed sequence [see schedule section].

10 QUALITY CONTROL

2012-07-17	[01] M .Wagstaff concerned about heat and concrete pours. Subcontractor responsible concrete not to crack. [02] R. Porter indicated subcontractor will get burlap to cover the concrete to keep sun heating even more.
2012-07-10	No issue. A. Saindon indicated that clay samples will be taken on site today for chemical and physical analysis.

11 SCHEDULE REVIEW

2012-07-17	OPEN. Review of last planner by B. Muesenfechter. [02] P. Zinsious reiterated for time being [while subcontractors on look-ahead] to attend the progress meeting. [02] Schedule has improved substantial completion date to 09-24 due to clay placement progress. Quadrants A and C clay placement are now complete. [03] Critical path is the clay placement, but another long path is the work now for AAA, FWI and BTD on the PCP. [04] Last week PCP sequencing was modified. [05] Decision made by the team to keep future weather days the same. [06] LEC will be on site today [07-17] to survey the PCP [for AER], and stake the paved concrete ditch [for AMS]. [07] S. Boyer reports GCL not received. [08] Discussion on close out and commission. M. Wagstaff indicated per Specification 16951. [09] S. Burch indicated FWI will provide book at close out with a test results. [10] P. Zinsious will produce [write] brief commission/close out process. [11] S. Burch indicated hydrostatic test will be in sections, at 100 PSI. FWI also has records of all HDPE welds. [12] M. Wagstaff will produce [write] the system OM.
2012-07-10	OPEN. Review of last planner by B. Muesenfechter. [01] General discussion introduction Last Planner: sequence, remaining duration units [RDU], and constraints. Last Planner provides a look ahead, engages field supervision, fosters team involvement, commitments and accountability. [02] Substantial completion is 09-28. Clay placement progressing early. [03] Progress has improved two weeks in a row. [04] General review and discussion of DS PCP progress.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-07-17	No issues.
2012-07-10	OPEN - M. Wagstaff indicated pay-app no issue.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS REMOVAL

2012-07-17	[01] AMS moving spoils from excavations of west side road [at paved ditch] of pond to Ash Pond A with wheel loader. [02] AMS moving spoils materials [from previous excavation] as "fill-in" continues in progress.
2012-07-10	OPEN - AMS moving spoils materials as "fill-in" continues in progress.

13 EWO-13 Electrical feeder/overhead

2012-07-17	[01] Final plans possibly 07-17. [02] M. Wagstaff indicated no significant changes to plans, minor variations.
2012-07-10	OPEN - Final plans by EOW. M. Wagstaff has approved the EWO.

14 EWO-14 FIELD TILE LOCATION

2012-07-17	Current non-issue. Reference Item No. 09.01-2012-07-17 above
2012-07-10	Non-issue. Reference Item No. 09.01 2012-07 above.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-07-17	[01] Fencing VES and/or alignment options to be reviewed at later date. Currently AER will submit for security review. [02] Electrical submittals under review. [03] Concrete submittals under review. [04] S. Boyer requested review of 4 FT cut at paved ditch outfall. M. Wagstaff to review after PM.
2012-07-10	[01] Fencing VES and/or alignment options. [02] Electrical submittals under review.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT

2012-07-17	[01] Field tile submittal. [02] Baro driver submittal.
2012-07-10	[01] Concrete submittals in progress. P. Zinsious to meet with T. Hunt after PM.

15 PRODUCTION

03 CLAY

2012-07-17	OPEN - FLT has currently 16x trucks. Placement as of 07-16 is 55,605 CY. R. Porter presented sketch M/U.
2012-07-10	OPEN - Trucks are hauling 11 CY. Currently 15x trucks. Placement as of 07-09 is 42,489 CY. R. Porter presented sketch M/U. LEC performed topographic outline survey to check clay placement estimation. AMS calculated [at time of the survey] 3,608 LD at 11 CY/LD = 39,688 CY. LEC survey area measured by 3 FT THK average calculated to 38,143 CY. This is a delta of only 1,545 CY, and the LD haul rate is agreed will continue to be 11 CY per truck.

16 DOCUMENTS TRANSMITTED

2012-07-17	[01] AER - Last Planner schedule dated 07-10 [02] AMS - Critical Path schedule dated 07-12.
2012-07-10	[01] AMS - Last Planner schedule dated 07-06. [02] AMS- Remaining Work schedule dated 07-06. [03] GEO - Submittal Log published 06-23.

17 DOCUMENTS REVIEW ONLY

2012-07-17	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-07-10	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, July 24, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01 S. Tincher	AAA
02 M. Burch	FWI
03 T. Boyer	BTD
04 T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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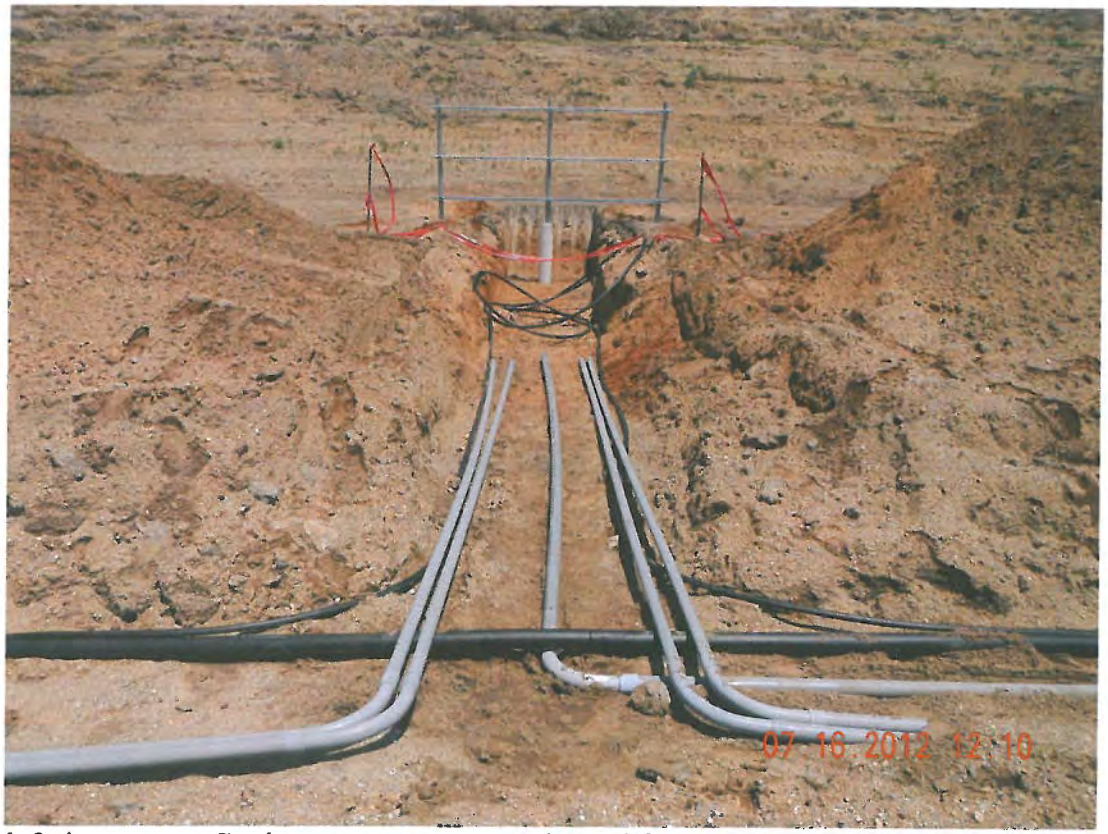
PHOTOGRAPH LOG



Photograph 1 - Grading paved gutter facing north



Photograph 2 - Setting west pump control panel facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 3 - Forming paved gutter facing north



Photograph 4 - PCP-6 compaction facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 5 ⮝ - Clay placement facing west



Photograph 6 ⮝ - Forming paved gutter facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 7 - Pouring paved gutter facing southwest



Photograph 8 - Concrete cylinder samples facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 9 - Pouring paved gutter facing northwest



Photograph 10 - Pouring paved gutter facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 11 - Curing paved gutter facing southeast



Photograph 12 - Curing paved gutter facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 13 ⮝ - DS-4 backfill facing west



Photograph 14 ⮝ - Saw cutting paved gutter facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC



Photograph 15 ⮝ - Overview Ash Pond D facing south



Photograph 16 ⮝ - Overview Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 16 and July 20, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: July 31, 2012

SUBJECT: Weekly Summary Report for July 23, 2012 to July 27, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 72 to 81°F, and temperature highs ranged from 93 to 104°F. Weather delays did not occur this week.

Construction Activities

Groundwater collection system installation, field tile installation, deep well utility locate, collector trench excavation, GCL subgrade preparation, butt fusion welding, sump discharge pipe installation, sump pump assembly and installation, paved gutter construction, and clay placement occurred this week. B&T Drainage continued construction of the groundwater collection system. This included work at dewatering sump DS-1 and DS-2 and perforated collector pipe PCP-3 and PCP-4. This completed the installation of the PCP. Field tile installation continued south of Ash Pond A, deep well utilities were potholed northeast of Ash Pond D, collector trench excavation continued south of Ash Pond B, and the subgrade for the GCL was prepared along PCP-4, PCP-5, PCP-6, and PCP-7. Freitag-Weinhardt, Inc. continued butt fusion welding sump discharge pipes, installed sump discharge pipes in the collector trench, and assembled and installed the sump pumps in DS-1 and DS-2. ST Construction, Inc. completed the concrete work for the paved gutter west of Ash Pond D. Concrete testing (including slump, air entrainment, and cylinders) was performed by Patriot Engineering, Inc. Lamac Engineering Co. surveyed grades for the groundwater collection system, field tile, and surveyed the locations of the deep well utilities. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued clay placement in Quadrant B. Approximately 16 to 18 trucks were used to haul clay material to Ash Pond D. The

vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT 279C Skid Steer
CAT CS-323C Smooth Drum Roller
Bomag BW 172 PDB-2 Roller
John Deere 624H Front End Loader
John Deere 450 LC Excavator
John Deere 410J Backhoe
John Deere 225C LC Excavator
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ameren Energy Resources – Richard Spurgeon
Ash Management Services, LLC (AMS) – Randy Porter, Matt Dishman, Robert Dunkley, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. (LEC) – Jake Lewis
B&T Drainage (BTD) – John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Eric Blankenship, and Abel English
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Lee Ruholl, Patrick Wente, Frank Draper, Jason Byers, and Aaron Gullett
Freitag-Weinhardt, Inc. (FWI) – Scott Burch and Jarrod Barrett
AAA Electric, Inc. (AAA) – None
ST Construction, Inc. (STC) – John Maetin, Jackie Hoover, Gary Hedges, Scott Hilton, and Robert Pressley
Patriot Engineering, Inc. (PEI) – Brandon McDonald
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, July 24, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer, 13 rolls of GSE GundSeal 30 mil Geosynthetic Clay Liner (GCL), Quik-Gel high yield powdered bentonite, IDOT Class SI concrete, and additional 3-inch HDPE sump discharge pipe.

Testing/Sampling

Patriot Engineering, Inc. performed concrete testing, including slump and air entrainment testing. Four concrete cylinders were cast and retrieved for testing. Refer to the concrete testing records for additional information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.



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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14303

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/23/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25hr for lunch)
Weather: Sunny, 77°AM, 103°PM | Contractor: AMS | Subcontr./Supplier: BTD/STC/PEI/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 450LC Excavator, 225CLC Excavator, 624H Front End Loader, BW 172
Site Activities / Observations / Contacts / Notes: Roller, 410J Backhoe, D5G Dozer, Water Truck

AMS:
Began dewatering DS-1 manhole with Thompson Pump for sump pump installation. The cured paved gutter was washed with the Water Truck to prepare for the NP-1 joint sealant application tomorrow. Matt Dishman is currently in Kentucky. Brad Bolenbaugh will be back next week.

BTD:
The excavation, installation, backfill, and compaction of PCP-4 continued. PCP-4 runs at +1.75% grade west towards CO-2. When PCP-4 construction passed the GCL Cap limit (+ Elev. 450) on the SE corner of Ash Pond B, the excavation and installation of the 12" ADS Field Tile was included with the PCP-4 construction. Utilities for the deep wells were potholed with a water vacuum excavation truck on the NE corner of APD where the Paved Ditch outfalls into the river. Abel English performed the potholing. Two power lines and one 8" water line was found, all at a depth of 48". Based on the current Cut of the Paved Ditch in this area, the utilities will become a issue. The CAT 330D Excavator was demobilized, and a Deere 225C LC mobilized.

STC:
The paved gutter on the south end of the box culvert on the west side of Section A was poured, finished, cured, saw cut, formed, and stripped. Batches - 1(8cy) 2(8cy) 3(8cy) totalling 24 cy.

PEI:
Brandon McDonald took 4 cylinders, one Slump - 4¾", one Air - 5%, and the temperature was 79°.

FWI:
Assembled sump pump mechanical: tees, pitless adaptors, couplings, paddlewheels w/saddle, 2" butt fusion welded for manhole exit, 3"-2" HDPE reducers, and stainless steel discharge. Delivery - 1600' of 3" HDPE sump discharge pipe.

FLT/BCI/TSI: Clay Placement - Eastbound Section B. Area = P-36, 37, and 68 to 72. Loads = 245

Additional Comments: AER - Richard Spurgeon (safety super) inspected/evaluated Confined Space Entry for manholes.

Randy Packer — Contractor Representative — AMS — Company
Signature — 7-23-12 — Date
Anna Samdon — Geotechnology, Inc. — 7-30-12 — Date
Engineer's Signature

AAA had no production today.

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14304

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 7/24/12

TIME: Arrive: 6:00 AM Depart: 5:30 PM Travel: 1.0 hr Total: 12.5 hrs (no lunch)
Weather: Partly cloudy, 72°AM, sunny 104° PM Contractor: AMS Subcontr./Supplier: BTD/STC/PEI/FWI/LEC/FLT BCI TSI
Equipment Working: D6N Dozer, 450 LC Excavator, 225C LC Excavator, 624H Front End Loader, BW 172
Site Activities / Observations / Contacts / Notes: Roller, 410J Backhoe, D5G Dozer, Water Truck

AMS:
Finished pumping DS-1 and began pumping DS-2. All other work performed at the CBS.

BTD:
Completed PCP-4 excavation, installation, backfill, and compaction running at +1.75% west towards CO-2. CO-2 was installed and backfilled. The excavation, installation, backfill, and compaction of PCP-3 continued. PCP-3 runs at a -1.0% west from CO-2 towards the kink. 12" ADS Field Tile installation continues. Paved Gutter spoils were graded along the roadway and the 8" lines running into DS-1 were plugged for sump pump installation. Length = 160'.

STC:
Completed pouring, finishing, curing, saw cutting, and stripping the paved gutter south of the box culvert, west side Section A. Contraction joints are 10' and expansion joints are 30'. All joints were sealed with NP-1 joint sealant, completing the paved gutter. One batch - 8 cy.

PEI:
Brandon McDonald took 4 cylinders, one Slump - 3½", one Air - 5%, and the temperature was 83°.

FWI:
Setup tripod confined space entry manhole retrieval system w/harness and remote, four gas air monitor. Field Change: The paddlewheel in DS-1 will be 2' below the pitless adaptor. DS-1 Installation: Sump pump, 2" SS discharge pipe, 2" check valve, off+on+alarm floats, paddlewheel, and pitless adaptor. The 502 divers have not been installed yet.

LEC:
Jake Lewis surveyed the manhole floors, CO-4, PCP-4, Field Tile, and deep well utilities.

FLT/BCI/TSI: Clay Placement - Eastbound Section B.

Additional Comments: ~~Bob Shehorn is no longer cycling.~~
Area = P-37 to 39, 70 to 74. Loads = 255

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
7-24-12 — Date
Anna Sowden — Geotechnology, Inc.
7-30-12 — Date
[signature] — Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14305

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/25/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 81°PM, 104°PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 450LC Excavator, 225C LC Excavator, 624H Front End Loader, BW 172 Roller, 410J Backhoe, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

Completed dewatering DS-2 manhole. All other work performed at the CBS.

BTD:

Completed PCP-3 excavation, installation, backfill, and compaction running at -1.0% west from CO-2 towards the kink southwest of Ash Pond B. This completes the excavation, installation, initial backfill, and compaction of the groundwater collection system. The installation of the 12" ADS field tile continues. The 8" collector lines running into DS-2 were plugged to allow the installation of the sump pump. A CAT 279C Skid Steer and a CAT CS-323C Smooth Drum Roller was mobilized. The GSE GundSeal Geosynthetic Clay Liner (Smooth HDPE 30 mil) was delivered and the roll numbers are as follows:

140132157	140132161	140132165	and 140132169
140132158	140132162	140132166	
140132159	140132163	140132167	13 Rolls Total*
140132160	140132164	140132168	

The GCL was stored in the car shed for weather protection.

FWI:

All manhole core holes for pipe/conduit will receive link seal. A bracket will be installed towards the top of all the manholes for all the float and sensor wires/cables. DS-2 assembly and installation: Sump pump, 2" SS discharge pipe, 2" check value, off + on + alarm floats, paddlewheel flow sensor, and pitless adaptor.

FLT/BCI/TSI: Clay Placement - Eastbound Section B.

Additional Comments: Area = P-39 to P-44 and P-74 to P-78.
Loads = 278

Randy Patel — Contractor Representative — AMS — Company — 7-25-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 7-30-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14306

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/26/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Cloudy, 75°AM, 93° PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 450 LC Excavator, 225C LC Excavator, 624H Front End Loader, CS-323C Roller, 410J Backhoe, D5G Dozer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Added additional silt fence on the east side of the paved gutter and covered GCL with plastic. All other work performed at the CBS. Matt Dishman will be overseeing Duck Creek next week.

BTD:
Continued 12" ADS Field Tile excavation, installation, and backfill heading west from PCP-3 towards the grade inlet manhole southwest of DS-1 along the south property fence line. The field tile is being installed at a 0.05% grade. The collector trench excavation continued from the kink southwest of Ash Pond B, south of APB, to the beginning location of the GCL placement southeast of APB. The GCL subgrade was graded and rolled along PCP-4, PCP-5, PCP-6, and PCP-7 at a depth of approx. 5'. The trench walls were cut back an additional foot for GCL placement. A depression was left around DS-3 and CO-4 for water accumulation in case of a rain event. Steps were installed in the DS-2 manhole base. The Bomag BW 172 Roller was demobilized. Powdered bentonite will be used for all GCL seams.

FWI:
Installed DS-1 and DS-2 sump discharge pipes in collection trench south of Ash Pond B. Continued butt fusion welding 3" HDPE sump discharge pipe. Fused = 800', Laid = 1040'

AAA:
No Production; will return to the site next week.

FLT/BCI/TSI:
Clay Placement - Eastbound Section B. Began constructing a slope diversion berm in Section C. Area = P-74 to P-78 and P-62 to P-63.
Loads = 276

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 7-26-12 — Date
Anna Sandon — Geotechnology, Inc. — 7-30-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14307

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/27/12

TIME: Arrive: 6:00 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 10.25 hrs (0.25 hr for lunch)
Weather: Sunny, 75° AM, 98° PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 450LC Excavator, 225C LC Excavator, 624H Front End Loader, CS-
Site Activities / Observations / Contacts / Notes: 323C Roller, 410J Backhoe, D5G Dozer, Water Truck

AMS:
All work performed at the CBS.

BTD:
Continued the excavation, installation, backfill, and compaction of the 12" ADS Field Tile west from PCP-3, towards the grade inlet manhole southwest of DS-1, along the south property fence line. The field tile is being installed at a 0.05% grade. The manhole tops and lids for DS-1 and DS-2 were reset onto the manholes for safety. GCL will begin next week.

FWI:
Continued staging and butt fusion welding 3" HDPE sump discharge pipes south of Ash Pond D. Threaded end caps and HDPE reducers (3"-2") were welded onto the DS-1 and DS-2 sump discharge pipe manhole entries for Hydrostatic Testing connections. Fittings were prepared for the Water Truck to perform Hydrostatic Testing. Fused = 640' + 10 joints for testing apparatus.

FLT/BCI/TSI:
Clay Placement - Eastbound Section B and slope diversion berms in Section A and Section C.
New Trucks - Aaron Gullett and Lee Ruholl (18 trucks total).
Area = P-63, P-64, and P-78 to P-81.
Loads = 196

Additional Comments:

Randy Potter — Contractor Representative — AMS — Company — 7-27-12 — Date
Signature
Anna Sandon — Geotechnology, Inc. — 7-30-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13859

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 1 Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-23-12

TIME: Arrive: 6:30 | Depart: 5:15 | Travel: 1.0 | Total: 11.75 (½hr lunch
Weather: 70-100s | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 Foot of coverage Fill over GeoMembrane, using D6 to Spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geomembrane from becoming wrinkled and/or being ripped or punctured. Fill placed on panels: P-36, 37, 68 thru 72.

Additional Comments:

Contractor Representative: [signature] | Company: AMS
Signature: [signature] | Date: 7-23-12
Geotechnology, Inc: [signature] | Date: 7/23/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 13860

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-24-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr lunch)
Weather: 80-100's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —

Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or being ripped or punctured. Fill is being placed on Panels: P-37 thru 39, 70 thru 74.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-24-12
Geotechnology, Inc. — Date: 7/24/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14367

FIELD OBSERVATION REPORT

Representative: Andrew DeCline | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: – | Client: Geotechnology | Date: 7/25/12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr. lunch)
Weather: 70-100 | Contractor: AMS | Subcontr./Supplier: –
Equipment Working: –
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot Coverage Fill over Geo-Membrane. Using D6 to place Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being torn or punctured. Fill placed on Panels: P-39 thru 44, 74 thru 78.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-25-12
Geotechnology, Inc. — Date: 7/25/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14368

FIELD OBSERVATION REPORT

Representative: Andrew DeCho | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7-26-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr lunch)
Weather: 80-90 | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot coverage fill over Geo-Membrane. Using D6 to spread fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill being placed on Panels: P-74 thru 78, 62 thru 63.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7-26-12
Geotechnology, Inc. — Date: 7/26/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14369

FIELD OBSERVATION REPORT

Representative: Andrew DeCline | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: ~ | Project Name: Hutsonville Ash Pond 1 Closure
Vehicle: 7 | Zone: ~ | Client: Geotechnology | Date: 7-27-12

TIME: Arrive: 6:30 | Depart: 2:30 | Travel: 1.0 | Total: 9.0
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: ~
Equipment Working: ~
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or being ripped or punctured. Fill being placed on Panels: P-63 thru 64, 78 thru 81.

Additional Comments:

Contractor Representative — Company
Signature — Date 7-27-12
Geotechnology, Inc. — Date 7/27/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 19 Minutes
Tuesday, July 24, 2012

01 PUBLICATION

Publish date:	2012-07-25	Submitted by:	PHZ		
Distribution:	E-mail only	Notes taken by:	PHZ		
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-07-24-PM-19		
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah GL:	4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL	Column1
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com	
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com	
03	Mr.	Bob	Muesenfechter	Ameren	314-681-2287	bmuesenfechter@ameren.com	
04	Mr.	Jimmy	Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com	
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com	
06	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com	

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethyiene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-07-24	OPEN - no issues.
2012-07-17	OPEN - no issues. J. King indicated will be a while before access to MCC is required. None projected for 2x week look ahead.

03 EMPLOYEE DRUG TESTING

2012-07-24	OPEN - no issues
2012-07-17	OPEN - FWI had 1x at Newton on 07-16. STC had 5x on 07-16.

04 AMS SAFETY

2012-07-24

[01] J. Tasich on site 07-25.
[02] R. Porter has signs for confined space.
[03] Site inspection by R. Spurgeon 07-23. E-mail form M. Wagstaff from R. Spurgeon with site visit report.
[04] No issues with traffic as the site is very busy with trucks and the other Ameren contractors on site.

2012-07-17 [01] J. Tasich on site 07-13. Schedule this week TBD.
[02] R. Porter indicated will pick up signs today for confined space, but further discussion, M. Wagstaff indicated R. Spurgeon [Newton Senior Safety Supervisor] can bring with him when on-site tomorrow [tentatively 10:00 AM CT] for FWI confined space entry review. M. Wagstaff to coordinate the meeting with Mr. Spurgeon.
[03] Relative the confined space entry for the DS, the lids will be removed on 07-17.
[04] B. Muesenfechter inquired about emergency response. S. Burch described details for response [i.e. call 911, he is an EMT, access tripods, 02 monitor 100% of the time, etc...].
[05] B. Muesenfechter inquired about barricade the PCP excavation. R. Porter reported this is dome every day at the end of the day. The barricade consists of either tape and or/berms.
[06] General comment on watching out for traffic as the site is very busy with trucks and the other Ameren contractors on site.

05 HOUSEKEEPING

2012-07-24 OPEN - No issues.

2012-07-17 OPEN - No issues. M. Wagstaff indicated site is dusty. Traffic level is high [see above] due to truck and Ameren [line] subcontractor.

06 PLANT ACCESS - CBT

20120-07-24 No issues.

20120-07-17 No issues.

08 OSHA LOG - WORK HOURS

2012-07-24 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-23.
No incidents or accidents.
6,093.00 RT
1,258.50 OT
7,351.50 TOTAL

2012-07-17 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] ~~07-02~~. 07-16.
No incidents or accidents.
5,481.00 RT
1,174.00 OT
6,655.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-07-24 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI], ST Construction [STC], and AAA Electric.
[02] Geotechnology [work hours not included in OSHA Log above]
[02] Pipe
[00] Mechanical
[01] Electrical
[00] Cement
[09] Laborers [AMS 2x, BTD 2x, STC 5x]
[03] Operators [AMS 0x, BCI 1x, BTD 2x]
[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]
[00] Survey
[03] Foreman [Full time] [AMS 2x, BTD 1x]
[36] TOTAL

2012-07-17 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI], and AAA Electric. **Correction for 07-24 added ST Construction [STC]**
[02] Geotechnology [work hours not included in OSHA Log above]
[02] Pipe
[00] Mechanical
[02] Electrical
[00] Cement
[09] Laborers [AMS 2x, BTD 2x, STC 5x]
[04] Operators [AMS 0x, BCI 1x, BTD 3x]
[17] Teamsters [FLT 16x borrow haul trucking, AMS 1x]
[00] Survey
[03] Foreman [Full time] [AMS 2x, BTD 1x]
[39] TOTAL

02 WORK HOURS AND OVERTIME

2012-07-24 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT - STC, FWI, and BTD.

2012-07-17 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT - STC, FWI, and BTD.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-07-24 OPEN - no issues.

2012-07-17 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-07-24	OPEN - no issues.
2012-07-17	OPEN - no issues. J. Griffith [Fawn Lane Trucking] update

02 SUBMITTALS

20120-07-24	Submittal log as published by GEO on 07-21 distributed. [01] Submittal log review, and general conversation. [02] Collector box submittal issue [requires 5 IN holes]. AMS checking on status.
20120-07-17	[01] J. Cravens indicated will update 06-23 submittal log. [02] M. Wagstaff discussion about accelerated work and time for submittal requirements. Look ahead in Last Planner. [03] Field tile submittal P. Zinsious may have to resubmit. [04] M. Burch hand unit issue, P. Zinsious to review after PM. Baro driver submittal. In progress. [05] P. Zinsious indicated A. Saindon review of CA-6 submittal AASHTO qualification issue. [06] AAA submit lift plan [form subcontractor] for crane for pole installation. [07] AER review of FWI confined space plan in progress. [08] Water removal from DS will by AMS. BTD to provide four plugs. No submittal. [09] M. Wagstaff indicated AAA can submit the aluminum wire and the rest of the EWO as no major changes to design. The 3 Phase size for wire is OK. [10] J. King inquired about electrical hand-hold boxes if now required. M. Wagstaff review. [11] J. King indicated AAA to use link seal to seal conduit penetrations. [12] J. King review of location junction boxes - field locate. Orientation of DS [steps] varies per S. Boyer. [13] J. King indicated AAA provide detectable warning tape. BTD will not required as pipe is deep. [14] S. Burch inquired about DS pump control float elevation and weights. [15] S. Burch indicated only two remote vents located on the drawings. FWI will install remote vents on all at no charge. [16] S. Burch inquired about elevation of stand pipe for 2 IN discharge. [17] S. Burch inquired about elevation of stand pipe for 2 IN discharge. [18] Discussion of conduit and pipe above the GCL area. [19] R. Porter request 20OZ geotextile and RR-3 submittals [by AMS].

08 MATERIAL

01 GENERAL

2012-07-24	NEW - listing for materials that have potential to impact schedule. [01] Overhead electrical [EWO-13] wire material [02] Collector box submittal.
2012-07-17	CLOSE - City of Robinson will not give the tax COE an extension.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-07-24	OPEN - Discussion during Progress Meeting: [01] No issues - work progressing well.
2012-07-17	OPEN - Discussion during Progress Meeting: [01] S. Boyer confirmed bedrock should not be an issue for field tile installation. [02] Pipe installation is going well, with no current issues. Discussed sequence [see schedule section].

10 QUALITY CONTROL

2012-07-24	[01] Concrete test breaks 1x in 7D and 2x in 28D. [02] A. Saindon to be onsite in the next 2x WKS for more clay samples.
2012-07-17	[01] M .Wagstaff concerned about heat and concrete pours. Subcontractor responsible concrete not to crack. [02] R. Porter indicated subcontractor will get burlap to cover the concrete to keep sun heating even more.

11 SCHEDULE REVIEW

2012-07-24	OPEN. Review of last planner by B. Muesenfechter. [01] Clay cap driving the schedule progress improvement. [02] Substantial completion date 09-17. [03] Paved ditch work on hold in area where conflict of elevation for water line [ref. 13.1 2012-07-24 Item No. 04]. [04] BTD pot holed the electrical lines and waterline. Lamac took elevation shots. [05] M. Wagstaff, J. Cravens and R. Porter to met with S. Boyer on GCL installation after the progress meeting. [06] M. Wagstaff, J. Cravens and R. Porter to met with FWI on HDPE hydro testing after the progress meeting. [07] J. Cravens reported on PCP progress dates.

	2012-07-17	OPEN. Review of last planner by B. Muesenfechter. [02] P. Zinsious reiterated for time being [while subcontractors on look-ahead] to attend the progress meeting. [02] Schedule has improved substantial completion date to 09-24 due to clay placement progress. Quadrants A and C clay placement are now complete. [03] Critical path is the clay placement, but another long path is the work now for AAA, FWI and BTD on the PCP. [04] Last week PCP sequencing was modified. [05] Decision made by the team to keep future weather days the same. [06] LEC will be on site today [07-17] to survey the PCP [for AER], and stake the paved concrete ditch [for AMS]. [07] S. Boyer reports GCL not received. [08] Discussion on close out and commission. M. Wagstaff indicated per Specification 16951. [09] S. Burch indicated FWI will provide book at close out with a test results. [10] P. Zinsious will produce [write] brief commission/close out process. [11] S. Burch indicated hydrostatic test will be in sections, at 100 PSI. FWI also has records of all HDPE welds. [12] M. Wagstaff will produce [write] the system OM.

12.0 COST AND BUDGET

02	**AMS PAY APPLICATION - CHANGE REQUEST**	
	2012-07-24	No issues.
	2012-07-17	No issues.

12.1 EXTRA WORK ORDERS

11	**EWO-11**	**BUILDING SPOILS REMOVAL**
	2012-07-24	OPEN - AMS continues in progress.
	2012-07-17	[01] AMS moving spoils from excavations of west side road [at paved ditch] of pond to Ash Pond A with wheel loader. [02] AMS moving spoils materials [from previous excavation] as "fill-in" continues in progress.
13	**EWO-13**	**Electrical feeder/overhead**
	2012-07-24	OPEN - J. King question on overhead change from aluminum to copper. AMS to provide cost by EOW.
	2012-07-17	[01] Final plans possibly 07-17. [02] M. Wagstaff indicated no significant changes to plans, minor variations.
14	**EWO-14**	**FIELD TILE LOCATION**
	2012-07-24	No issue.
	2012-07-17	Current non-issue. Reference Item No. 09.01-2012-07-17 above

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-07-24	[01] Fencing VES and/or alignment options M. Wagstaff to check status. [02] Electrical submittals under review. [03] Concrete submittals under review. [04]Lamac shot elevations pipe same elev. as 4 FT cut at paved ditch outfall. M. Wagstaff to review with Hanson reverse flow line.
	2012-07-17	[01] Fencing VES and/or alignment options to be reviewed at later date. Currently AER will submit for security review. [02] Electrical submittals under review. [03] Concrete submittals under review. [04] S. Boyer requested review of 4 FT cut at paved ditch outfall. M. Wagstaff to review after PM.

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT**	
	2012-07-24	[01] Field tile submittal. Done 07-19. [02] Baro driver submittal. Done 07-19.
	2012-07-17	[01] Field tile submittal. [02] Baro driver submittal.

15 PRODUCTION

03	**CLAY**	
	2012-07-24	OPEN - no issues [01] Placement as of 07-23 is 65,549 CY. [02] R. Porter presented sketch M/U. [03] Roads are in good shape.
	2012-07-17	OPEN - FLT has currently 16x trucks. Placement as of 07-16 is 55,605 CY. R. Porter presented sketch M/U.

16 DOCUMENTS TRANSMITTED

2012-07-24	[01] AER - Last Planner schedule dated 07-18.
	[02] AMS- Critical path schedule dated 07-18.
	[03] AMS- Contact list dated 07-20.
	[04] GEO - Submittal Log published 07-21.
2012-07-17	[01] AER - Last Planner schedule dated 07-10
	[02] AMS - Critical Path schedule dated 07-12.

17 DOCUMENTS REVIEW ONLY

2012-07-24	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-07-17	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, July 31, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - Pouring paved gutter facing northwest



Photograph 2 - PCP-4 installation facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC



Photograph 3 - Potholing for deep well utilities facing northeast



Photograph 4 - Dewatering DS-1 facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC



Photograph 5 - Field tile installation facing northwest



Photograph 6 - Confined space entry facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC



Photograph 7 - Paved gutter completion facing southwest



Photograph 8 - DS-1 sump pump assembly installation facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC



Photograph 9 - Clay placement facing southeast



Photograph 10 - DS-2 sump pump assembly installation facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC



Photograph 11 - GCL storage facing east



Photograph 12 - Slope diversion berm construction facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC



Photograph 13 - Overview Ash Pond D facing southeast



Photograph 14 - Overview Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 23 and July 27, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: August 6, 2012

SUBJECT: Weekly Summary Report for July 30, 2012 to August 3, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny and dry. Temperature (°F) lows ranged from 72 to 78°F, and temperature highs ranged from 95 to 101°F. Weather delays did not occur this week.

Construction Activities

Field tile installation, collector trench excavation and backfill, GCL subgrade preparation and installation, power pole utility locate, butt fusion welding, sump discharge pipe and remote vent installation, hydrostatic testing, electrical conduit installation, junction box installation, anchor trench spoil transportation, slope diversion berm construction, and clay placement occurred this week. B&T Drainage continued field tile installation, collector trench excavation and backfill, geosynthetic clay liner (GCL) subgrade preparation and installation along PCP-4, PCP-5, PCP-6, and PCP-7. Potholing occurred at the proposed locations for the power poles for existing utilities. Freitag-Weinhardt, Inc. continued butt fusion welding sump discharge pipes and installed the sump discharge pipes and remote vents in the collector trench. Hydrostatic testing of DS-1 and DS-2 sump discharge pipes occurred. AAA Electric, Inc. installed electrical conduit in the collector trench, electrical junction boxes at DS-1 and DS-2, and the west pump control panel. IDOT FA-01 sand was placed around the electrical conduit prior to backfilling the collector trench. Detectable utility tape was placed 12 to 18-inches below the ground surface above the sump discharge pipes and electrical conduit. Lamac Engineering Co. surveyed the locations of the slope diversion berms and letdown channel in Quadrant A and B. Ash Management Services, Inc. continued transporting anchor trench ash spoils from Ash Pond D to

Ash Pond A. Fawn Lane Transit, Inc. and Belt Construction, Inc. completed clay placement in Quadrant B and began clay placement in Quadrant D. Slope diversion berm construction continued in Quadrant A and B. Approximately 13 to 18 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT 279C Skid Steer
CAT CS-323C Smooth Drum Roller
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Greg Siverly, Jeremy Shorter, Brad Bolenbaugh, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
Lamac Engineering Co. (LEC) – Jake Lewis
B&T Drainage (BTD) – John Boyer, Scott Boyer, Brian Schaefer, Brent Neibauer, Michael Switzer, Eric Blankenship, and Abel English
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Lee Ruholl, Patrick Wente, Frank Draper, Jason Byers, and Aaron Gullett
Freitag-Weinhardt, Inc. (FWI) – Scott Burch and Jarrod Barrett
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, July 31, 2012. Refer to the attached meeting minutes for additional information.

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Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer, IDOT FA-01 sand, electrical NEMA junction boxes, 3-inch HDPE pipe, and 8-inch HDPE pipe were delivered.

Testing/Sampling

The 3-inch HDPE sump discharge pipes for DS-1 and DS-2 were hydrostatic tested in accordance with ASTM F2164. Leaks were not observed in the sump discharge pipes. Refer to Freitag-Weinhardt, Inc.'s test documentation for detailed information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14308

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/30/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 78°AM, 100°PM cloudy | Contractor: AMS | Subcontr./Supplier: BTD/AAA/FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450 LC Excavator, 225C LC Excavator, 624H Front End Loader,
Site Activities / Observations / Contacts / Notes: CS-323C Roller, 410J Backhoe, D5G Dozer, 279C Skid Steer, Water Truck

AMS:
The plant access roads and entrance were cleaned/graded. Continued transporting anchor trench ash spoils from the northwest corner of Ash Pond D to the southeast corner of the geotubes in Ash Pond A. Brad Bolenbaugh is back on site and Matt Dishman is temporarily off site.

BTD:
Final compaction for the GCL subgrade was completed along PCP-4, PCP-5, PCP-6, and PCP-7. The depressions around DS-3 and CO-4 were graded and compacted. The GCL deployment, backfill, grading, and compaction along PCP-4, PCP-5, PCP-6, and PCP-7 has been completed. The GCL has a minimum of 12" overlap along the sides of the trench, and all seams were sealed with powdered bentonite, including the seams around DS-3 + DS-4 manholes and CO-3 + CO-4 cleanouts. 10 GCL rolls were placed and are as follows: 140132157, 140132158, 140132159, 140132163, 140132164, 140132165, 140132166, 140132167, 140132168. BTD recorded the locations of the deployed rolls on S-386, Sheet No. 8. The trench was left open after approx. 2' of backfill was compacted to act as the collector trench for the remote vents, sump discharge pipes, and electrical conduit. The 624H Front End Loader was demobilized.

AAA:
Installed additional 2½" electrical feeder conduit in the collector trench south of APB. Installed additional 2" high/low voltage conduit in collector trench towards DS-1 and DS-2. Installed junction boxes on DS-1 and the conduit drain. Began spacing conduit in collector trench 12" apart.

FWI: Continued butt fusion welding 3" HDPE (L=240') and installed fittings/seals for Hydro Testing.

FLT/BCI/TSI: Clay Placement - East bound Section B. Continued constructing slope diversion berms in Section A and backfilled against paved gutter in Section A. Section B should be finished tomorrow. Area=P-79 to P-86. Loads = 311

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 7-30-12 — Date
Anna Sanda — Geotechnology Inc. — 8-6-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14309

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 7/31/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 13 hrs (no lunch)
Weather: Sunny, 72° AM, 101° PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/AAA/LEC/FLT/BCI/TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, CS-323C Roller, 410J Backhoe,
Site Activities / Observations / Contacts / Notes: D5G Dozer, 279C Skid Steer, Water Truck

AMS:

Continued transporting anchor trench ash spoils from the northwest corner of Ash Pond D to the southeast corner of the geotubes in Ash Pond A. All other work performed at the CBS.

BTD:

The 12" ADS field tile excavation, installation, backfill, and compaction has been completed up to ≈ 20' of the grade inlet manhole south of Ash Pond A, southwest of DS-1. The field tile runs at a -0.05% west to east. The field tile and field tile outfall onto the paved ditch cannot be completed until the collector trench construction is completed south of Ash Pond D. Until the field tile is completed, it will not be tied into the manhole southwest of DS-1. The collector trench excavation has been completed, tying together all the manholes. This excludes the trench towards the power poles for the electric feeder and the trench towards the east pump control panel. The collector trench south of APD is essentially the backfilled/compacted GCL. The HDPE pipes and electrical conduit will be installed on the north side of the trench in this area to be offset from the ℄ of the PCP. They began demobilizing materials. No major work items can continue until FWI and AAA are finished in the collector trench, the new paved ditch design is complete, etc. BTD will only be on site as needed. Breakdown - CAT 450LC Excavator (2 hrs). Delivery - IDOT FA-01 Sand. Demobilized - CAT 225C LC Excavator.

AAA:

Completed spacing the electrical conduit in the collector trench 12" apart south of Ash Pond A. Installed high/low voltage junction boxes on DS-2 and the conduit drain. Hooked up the high/low voltage conduit to the junction boxes on DS-1 and DS-2. Installed additional 2½" electrical feeder conduit in the collector trench south APB + APD.

Additional Comments: Next Page

Randy Packer — Contractor Representative | AMS — Company
Signature | 7-31-12 — Date
Anna Sandon — Geotechnology, Inc. | 8-6-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14310

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 7/31/12

TIME: Arrive: | Depart: | Travel: | Total:
Weather: | Contractor: | Subcontr./Supplier:
Equipment Working:
Site Activities / Observations / Contacts / Notes:

REFER TO PAGE 1

FWI:
Installed additional DS-1 and DS-2 3" HDPE sump discharge pipes in the collector trench south of Ash Pond B and Ash Pond D. Approx. 3100' of HDPE currently in the collector trench. Continued staging and butt fusion welding 3" HDPE sump discharge pipes south of Ash Pond D. DS-1 and DS-2 sump discharge pipes currently run east to DS-3. These two pipes were connected to form a single continuous pipe for Hydro Testing. DS-1 pipe has the water valve and the DS-2 pipe has the air valve. Both sump discharge pipes were filled with water and pressurized to 110 psi. After 15 minutes, the pressure dropped 3 lbs to 107 psi. During the time the pipes were pressurized, there were no visible leaks in any of the butt fusion welded joints. The pressure was released and the connection between DS-1 and DS-2 sump discharge pipes was cut, allowing the water to drain east of DS-3, completing the Hydrostatic Test per ASTM F 2164. The collector trench south of APA and APB can now be backfilled.
LEC:
Jake Lewis surveyed additional slope diversion berms in Section A and Section B, and surveyed the letdown channel/rock chute in Section B. Refer to S-386, Sheet 11, Details 1 and 4.
FLT/BCI/TSI:
Clay Placement - Section B was completed and began placing Eastbound on Section D. Continued constructing slope diversion berms in Section A and backfilled against the paved gutter in Section A.
Area = P-63 to P-66 and P-78 to P-86.
Loads = 311

Additional Comments:

Randy Pucket — Contractor Representative — AMS — Company — 7-31-12 — Date
Signature
Anna Sanders — Geotechnology, Inc. — 8-6-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14311

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 8/1/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 75°AM, 98°PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/AAA/FLT/BCI/TSI
Equipment Working: D6N Dozer, 580 Backhoe, 410J Backhoe, D5G Dozer, CS-323C Roller, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:

Continued transporting anchor trench ash spoils from the northwest corner of Ash Pond D to the southeast corner of the geotubes in Ash Pond A. The collector trench running to the west pump control panel was widened for the 5 runs of electrical conduit to achieve a 12" space between each conduit. Began the excavation for the wrap-around collector trench southeast of Ash Pond B for the 2½" electrical feeder for the west pump control panel to be connected to the overhead electric running along the power poles from the MCC building. All other work at the CBS.

BTD:

Personnel - Brian Schaefer and Michael Switzer. Haunching the electrical conduit with IDOT FA-1 Sand in the collector trench south of Ash Pond A was completed. The collector trench was backfilled, graded, and compacted to approx. 12" to 18" below the ground surface and then the mechanical (water) and electrical detectable tapes were placed within the collector trench over the appropriate piping. After the tape was in place, final backfill of the collector trench south of Ash Pond A began. Approx. 30' of trench was left open for DS-1 and 2, and the panel.

FWI:

Continued installing and butt fusion welding 3" HDPE Sump Discharge Pipes for DS-1, DS-2, and DS-3 in the collector trench south of Ash Pond D. Length Fused = 880'

AAA:

Installed the 2" high/low voltage conduit for DS-1 and DS-2, along with the 2½" electrical feeder conduit, up to the west pump control panel. Installed 2½" electrical feeder conduit and 2" high/low voltage conduit for DS-3 and DS-4 in the collector trench south of Ash Pond D.

FLT/BCI/TSI: Clay Placement - Eastbound Section D.

Additional Comments: Continued constructing slope diversion berms in Sec. A and B. Area = P-63 to P-71. Loads = 306

Randy Pocted — Contractor Representative — AMS — Company
Signature — 8-1-12 — Date
Anna Samedan — Geotechnology, Inc. — 8-6-12 — Date
Engineer's Signature

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No. A 14312

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: -
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: -
Client: Ameren ER
Date: 8/2/12

TIME: Arrive: 6:00 AM Depart: 5:30 PM Travel: 1.0 hr Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 72°AM, 101°PM Contractor: AMS Subcontr./Supplier: BTD/FWI/AAA/FLT/BCI/TSI
Equipment Working: D6N Dozer, 410J Backhoe, D5G Dozer, CS-323C Roller, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
All work performed at the CBS.

BTD:
Completed final backfill and compaction of the collector trench south of Ash Pond A. Haunching the electrical conduit with IDOT FA-1 Sand in the collector trench south of Ash Pond B was completed. Began backfilling, grading, and compacting the collector trench approx. 12" to 18" below the ground surface and began installing the water and electrical detectable tapes in the collector trench over the appropriate piping. Final backfill of the collector trench south of Ash Pond B began. Began grading PCP spoils off of the south embankment of Ash Pond B. Note: The 3" HDPE Sump Discharge Pipes were also haunched with FA-1 sand in some areas due to the rocky backfill. The remaining GCL and other misc. materials were demobilized.

FWI:
The Zoeller sump pumps were delivered with standard 20' electrical cords. These cords are too short to reach the junction box in DS-2, DS-3, DS-4. If the cords were spliced in the field, it would void the pump's warranty. Therefore, the sump pump in DS-2 was taken out, and 3 pumps were sent to the manufacturer to have 35' cords installed. The electrical cords for the floats are also too short and will have to be replaced for DS-2, DS-3, DS-4. Continued installing and butt fusion welding 3" HDPE sump discharge pipes for DS-1, 2, 3, and 4 in the collector trench.

AAA:
Installed additional 2½" electrical feeder conduit in the wrap-around collector trench southeast of APB. Installed stainless steel conduit with PVC coating on the west pump control panel. Installed junction boxes for DS-1 and DS-2 on the west panel.

Additional Comments: FLT/BCI/TSI: Clay Placement - Eastbound Section D. Area = P-63 to 69, P-92 to 94. Loads = 228

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
8-2-12 — Date
Anna Saindon — Geotechnology, Inc.
8-6-12 — Date
[signature] — Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14313

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/3/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 74°AM, 95°PM | Contractor: AMS | Subcontr./Supplier: BTD/FWI/AAA/FLT/BCI/TSI
Equipment Working: D6N Dozer, 410J Backhoe, D5G Dozer, CS-323C Roller, 279C Skid Steer, Water Truck
Site Activities / Observations / Contacts / Notes: AMS: All work performed at the CBS.

BTD:

Personnel- Brian Schaefer, Abel English, John Boyer. Completed grading the PCP Spoils off of the south embankment of Ash Pond B. Began haunching the electrical conduit with IDOT FA-1 Sand in the collector trench south of Ash Pond D. Completed backfilling, grading, and compacting the collector trench approx. 12"-18" below the ground surface and installing the water and electrical detectable tapes in the collector trench over the appropriate piping south of Ash Pond B. Completed final backfill and compaction of the collector trench south of Ash Pond B. Began excavating the wrap-around collector trench southwest of Ash Pond D for the 2½" electrical feeder conduit for the east pump control panel to be connected to the overhead electric at the power pole southeast of Ash Pond B. Installed the conduit in the wrap-around collector trench. Completed potholing approx. 6' deep for existing utilities at the 10 power pole locations for the overhead electric running from the MCC building to southeast of Ash Pond B. A water vacuum excavation truck was utilized for potholing. Refer to E-386, Sheet 1, Rev. D, 7-17-12 for the 10 proposed power pole locations. Added the last 16" precast section on-site to the DS-4 manhole.

FWI:

Continued installing and butt fusion welding 3" HDPE sump discharge pipes for DS-1, DS-2, DS-3, and DS-4 in the collector trench south of Ash Pond D. Installed the DS-1 and DS-2 1" HDPE Remote Vent pipes onto the west pump control panel with vent, mesh caps. Marked DS-3 for coring. Delivery- 8" HDPE pipe and 3" HDPE pipe. Length Fused = 680'

AAA:

Assembled the east pump control panel rack and staged conduit south of Ash Pond D.

FLT/BCI/TSI: Clay Placement- Eastbound Sec. D.

Additional Comments: Area = P-65 to P-71
Loads = 216

Randy Porter — Contractor Representative — AMS — Company — 8-3-12 — Date
Signature
Anna Saunders — Geotechnology, Inc. — 8-6-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14370

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Huntsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7/30/12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½ hr. lunch)
Weather: 60-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 Foot coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in From offsite Borrow Area - Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being punctured or torn. Fill placed on Panels: P-79 thru 86

Additional Comments:

Contractor Representative — Company
Signature — Date 7/30/12
Geotechnology, Inc. — Date 7/30/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14371

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 0370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 7/31/12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 Foot of coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill placed on Panels: P- 63 thru 66 and 78 thru 86.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 7/31/12
Geotechnology, Inc. — Date: 7/31/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14372

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond 0 Closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 8-1-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Feet of coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or being ripped or Punctured. Fill placed on Panels: P-63 thru 71.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 8-1-12
Geotechnology, Inc. — Date: 8/1/12
Engineer's Signature

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No. A 14373

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 237

Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure

Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 8-2-12

TIME: Arrive: 6:45 | Depart: 5:00 | Travel: 1.0 | Total: 11.25 (½hr. lunch)

Weather: 70-90's | Contractor: AMS | Subcontr./Supplier: —

Equipment Working: —

Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot Coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill being placed in such a way to prevent Geo-membrane From becoming wrinkled and or becoming ripped or punctured. Spend First couple hours in morning filling in some low spots on previously Filled area. Fill placed on Panels: P-63 thru 69, 92 thru 94

Additional Comments: —

Contractor Representative — Company AMS

Signature — Date 8-2-12

Geotechnology, Inc. — Date 8-2-12

Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14374

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 8-3-12

TIME: Arrive: 6:45 | Depart: 5:00 | Travel: 1.0 | Total: 11.25 (½ hr
Weather: 70-90s | Contractor: AMS | Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3Foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in From offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or being torn and/or punctured. Fill being placed on panels P-65 thru 71

Additional Comments:

Contractor Representative | Company: AMS
Signature | Date: 8-3-12
Geotechnology, Inc. | Date: 8/3/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 20 Minutes
Tuesday, July 31, 2012

01 PUBLICATION

Publish date:	2012-08-01	Submitted by:	PHZ
Distribution:	E-mail only	Notes taken by:	PHZ
Location:	Hutsonville Power Station	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-07-31-PM-20
AER PO:	567523 R4	AMS-Charah Contract:	00030-01 AMS-Charah GL: 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL	Column1
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com	
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com	
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com	
04	Mr.	John	Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com	
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com	
06	Mr.	Scott	Burch	Freitag	812-208-1779	sburch@freitaginc.com	
07	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com	

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point of Contact
EOD	End of [the] Day	T/M	Time and Materials
EOM	End of [the] month	TBD	To Be Determined
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-07-31	OPEN - no issues.
2012-07-24	OPEN - no issues.

03 EMPLOYEE DRUG TESTING

2012-07-31	OPEN - no issues. FLT 2x on Friday 07-27.
2012-07-24	OPEN - no issues

04 AMS SAFETY

2012-07-31	[01] J. Tasich tentative schedule Wed 08-01 or Thu 08-02. [02] Next scheduled safety luncheon 08-14. [03] Cooling stations are set up, no issues. [04] M. Wagstaff to investigate status [official response] for confined space entry plan submittal.
2012-07-24	[01] J. Tasich on site 07-25. [02] R. Porter has signs for confined space. [03] Site inspection by R. Spurgeon 07-23. E-mail form M. Wagstaff from R. Spurgeon with site visit report. [04] No issues with traffic as the site is very busy with trucks and the other Ameren contractors on site.

05 HOUSEKEEPING

2012-07-31 OPEN - No issues. Watch for blowing paper off of trucks.

2012-07-24 OPEN - No issues.

06 PLANT ACCESS - CBT

20120-07-31 Zinsious badge not operational, M. Wagstaff to investigate.

20120-07-24 No issues.

08 OSHA LOG - WORK HOURS

2012-07-31 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-30.

No incidents or accidents.

6,570.00 RT

1,328.50 OT

7,898.50 TOTAL

2012-07-24 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-23.

No incidents or accidents.

6,093.00 RT

1,258.50 OT

7,351.50 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-07-31 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI], and AAA Electric.

[02] Geotechnology [work hours not included in OSHA Log above]

[02] Lamac Engineering [part time]

[02] Pipe

[00] Mechanical

[02] Electrical

[00] Cement

[04] Laborers [AMS 2x, BTD 2x]

[04] Operators [AMS 1x, BCI 1x, BTD 2x]

[19] Teamsters [FLT 18x borrow haul trucking, AMS 1x]

[00] Survey

[02] Foreman [Full time] [AMS 1x, BTD 1x]

[37] TOTAL

2012-07-24 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI], ST Construction [STC], and AAA Electric.

[02] Geotechnology [work hours not included in OSHA Log above]

[02] Pipe

[00] Mechanical

[01] Electrical

[00] Cement

[09] Laborers [AMS 2x, BTD 2x, STC 5x]

[03] Operators [AMS 0x, BCI 1x, BTD 2x]

[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]

[00] Survey

[03] Foreman [Full time] [AMS 2x, BTD 1x]

[36] TOTAL

02 WORK HOURS AND OVERTIME

2012-07-31 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT.

2012-07-24 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT - STC, FWI, and BTD.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-07-31 OPEN - no issues.

2012-07-24 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-07-31	OPEN - no issues. AAA has inquired if being signatory to NMA is required if subcontractor on site for a day or two. J. Denham briefly defined the NMA agreement with Ameren and clarified that it is required no matter what amount of time a subcontractor is on site.
2012-07-24	OPEN - no issues.

02 SUBMITTALS

20120-07-31	Submittal log as published by GEO on 07-28 distributed. [01] Submittal log review, and general conversation. [02] M. Wagstaff has forwarded collector box submittal to Hanson. BTD to forward hatch details. [03] R. Porter meeting with bated yesterday [07-30] regarding submittals. [04]
20120-07-24	Submittal log as published by GEO on 07-21 distributed. [01] Submittal log review, and general conversation. [02] Collector box submittal issue [requires 5 IN holes]. AMS checking on status.

08 MATERIAL

01 GENERAL

2012-07-31	NEW - listing for materials that have potential to impact schedule. [01] Overhead electrical [EWO-13] wire material has been submitted per P. Zinsious. [02] Collector box submittal has been submitted per P. Zinsious. [03] DS lids option to be submitted per R. Porter, round not large enough for pump to be removed. BTD looking into a lightweight aluminum hatch that can be sealed watertight. [04] S. Burch reports 3x pumps and 3x floats ordered/delivered have cords too short. Team brief conversation on options such a splices. FWI to investigate options. R. Porter and J. Cravens indicated that DS installation elevations are either right at or shallower than plan.
2012-07-24	NEW - listing for materials that have potential to impact schedule. [01] Overhead electrical [EWO-13] wire material [02] Collector box submittal.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-07-31	OPEN - Discussion during Progress Meeting: [01] Work being completed. GCL liner 100% installed. [02] R. Porter inquired about pulling cap off the clean-out, and future pulling on a riser pipe vertically installed as these clean-outs are. Recommended a mechanical joint [MJ] connection with cap. M. Wagstaff agreed. The PCP line now has total 6x clean-outs. [03] Reference EWO-15 for fence discussion.
2012-07-24	OPEN - Discussion during Progress Meeting: [01] No issues - work progressing well.

10 QUALITY CONTROL

2012-07-31	[01] No results form concrete testing returned to dated per J. Cravens. [02] Discussion on CA-6 gravel verses CA-6 stone. AER allow base of gravel with stone cap, but concern on interlocking. AMS to provide all "white" CA-6 stone for the aggregate roadways. J. Cravens to investigate if geotextile required to be tested per CQA plan. [03] M. Wagstaff concerned over the expansion of the HDPE pipe in the heat relative burial and connections. S. Burch indicated burial will be in the morning when pipe is cool. [04] M. Wagstaff inquired about installation of the GCL. J. Cravens indicated installation correct. Back fill is 18 IN to 24 IN over the GCL. No issues with the GCL and possible soil movement, as some overlaps of material about 5 FT. Seams were sealed with the Bentonite powder. Before placement of the GCL, the fill material was smooth-drum rolled. [05] Clay samples not taken this past week.
2012-07-24	[01] Concrete test breaks 1x in 7D and 2x in 28D. [02] A. Saindon to be onsite in the next 2x WKS for more clay samples.

11 SCHEDULE REVIEW

2012-07-31	OPEN. Review of last planner by M. Wagstaff. Major items: [01] GCL 100% [02] Field tile piping 100% [03] Paved gutter 100% [04] Clay Placement Area B 100% [05] Clay Placement Area C 100% [06] DS1 set pump 100% [07] Roadway aggregates submittal [process] 100%
2012-07-24	OPEN. Review of last planner by B. Muesenfechter. [01] Clay cap driving the schedule progress improvement. [02] Substantial completion date 09-17. [03] Paved ditch work on hold in area where conflict of elevation for water line [ref. 13.1 2012-07-24 Item No. 04]. [04] BTD pot holed the electrical lines and waterline. Lamac took elevation shots. [05] M. Wagstaff, J. Cravens and R. Porter to met with S. Boyer on GCL installation after the progress meeting. [06] M. Wagstaff, J. Cravens and R. Porter to met with FWI on HDPE hydro testing after the progress meeting. [07] J. Cravens reported on PCP progress dates.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-07-31	AMS to submit draft pay-app. M. Wagstaff inquired about credit for PVC option [VES]. AMS confirmed inclusion.
2012-07-24	No issues.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS REMOVAL

2012-07-31	OPEN - AMS continues in progress as "fill-in-work" [backhoe was moving materials today - 07-31].
2012-07-24	OPEN - AMS continues in progress.

13 EWO-13 Electrical feeder/overhead

2012-07-31	OPEN - M. Wagstaff, J. King, J. Denham, and P. Zinsious to meet after PM. See below EWO-15 for pole-gate location concern.
2012-07-24	OPEN - J. King question on overhead change from aluminum to copper. AMS to provide cost by EOW.

14 EWO-14 FIELD TILE LOCATION

2012-07-31	CLOSE - work in area and farmer should be done in 2x WKs.
2012-07-24	No issue.

15 EWO-15 FENCE ALIGNMENT

2012-07-31	NEW - AMS to present Value Engineering Submittal [VES-03] for fence alignment along Ash Pond D and adjacent property to Dement-Wampler farmland consisting of reuse of fence fabric, new and relocated gates, and new perimeter fence alignment. M. Wagstaff reported Mr. Duane Holley [AER Engineering] has approved alignment, and Mr. Jim Williams [AER Plant Operations] to review. Discussion of the overhead power pole locations and the proposed gates. J. Cravens has the approximate pole locations marked per plan.

16 EWO-16 AGGREGATE STONE ROADWAY ALIGNMENT

2012-07-31	NEW - AMS to present Value Engineering Submittal [VES-03] for any aggregates stone road alignment.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-07-31	NEW - Paved ditch may be re-aligned due to elevation conflict with existing utilities. Reference Item No. 11-2012-07-24 No. 3 above, and Item No. 13-2012-07-24 No. 04 below. M. Wagstaff reviewing with Hanson, and will walk site after PM. Consideration of installation of drainage pipes across the aggregate roadway.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-07-31	[01] Fencing VES and/or alignment options M. Wagstaff to check status. CLOSE - moved to EWO-15 above. [02] Electrical submittals have been returned, some re-submittals to review. [03] Concrete submittals under review. CLOSE AMS has received. [04] Paved ditch issue, M. Wagstaff to review with Hanson reverse flow line - CLOSE moved to EWO-17 above.
2012-07-24	[01] Fencing VES and/or alignment options M. Wagstaff to check status. [02] Electrical submittals under review. [03] Concrete submittals under review. [04]Lamac shot elevations pipe same elev. as 4 FT cut at paved ditch outfall. M. Wagstaff to review with Hanson reverse flow line.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-07-31	[01] Electrical re-submittals.
2012-07-24	[01] Field tile submittal. Done 07-19.
	[02] Baro driver submittal. Done 07-19.

15 PRODUCTION

03 CLAY

2012-07-31	OPEN - no issues
	[01] Placement as of 07-30 is 80,025 CY [7,275 LD].
	[02] R. Porter presented sketch M/U for review of placement area progress.
2012-07-24	OPEN - no issues
	[01] Placement as of 07-23 is 65,549 CY.
	[02] R. Porter presented sketch M/U.
	[03] Roads are in good shape.

16 DOCUMENTS TRANSMITTED

2012-07-31	[01] AER - Last Planner schedule dated 07-26 [publish date].
	[02] GEO - Submittal Log published 07-28.
2012-07-24	[01] AER - Last Planner schedule dated 07-18.
	[02] AMS- Critical path schedule dated 07-18.
	[03] AMS- Contact list dated 07-20.
	[04] GEO - Submittal Log published 07-21.

17 DOCUMENTS REVIEW ONLY

2012-07-31	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
	[02] S-386 RG M/U for fencing [after main PM].
2012-07-24	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, August 7, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 ⮝ - GCL subgrade compaction facing west



Photograph 2 ⮝ - GCL deployment facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 3 - GCL deployment facing northeast



Photograph 4 - GCL backfill facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 5 ⮝ - GCL backfill facing west



Photograph 6 ⮝ - GCL seaming facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 7 - Backfill against paved gutter facing north



Photograph 8 - DS-1 with junction boxes facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 9 - GCL backfill compaction facing west



Photograph 10 - Slope diversion berm construction facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 11 ⮝ - Clay placement facing east



Photograph 12 ⮝ - Hydrostatic pump test facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 13 - Collector trench overview facing west



Photograph 14 - Sand placement in collector trench facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 15 ⮝ - Detectable utility tape in collector trench facing east



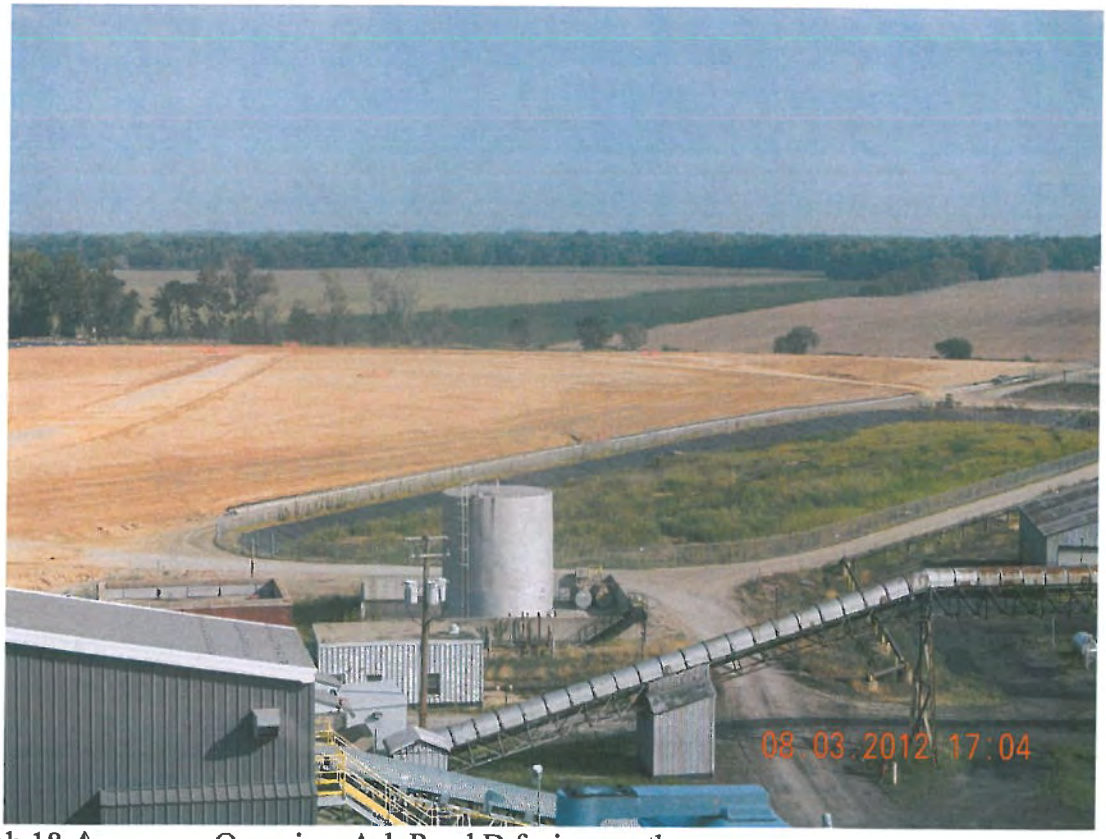
Photograph 16 ⮝ - West pump control panel installation facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC



Photograph 17 ⮝ - Overview Ash Pond D facing south



Photograph 18 ⮝ - Overview Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between July 30 and August 3, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: August 13, 2012

SUBJECT: Weekly Summary Report for August 6, 2012 to August 10, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny with periods of clouds and isolated thunderstorms. Temperature (°F) lows ranged from 65 to 71°F, and temperature highs ranged from 78 to 99°F. A weather delay occurred on August 9, 2012 from a storm event the previous evening.

Construction Activities

Field tile installation, collector trench excavation and backfill, butt fusion welding, sump discharge pipe and remote vent installation, sump pump assembly, hydrostatic testing, electrical conduit installation, junction box installation, east pump control panel installation, anchor trench spoil transportation, fence layout, slope diversion berm construction, and clay placement occurred this week. B&T Drainage completed field tile installation and collector trench excavation, and continued collector trench backfill and grading. The remote vents for cleanouts CO-3 and CO-4 were installed in the collector trench. Freitag-Weinhardt, Inc. completed butt fusion welding and installing sump discharge pipes for dewatering sumps DS-1, DS-2, DS-3, and DS-4. The remote vents for DS-3 and DS-4 were installed in the collector trench, and the sump pumps were assembled for DS-3 and DS-4. Hydrostatic testing of DS-1, DS-2, DS-3, and DS-4 sump discharge pipes occurred. AAA Electric, Inc. installed electrical conduit in the collector trench, electrical junction boxes at DS-3 and DS-4, and the east pump control panel. IDOT FA-01 sand was placed around the electrical conduit prior to backfilling the collector trench. Detectable utility tape was placed 12 to 18-inches below the ground surface above the sump discharge pipes and electrical conduit. Ash Management Services, Inc. completed transportation

of anchor trench ash spoils from Ash Pond D to Ash Pond A, completing EWO-11. Collins and Hermann, Inc. measured the layouts for the new chain link fence gates per EWO-15. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued clay placement in Quadrant D. Slope diversion berm construction continued in Quadrant A and B. Approximately 13 to 16 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT CS-323C Smooth Drum Roller
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Matt Dishman, Robert Dunkley, Greg Siverly, Jeremy Shorter, Brad Bolenbaugh, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
B&T Drainage (BTD) – Brian Schaefer, Michael Switzer, and Michael Dashiell
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Lee Ruholl, Patrick Wente, Frank Draper, Jason Byers, and Aaron Gullett
Freitag-Weinhardt, Inc. (FWI) – Scott Burch and Jarrod Barrett
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
Collins and Hermann, Inc. (CHI) – Jacob Williams
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, August 7, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer, IDOT FA-01 sand, Propex Geotex 861 geotextile, 1-inch HDPE remote vent pipe, and MJ mechanical fitting bolt-on caps were delivered.

Testing/Sampling

The 3-inch HDPE sump discharge pipes for DS-1, DS-2, DS-3, and DS-4 were hydrostatic tested in accordance with ASTM F2164. Leaks were not observed in the sump discharge pipes. Refer to Freitag-Weinhardt, Inc.'s test documentation for detailed information.

Calibration Records

Calibration information was obtained from Freitag-Weinhardt, Inc. for the Ashcroft Gauge used during the hydrostatic test.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14314

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/6/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 71°AM, 94° PM | Contractor: AMS | Subcontr./Supplier: BTD, FWI, AAA, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450 LC Excavator, 410J Backhoe, D5G Dozer,
Site Activities / Observations / Contacts / Notes: CS-323C Roller, Water Truck

AMS:
Continued transporting anchor trench ash spoils from the northwest corner of Ash Pond D to the southeast corner of the geotubes in Ash Pond A. All other work performed at the CBS.

BTD:
Personnel - Brian Schaefer, Michael Switzer, and Michael Dashiell. Continued haunching the electrical conduit with IDOT FA-1 sand in the collector trench south of Ash Pond D. Continued backfilling, grading, and compacting the collector trench approx. 12" to 18" below the ground surface, and installing the water and electrical detectable tapes in the collector trench over the piping south of Ash Pond D. Began final backfill and compaction of collector trench south of Ash Pond D. Began the collector trench excavation east of Ash Pond D. The 450 LC excavator broke down again. The 279C skid steer was demobilized.

FWI:
The DS-3 and DS-4 manholes were cored for the 3" HDPE sump discharge pipes and the 1" HDPE remote vents. Additional pipe was staged in the collector trench.

AAA:
Powr-Fish Pull Line was run through the 2" high and low voltage conduit between the DS-1 and DS-2 junction boxes, and the west pump control panel junction boxes. The DS-3 and DS-4 manholes were cored for the high and low voltage junction boxes and the conduit drain. Installed additional 2" high and low voltage conduit in the collector trench.

FLT/BCI/TSI:
Clay Placement - Eastbound Section D. Continued constructing slope diversion berms in Section A and B. Area = P-68 to 72, P-92 to 94.

Additional Comments: Loads = ~~234~~ 242

Randy Porter — Contractor Representative — AMS — Company — 8-6-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 8/13/12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14315

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 8/7/12

TIME: Arrive: 6:00 AM Depart: 5:45 Travel: 1.0 hr Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 68°AM, 96°PM Contractor: AMS Subcontr./Supplier: BTD, FWI, AAA, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer,
Site Activities / Observations / Contacts / Notes: CS-323C Roller, Water Truck

AMS:
Continued transporting anchor trench ash spoils from the northwest corner of Ash Pond D to the southeast corner of the geotubes in Ash Pond A. All other work performed at the CBS.

BTD:
Continued haunching the electrical conduit with IDOT FA-1 sand in the collector trench south of Ash Pond D. Continued backfilling, grading, and compacting the collector trench approx. 12" to 18" below the ground surface, and installing the utility detectable tapes in the collector trench over the piping south of Ash Pond D. Completed final backfill and compaction of the collector trench up to DS-3. No further collector trench work can continue until additional 3" HDPE sump discharge are hydro tested. Completed the collector trench excavation east of Ash Pond D. Continued the excavation, installation, backfill, and compaction of the 12" ADS field tile south of Ash Pond B and D. Installed a single 12" tee in the field tile southwest of Ash Pond D to tie into Wampler's field tile. Began filling in low spots from the excavations south of Ash Pond A and B.

FWI:
Continued installing and butt fusion welding 3" HDPE sump discharge pipes in the collector trench south and east of Ash Pond D for DS-1, DS-2, DS-3, and DS-4. Installed 2" HDPE fittings + 3"-2" HDPE reducers for DS-3 and DS-4. Prepared fittings for Hydro Test. Fused = 520'.

AAA:
Installed link seals, conduit drains, and junction boxes on DS-3 and DS-4. Installed high and low voltage conduit in the collector trench to the junction boxes. Set the east pump control panel.

FLT/BCI/TSI: Clay Placement - Eastbound Section D.
Area = P-71 to P-75. Loads = 228

Additional Comments: Jacob Williams with Collins and Hermann, Inc. took measurements for the fences and gates.

Randy Doctor
Contractor Representative
AMS
Company
8-7-12
Signature
Date
8/13/12
Geotechnology, Inc.
Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14316

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/8/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.5 hr for lunch)
Weather: Sunny, 67°AM, 95°PM | Contractor: AMS | Subcontr./Supplier: FWI/FLT/BCI/TSI
Equipment Working: D6N Dozer, 580 Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Completed transporting anchor trench ash spoils from the northwest corner of Ash Pond D to the southeast corner of the geotubes in Ash Pond A. This completes EWO-11 Building Spoils Removal. Excavated the collector trench towards the east pump control panel south of Ash Pond D. Cleaned/graded the plant access roads and entrance. All other work at CBS.

FWI:
Completed installing and butt fusion welding the 3" HDPE sump discharge pipes for DS-1, DS-2, DS-3, and DS-4 in the south and east collector trench. Hydrostatic Testing was completed for all four sump discharge HDPE pipes in accordance with ASTM F 2164. This excludes the four 2" HDPE connections at each manhole, and the four 3" HDPE connections at the collector box. These connections will be visually inspected prior to backfill and tested in-service. Hydro Test: All four sump discharge pipes were connected to allow a single hydro test for all four pipes. DS-1 contained the water valve, and DS-2, DS-3, and DS-4 contained bleed values. The value at DS-2 was pressurized and monitored. The pipe system was pressurized to 115 psi and dropped to 112 psi over 10 minutes, passing the test. No leaks in the discharge pipes observed.

Note.: BTD and AAA were not on site today but will return tomorrow.
FLT/BCI/TSI: Clay Placement - Eastbound Section D. Area = 72 to 77, 92 to 94.
Loads = 249

Additional Comments: All cleanouts will receive water-tight, MJ mechanical fittings for the caps.

Randy Koester — Contractor Representative — AMS — Company
Signature — 8-8-12 — Date
Geotechnology, Inc. — 8/13/12 — Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14317

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/9/12

TIME: Arrive: 6:00 AM | Depart: 3:00 PM | Travel: 1.0 hr | Total: 10 hrs (no lunch)
Weather: Cloudy, 66°AM, sunny 99°PM | Contractor: AMS | Subcontr./Supplier: FWI, AAA, BTD
Equipment Working: 450 LC Excavator, D5G Dozer, 410J Backhoe, CS-323C Roller
Site Activities / Observations / Contacts / Notes:

AMS:
Disassembled remaining fence running north to south at the southwest corner of Ash Pond D. The fence posts will be pulled at a later date. The north/south fence line along the west side of Ash Pond D will no longer have to be reconstructed due to the new gates being installed between Bottom Ash Pond/Pond C, Pond C/Pond B, Pond B/south property line. Refer to EWO-15 for fence detail. Delivery: 4 Rolls of Propex Geotex 861 geotextile. Geotex badge numbers - 2022355105, 2022355188, 2022355382, and 2022355388.

FWI:
Installed 1" HDPE Remote Vents for DS-3, DS-4, in the collector trench south of Ash Pond D, installed the seals in the manholes, and ran the remote vents to the east pump control panel. Began threading the stainless steel sump discharge pipes for DS-3 and DS-4.

AAA:
Installed additional 2½" electrical feeder conduit and 2" high/low voltage conduit in the collector trench south of Ash Pond D, and towards the east pump control panel.

BTD:
Completed the excavation, installation, backfill, and compaction of the 12" ADS field tile, excluding the connection to the grade inlet manhole southwest of DS-1. This will be completed after the paved ditch. Completed the excavation of the collector trench. Installed the saddle and compression fitting in CO-3, and installed the 1" HDPE Remote Vent from CO-3 to the east pump control panel. Completed haunching the electrical conduit with IDOT FA-1 sand in the collector trench. Continued placing detectable utility tape in the collector trench, along with backfilling, grading, and compacting. Delivery -

Additional Comments: IDOT FA-1 Sand, 1" HDPE pipe, and MJ mechanical fittings w/caps for cleanouts.

Randy Porter — Contractor Representative — AMS — Company
Signature — 8-9-12 — Date
Anna Saunders — Geotechnology, Inc. — 8-13-12 — Date
Engineer's Signature

No Clay Placement due to the rain the night before.

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14318

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 8/10/12

TIME: Arrive: 6:00 AM Depart: 5:30 PM Travel: 1.0 hr Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 65°AM, cloudy 78°PM Contractor: AMS Subcontr./Supplier: BTD, FWI, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer, CS-323C
Site Activities / Observations / Contacts / Notes: Roller, Water Truck, Kubota L245DT Tractor

AMS:
Cleaned/graded all plant access roads and entrance. All other work performed at CBS.

BTD:
Continued placing detectable utility tape 12"-18" below the ground surface over the 3" HDPE sump discharge pipes and the 1" HDPE remote vents in the collector trench south and east of Ash Pond D. Continued backfilling, grading, and compacting the collector trench south and east of Ash Pond D. Installed the end compression fitting in CO-4, with the saddle, and installed the 1" HDPE remote vent from CO-4 to the top of the embankment on the southeast corner of Ash Pond D. The bollard will be installed at this location when the cleanout bollards are installed. Installed the MJ mechanical fitting bolt-on cap onto CO-3. Reconstructed the anchor trench outlet toe drains (4" ADS) and rip rap pads on the east side of Ash Pond D that were damaged from the collector trench excavation. Began grading the south side of Ash Pond D for the paved ditch survey on Monday.

FWI:
Installed the 1" HDPE remote vents from DS-3 and DS-4 onto the east pump control panel with the 90° fittings and the mesh vent cap. Stubbed off the remote vent from CO-3 and will install the fittings and vent cap at a later date. Assembled the sump pump assemblies for DS-3 and DS-4. This included the threaded stainless steel sump discharge pipes (standpipes), sump pump connection, on/off/alarm floats, paddlewheel flow sensor with saddle, check valve, tee and pitless adaptor, and top caps.

FLT/BCI/TSI: Clay Placement - Eastbound Section D
Area = P-72 to 77, 92 to 94. Loads = 241

Additional Comments: Lamac, ST Construction, and Collins and Hermann to be on site next week.

Randy Porter
Contractor Representative
AMS
Company
Signature
8-10-12
Date
Anna Saindon
Geotechnology, Inc.
8-13-12
Date
Engineer's Signature

AAA had no production.

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14375

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeClue
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond Dclosure
Vehicle: 7
Zone: —
Client: Geotech
Date: 8-6-12

TIME: Arrive: 6:45 Depart: 5:15 Travel: 1.0 Total: 11.5 (½hr. lunch)
Weather: 70-100% Contractor: AMS Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage fill over Geo-Membrane. Using D6 to spread fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or becoming ripped or punctured. Fill is placed on panels: P-68 thru 72, 92 thru 94.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 8-6-12
Geotechnology, Inc. — Date: 8/6/12
Engineer's Signature

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No. A 14376

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J0198896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 8-7-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr. lunch)
Weather: 60-100 | Contractor: AMS | Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill is being placed on Panels: P-71 thru 75.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 8-7-12
Geotechnology, Inc. — Date: 8/7/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14377

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J0198916.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 8-8-12

TIME: Arrive: 6:45 | Depart: 5:00 | Travel: 1.0 | Total: 11.25
Weather: 60-90's | Contractor: AMS | Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage Fill over Geo-Membrane. Using D6 to place Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill placed on Panels: P-72 thru 77, 92 thru 94.

Additional Comments:

Contractor Representative | Company AMS
Signature | Date 8-8-12
Geotechnology Inc. | Date 8/8/12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14378

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2376
Equipment & ID No.: | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 8-10-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.0 (½ hr. lunch)
Weather: 60's - 80's | Contractor: AMS | Subcontr./Supplier: -
Equipment Working:
Site Activities / Observations / Contacts / Notes: Belt construction Continuing to place 3 Foot coverage Fill over Geo-membrane. using D6 to place Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill being placed on Panels: P-72 thru 77, 92 thru 94

Additional Comments:

Contractor Representative | Company: AMS
Signature | Date: 8-10-12
Geotechnology Inc. | Date: 8/10/12
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 21 Minutes
Tuesday, August 7, 2012

01 PUBLICATION

Publish date:	2012-08-08	Submitted by:	PHZ
Distribution:	E-mail only	Notes taken by:	PHZ
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-08-07-PM-21
AER PO:	567523 R4	AMS-Charah Contract:	00030-01 AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Jimmy	Boone	AMS - ARM	502-574-5465	jboone@ashmanagementservices.com
03	Mr.	Matt	Dishman	AMS - Focus	502-287-9163	mdishman@charah.com
04	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr.	Scott	Burch	Freitag	812-208-1779	sburch@freitaginc.com
07	Ms.	Anna	Saindon	Geotechnology	314-997-7440	a_saindon@geotechnology.com
08	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-08-07	OPEN - no issues. AAA does not project need for next 2x WKS.
2012-07-31	OPEN - no issues.

03 EMPLOYEE DRUG TESTING

2012-08-07	OPEN - no issues. No workers tested this period [week].
2012-07-31	OPEN - no issues. FLT 2x on Friday 07-27.

04 AMS SAFETY

2012-08-07	[01] J. Tasich on site 08-05. [02] Safety luncheon o 08-14 postponed to following week 08-21, e-mail will be sent out. [03] AMS has received AER official response for confined space entry plan submittal. [04] Cooling stations are set up, no issues.
2012-07-31	[01] J. Tasich tentative schedule Wed 08-01 or Thu 08-02. [02] Next scheduled safety luncheon 08-14. [03] Cooling stations are set up, no issues. [04] M. Wagstaff to investigate status [official response] for confined space entry plan submittal.

05 HOUSEKEEPING

2012-08-07 OPEN - No issues.

2012-07-31 OPEN - No issues. Watch for blowing paper off of trucks.

06 PLANT ACCESS - CBT

2012-08-07 OPEN - No issues.

2012-07-31 Zinsious badge not operational, M. Wagstaff to investigate.

08 OSHA LOG - WORK HOURS

2012-08-07 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-06.

No incidents or accidents.

7,051.00 RT

1,409.00 OT

8,460.00 TOTAL

2012-07-31 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 07-30.

No incidents or accidents.

6,570.00 RT

1,328.50 OT

7,898.50 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-08-07 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	TBD
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	2	1	1	1	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	FLT	0	0	0	0	14	0	0	0	0
06	FWI	0	0	0	0	0	0	2	0	0
07	GEO	0	2	0	0	0	0	0	0	0
08	LEC	0	0	0	0	0	0	0	0	0
09	Z-1	0	0	0	0	0	0	0	0	0
10	Z-2	0	0	0	0	0	0	0	0	0

Total on site: 29

2012-07-24 AMS, BT Drainage [BTD], Belt Construction [BCI], Freitag [FWI], ST Construction [STC], and AAA Electric.

[02] Geotechnology [work hours not included in OSHA Log above]

[02] Pipe

[00] Mechanical

[01] Electrical

[00] Cement

[09] Laborers [AMS 2x, BTD 2x, STC 5x]

[03] Operators [AMS 0x, BCI 1x, BTD 2x]

[16] Teamsters [FLT 15x borrow haul trucking, AMS 1x]

[00] Survey

[03] Foreman [Full time] [AMS 2x, BTD 1x]

[36] TOTAL

02 WORK HOURS AND OVERTIME

2012-08-07 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT.

2012-07-31 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-08-07 OPEN - no issues.

2012-07-31 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-08-07	OPEN - no issues. AAA subcontractor Plant Brothers AMS review in progress.
2012-07-31	OPEN - no issues. AAA has inquired if being signatory to NMA is required if subcontractor on site for a day or two. J. Denham briefly defined the NMA agreement with Ameren and clarified that it is required no matter what amount of time a subcontractor is on site.

02 SUBMITTALS

20120-08-07	Submittal log as published by GEO on 08-03 distributed. [01] Submittal log review, and general conversation. [02] A. Saindon to have geomembrane warranty reviewed by EOW. [03] J. Cravens reported that testing on the geotextile fabric non-woven will not be required [reference AMS HUT-SUB-023-03]. [04] Collector box submittal review completed - CLOSE [05] Pump and float cord issue resolved by FWI - CLOSE [06] DS hatch [option] researched by R. Porter submitted and resolved. [07] J. King indicated some electrical submittals are critical - P. Zinsious to review.
20120-07-31	Submittal log as published by GEO on 07-28 distributed. [01] Submittal log review, and general conversation. [02] M. Wagstaff has forwarded collector box submittal to Hanson. BTD to forward hatch details. [03] R. Porter meeting with ~~bated~~ BTD yesterday [07-30] regarding submittals.

08 MATERIAL

01 GENERAL

2012-08-07	OPEN - listing for materials that have potential to impact schedule. [01] Overhead electrical [EWO-13] wire material [ref. Item No. 07.02-2012-08-07 No. 07 above].
2012-07-31	NEW - listing for materials that have potential to impact schedule. [01] Overhead electrical [EWO-13] wire material has been submitted per P. Zinsious. [02] Collector box submittal has been submitted per P. Zinsious. [03] DS lids option to be submitted per R. Porter, round not large enough for pump to be removed. BTD looking into a lightweight aluminum hatch that can be sealed watertight. [04] S. Burch reports 3x pumps and 3x floats ordered/delivered have cords too short. Team brief conversation on options such a splices. FWI to investigate options. R. Porter and J. Cravens indicated that DS installation elevations are either right at or shallower than plan.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-08-07	OPEN - Discussion during Progress Meeting: [01] No issues - work progressing well.
2012-07-31	OPEN - Discussion during Progress Meeting: [01] Work being completed. GCL liner 100% installed. [02] R. Porter inquired about pulling cap off the clean-out, and future pulling on a riser pipe vertically installed as these clean-outs are. Recommended a mechanical joint [MJ] connection with cap. M. Wagstaff agreed. The PCP line now has total 6x clean-outs. [03] Reference EWO-15 for fence discussion.

10 QUALITY CONTROL

2012-08-07	[01] No results form concrete testing returned to dated per J. Cravens. [02] J. Cravens reports geotextile is not required to be tested per CQA plan [ref. Item No. 07.02-2012-08-07 No. 03 above] - CLOSE. [03] M. Wagstaff concerned over the expansion of the HDPE pipe in the heat relative burial and connections. S. Burch indicated burial will be in the morning when pipe is cool. S. Burch indicated installation as described, no issues. CLOSE [04] FWI and AAA report no quality issues. [05] A. Saindon took 3x clay samples today [08-70]. Previous samples analysis passed, no issues. These sample test results will take longer as the samples will be subject to a "shake test" [a type of leachate test]. The result will be available in 2x weeks.
2012-07-31	[01] No results form concrete testing returned to dated per J. Cravens. [02] Discussion on CA-6 gravel verses CA-6 stone. AER allow base of gravel with stone cap, but concern on interlocking. AMS to provide all "white" CA-6 stone for the aggregate roadways. J. Cravens to investigate if geotextile required to be tested per CQA plan. [03] M. Wagstaff concerned over the expansion of the HDPE pipe in the heat relative burial and connections. S. Burch indicated burial will be in the morning when pipe is cool. [04] M. Wagstaff inquired about installation of the GCL. J. Cravens indicated installation correct. Back fill is 18 IN to 24 IN over the GCL. No issues with the GCL and possible soil movement, as some overlaps of material about 5 FT. Seams were sealed with the Bentonite powder. Before placement of the GCL, the fill material was smooth-drum rolled. [05] Clay samples not taken this past week.

11 SCHEDULE REVIEW

2012-08-07	OPEN. Review of last planner by P. Zinsious. [01] AID 188 - Clay placement of Section D 30%. [02] AID 237a, 252a, 272a, 294a - DS lid on order [03] AID 206 - Paved ditch work on hold until Hanson information received. [04] AID 255a, 276, 279 - pump and float cord length issue resolved [05] AID 114, 420 - AAA waiting on EWO submittal review [06] AID 191 - APD berms 18% [07] AID EWO 16, EWO 16a - deleted activity as CA-6 stone to be used per plan [see EWO-16]
2012-07-31	OPEN. Review of last planner by M. Wagstaff. Major items: [01] GCL 100% [02] Field tile piping 100% [03] Paved gutter 100% [04] Clay Placement Area B 100% [05] Clay Placement Area C 100% [06] DS1 set pump 100% [07] Roadway aggregates submittal [process] 100%

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-08-07	No issues. AMS submitted pay application this Monday.
2012-07-31	AMS to submit draft pay-app. M. Wagstaff inquired about credit for PVC option [VES]. AMS confirmed inclusion.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS

2012-08-07	OPEN - AMS continues in progress as "fill-in-work", in progress.
2012-07-31	OPEN - AMS continues in progress as "fill-in-work" [backhoe was moving materials today - 07-31].

13 EWO-13 Electrical

2012-08-07	OPEN - AMS has submitted requested B/U information [on Friday 08-03].
2012-07-31	OPEN - M. Wagstaff, J. King, J. Denham, and P. Zinsious to meet after PM. See below EWO-15 for pole-gate location concern.

15 EWO-15 FENCE ALIGNMENT

2012-08-07	OPEN - J. Williams [Illinois representative for CHI] was on site this AM to walk through with R. Porter and price VES. Count on gates: 2x 24 FT and 1x 20 FT. R. Porter recommending guard rail at stilling basin [at culvert between Ash Pond D and Ash Pond C] where fence has been removed, and edge of basin is close to the roadway. CHI currently has a crew on site installing fence around the electrical substation. R. Porter is recommending work to start by EWO, but approval form AER is required.
2012-07-31	NEW - AMS to present Value Engineering Submittal [VES-03] for fence alignment along Ash Pond D and adjacent property to Dement-Wampler farmland consisting of reuse of fence fabric, new and relocated gates, and new perimeter fence alignment. M. Wagstaff reported Mr. Duane Holley [AER Engineering] has approved alignment, and Mr. Jim Williams [AER Plant Operations] to review. Discussion of the overhead power pole locations and the proposed gates. J. Cravens has the approximate pole locations marked per plan.

16 EWO-16 AGGREGATE STONE ROADWAY ALIGNMENT

2012-08-07	CLOSE - AMS to provide CA-6 stone per plans.
2012-07-31	NEW - AMS to present Value Engineering Submittal [VES-03] for any aggregates stone road alignment.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-08-07	OPEN - Hanson to provide elevations. R. Porter has STC on hold until information received.
2012-07-31	NEW - Paved ditch may be re-aligned due to elevation conflict with existing utilities. Reference Item No. 11-2012-07-24 No. 3 above, and Item No. 13-2012-07-24 No. 04 below. M. Wagstaff reviewing with Hanson, and will walk site after PM. Consideration of installation of drainage pipes across the aggregate roadway.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-08-07	[01] Electrical submittals have been returned on 08-03. P. Zinsious to check remainder.
2012-07-31	[01] Fencing VES and/or alignment options M. Wagstaff to check status. CLOSE - moved to EWO-15 above. [02] Electrical submittals have been returned, some re-submittals to review. [03] Concrete submittals under review. CLOSE AMS has received. [04] Paved ditch issue, M. Wagstaff to review with Hanson reverse flow line - CLOSE moved to EWO-17 above.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-08-07	[01] Electrical re-submittals.
2012-07-31	[01] Electrical re-submittals.

15 PRODUCTION

03 CLAY

2012-08-07	OPEN - no issues [01] Placement as of 08-06 is 94,358 CY. [02] R. Porter presented sketch M/U for review of placement area progress - A. Saindon reviewed.
2012-07-31	OPEN - no issues [01] Placement as of 07-30 is 80,025 CY [7,275 LD]. [02] R. Porter presented sketch M/U for review of placement area progress.

16 DOCUMENTS TRANSMITTED

2012-08-07	[01] AER - Last Planner schedule dated 08-02 [publish date]. [02] GEO - Submittal Log published 08-04.
2012-07-31	[01] AER - Last Planner schedule dated 07-26 [publish date]. [02] GEO - Submittal Log published 07-28.

17 DOCUMENTS REVIEW ONLY

2012-08-07	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-07-31	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement [02] S-386 RG M/U for fencing [after main PM].

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, August 14, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 ⮝ - Clay placement facing northwest



Photograph 2 ⮝ - Detectable utility tape in collector trench facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 6 and August 10, 2012

JRC



Photograph 3 - Slope diversion berm construction facing east



Photograph 4 - Collector trench excavation facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 6 and August 10, 2012

JRC



Photograph 5 - Collector trench facing east



Photograph 6 - Bleed valve at DS-2 for hydrostatic testing facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 6 and August 10, 2012

JRC



Photograph 7 - Cleanout remote vent facing east



Photograph 8 - Anchor trench outlet toe drain repairs facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 6 and August 10, 2012

JRC



Photograph 9 ⮝ - Overview Ash Pond D facing southeast



Photograph 10 ⮝ - Overview Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 6 and August 10, 2012

JRC



Photograph 11 - Overview Ash Pond D facing southeast



Photograph 12 - Overview Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 6 and August 10, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: August 20, 2012

SUBJECT: Weekly Summary Report for August 13, 2012 to August 17, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally sunny with periods of clouds and isolated thunderstorms. Temperature (°F) lows ranged from 60 to 68°F, and temperature highs ranged from 79 to 90°F. A weather delay occurred on August 13 and 17, 2012 from storm events.

Construction Activities

Collector trench backfill, surveying, sump pump assembly and installation, butt fusion welding, electric and junction box installation, slope diversion berm construction, paved ditch construction, and clay placement occurred this week. B&T Drainage completed backfilling the collector trench and began grading the paved ditch south of Ash Pond D. Excavation of outfall swales and installation of the geotextile and rip rap occurred. ST Construction, Inc. began forming, pouring, finishing, and curing the paved ditch along the south side of Ash Pond D. Freitag-Weinhardt, Inc. continued installing sump pumps and associated piping. AAA Electric, Inc. installed electric lines in conduits on the west portion of the groundwater collector trench system and junction boxes on the east pump control panel. Lamac Engineering Co. surveyed slope diversion berms and the paved ditch. Massmann Surveying surveyed the 100-foot certification grid for the vegetative cover. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued clay placement in Quadrant D. Slope diversion berm construction continued in Quadrant A and B. Approximately 13 to 16 trucks were used to haul clay material to Ash Pond D. The vegetative cover is being placed in a single three foot lift, and a representative from TSI

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Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT CS-323C Smooth Drum Roller
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Greg Siverly, Jeremy Shorter, Brad Bolenbaugh, Blake Bunting, Eric Sefton, John Denham, and Scott Sewel
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
B&T Drainage (BTD) – Brian Schaefer, Michael Switzer, Michael Dashiell, and John Boyer
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, Alan Ruholl, Lee Ruholl, Patrick Wente, Frank Draper, Frank Walton, Jason Byers, and Aaron Gullett
Freitag-Weinhardt, Inc. (FWI) – Scott Burch and Jarrod Barrett
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
Collins and Hermann, Inc. (CHI) – Jacob Williams
Lamac Engineering Co. (LEC) – Jake Lewis
Massmann Surveying – Rick Koeac
Daylight Land Management (DLM) – John Ziliak
ST Construction, Inc. (STC) – John Maetin, Gary Hedges, Scott Hilton, Robert Pressley, Kenneth Kientzel, and Mark Newlin
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, August 14, 2012. Refer to the attached meeting minutes for additional information.

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Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer, IDOT FA-01 sand, RR-01 rip rap, RR-04 rip rap, Propex Geotex 861 geotextile, IDOT SI 4000 psi concrete, welded wire fabric W1.4xW1.4 reinforcement, fiberboard with Seal Tight Snap-Caps, Right Pointe White Water Wax curing compound, fencing, guardrails, and 502 Baro Diver level sensors were delivered.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14319

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/13/12

TIME: Arrive: 6:00 AM | Depart: 1:45 PM | Travel: 1.0 hr | Total: 8.75 (no lunch)
Weather: Cloudy w/Rain, 68°AM, Cloudy 80°PM | Contractor: AMS | Subcontr./Supplier: ~~None~~ LEC, CHI, DLM
Equipment Working: None.
Site Activities / Observations / Contacts / Notes:

AMS:
The rest of the geotextile was delivered (9 rolls), totaling 13 rolls. Badge Numbers: 2022355 242, 243, 247, 249, 252, 256, 260, 262, 264.
The 502 Baro Diver sensors were delivered for DS-1, DS-2, DS-3, and DS-4.

LEC:
Jake Lewis with Lamac surveyed additional slope diversion berms and the paved ditch.

CHI:
Jacob Williams with Collins and Hermann delivered all the fencing for the new gates.

DLM:
John Ziliak with Daylight Land Management toured the site to prepare for seeding + mulching.

Rain Day - No Production Occured. *

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company — 8-13-12 — Date
Signature
Anna Sawdon — Geotechnology, Inc. — 8-20-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14320

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/14/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.0 hrs (0.5 hr for lunch)
Weather: Cloudy, 68°AM, Sunny 83°PM | Contractor: AMS | Subcontr./Supplier: BTD, FWI, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer,
Site Activities / Observations / Contacts / Notes: CS-323C Roller, 762B Scraper, Water Truck

AMS:
Staked cross-section layouts for slope diversion berms and letdown channels in Section A, B, C, and D. Graded plant access roads, plant entrance, and roadways on the pond cap for the dump trucks. Removed remaining fence posts and fence material from the southwest corner of Ash Pond D to the construction yard.

BTD:
Completed backfilling, grading, and compacting the collector trench south and east of Ash Pond D, excluding the four DS manholes and the proposed location of the collector box. Began grading the paved ditch south of Ash Pond D. The paved ditch will be offset approx. 9.0' to the north on the south side of Ash Pond D to bypass the utilities in the collector trench and to be aligned with the 12" ADS field tile outlet. Installed the MJ mechanical fitting bolt-on caps on CO-1, CO-1A, CO-1B, and CO-2. One more cap needs delivered for CO-4. Note: Only remote vents were installed for CO-3 and CO-4; the west end CO's were vented by drilling two 3/8" holes at the top of the pipe, directly below the MJ caps. Mobilized a John Deere 762B Paddle Wheel Scraper for grading along the south property.

FWI:
Reinstalled the sump pump and floats (on, off, alarm) with the longer cords in DS-2. Installed sump pump and assembly in DS-3 and fused the discharge outlet to the sump discharge pipe. Note: all floats and sump cords enter the high voltage junction box, and all paddlewheel and baro sensors enter the low voltage junction box. Applied seal protectant on the bracket for the three floats in all manholes. Note: Baro divers will be installed last due to being self-weighted, they do not attach to the standpipe, and they cannot be exposed to weather and must be wired immediately.

Additional Comments:

Randy Voltz — Contractor Representative | AMS — Company
Signature | 8-14-12 — Date
Anna Saunders — Geotechnology, Inc. | 8-20-12 — Date
Engineer's Signature

FLT/BCI/TSI: Clay Placement
Area = P-77 to 81. Section D
Loads = 242 Eastbound

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14321

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/15/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 60°AM, 88°PM | Contractor: AMS | Subcontr./Supplier: BTD, FWI, AAA, MMS, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer, 762B
Site Activities / Observations / Contacts / Notes: Scraper, CS-323C Roller, L245DT Tractor, Water Truck

AMS:
Graded plant access roads, plant entrance, and performed housekeeping. All other work at the CBS.

BTD:
Excavated outfall swales to River at the paved ditch outfall section and the rock chute section off the northeast embankment of Ash Pond D. Geotextile was placed in the outfall swales for the rip rap pads (classes B2 and B4). Continued grading the paved ditch south of Ash Pond D. Backfilled around DS-3 and DS-4 manholes. A ≈6' area will be left open at the entry of the sump discharge pipes to inspect the final HDPE welds in-service at the time of commisioning the sump pumps. Delivery - IDOT CA-6 Fill for paved ditch and RR-1 rip rap for outfall swales.

FWI:
Butt fusion welded and installed the 90° fittings for the 1" HDPE remote vent for CO-3 on the east pump control panel and for CO-4 on top of the embankment at the southeast corner of Ash Pond D at the proposed bollard location. Installed the sump pump and assembly in DS-4 and fused the discharge outlet to the sump discharge pipe. Fused the discharge outlets to the sump discharge pipes at DS-1 and DS-2. Work completed until the collector box arrives.

AAA:
Pulled the high voltage electric for the sump pumps and the floats from the alarm control panel on the west pump control panel to the high voltage junction boxes at DS-1 and DS-2. No. 6 wires are used to power the sumps and No. 10 wires are used to power the floats.

MMS:
Rick Koeac with Massmann surveyed the 100' grid for the Ash Pond D clay cap.

FLT/BCI/TSI: BCI cut the southeast embankment corner of Ash Pond D for use as fill for the paved ditch and regraded east embankment.

Additional Comments:

Randy Porter — AMS
Contractor Representative — Company
Signature — 8-15-12 Date
Anna Sawdon — 8-20-12
Geotechnology, Inc. — Date
Engineer's Signature

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Clay Placement - Eastbound Section D
Area = P-77 to 81, and P-92 to 94.
Loads = 195

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14322

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/16/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 66°AM, Cloudy, 90°PM | Contractor: AMS | Subcontr./Supplier: BTD, STC, AAA, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450 LC Excavator, 410J Backhoe, D5G Dozer, 762B
Site Activities / Observations / Contacts / Notes: Scraper, CS-323C Roller, L245DT Tractor, Water Truck

AMS:
Graded Ash Pond D clay cap with a drag blade. All other work performed at the CBS.

BTD:
Continued grading and rolling the paved ditch on the south and east sides of Ash Pond D. Placed rip rap in the outfall swales to river on top of the geotextile at the paved ditch outfall section and the rock chute section off the northeast embankment of Ash Pond D. 6" of RR-01 (class B2) was placed for bedding and 16" of RR-04 (class B4) was placed on top. Refer to S-386, Sheet 9, Detail 3 for outfall swale details. Placed CA-6 fill for the paved ditch bedding south of Ash Pond D. Delivery - RR-01 rip rap, RR-04 rip rap, and CA-6 fill for paved ditch.

STC:
Personnel - John Maetin, Gary Hedges, Scott Hilton, Robert Pressley, Kenneth Kientzel, and Mark Newlin. Began forming, pouring, finishing, and curing the paved ditch south of Ash Pond D. All concrete delivered from R&L Ready Mix Concrete, Inc. Materials - IDOT SI 4000 psi concrete, wire mesh reinforcement, and fiber board with Seal Tight Snap Caps for expansion joints. Right Pointe White Water Wax was used for curing. All concrete has a broom finish. Expansion joints are every 30' and contraction joints are every 10'. Refer to S-386, Sheet 11, Detail 5 for paved ditch details. Two trucks delivered - 1(7cy) and 2(8cy) totaling 15 cy.

AAA:
Installed high and low voltage conduit to the east pump control panel for DS-3 and DS-4. Poured the posts for the east pump control panel and began installing junction boxes on the rack.

FLT/BCI/TSI: BCI continued constructing slope diversion berms in Section A and B, and high spots on APD. Clay Placement - Eastbound Sec. D

Additional Comments: Area = P-78 to 82, and P-90 to 94.
Loads = 249

Randy Poetter — Contractor Representative — AMS — Company — 8-16-12 — Date
Signature
Anna Sandon — Geotechnology, Inc. — 8-20-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14323

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 8/17/12

TIME: Arrive: 6:00 AM | Depart: 11:15 AM | Travel: 1.0 | Total: 6.25 hrs (no lunch)
Weather: Sunny, 65°AM, 79°AM | Contractor: AMS | Subcontr./Supplier: STC
Equipment Working: None
Site Activities / Observations / Contacts / Notes:

STC:
Saw cut contraction joints every 10' (2" depth) in the paved ditch that was poured yesterday.

Misc:
The hydrostatic testing for the HDPE welds at the collector box and the four DS manholes will not be required. These will be visually inspected and in-service tested at commision.

The pipe bollards at the cleanouts and the CO-4 remote vent will now be 7' long with 5' of stickup. The HDPE bollard covers are still required, but the 1" fiberglass stickup pipe with zipties will be omitted. Refer to S-386, Sheet 12, Detail 7 for pipe bollard details.

Angle iron will now be used for valve supports within the collector box.

The stilling basin will be omitted at the box culvert; rip rap will extend down to the box culvert without a rip rap berm. Refer to S-386, Sheet 11, Detail 6 for box culvert details.

The new fence gates and box culvert guard rail were approved. Collins & Hermann delivered the fence and rail materials.

Rain Day: Due to the storm event last night, no production occured today.

Additional Comments: John Denham and Scott Sewell with AMS toured the site.

Randy Foster — Contractor Representative — AMS — Company
Signature — 8-17-12 — Date
Amber Sanders — Geotechnology, Inc. — 8-20-12 — Date
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14384

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond Closure
Vehicle: 7 | Zone: – | Client: Geotechnology | Date: 8/14/12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr lunch)
Weather: 70-80's | Contractor: AMS | Subcontr./Supplier: –
Equipment Working:
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot of coverage Fill over Geo-Membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill placed on Panels P-77 thru 81.

Additional Comments:

Contractor Representative | Company AMS
Signature | Date 8/14/12
Geotechnology Inc. | Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14385

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J0198961.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 8-15-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.0 (½ hr. lunch)
Weather: 80's - 90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-membrane from becoming wrinkled and or becoming ripped or punctured. Fill is being placed on Panels P-77 thru 81, 92 thru 94

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 8/15/12
Geotechnology, Inc. — Date: 8/15/12
Engineer's Signature

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No. A 14386

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Andrew DeChe — Project No.: J019896.01 — Task: 2370

Equipment & ID No.: — — Project Name: Hutsonville Ash Pond D Closure

Vehicle: 7 — Zone: — — Client: Geotechnology — Date: 8-16-12

TIME: Arrive: 6:45 — Depart: 4:45 — Travel: 1.0 — Total: 10.75 (½ hr. lunch)

Weather: 60-90's — Contractor: AMS — Subcontr./Supplier: —

Equipment Working: —

Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot coverage Fill over Geo-Membrane. Using D6 to place Fill being hauled in from offsite borrow Area. Fill being placed in such a way to prevent Geo-Membrane From becoming wrinkled and/or being ripped or punctured. Fill placed on Panels: P-78 thru 82 ; 90 thru 94.

Additional Comments:

Contractor Representative — Company: AMS

Signature — Date: 8-16-12

Geotechnology, Inc. — Date: 8/16/12

Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 22 Minutes
Tuesday, August 14, 2012

01 PUBLICATION

Publish date:	2012-08-16	Submitted by:	PHZ
Distribution:	E-mail only	Notes taken by:	RMP
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-08-14-PM-22
AER PO:	567523 R4	AMS-Charah Contract:	00030-01 AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
02	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
03	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-08-14	OPEN - no issues.
2012-08-07	OPEN - no issues. AAA does not project need for next 2x WKS.

03 EMPLOYEE DRUG TESTING

2012-08-14	OPEN - no issues. Schedule 1x worker for 08-15.
2012-08-07	OPEN - no issues. No workers tested this period [week].

04 AMS SAFETY

2012-08-14	[01] J. Tasich on site 08-12. [02] Next scheduled safety luncheon 08-21 [brauts - bring a side]. [03] Cooling stations are set up, no issues.
2012-08-07	[01] J. Tasich on site 08-05. [02] Safety luncheon o 08-14 postponed to following week 08-21, e-mail will be sent out. [03] AMS has received AER official response for confined space entry plan submittal. [04] Cooling stations are set up, no issues.

05 HOUSEKEEPING

2012-08-14	OPEN - No issues.
2012-08-07	OPEN - No issues.

06 PLANT ACCESS - CBT

2012-08-14 OPEN - No Issues.

2012-08-07 OPEN - No issues.

08 OSHA LOG - WORK HOURS

2012-08-14 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13

No incidents or accidents.

7,343.00 RT

1,461.00 OT

8,804.00 TOTAL

2012-08-07 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-06.

No incidents or accidents.

7,051.00 RT

1,409.00 OT

8,460.00 TOTAL

05 MANPOWER [HEAD COUNT]

01 CREW SIZE

2012-08-14 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	TBD
01	AAA	0	0	0	0	0	0	0	0	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	FLT	0	0	0	0	14	0	0	0	0
06	FWI	0	0	0	0	0	0	2	0	0
07	GEO	0	2	0	0	0	0	0	0	0
08	LEC	0	0	0	0	0	0	0	0	0
09	Z-1	0	0	0	0	0	0	0	0	0
10	Z-2	0	0	0	0	0	0	0	0	0

Total on site: 27

2012-08-07 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	TBD
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	2	1	1	1	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	FLT	0	0	0	0	14	0	0	0	0
06	FWI	0	0	0	0	0	0	2	0	0
07	GEO	0	2	0	0	0	0	0	0	0
08	LEC	0	0	0	0	0	0	0	0	0
09	Z-1	0	0	0	0	0	0	0	0	0
10	Z-2	0	0	0	0	0	0	0	0	0

Total on site: 29

02 WORK HOURS AND OVERTIME

2012-08-14 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT.

2012-08-07 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-08-14 OPEN - no issues.

2012-08-07 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-08-14	OPEN - no issues. AAA subcontractor Plant Brothers AMS review in progress.
2012-08-07	OPEN - no issues. AAA subcontractor Plant Brothers AMS review in progress.

02 SUBMITTALS

20120-08-14	Submittal log was distributed as published by GEO on 08-10. [01] Submittal log review, and general conversation. [02] A. Saindon to have geomembrane warranty reviewed by EOW. OPEN [03] J. Cravens reported that testing on the geotextile fabric non-woven will not be required [reference AMS HUT-SUB-023-03]. OPEN [04] AMS resubmit B3 Rip Rap for letdown chutes and stilling basins. [05] Collector box submittal review completed - CLOSE Reinforcing steel in tops required. [06] DS hatch [option] researched by R. Porter submitted and resolved. Reinforcing steel in tops required. [07] J. King indicated some electrical submittals are critical - P. Zinsious to review. OPEN - In progress with Ameren.
20120-08-07	Submittal log as published by GEO on 08-03 distributed. [01] Submittal log review, and general conversation. [02] A. Saindon to have geomembrane warranty reviewed by EOW. [03] J. Cravens reported that testing on the geotextile fabric non-woven will not be required [reference AMS HUT-SUB-023-03]. [04] Collector box submittal review completed - CLOSE [05] Pump and float cord issue resolved by FWI - CLOSE [06] DS hatch [option] researched by R. Porter submitted and resolved. [07] J. King indicated some electrical submittals are critical - P. Zinsious to review.

08 MATERIAL

01 GENERAL

2012-08-14	OPEN - listing for materials that have potential to impact schedule. [01] R. Porter to receive delivery date for collector box tomorrow [08-16].
2012-08-07	OPEN - listing for materials that have potential to impact schedule. [01] Overhead electrical [EWO-13] wire material [ref. Item No. 07.02-2012-08-07 No. 07 above].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-08-14	OPEN - Discussion during Progress Meeting: [01] Lamac [LEC] staked out for fence on property line [south side of property].
2012-08-07	OPEN - Discussion during Progress Meeting: [01] No issues - work progressing well.

10 QUALITY CONTROL

2012-08-14	[01] Results of 7D [seven day] break passed.
2012-08-07	[01] No results form concrete testing returned to dated per J. Cravens. [02] J. Cravens reports geotextile is not required to be tested per CQA plan [ref. Item No. 07.02-2012-08-07 No. 03 above] - CLOSE. [03] M. Wagstaff concerned over the expansion of the HDPE pipe in the heat relative burial and connections. S. Burch indicated burial will be in the morning when pipe is cool. S. Burch indicated installation as described, no issues. CLOSE [04] FWI and AAA report no quality issues. [05] A. Saindon took 3x clay samples today [08-70]. Previous samples analysis passed, no issues. These sample test results will take longer as the samples will be subject to a "shake test" [a type of leachate test]. The result will be available in 2x weeks.

11 SCHEDULE REVIEW

2012-08-14	OPEN - Review of last planner by M. Wagstaff. Report by R. Porter: [01] 138 Fence work set post & install fence duration 4 days, waiting on start date from sub. [02] 139 Fence work set gates 1 day duration, waiting on start date from sub. [03] 188 Clay placement section –D finish date 8-24-12 used 2 rain days since last meeting. Completion 50%. [04] 191 Earthwork slope diversion berms start date 8-06-12 finish 8-31-12. Completion 18% - no change. [05] 192 Earthwork let down channels start date 8-20-12 finish 8-31-12. [06] 193 Earthwork rock chutes start date 8-22-12 finish 8-31-12. [07] 196 Earthwork finish grade start date 9-04-12 finish 9-07-12. [08] 198 Roadways resurface south perimeter road start date 7-27-12 finish 7-31-12. [09] 198A Roadways resurface interior plant roads start date 8-04-12 finish 8-07-12. [10] 199 Roadways new access road to control panel start date 7-27-12 finish 7-29-12. [11] 206 Concrete paved ditch prep. Started 8-14-12 finish 8-17-12. [12] 207 Concrete paved ditch form and pour start date 8-16-12 finish 8-24-12. [13] 208 Concrete paved ditch strip forms and backfill start date 8-27-12 finish 8-31-12. [14] 210 Ground cover mobilization start date 9-04-12 finish 9-04-12. [15] 211 Ground cover erosion control blanket & reinforced mat start date 9-04-12 finish 9-05-12. [16] 212 Ground cover hydro seed & mulch start date 9-06-12 finish 9-13-12. [17] 317 Install collector box 1 day duration, will receive call from County Materials for delivery date. [18] 370 Install 10 new power poles, waiting for delivery date from AAA.
2012-08-07	OPEN. Review of last planner by P. Zinsious. [01] AID 188 - Clay placement of Section D 30%. [02] AID 237a, 252a, 272a, 294a - DS lid on order [03] AID 206 - Paved ditch work on hold until Hanson information received. [04] AID 255a, 276, 279 - pump and float cord length issue resolved [05] AID 114, 420 - AAA waiting on EWO submittal review [06] AID 191 - APD berms 18% [07] AID EWO 16, EWO 16a - deleted activity as CA-6 stone to be used per plan [see EWO-16]

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-08-14	No issues.
2012-08-07	No issues. AMS submitted pay application this Monday.

12.1 EXTRA WORK ORDERS

11 EWO-11 BUILDING SPOILS

2012-08-14	CLOSE - Work completed.
2012-08-07	OPEN - AMS continues in progress as "fill-in-work", in progress.

13 EWO-13 Electrical

2012-08-14	OPEN - no report.
2012-08-07	OPEN - AMS has submitted requested B/U information [on Friday 08-03].

15 EWO-15 FENCE ALIGNMENT

2012-08-14	OPEN - M. Wagstaff gave verbal approval, will notify P. Zinsious on 08-15.
2012-08-07	OPEN - J. Williams [Illinois representative for CHI] was on site this AM to walk through with R. Porter and price VES. Count on gates: 2x 24 FT and 1x 20 FT. R. Porter recommending guard rail at stilling basin [at culvert between Ash Pond D and Ash Pond C] where fence has been removed, and edge of basin is close to the roadway. CHI currently has a crew on site installing fence around the electrical substation. R. Porter is recommending work to start by EWO, but approval form AER is required.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-08-14	OPEN - Will use CA-6 "gravel" on slopes. M .Wagstaff verbal approval of up to estimated $ 3,000 [approximately 20 loads].
2012-08-07	OPEN - Hanson to provide elevations. R. Porter has STC on hold until information received.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-08-14	[01] Electrical submittals have been returned on 08-03. P. Zinsious to check remainder.
2012-08-07	[01] Electrical submittals have been returned on 08-03. P. Zinsious to check remainder.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-08-14	[01] Electrical re-submittals. CLOSE
	[02] B3 Rip Rap [ref. Item No. 07.02-2012-08-14 No. 04 above]
2012-08-07	[01] Electrical re-submittals.

15 PRODUCTION

03 CLAY

2012-08-14	OPEN - no issues
	[01] Placement as of 08-13 is 102,300 CY.
	[02] R. Porter presented sketch M/U for review of placement area progress.
2012-08-07	OPEN - no issues
	[01] Placement as of 08-06 is 94,358 CY.
	[02] R. Porter presented sketch M/U for review of placement area progress - A. Saindon reviewed.

16 DOCUMENTS TRANSMITTED

2012-08-14	[01] AER - Last Planner schedule dated 08-07 [data date].
	[02] GEO - Submittal Log published 08-10.
2012-08-07	[01] AER - Last Planner schedule dated 08-02 [publish date].
	[02] GEO - Submittal Log published 08-04.

17 DOCUMENTS REVIEW ONLY

2012-08-14	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-08-07	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, August 21, 2012 at Hutsonville [safety luncheon]

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Collector trench backfill facing northeast



Photograph 2 - DS-2 sump pump installation facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 13 and August 17, 2012

JRC

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Photograph 3 - Confined space entry at DS-2 manhole facing northeast



Photograph 4 - Collector trench backfill facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 13 and August 17, 2012

JRC



Photograph 5 - Staking slope diversion berms and letdown channels facing north



Photograph 6 - Clay placement Quadrant D facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 13 and August 17, 2012

JRC



Photograph 7 - Electric for sumps and floats facing northwest



Photograph 8 - Grading Ash Pond D cap facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 13 and August 17, 2012

JRC



Photograph 9 - Paved ditch construction facing east



Photograph 10 - Paved ditch construction facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 13 and August 17, 2012

JRC



Photograph 11 - Paved ditch construction facing northwest



Photograph 12 - Overview Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 13 and August 17, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: August 31, 2012

SUBJECT: Weekly Summary Report for August 20, 2012 to August 24, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally clear and sunny with periods of cloudy skies. Temperature (°F) lows ranged from 55 to 66°F, and temperature highs ranged from 80 to 96°F. Weather delays did not occur this week.

Construction Activities

The following activities occurred this week: rock chute and letdown channel construction, paved ditch construction, outfall swale construction, field tile installation, collector box installation and piping, pipe bollard installation, electrical and pump control panel installation, subgrade preparation for gravel surfacing, slope diversion berm construction, and clay placement. Ash Management Services, LLC installed rock chutes with geotextile and rip rap, and began constructing letdown channels. B&T Drainage continued grading the paved ditch, placing fill for the paved ditch bedding, and backfilling against the paved ditch. Additional rip rap was placed in the outfall swales to the river. The new field tile was connected to the existing manhole south of Ash Pond A, completing the field tile installation. The collector box was installed adjacent to the existing outfall manhole on the northeast corner of Ash Pond D, and the outlet drainage pipe from the collector box to the manhole was installed. Freitag-Weinhardt, Inc. installed the sump discharge pipes and ball valves inside the collector box. ST Construction, Inc. continued paved ditch concrete construction along the south side of Ash Pond D. Concrete testing, including slump, air entrainment, and cast cylinders, was performed by Patriot Engineering, Inc. The pipe bollards were installed beside the groundwater collection system cleanouts. AAA Electric, Inc.

installed electrical lines in the conduit for the east portion of the groundwater collection system. Junction boxes and conduit were installed on the west and east pump control panels, and the ground rods were installed for both panels. Fawn Lane Transit, Inc. and Belt Construction, Inc. placed soil in Quadrant D for the vegetative cover. Subgrade preparation for the new roadways and gravel surfacing began. Slope diversion berm construction continued in Quadrant C and D. Approximately 12 to 16 trucks were used to haul clay material to Ash Pond D. The vegetative cover was placed in a single three foot lift, and a representative from TSI Engineering, Inc. observed quality control for the clay placement procedure. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT CS-323C Smooth Drum Roller
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
John Deere 410J Backhoe
John Deere 4020 Tractor
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
TSI Engineering, Inc. – Andrew DeClue
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Greg Siverly, Jeremy Shorter, Brad Bolenbaugh, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
B&T Drainage (BTD) – Brian Schaefer, Michael Switzer, and Michael Dashiell
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Lee Ruholl, Patrick Wente, Frank Draper, Jason Byers, and Aaron Gullett
Freitag-Weinhardt, Inc. (FWI) – Scott Burch and Jarrod Barrett
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
ST Construction, Inc. (STC) – John Maetin, Gary Hedges, Scott Hilton, Robert Pressley, Kenneth Kientzel, and Mark Newlin
Patriot Engineering, Inc. (PEI) – Thad Simpson
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

J019896.01

The weekly progress meeting was held on Tuesday, August 21, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

Clay for the vegetative layer, IDOT CA-6 fill, RR-03 rip rap, RR-04 rip rap, IDOT SI 4000 psi concrete, fiberboard with Seal Tight Snap-Caps, Octocrete non-shrink grout, pipe bollards, bollard covers, and the precast collector box were delivered.

Testing/Sampling

Patriot Engineering, Inc. performed concrete testing for the paved ditch, including slump and air entrainment testing. Four concrete cylinders were cast and retrieved each day for testing. Refer to the concrete testing records for additional information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer


for

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14324

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/20/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 58° AM, Cloudy 80° PM | Contractor: AMS | Subcontr./Supplier: BTD, STC, PEI, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer, 762B
Site Activities / Observations / Contacts / Notes: Scraper, CS-323C Roller, L245 DT Tractor, Water Truck

AMS:
Graded plant access roads and put up silt fence around the paved ditch south of Ash Pond D.

BTD:
Continued grading and rolling the subgrade for the paved ditch south and east of Ash Pond D. Placed additional rip rap in the outfall swales to river at the paved ditch outfall section and the rock chute section off the northeast embankment of Ash Pond D. Placed CA-6 fill for the paved ditch bedding south of Ash Pond D. Began backfilling against the paved ditch south of Ash Pond D. Backfilled around DS-1 and DS-2 manholes, and around the west and east pump control panels. Delivery - CA-6 fill, RR-04 riprap (B4), and the collector box.

STC:
Continued forming, stripping, pouring, finishing, and curing the paved ditch south of Ash Pond D. Expansion joints were placed every 30'. Three trucks delivered - 1(8cy), 2(8cy), 3(8cy) = 24cy

PEI:
Thad Simpson performed concrete testing for the paved ditch. 75°, 4 cylinders cast, and slump = 3". The air entrainment testing apparatus is currently being repaired. Refer to the project CQA Plan for sampling/testing details. Test tolerances are being field approved.

FLT/BCI/TSI:
BCI backfilled against the paved gutter west of Section C. Additional clay fill was placed on the southwest side of Section C to compensate the shallow, relocated 18" HDPE drainage pipe. Began grading the subgrade for the new gravel road running to the east pump control panel south of Section C. Graded the south embankment of Ash Pond D.

Clay Placement - Eastbound Section D.
Additional Comments: Area = P81 to 84, and P-89.
Loads = 284

Randy Porter — Contractor Representative
AMS — Company
Signature
8-20-12 — Date
Geotechnology, Inc. — Company
Engineer's Signature
Date

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14379

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/21/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 55° AM, Sunny 86° PM | Contractor: AMS | Subcontr./Supplier: BTD, STC, PEI, FWI, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450 LC Excavator, 410J Backhoe, D5G Dozer, 762B
Site Activities / Observations / Contacts / Notes: Scraper, CS-323C Roller, L245DT Tractor, Water Truck

AMS:
Excavated 6'x6' pad and slopes for the stilling basin at the invert of the existing 2'x5' box culvert on the west side of Ash Pond D. Placed 8 oz. geotextile and RR-03 rip rap (Class B3) onto the excavated pad and slopes up to the box culvert. Delivery - RR-03 rip rap.

BTD:
Continued grading and rolling the subgrade for the paved ditch east of Ash Pond D. Continued placing CA-6 fill for the paved ditch bedding south of Ash Pond D. Excavated and installed the collector box northeast of Ash Pond D, south of the existing outfall manhole. Installed the 8" HDPE drainage pipe from the collector box to the outfall manhole. The collector box exit and the manhole entry received a concrete collar. The inside of the collector box and manhole will receive non-shrink grout.

STC:
Continued forming, stripping, pouring, finishing, curing, and saw cutting the paved ditch south of Ash Pond D. Three trucks delivered - 1(8cy) + 2(8cy) + 3(8cy) = 24 cy

PEI:
Thad Simpson performed concrete testing for the paved ditch. 78°, 4 cylinders cast, Air = 4.2%, and Slump = 2". A rain event occurred from 8:00 AM to 8:45 AM and, therefore, the first concrete truck's pour was delayed. Per ACI 305.1-06, the concrete mixing in the truck had passed its time limit. This also caused the 2" slump. Therefore, the pouring from the first truck was ceased and the remaining concrete was disposed of.

FWI: Butt fusion welded and installed the 3" HDPE ball valves for DS-1, DS-2, DS-3, and DS-4 in the collector box. Angle iron was installed as supports for the valves. Electrofusion couplers were omitted in the box.

Additional Comments:

Contractor Representative: Randy Parker | Company: AMS
Signature: Randy Parker | Date: 8-21-12
Geotechnology, Inc. | Date
Engineer's Signature

FLT/BCI/TSI: Clay Placement D Area = P-81 to 84. Loads = 201

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14380

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 8/22/12

TIME: Arrive: 6:00 AM Depart: 5:30 PM Travel: 1.0 hr Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 55° AM, 91° PM Contractor: AMS Subcontr./Supplier: BTD, STC, PEI, AAA, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer, 762B Scraper,
Site Activities / Observations / Contacts / Notes: CS-323C Roller, L245DT Tractor, 4020 Tractor, Water Truck

AMS:
Excavated the rock chute to the outfall swale to river off the northeast embankment of Ash Pond D. Placed 8 oz. geotextile and RR-03 rip rap into the rock chute. Note - the letdown channel Section C-C at the bottom of the rock chute will be omitted and the rock chute will extend down to the beginning of the outfall swale. Note - the stilling basins at the bottom of the rock chutes will be omitted and all chute containment berms will be 1.0' in height. The rock chute slopes will be as-built to match the current Ash Pond D embankment slopes. Silt fence was placed around the rip rap and the containment berms will be built at a later date.

BTD:
Continued grading the subgrade for the paved ditch east of Ash Pond D. Continued placing CA-6 fill for the paved ditch bedding south of Ash Pond D. Backfilled against the paved ditch and the collector box. Excavated for field tile installation south of Ash Pond A. Drilled holes for pipe bollards beside all the cleanouts and the remote vent for CO-4. Poured concrete collar for 8" HDPE drainage pipe inside existing outfall manhole. Sealed sump discharge pipes and 8" HDPE drainage pipe with Octocrete non-shrink grout inside the collector box northeast of Ash Pond D. Delivery - CA-6 fill, 7 pipe bollards, and Octocrete non-shrink grout

STC:
Continued paved ditch concrete construction south of Ash Pond D. Set and poured the pipe bollards beside the cleanouts. Three trucks delivered - 1(8cy) + 2(8cy) + 3(8cy) = 24 cy

PEI:
Tested concrete for the paved ditch - Temp = 75°, Air = 4.5%, Slump = 3", and 4 cylinders cast.

AAA: Installed junction boxes on the east pump control panel and pulled measurements for the electric feeder from MCC to east and west PCS.

Additional Comments:

Contractor Representative: [signature] Company: AMS
Signature: [signature] Date: 8-22-12
Geotechnology, Inc. Date
Engineer's Signature: [signature]

FLT/BCI/TSI - Clay Placement D
Area = P-85 to 87. Loads = 247
Mobilize - John Deere 4020 Tractor

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14381

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/23/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 58°AM, 93°PM | Contractor: AMS | Subcontr./Supplier: BTD, STC, PEI, AAA, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer, 762B
Site Activities / Observations / Contacts / Notes: Scraper, CS-323C Roller, L245DT Tractor, Water Truck

AMS:
Constructed an additional rock chute to the box culvert riprap swale on the west side of Ash Pond D extending from the slope diversion berms. RR-03 riprap and 8 oz. geotextile were used in the rock chute. Graded the Ash Pond D cap with a drag blade. Delivery – RR03 riprap.

BTD:
Broke a entry hole into the existing grade inlet manhole southwest of DS-1 for the field tile. The new entry will contain the 12" ADS field tile and an existing 6" ADS field tile coming from the southern field. Note - the 6" ADS tile was plugged with soil. Both field tiles were installed and received a concrete collar in the grade inlet manhole. This completed the field tile work items. Backfilled against the grade inlet manhole, DS-1, west pump control panel, and paved ditch. Placed CA-6 fill for the paved ditch bedding. Delivery - CA-6 fill. Demobilized - John Deere 4020 tractor.

STC:
Continued paved ditch concrete construction south of Ash Pond D. Three trucks delivered - 24 cy.

PEI:
Tested concrete for the paved ditch - Temp = 73°, Air = 4.7%, Slump = 3¾", and 4 cylinders cast.

AAA:
Pulled the high voltage electric lines for the sump pump and floats from the pump junction box on the east pump control panel to the high voltage junction box on DS-4. Installed ¾" SS conduit for the paddle wheel flow sensor and 1¼" SS conduit for the Diver level sensor onto the east pump control panel. Note - Herculine is used for all conduit length measurements.

FLT/BCI/TSI: An air bubble developed in the southeast corner of Section D towards clay placement completion. The embankment adjacent to the

Additional Comments: side of the anchor trench was excavated to release the air. Clay placement will continue tomorrow.

Randy Parker — Contractor Representative — AMS — Company
Signature — 8-23-12 — Date
Geotechnology, Inc. — Date
Engineer's Signature

Constructed slope diversion berms in Section C.
Clay Placement - Area = P-85 to P-87.
Loads = 242

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14382

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/24/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Sunny, 66°AM, 96°PM | Contractor: AMS | Subcontr./Supplier: BTD, STC, PEI, AAA, FLT, BCI, TSI
Equipment Working: D6N Dozer, 580 Backhoe, 450LC Excavator, 410J Backhoe, D5G Dozer, 762B
Site Activities / Observations / Contacts / Notes: Scraper, CS-323C Scraper, L245DT Tractor, Water Truck

AMS:
Began constructing letdown channel containment berms on the south side of Ash Pond D. Installed silt fence around the additional rock chute for the box culvert outfall swale on the west side of Ash Pond D. Backfilled against the paved ditch with outfall swale and rock chute spoils.

BTD:
Installed MJ mechanical fitting bolt-on cap on CO-4. Prepared bedding for cleanout and pipe bollard slabs. Note- the concrete slabs will now be SOG (slab-on-grade). Refer to S-386, Sheet 12, Details 5, 6, and 7 for cleanout/pipe bollard details. Placed CA-6 fill for bedding for the paved ditch. Backfilled against the paved ditch. Continued grading and rolling the paved ditch on the east side of Ash Pond D. Installed Foamular 250 moisture-resistant XPS insulation over the existing deep well utilities in the location of the paved ditch on the northeast side of Ash Pond D. Demobilized - CAT D5G Dozer.

STC:
Continued paved ditch concrete construction south of Ash Pond D. Four trucks delivered - 32 cy.

PEI:
Tested concrete for the paved ditch - Temp= 73°, *Air = 3.8%, 5.6%, Slump = (before 25 cy) 3", (after 25 cy) 3¼", and 4 cylinders cast. *Due to the low air content from the first load, the second load was tested and had acceptable results; concrete pouring resumed.

AAA: Installed ¾" SS conduit for the flow sensors and 1¼" SS conduit for the level sensors on the west pump control panel, as well as back panels and receptacle boxes. Installed ground rod and exothermic (cad) welded the ground cable to the ground rod at the west pump control panel.

FLT/BCI/TSI: Finished day placement in Section D,

Additional Comments: completing the vegetative cover. Slope diversion berm construction in Sections C and D.

Contractor Representative — Company
Signature — Date 8-24-12
Geotechnology, Inc. — Date
Engineer's Signature

Graded the subgrade for gravel roadways along the south property line and to the east pump control panel south Section C.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14387

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2375
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 0 Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 8-20-12

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.0 (½hr. lunch)
Weather: 60-80's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Feet of Coverage Fill over Geo-Membrane, using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or being ripped or punctured. Fill placed on Panels: P-81 thru 84 and 89.

Additional Comments:

Contractor Representative — Company: AMS
Signature — Date: 8-20-12
Geotechnology, Inc. — Date: 8/20/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14388

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J01989601 | Task: 3370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond 1 Closure
Vehicle: 7 | Zone: – | Client: Geotechnology | Date: 8-21-12

TIME: Arrive: 6:30 | Depart: 5:15 | Travel: 1.0 | Total: 11.25 (½hr. lunch)
Weather: 60-90's | Contractor: AMS | Subcontr./Supplier: –
Equipment Working: –

Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 foot of Coverage Fill over Geo-Membrane, using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-Membrane from becoming wrinkled and/or becoming ripped or punctured. Fill placed on Panels: P-81 thru 84.

Additional Comments:

Contractor Representative: [signature] | Company: AMS
Signature: [signature] | Date: 8/21/12
Geotechnology, Inc.: [signature] | Date: 8/21/12
Engineer's Signature: [signature]

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14389

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J015896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 0 Closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 8-21-12 22

TIME: Arrive: 6:45 | Depart: 5:15 | Travel: 1.0 | Total: 11.5 (½hr lunch)
Weather: 60-90's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt construction continuing to place 3 Foot of Coverage Fill over Geo membrane. Using D6 to place Fill being hauled in From offsite borrow area. Fill is being placed in such a way to prevent Geo-membrane From becoming wrinkled and or being torn or punctured. Fill being placed on Panels: P-85 thru 87.

Additional Comments:

Contractor Representative — Company AMS 22
Signature — Date 8-21-12
Geotechnology Inc. — Date 8/22/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14390

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D closure
Vehicle: 7 | Zone: - | Client: Geotechnology | Date: 8-23-12

TIME: Arrive: 6:45 | Depart: 3:30 | Travel: 1.0 | Total: 9.75
Weather: 60-80's | Contractor: AMS | Subcontr./Supplier: -
Equipment Working: -
Site Activities / Observations / Contacts / Notes: Belt Construction continuing to place 3 Foot of coverage Fill over Geo-membrane. Using D6 to spread Fill being hauled in from offsite borrow area. Fill is being placed in such a way to prevent Geo-membrane from becoming wrinkled and/or becoming punctured or torn. Fill Placed on Panels: P-85 then 87.

Additional Comments:

Contractor Representative | Company: AMS
Signature | Date: 8-23-12
Geotechnology Inc. | Date: 8/23/12
Engineer's Signature

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14391

FIELD OBSERVATION REPORT

Representative: Andrew DeClue | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond 0 closure
Vehicle: 7 | Zone: — | Client: Geotechnology | Date: 8-24-12

TIME: Arrive: 6:30 | Depart: 11:00 | Travel: 1.0 | Total: 5.5
Weather: 70's | Contractor: AMS | Subcontr./Supplier: —
Equipment Working: —
Site Activities / Observations / Contacts / Notes: Belt Construction Finishing placing 3 foot coverage Fill over Geo-Membrane. Fill placed on Panels: P-86 thru 87.

Additional Comments: —

Andrew DeClue — Contractor Representative — AMS — Company
Signature — 8-24-12 — Date
Geotechnology Inc. — 8/24/12 — Date
Engineer's Signature

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MEETING MINUTES

AMS
Ash Management Services

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 23 Minutes
Tuesday, August 21, 2012

01 PUBLICATION

Publish date:	2012-08-27	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-08-21-PM-23	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
04	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr.	Joko	Tasich	Charah	502-649-7633	jtasich@charah.com
06	Mr.	Mike	Burch	Freitag	812-208-1771	mburch@freitaginc.com
07	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-08-21	OPEN - no issues. AAA project need for WPA next 2x WKS - 08-31. AMS and AAA to coordinate LOTO. M. Wagstaff to coordinate AER with Mr. Steve Bruner. Confirmation of WPA next Tuesday [08-21].
2012-08-14	OPEN - no issues.

03 EMPLOYEE DRUG TESTING

2012-08-21	OPEN - no issues. Plant Brothers workers to be tested this period [week].
2012-08-14	OPEN - no issues. Schedule 1x worker for 08-15.

04 AMS SAFETY

2012-08-21 [01] J. Tasich on site 08-21. Provided overview, safety reports:
- [01] PPE and safety processes look good - no issues.
- [02] Spotters [laborers] are rotating - no issues.
- [03] No confined space entry this look-ahead.

[02] M. Wagstaff brief discussion regarding connection to Ash Pond C [pump station] WPA/LOTO. To be further discussed 08-21.
[03] Plant Brothers to received site-specific safety training next week.
[04] M. Wagstaff inquired about pump [control] panels. J. King to LOTO.
[05 Brief discussion regarding final connection and testing of the DS pumps. M. Wagstaff concern about final discharge through the collector box until approval of discharge permit by IEPA. M. Wagstaff required the valves LOTO. FWI and R. Porter to coordinate.

2012-08-14 [01] J. Tasich on site 08-12.
[02] Next scheduled safety luncheon 08-21 [brauts - bring a side].
[03] Cooling stations are set up, no issues.

05 HOUSEKEEPING

2012-08-21 OPEN - No issues.
2012-08-14 OPEN - No issues.

06 PLANT ACCESS - CBT

2012-08-21 OPEN - No issues.
2012-08-14 OPEN - No issues.

08 OSHA LOG - WORK HOURS

2012-08-21 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-20.
No incidents or accidents.
7,771.00 RT
1,523.00 OT
9,294.00 TOTAL

2012-08-14 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13
No incidents or accidents.
7,343.00 RT
1,461.00 OT
8,804.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-08-21 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	TBD
01	AAA	0	0	0	0	0	0	0	1	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	FLT	0	0	0	0	14	0	0	0	0
06	FWI	0	0	0	0	0	0	2	0	0
07	GEO	0	2	0	0	0	0	0	0	0
08	LEC	0	0	0	0	0	0	0	0	0
09	STC	0	0	0	0	0	6	0	0	0
10	Z-2	0	0	0	0	0	0	0	0	0

Total on site: 34

2012-08-14 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	TBD
01	AAA	0	0	0	0	0	0	0	0	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	FLT	0	0	0	0	14	0	0	0	0
06	FWI	0	0	0	0	0	0	2	0	0
07	GEO	0	2	0	0	0	0	0	0	0
08	LEC	0	0	0	0	0	0	0	0	0
09	Z-1	0	0	0	0	0	0	0	0	0
10	Z-2	0	0	0	0	0	0	0	0	0

Total on site: 27

02 WORK HOURS AND OVERTIME

2012-08-21 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT. Labor Day holiday 09-03 - no work.
2012-08-14 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-08-21 OPEN - no issues.
2012-08-14 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-08-21	OPEN - no issues. P. Zinsious to track FWI CO.
2012-08-14	OPEN - no issues. AAA subcontractor Plant Brothers AMS review in progress.

02 SUBMITTALS

20120-08-21	Submittal log was distributed as published by GEO on 08-18. [01] Submittal log review, and general conversation. [02] A. Saindon to have geomembrane warranty reviewed by EOW. CLOSE [03] J. Cravens reported that testing on the geotextile fabric non-woven will not be required [reference AMS HUT-SUB-023-03]. CLOSE [04] AMS resubmit B3 Rip Rap for letdown chutes and stilling basins. CLOSE [05] DS hatch [option] researched by R. Porter submitted and resolved. Reinforcing steel in tops required. M. Wagstaff done. CLOSE [06] Wire insulation discussion previous to PM with M. Wagstaff, J. King, and P. Zinsious. [07] General discussion on manuals for close-out: [01] M. Wagstaff requirement 1x copy digital and 1x copy hard bound [02] J. Cravens collected manuals from FWI for Omega and Zoeller, transmitted to P. Zinsious. [08] General discussion on record drawings for close out: [01] Schematics for panels to be included. [02] M. Wagstaff indicated that Lamac will probably do record drawings in AutoCAD. [03] AMS to provide 1x copy to AER, who will forward to LEC.
20120-08-14	Submittal log was distributed as published by GEO on 08-10. [01] Submittal log review, and general conversation. [02] A. Saindon to have geomembrane warranty reviewed by EOW. OPEN [03] J. Cravens reported that testing on the geotextile fabric non-woven will not be required [reference AMS HUT-SUB-023-03]. OPEN [04] AMS resubmit B3 Rip Rap for letdown chutes and stilling basins. [05] Collector box submittal review completed - CLOSE Reinforcing steel in tops required. [06] DS hatch [option] researched by R. Porter submitted and resolved. Reinforcing steel in tops required. [07] J. King indicated some electrical submittals are critical - P. Zinsious to review. OPEN - In progress with Ameren.

08 MATERIAL

01 GENERAL

2012-08-21	OPEN - listing for materials that have potential to impact schedule. [01] M. Burch reports Omega sensor to be ordered. [02] General discussion of Baro sensor to be in separate panel box. P. Zinsious recommended FWI research with vendor if placed is electrical panel would other signals/inductance create and issue. [03] Collector box holes for the DS lines are too small for Link-Seal. R. Porter recommended using non-shrink grout as used in other area of the projection man holes. P. Zinsious indicated the exterior could be also coated in a mastic to help seal the penetrations. M. Wagstaff indicated that the box still remains in the flood plain, even with the revised elevations and is to be sealed.
2012-08-14	OPEN - listing for materials that have potential to impact schedule. [01] R. Porter to receive delivery date for collector box tomorrow [08-16].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-08-21	OPEN - Discussion during Progress Meeting: [01] Lamac [LEC] staked out for fence on property line [south side of property]. CLOSE [02] R. Porter reported that Wampler has requested that [field drain] line be plugged. This line is off site, and not part of the scope of work, and is an issue with the agreement between AER and Wampler. M. Wagstaff to investigate.
2012-08-14	OPEN - Discussion during Progress Meeting: [01] Lamac [LEC] staked out for fence on property line [south side of property].

10 QUALITY CONTROL

2012-08-21	[01] No results form concrete testing returned. P. Zinsious to check with STC. [02] J. Cravens reports recent concrete pour slump was about 2 IN. Pour was held up due to rain, and truck walt time exceeded. Therefore approximately 2 CY wasted. [03] HDPE [field tile] no issues. [04] DS-3 ring height issues due to re-grade of the paved concrete ditch. J. king indicated drilling 2x more holes.
2012-08-14	[01] Results of 7D [seven day] break passed.

11 SCHEDULE REVIEW

2012-08-21	OPEN - Review of last planner by M. Wagstaff. [01] Rain day on 08-17. [02] Major changes commentary: [01] Not on LP - AID 199 S = 08-27, D = 2 [01] Not on LP - AID 198 S = 08-27, D = 4 [01] Not on LP - AID 198a S = 09-04, D = 3 [03] Add AID 119a "Install fence and gate" S = 08-27, D = 4 [04] Mark-up on LP, submitted to AER for change.
2012-08-14	OPEN - Review of last planner by M. Wagstaff. Report by R. Porter: [01] 138 Fence work set post & install fence duration 4 days, waiting on start date from sub. [02] 139 Fence work set gates 1 day duration, waiting on start date from sub. [03] 188 Clay placement section –D finish date 8-24-12 used 2 rain days since last meeting. Completion 50%. [04] 191 Earthwork slope diversion berms start date 8-06-12 finish 8-31-12. Completion 18% - no change. [05] 192 Earthwork let down channels start date 8-20-12 finish 8-31-12. [06] 193 Earthwork rock chutes start date 8-22-12 finish 8-31-12. [07] 196 Earthwork finish grade start date 9-04-12 finish 9-07-12. [08] 198 Roadways resurface south perimeter road start date 7-27-12 finish 7-31-12. [09] 198A Roadways resurface interior plant roads start date 8-04-12 finish 8-07-12. [10] 199 Roadways new access road to control panel start date 7-27-12 finish 7-29-12. [11] 206 Concrete paved ditch prep. Started 8-14-12 finish 8-17-12. [12] 207 Concrete paved ditch form and pour start date 8-16-12 finish 8-24-12. [13] 208 Concrete paved ditch strip forms and backfill start date 8-27-12 finish 8-31-12. [14] 210 Ground cover mobilization start date 9-04-12 finish 9-04-12. [15] 211 Ground cover erosion control blanket & reinforced mat start date 9-04-12 finish 9-05-12. [16] 212 Ground cover hydro seed & mulch start date 9-06-12 finish 9-13-12. [17] 317 Install collector box 1 day duration, will receive call from County Materials for delivery date. [18] 370 Install 10 new power poles, waiting for delivery date from AAA.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-08-21	No issues.
2012-08-14	No issues.

12.1 EXTRA WORK ORDERS

13 EWO-13 Electrical

2012-08-21	CLOSE
2012-08-14	OPEN - no report.

15 EWO-15 FENCE ALIGNMENT

2012-08-21	OPEN - AMS to provide back-up information.
2012-08-14	OPEN - M. Wagstaff gave verbal approval, will notify P. Zinsious on 08-15.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-08-21	OPEN - In progress.
2012-08-14	OPEN - Will use CA-6 "gravel" on slopes. M .Wagstaff verbal approval of up to estimated $ 3,000 [approximately 20 loads].

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-08-21	[01] Electrical submittals have been returned on 08-03. P. Zinsious to check remainder. CLOSE
2012-08-14	[01] Electrical submittals have been returned on 08-03. P. Zinsious to check remainder.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-02-21	[01] B3 Rip Rap [ref. Item No. 07.02-2012-08-14 No. 04 above] CLOSE
2012-08-14	[01] Electrical re-submittals. CLOSE [02] B3 Rip Rap [ref. Item No. 07.02-2012-08-14 No. 04 above]

15 PRODUCTION

03 CLAY

2012-08-21	OPEN - no issues [01] Placement as of 08-20 is 112,970 CY. [02] R. Porter presented sketch M/U for review of placement area progress.
2012-08-14	OPEN - no issues [01] Placement as of 08-13 is 102,300 CY. [02] R. Porter presented sketch M/U for review of placement area progress.

16 DOCUMENTS TRANSMITTED

2012-08-21	[01] AER - Last Planner schedule dated 08-14 [data date]. [02] GEO - Submittal Log published 08-18.
2012-08-14	[01] AER - Last Planner schedule dated 08-07 [data date]. [02] GEO - Submittal Log published 08-10.

17 DOCUMENTS REVIEW ONLY

2012-08-21	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-08-14	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, August 28, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Construction of the outfall swale to the river facing north.



Photograph 2 - Grading for the paved ditch facing northeast.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC



Photograph 3 - Typical finishing for the paved ditch facing east.



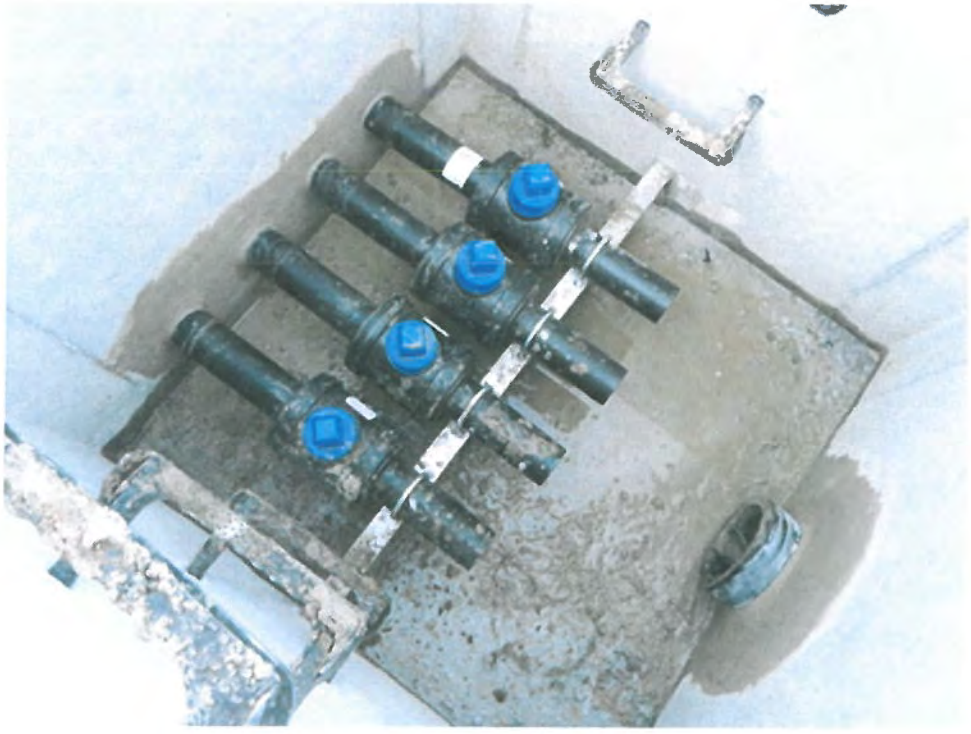
Photograph 4 - Placing IDOT CA-6 bedding for the paved ditch facing east.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC



Photograph 5 - Collector box precast installation facing east.



Photograph 6 - Collector box piping installation facing southwest.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC



Photograph 7 - Rock chute construction facing south.



Photograph 8 - Field tile installation facing northwest.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC



Photograph 9 - Completing clay placement facing northeast.



Photograph 10 - Slope diversion berm construction facing east.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC



Photograph 11 - Forming the paved ditch facing east.



Photograph 12 - Overview of Ash Pond D facing southeast.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC



Photograph 13 - Overview of Ash Pond D facing east.

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 20 and August 24, 2012.

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: September 6, 2012

SUBJECT: Weekly Summary Report for August 27, 2012 to August 31, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally clear and sunny with periods of cloudy skies. Temperature (°F) lows ranged from 64 to 76°F, and temperature highs ranged from 88 to 96°F. Weather delays occurred on August 27 and 28, 2012 due to wet conditions.

Construction Activities

The following activities occurred this week: rock chute construction, paved ditch construction, vegetative cover potholing and surveying, power pole installation, electrical and pump control panel installation, fencing installation, guardrail installation, slope diversion berm construction, and subgrade preparation for gravel surfacing. Ash Management Services, LLC installed rock chutes with geotextile and rip rap, backfilled against the completed paved ditch, and excavated and backfilled collector trenches for the electrical feeder. B&T Drainage continued preparing the subgrade for the paved ditch and backfilling against the completed paved ditch. The vegetative cover over Ash Pond D was potholed to assess the vegetative layer thickness. Lamac Engineering CO. surveyed the potholed locations and staked the 100-ft. certification grid. ST Construction, Inc. continued paved ditch concrete construction along the south and east sides of Ash Pond D. Concrete testing, including slump, air entrainment, and cast cylinders, was performed by Patriot Engineering, Inc. Plant Brothers Excavating and Construction CO. installed power poles for the overhead electric to the groundwater collection system. AAA Electric, Inc. installed additional electrical conduit for the groundwater collection system, low voltage electric lines for sensors, mini power zone (MPZ) boxes, guy wire anchors for the power poles, and managed the

power pole installation. Collins and Hermann, Inc. installed new fencing, three gates, and a guardrail at the box culvert, completing EWO-15. Fawn Lane Transit, Inc. and Belt Construction, Inc. placed backfill against the completed paved ditch and continued slope diversion berm construction. Subgrade preparation for the new roadways and gravel surfacing continued. Approximately 12 to 16 trucks were used to haul clay material to Ash Pond D. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT CS-323C Smooth Drum Roller
CAT 304C Mini Excavator
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
John Deere 410J Backhoe
New Holland C232 Skid Steer
Case 580 Backhoe
Case 688G Telehandler
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Paul Zinsious, Robert Dunkley, Greg Siverly, Jeremy Shorter, Brad Bolenbaugh, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
B&T Drainage (BTD) – Brian Schaefer, Michael Dashiell, and Abel English
Fawn Lane Transit, Inc. (FLT) – Kim Edington, Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Greg Lingorfelter, Tom Sager, Eric Bierman, Robert Shehorn, Billie Meadows, John Niles, Brian Griffith, Bob Smithenry, Alan Ruholl, Lee Ruholl, Patrick Wente, Frank Draper, Jason Byers, and Aaron Gullett
Lamac Engineering CO. (LEC) – Austin Ridgley and Jake Lewis
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
ST Construction, Inc. (STC) – John Maetin, Gary Hedges, Scott Hilton, Robert Pressley, Kenneth Kientzel, and Mark Newlin
Patriot Engineering, Inc. (PEI) – Thad Simpson, Jim Wade, and Mark Wooten
Collins and Hermann, Inc. (CHI) – James Fox, Aaron Benjamin, and Chuck Rak
Plant Brothers Excavating and Construction CO. (PBC) – Mike Doss, Terry Mace, and Daniel VanDuyn
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

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Meetings

The weekly progress meeting was held on Tuesday, August 28, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: clay for slope diversion berms and backfill, timber power poles, MPZ electrical boxes, guy wire anchors, RR-03 rip rap, IDOT CA-6 fill, IDOT FA-1 sand, and IDOT SI 4000 psi concrete.

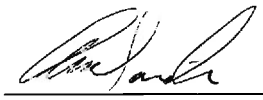
Testing/Sampling

Patriot Engineering, Inc. performed concrete testing for the paved ditch, including slump and air entrainment testing. Four concrete cylinders were cast and retrieved each day for testing. Refer to the concrete testing records for additional information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer



Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14887

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 8/27/12

TIME: Arrive: 6:00 AM | Depart: 4:45 PM | Travel: 1.0 hr | Total: 11.5 hrs (0.25 hr for lunch)
Weather: Cloudy/Rain, 74° AM, Sunny 88° PM | Contractor: AMS | Subcontr./Supplier: CHI, BCI, AAA, STC
Equipment Working: D6N Dozer, 580 Backhoe, C232 Skid Steer
Site Activities / Observations / Contacts / Notes:

AMS:
Cleaned and graded plant access roads for traffic. Placed reflective HDPE bollard covers on pipe bollards beside the cleanouts. Removed washed out soil from the paved gutter.

CHI:
Personnel - James Fox, Aaron Benjamin, and Chuck Rak. Mobilized - New Holland C232 Skid Steer. Drilled (12") and set all posts for the fence, gate, and guardrail per EWO-15: Fence Alignment. The fence and gate posts were set between the Bottom Ash Pond and Ash Pond C, between Ash Pond C and Ash Pond B, between Ash Pond B and the south property line, and along the south property line. The guard rail posts were set adjacent to the box culvert on the west side of Ash Pond D. Murphy Masonry, Inc. delivered all the concrete for the posts.

BCI:
Graded the northwest side of Ash Pond D for the turf reinforcement mat at the groin on the slope and swale. Continued constructing slope diversion berms in Section A.

AAA:
Installed the low voltage electrical lines for the paddlewheel flow sensor and the diver level sensor in the 2" PVC conduit for DS-1, DS-2, and DS-4. Note - DS-3 riser will have to be raised, along with the junction boxes, before electric can be installed at this location.

STC: Saw cut contraction joints in the paved ditch.

Additional Comments: Plant Bros. Co. mobilized equipment: Case 688G Telehandler and CAT 304C Mini Excavator.

Randy Poetic — Contractor Representative — AMS — Company
Signature — 8-27-12 — Date
Anna Samdon — Geotechnology, Inc. — 9-4-12 — Date
Engineer's Signature

Partial Rain Day.

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14888

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 8/28/12

TIME: Arrive: 6:00 AM | Depart: 7:00 PM | Travel: 1.0 hr | Total: 13.75 hrs (0.25 hr for lunch)
Weather: Sunny, 64°AM, 93° PM | Contractor: AMS | Subcontr./Supplier: CHI, PBC, AAA, BCI, LEC, BTD
Equipment Working: D6N Dozer, 580 Backhoe, C232 Skid Steer, 304C Mini Ex., 688G Telehandler
Site Activities / Observations / Contacts / Notes:

*Vegetative Cover Thickness:

Massmann's survey data for the clay cover was received and reviewed. The as-built ash elevations and as-built clay elevations provided an average clay thickness of 2.42', with a range from 0.79' to 4.50', having large areas across the pond with 1.5' to 2.5' of cover. The CQA Plan provides a cover tolerance of 0 to -0.4'. Therefore, based on the survey data, a large amount of fill is required to achieve the required cover thickness. To determine if the survey data was correct and/or there was settlement in the ash, test grid points were chosen across the pond. Austin with LEC staked the grid points and Abel with BTD potholed the points down to the liner by water excavation. LEC then shot the cover and liner elevations, and the cover thickness was measured. The test points, for the majority, matched Massmann's data. Therefore, this provides that the ash has experienced minimal settlement, and the clay cover has experienced significant settlement due to the live loads from the clay placement procedure. In summary, a large amount of clay will have to be placed to achieve the required cover thickness of 3.0', approx. 50,000 cy of material. — LEC will submit their findings by the end of the week and they are scheduled to restake the 100' grid across Ash Pond D with cut and fill grades for additional clay placement. It is estimated that this will extend the project 2 to 4 weeks. Nothing has been officialized at this time and work will proceed as scheduled.

AMS:

Placed silt fence around paved ditch and the subgrade for the new access road towards the east pump control panel. Added rip rap to the box culvert rock chute. Graded the plant access roads and entrance. Backfilled against the paved ditch with outfall swale and rock chute spoils from the northeast embankment of Ash Pond D.

Additional Comments: NEXT PAGE

Randy Postel — Contractor Representative — AMS — Company
Signature — 8-28-12 — Date
Anna Samdon — Geotechnology, Inc. — 9-4-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14889

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 8/28/12

TIME: Arrive: _____ Depart: _____ Travel: _____ Total: _____
Weather: _____ Contractor: REFER to PAGE 1 Subcontr/Supplier: _____
Equipment Working: _____
Site Activities / Observations / Contacts / Notes:

CHI:
Installed the guard rail at the box culvert on the west side of Ash Pond D. Installed the chain link fence and rails between the Bottom Ash Pond and Ash Pond C, Ash Pond C and Ash Pond B, Ash Pond B and the south property line, and along the south property line. Only the gates and barb wire remain to be installed. Note - all directions of the barb wire will be matched to existing fencing across the site.

PBC:
Plant Brothers Excavating & Construction Co. mobilized. Personnel - Mike Doss, Terry Mace, and Daniel VanDuyn. Delivery - timber power poles. The 10 proposed power poles from the MCC building to the southeast corner of Ash Pond B were drilled with a 24" auger and installed for overhead electric to the groundwater collection system per EWO-13. All backfill for the power poles was tamped. Drilled 12" holes beside the power poles for the guide wires. Completed the installation and demobilized the CAT 304C Mini Ex. and Case 688G Telehandler.

AAA:
Overseen the power pole installation. Delivery - Mini Power Zone (MPZ) junction boxes. Set anchors, assembled, and installed the MPZ boxes on the west and east pump control panels.

BCI:
Continued constructing slope diversion berms in all Quadrants of Ash Pond D.

Note: Paved ditch construction was delayed two days due to the rain over the weekend.

Additional Comments: CQA plan also requires a minimum thickness of 3 feet for vegetative cover.

Randy Portell — Contractor Representative — ANS — Company — 8-28-12 — Date
Signature
Aaron Saindon — Geotechnology, Inc. — 9-4-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14890

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 8/29/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 76°AM, 93°PM | Contractor: AMS | Subcontr./Supplier: CHI, AAA, BTD, STC, PEI, BCI, FLT
Equipment Working: D6N Dozer, 580 Backhoe, C232 Skid Steer, D5G Dozer, CS-323C Roller, Water Truck

Site Activities / Observations / Contacts / Notes:

AMS:
Excavated the wrap-around collector trenches for the electrical feeder, to the west and east pump control panels, in between Ash Pond D and Ash Pond B, to the power pole on the southeast corner of Ash Pond B. Haunched all conduit in the trenches with FA-1 sand, placed detectable tape over the conduit, and backfilled the collector trenches. Note- the collector trench crossing the gravel road followed E-386, Sheet 5, Detail 3. Backfilled against the paved ditch.

CHI:
Installed the new gates in between Bottom Ash Pond and Ash Pond C, Ash Pond C and Ash Pond B, and Ash Pond B and the south property line. Installed the barb wire on all the new fencing. Completed EWO-15 Fence Alignment and demobilized the New Holland C232 Skid Steer.

AAA:
Installed 2½" electrical feeder PVC conduit in the wrap-around collector trenches to the power pole on the southeast corner of Ash Pond B. Installed the low voltage electric for the flow and level sensors in the conduit from DS-4 to the east pump control panel. Installed conduit to the single phase MPZ box on the east pump control panel.

BTD:
Graded the paved ditch subgrade, placed CA-6 fill for the paved ditch bedding, and backfilled against the paved ditch. Delivery - IDOT CA-6 fill. Remobilized - CAT D5G Dozer.

STC: Continued forming, stripping, pouring, finishing, curing, saw cutting contraction joints, and sealing the paved ditch with NP-1 sealant southeast radius of Ash Pond D. 16 cy.

PEI: Tested concrete for the paved ditch - Will receive today's results next week.

BCI/FLT: Dumping and backfilling against the paved ditch south of Ash Pond D and constructing slope diversion berms.

Additional Comments:

Randy Poeter — Contractor Representative — AMS — Company
Signature — 8-29-12 — Date
Anna Saindon — Geotechnology, Inc. — 9-4-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14891

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/30/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 64° AM, 96° PM | Contractor: AMS | Subcontr./Supplier: AAA, BTD, STC, PEI, LEC, BCI, FLT
Equipment Working: D6N Dozer, 580 Backhoe, D5G Dozer, CS-323C Roller, 762B Scraper, Water Truck

Site Activities / Observations / Contacts / Notes:

AMS:
Backfilled wrap-around collector trenches in between Ash Pond D and Ash Pond B up to the power pole for overhead electric on the southeast corner of Ash Pond B. Backfilled against the west pump control panel, graded plant access roads, and began finish grading south of Ash Pond A.

AAA:
Installed the guide wire anchors for the new power poles. Installed the 2½" electric feeder PVC conduit into the single phase MPZ box on the west pump control panel. Exothermic welded the ground cable to the ground rod with CAD weld at the east pump control panel.

BTD:
Continued grading the paved ditch subgrade east of Ash Pond D, placing CA-6 fill for the paved ditch bedding, and backfilling against the paved ditch south of Ash Pond D.

STC:
Continued paved ditch concrete construction east of Ash Pond D. Three trucks delivered - 24 cy.

PEI:
Jim Wade tested paved ditch concrete - Temp = 61°, Slump = 4½", Air = 5.25%, and 4 cylinders.

LEC:
Austin Ridgley and Jake Lewis surveyed the 100' certification grid across the cap of Ash Pond D, with cuts/fills on the stakes. Clay placement will resume next week for additional cover.

BCI/FLT:
Continued dumping and backfilling against the paved ditch south of Ash Pond D and constructing slope diversion berms in all Quadrants.

Additional Comments: Areas across the site were prepared for hurricane effect rains this coming weekend.

Randy Peterk — Contractor Representative — AMS — Company — 8-30-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 9-4-12 — Date
Engineer's Signature

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No. A 14892

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 8/31/12

TIME: Arrive: 6:00 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 10.5 hrs (no lunch)
Weather: Partly Cloudy, 72° AM, Cloudy, 89° PM | Contractor: AMS | Subcontr./Supplier: AAA, BTD, STC, PEI, BCI, FLT
Equipment Working: D6N Dozer, 580 Backhoe, 410J Backhoe, L245DT Tractor, D5G Dozer, CS-323C Roller,
Site Activities / Observations / Contacts / Notes: 762B Scraper, Water Truck

AMS:
Put up additional silt fence along the paved ditch. Backfilled against the power pole on the southeast corner of Ash Pond B. Constructed an additional rock chute with geotextile and rip rap on the letdown channel on the southern end of Ash Pond D. The rock chute will extend from the most southern slope diversion berms down to the paved ditch.

BTD:
Continued grading the paved ditch subgrade east of Ash Pond D, placing CA-6 fill for the paved ditch bedding, and backfilling against the paved ditch east of Ash Pond D. Added additional slab bedding at the pipe bollards and cleanouts to 4" below the HDPE bollard covers.

STC:
Continued paved ditch concrete construction east of Ash Pond D. Three trucks delivered - 24 cy.

PEI:
Mark Wooten tested paved ditch concrete - Temp=71°, Slump=2", Air=5.5%, and 4 cylinders cast.

AAA:
Installed 2½" stainless steel conduit onto power pole up to the disconnect for the electric feeder on the southeast corner of Ash Pond B. Installed ¾" stainless steel conduit onto the west pump control panel for the electric to the pumps, floats, and receptacles.

BCI/FLT:
Continued dumping and backfilling against the paved ditch south of Ash Pond D and constructing slope diversion berms in all Quadrants.

Additional Comments:

Randy Foster — Contractor Representative — AMS — Company
Signature — 8-31-12 — Date
Anna Saindon — Geotechnology, Inc. — 9-4-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 24 Minutes
Tuesday, August 28, 2012

01 PUBLICATION

Publish date:	2012-08-30	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-08-28-PM-24	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
04	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-08-28	OPEN - no issues. AAA projection per revised schedule, M. Wagstaff to coordinate with J. King.
2012-08-21	OPEN - no issues. AAA project need for WPA next 2x WKS - 08-31. AMS and AAA to coordinate LOTO. M. Wagstaff to coordinate AER with Mr. Steve Bruner. Confirmation of WPA next Tuesday [08-21].

03 EMPLOYEE DRUG TESTING

2012-08-28	OPEN - no issues. Schedule Daylight 1x worker for 09-04. Plant Brothers have been tested [on site today 08-28].
2012-08-21	OPEN - no issues. Plant Brothers workers to be tested this period [week].

04 AMS SAFETY

2012-08-28	[01] J. Tasich on site schedule TBD. [02] No safety issues reported. [03] Plant Brothers power pole installation - M. Wagstaff inquire about strap/chocker for pole installation. AAA indicated standard procedure. Rigging was inspected, new choker. Installation [using forklift], work progressing safety. [04] R. Porter has copy of forklift certification.
2012-08-21	[01] J. Tasich on site 08-21. Provided overview, safety reports: [01] PPE and safety processes look good - no issues. [02] Spotters [laborers] are rotating - no issues. [03] No confined space entry this look-ahead. [02] M. Wagstaff brief discussion regarding connection to Ash Pond C [pump station] WPA/LOTO. To be further discussed 08-21. [03] Plant Brothers to received site-specific safety training next week. [04] M. Wagstaff inquired about pump [control] panels. J. King to LOTO. [05 Brief discussion regarding final connection and testing of the DS pumps. M. Wagstaff concern about final discharge through the collector box until approval of discharge permit by IEPA. M. Wagstaff required the valves LOTO. FWI and R. Porter to coordinate.

05 HOUSEKEEPING

2012-08-28 OPEN - No issues.

2012-08-21 OPEN - No issues.

06 PLANT ACCESS - CBT BADGE

2012-08-28 OPEN - No issues.

2012-08-21 OPEN - No issues.

08 OSHA LOG - WORK HOURS

2012-08-28 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13

No incidents or accidents.

8,354.00 RT

1,626.00 OT

9,980.00 TOTAL

2012-08-21 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-20.

No incidents or accidents.

7,771.00 RT

1,523.00 OT

9,294.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-08-28 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	CHI	0	0	0	1	0	1	0	0	1
06	FLT	0	0	0	0	14	0	0	0	0
07	FWI	0	0	0	0	0	0	2	0	0
08	GEO	0	2	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	2	0	1	0	0	0
11	STC	0	0	0	0	0	6	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 41

2012-08-21 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	TBD
01	AAA	0	0	0	0	0	0	0	1	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	FLT	0	0	0	0	14	0	0	0	0
06	FWI	0	0	0	0	0	0	2	0	0
07	GEO	0	2	0	0	0	0	0	0	0
08	LEC	0	0	0	0	0	0	0	0	0
09	STC	0	0	0	0	0	6	0	0	0
10	Z-2	0	0	0	0	0	0	0	0	0

Total on site: 34

02 WORK HOURS AND OVERTIME

2012-08-28 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting changed to 06:30 AM CT due to light [safety]. Labor Day holiday 09-03 - no work.

2012-08-21 OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting at 06:00 AM CT. Labor Day holiday 09-03 - no work.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-08-28 OPEN - no issues. Look ahead to removing trailers on 09-28.

2012-08-21 OPEN - no issues.

07 PREVIOUS

01 SUBCONTRACTS

2012-08-28	OPEN - no issues. P. Zinsious to track FWI CO. In progress, FWI will have EOW.
2012-08-21	OPEN - no issues. P. Zinsious to track FWI CO.

02 SUBMITTALS

20120-08-28	Submittal log was distributed as published by GEO on 08-25. [01] Submittal log review, and general conversation. [02] Wire insulation discussion previous to PM with M. Wagstaff, J. King, and P. Zinsious. CLOSE [03] P. Zinsious reports that AAA has confirmed receipt of everything needed to proceed with work. [04] AMS has received digital reader submittal form FWI. P. Zinsious to forward. [05] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. [06] R. Porter reports not having information yet from subcontractors on record drawings.
20120-08-21	Submittal log was distributed as published by GEO on 08-18. [01] Submittal log review, and general conversation. [02] A. Saindon to have geomembrane warranty reviewed by EOW. CLOSE [03] J. Cravens reported that testing on the geotextile fabric non-woven will not be required [reference AMS HUT-SUB-023-03]. CLOSE [04] AMS resubmit B3 Rip Rap for letdown chutes and stilling basins. CLOSE [05] DS hatch [option] researched by R. Porter submitted and resolved. Reinforcing steel in tops required. M. Wagstaff done. CLOSE [06] Wire insulation discussion previous to PM with M. Wagstaff, J. King, and P. Zinsious. [07] General discussion on manuals for close-out: [01] M. Wagstaff requirement 1x copy digital and 1x copy hard bound [02] J. Cravens collected manuals from FWI for Omega and Zoeller, transmitted to P. Zinsious. [08] General discussion on record drawings for close out: [01] Schematics for panels to be included. [02] M. Wagstaff indicated that Lamac will probably do record drawings in AutoCAD. [03] AMS to provide 1x copy to AER, who will forward to LEC.

08 MATERIAL

01 GENERAL

2012-08-28	OPEN - listing for materials that have potential to impact schedule. [01] M. Burch reports Omega sensor to be ordered. AMS has submittal [ref. above 07.02.2012-08-28.04]. [02] General discussion of Baro sensor to be in separate panel box. P. Zinsious recommended FWI research with vendor if placed is electrical panel would other signals/inductance create and issue. J. King has no feedback, but does not see this as an issue. [03] J. Craven presented report from Massmann survey of the clay grade and the calculated thickness of the clay. Review of the report shows several areas that did not seem to have the correct in place clay thickness relative to what clay had been placed. No determination was made if the data showed settlement in ash, clay [or both], or if there was error. After general discussion of the issue, it was determined that AMS would check the clay thickness in several areas.
2012-08-21	OPEN - listing for materials that have potential to impact schedule. [01] M. Burch reports Omega sensor to be ordered. [02] General discussion of Baro sensor to be in separate panel box. P. Zinsious recommended FWI research with vendor if placed is electrical panel would other signals/inductance create and issue. [03] Collector box holes for the DS lines are too small for Link-Seal. R. Porter recommended using non-shrink grout as used in other area of the projection man holes. P. Zinsious indicated the exterior could be also coated in a mastic to help seal the penetrations. M. Wagstaff indicated that the box still remains in the flood plain, even with the revised elevations and is to be sealed.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-08-28	OPEN - Discussion during Progress Meeting: [01] R. Porter reported that Wampler has requested that [field drain] line be plugged. This line is off site, and not part of the scope of work, and is an issue with the agreement between AER and Wampler. M. Wagstaff to investigate. In progress.
2012-08-21	OPEN - Discussion during Progress Meeting: [01] Lamac [LEC] staked out for fence on property line [south side of property]. CLOSE [02] R. Porter reported that Wampler has requested that [field drain] line be plugged. This line is off site, and not part of the scope of work, and is an issue with the agreement between AER and Wampler. M. Wagstaff to investigate.

10 QUALITY CONTROL

2012-08-28 [01] No results form concrete testing returned. P. Zinsious to call STC.
[02] DS-3 ring height issues due to re-grade of the paved concrete ditch. R. Porter to call BTD for update.

2012-08-21 [01] No results form concrete testing returned. P. Zinsious to check with STC.
[02] J. Cravens reports recent concrete pour slump was about 2 IN. Pour was held up due to rain, and truck wait time exceeded. Therefore approximately 2 CY wasted.
[03] HDPE [field tile] no issues.
[04] DS-3 ring height issues due to re-grade of the paved concrete ditch. J. king indicated drilling 2x more holes.

11 SCHEDULE REVIEW

2012-08-28 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain day on 08-27 and 08-28.
[02] Major changes commentary:
[01] Add AID 401 "Testing"] S = 400, 218] P = 312b, 313c, 385, 395] D = 1D] Start 09-11
[02] Change LP form Zinsious to Porter on AID 111, 198, 198a, and 199
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
01	AAA-King	124c	Install DS Baro...				50%	
02	AAA-King	279a	DS3 - Electrical wiring...		9/7/2012	9/7/2012		
03	AAA-King	301a	DS4 - Electrical...			8/29/2012	50%	
04	AAA-King	420	Install conduits...			8/29/2012		
05	AAA-King	430	PCS - East Pull Cables..				100%	
06	AAA-King	312b	PCS - East Wire...			9/10/2012		
07	AAA-King	400	Energize Power...			9/12/2012		
08	AAA-King	116	Procurement Receive...Group 3				100%	
09	AAA-King	117	Procurement Receive...Group 4				100%	
10	AAA-King	114	Procurement Receive...Group 1			9/4/2012		
11	AAA-King	313c	PCS - West - Wire...			9/10/2012		
12	AAA-King	318	PCP-PCR - electrical final checkout		9/14/2012			
13	AER-Wagstaff	EWO15a	Ameren review AMS Fence...				100%	
14	AMS-Porter	188	Clay - Placement - SEC -D				100%	
15	AMS-Porter	199	Roadways - PCS access road	2	8/29/2012	8/30/2012		
16	AMS-Porter	198	Roadways - APD perimeter road		8/31/2012	9/6/2012		
17	AMS-Porter	111	Procurement - receive...aggregates			9/6/2012		
18	AMS-Porter	191	Earthwork APD - slope diversion...				50%	
19	AMS-Porter	193	Earthwork APD - rock chutes				75%	
20	BTD-Boyer	317	PCP-PCR - install discharge collector...				95%	J. Cravens
21	CHI-Williams	101	Procurement - issue - fence/gate				100%	R. Porter
22	CHI-Williams	119	Procurement - receive - fence/gate				100%	R. Porter
23	CHI-Williams	139	Fence - APD - install gate			8/31/2012	25%	R. Porter
24	FWI-Burch	316	PCP-PCR - Connect DS 1-4 piping...				100%	J. Cravens
25	FWI-Burch	300a	Install DS 1-4 external piping				100%	

2012-08-21 OPEN - Review of last planner by M. Wagstaff.
[01] Rain day on 08-17.
[02] Major changes commentary:
[01] Not on LP - AID 199 S = 08-27, D = 2
[01] Not on LP - AID 198 S = 08-27, D = 4
[01] Not on LP - AID 198a S = 09-04, D = 3
[03] Add AID 119a "Install fence and gate" S = 08-27, D = 4
[04] Mark-up on LP, submitted to AER for change.

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-08-28 No issues. AMS to submit EOM draft.
2012-08-21 No issues.

12.1 EXTRA WORK ORDERS

15 EWO-15 FENCE ALIGNMENT

2012-08-28 OPEN - AMS to provide back-up information.
2012-08-21 OPEN - AMS to provide back-up information.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-08-28 OPEN - In progress. AMS brining in clay [to fill in adjacent area to make grade].
2012-08-21 OPEN - In progress.

18	EWO-18	VENT PROTECTION RING	
	2012-08-28	NEW - AMS to provide information for ring to protect HDPE vents from damage by [tractor] bush hog [and/or trimmers].	
19	EWO-19	COMMISSIONING	
	2012-08-28	NEW - AMS to provide information for pumping Dewatering Sumps [DS] water from collector sump back to Ash Pond C during commissioning. This is due to IEPA permit not issued. Research what size pump [4 IN or 6 IN] or if a generator/pump combination is required. A confined space entry permit will be required to access the manhole for plugging to outfall line to the river. Projected duration is 2x WKS, operating 24/7 to be able to draw down the groundwater at the DS area for commissioning.	

13 ACTION ITEMS - AER [25]

01	AMEREN [AER]	
	2012-08-28	No report.
	2012-08-21	[01] Electrical submittals have been returned on 08-03. P. Zinsious to check remainder. CLOSE

14 ACTION ITEMS - AMS [21]

01	ASH MANAGEMENT [AMS]	
	2012-08-28	No report.
	2012-02-21	[01] B3 Rip Rap [ref. Item No. 07.02-2012-08-14 No. 04 above] CLOSE

15 PRODUCTION

03	CLAY	
	2012-08-28	OPEN - no issues [01] Placement as of 08-27 is 121,968 CY. [02] R. Porter presented sketch M/U for review of placement area progress.
	2012-08-21	OPEN - no issues [01] Placement as of 08-20 is 112,970 CY. [02] R. Porter presented sketch M/U for review of placement area progress.

16 DOCUMENTS TRANSMITTED

2012-08-28	[01] AER - Last Planner schedule dated 08-21 [data date]. [02] GEO - Submittal Log published 08-25. [03] GEO - Massmann survey packet with GEO spreadsheet elevation point comparison. [04] AMS - revised contact list HUT-APD-CON-2012-08-27
2012-08-21	[01] AER - Last Planner schedule dated 08-14 [data date]. [02] GEO - Submittal Log published 08-18.

17 DOCUMENTS REVIEW ONLY

2012-08-28	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement
2012-08-21	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, September 4, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Cleanout pipe bollards facing northwest



Photograph 2 - Installing new fence posts facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 27 and August 31, 2012

JRC



Photograph 3 - Repairing storm damage at box culvert facing east



Photograph 4 - Power pole installation facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 27 and August 31, 2012

JRC



Photograph 5 ⮝ - Installing fence facing southwest



Photograph 6 ⮝ - Potholing to check vegetative layer thickness facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 27 and August 31, 2012

JRC



Photograph 7 - Installing PVC conduit for electric facing southwest



Photograph 8 - Paved ditch construction facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 27 and August 31, 2012

JRC



Photograph 9 ⮝ - Rock chute construction south of Ash Pond D facing north



Photograph 10 ⮝ - Slope diversion berm construction facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 27 and August 31, 2012

JRC



Photograph 11 - Overview of Ash Pond D facing southeast



Photograph 12 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between August 27 and August 31, 2012

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: September 10, 2012

SUBJECT: Weekly Summary Report for September 4, 2012 to September 7, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally mostly cloudy to sunny with periods of fog and rain. Temperature (°F) lows ranged from 68 to 73°F, and temperature highs ranged from 82 to 93°F. Weather delays occurred each day this week due to storm events and wet conditions.

Construction Activities

The following activities occurred this week: repairing impacts from storm events, access road improvement and gravel surfacing, finish grading, additional rip rap wall construction, paved ditch construction, and electrical installations. Ash Management Services, LLC repaired impacts to the paved gutter, paved ditch, and plant access roads from the recent storm events. Access road improvement and gravel surfacing was performed on the existing gravel road south of Ash Pond A and Ash Pond B with geotextile and gravel. Finish grading was performed south of Ash Pond A to promote drainage to the west towards existing manholes. A rip rap wall was constructed along the paved gutter on the west side of Quadrant C to mitigate erosion. ST Construction, Inc. saw-cut contraction joints in the completed paved ditch. AAA Electric, Inc. installed additional stainless steel conduit on the east pump control panel for the junction boxes, guy wires for the power poles, and overhead spool insulators. The disconnect switch, stainless steel conduit, and weather head was installed onto the Ash Pond C service pole. All other subcontracted work items were delayed this week due to the recent storm events. Refer to the daily reports for detailed information.

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Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT CS-323C Smooth Drum Roller
JLG 450AJ Articulating Boom Lift
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Brad Bolenbaugh, Blake Bunting, and Eric Sefton
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
ST Construction, Inc. (STC) – Kenneth Kientzel
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, September 4, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: IDOT CA-6 gravel, IDOT CA-6 fill, RR-03 rip rap, ceramic spool insulators, aluminum aerial cable, and guy wires.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

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Signature of CQA Officer



Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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No. A 14893

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 9/4/12

TIME: Arrive: 6:30 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 11.75 hrs (0.25 hr for lunch)
Weather: Foggy, Sunny, 69° AM, Partly Cloudy, 93° | Contractor: AMS | Subcontr./Supplier: AAA, STC
Equipment Working: D6N Dozer, 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS:

Cleaned washed out soil from the paved ditch on the south and east sides of Ash Pond D, and the paved gutter on the west side of Ash Pond D. Began access road improvement south of Ash Pond A and Ash Pond B along the property line. The subgrade for the gravel surfacing was graded south of Ash Pond A and Ash Pond B. IDOT 8 oz. non-woven Propex geotextile was laid over the subgrade, and IDOT CA-6 roadpack was placed on top of the geotextile. Approx. 8" of CA-6 was placed and it was back dragged on top of the geotextile. After back dragging, a dozer was utilized to fine grade the CA-6. All gravel surfacing will be compacted at a later date with a steel drum roller. Refer to S-386, Sheet 2, Detail 1 for access road improvement details. Began finish grading south of Ash Pond A to allow surface drainage to the west towards the existing grade inlet manholes.

AAA:

Installed the disconnect onto the power pole located southwest of Ash Pond C for the new power to the pump in Ash Pond C. 2½" stainless steel conduit was installed onto the power pole on top of the disconnect for the overhead electrical feeder. Installed 1¼" and ¾" stainless steel conduit onto the east pump control panel for the junction boxes.

STC:

Saw cut remaining contraction joints in the paved ditch east of Ash Pond D.

Additional Comments: The site was too wet for FLT, BCI, STC, and BTD to perform work.

Randy Foster — Contractor Representative — AMS — Company
Signature — 9-4-12 — Date
Joan Sacredon — Geotechnology, Inc. — 9-10-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14894

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 9/5/12

TIME: Arrive: 6:30 AM | Depart: 1:30 PM | Travel: 1.0 hr | Total: 8 hrs (no lunch)
Weather: Sunny, 73°AM, Rain 70°PM | Contractor: AMS | Subcontr./Supplier: AAA
Equipment Working: D6N Dozer, 450AJ Lift
Site Activities / Observations / Contacts / Notes:

AMS:
Continued access road improvement south of Ash Pond A and Ash Pond B along the property line. Gravel surfacing included geotextile over the subgrade and ≈8" of CA-6 over the geotextile. Continued finish grading south of Ash Pond A to promote surface drainage to the west.

AAA:
Installed 1¼" and ¾" stainless steel conduit onto the east pump control panel. Began installing the guy wires for the power poles that will have unbalanced lateral loads from the overhead electric lines. The anchors on the poles were installed approx. 1.0' from the top of the pole. The guy wires connecting the pole and ground anchors are stainless steel ⅜" braided cables. The overlap at the ground anchor follows the electrical code.
Mobilized - JLG 450AJ Articulating Boom Lift

Other:
It began raining in the PM again. Clay Placement has been called off until next week. It is still too wet for FLT, BCI, STC, and BTD to perform work.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company — 9-5-12 — Date
Signature
Anna Saunders — Geotechnology, Inc. — 9-10-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14895

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 9/6/12

TIME: Arrive: 6:30 AM | Depart: 4:30 PM | Travel: 1.0 hr | Total: 10.75 hrs (0.25 hr for lunch)
Weather: Foggy, Sunny, 68° AM, Sunny, 82° PM | Contractor: AMS | Subcontr./Supplier: AAA
Equipment Working: 580 Backhoe, 450AJ Lift
Site Activities / Observations / Contacts / Notes:

AMS:

Due to the quantity of fill required on the west side of Section C, and the short distance between the PGL and the paved gutter, the slope from the paved gutter to the PGL would be too steep to maintain and mow. Therefore, AMS began constructing a rip rap wall between the PGL and the paved gutter on the west side of Section C. The proposed rip rap wall is made up of RR-03 rip rap and Propex Geotex 8 oz. geotextile overlying the subgrade. Fill was placed behind the rip rap wall to achieve the ≈3' cover at the PGL, as well as act as bedding for the rip rap wall. The wall was also extended around the flared end section of the drainage culvert at the end of the gutter at the southwest corner of Section C. The site was too wet for roadway construction. Delivery - RR-03 rip rap.

AAA:

Completed installing the guy wires for the power poles that will have unbalanced lateral loads from the overhead electric. Installed the spool insulators onto all the power poles for the base neutral messenger wire. Inspected the wiring for the spare 100A/3P breaker with starter in the coal conveyor MCC-1. All energized power running to the MCC-1 will be shut off during wire distribution, breaker replacement, and disconnect installation. Delivery - ceramic spool insulators and 3 conductor #4/0 AWG aluminum aerial cable. Installed the stainless steel weatherhead onto the conduit above the 600V, 200A/3P heavy duty non-fused disconnect switch at the Ash Pond C service pole.

Additional Comments: The site was too wet for FLT, BCI, STC, and BTD to perform work.

Randy Porter — Contractor Representative — AMS — Company
Signature — 9-6-12 — Date
Anna Saindon — Geotechnology, Inc. — 9-10-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14896

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 9/7/12

TIME: Arrive: 6:30 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 9.75 hrs (0.25 hr for lunch)
Weather: Sunny, 70°AM, 90° cloudy PM | Contractor: AMS | Subcontr./Supplier: None
Equipment Working: 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS:
Continued constructing the rip rap wall between the PGL and the paved gutter on the west side of Section C. RR-03 rip rap overlying 8oz. geotextile was used to build the wall and fill was placed behind the wall for bedding and to achieve ≈3' of cover at the PGL. Continued site remediation on the paved gutter and ditch from recent storm events.

Other:
The site was too wet for FLT, BCI, STC, and BTD to perform work.
AAA had no production today.
No deliveries today.

Additional Comments:

Randy Parker — Contractor Representative — AMS — Company — 9-7-12 — Date
Signature
Anna Swindon — Geotechnology, Inc. — 9-10-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 25 Minutes
Tuesday, September 4, 2012

01 PUBLICATION

Publish date:	2012-09-05	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-09-04-PM-25	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
04	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-09-04	OPEN: [01] J. King indicated that LOTO of MCC not sufficient, as other lines in. [02] M. Wagstaff to get with plant/local utility to review cut off power, and coordinate with J. King.
2012-08-28	OPEN - no issues. AAA projection per revised schedule, M. Wagstaff to coordinate with J. King.

03 EMPLOYEE DRUG TESTING

2012-09-04	OPEN - no issues. No testing scheduled.
2012-08-28	OPEN - no issues. Schedule Daylight 1x worker for 09-04. Plant Brothers have been tested [on site today 08-28].

04 AMS SAFETY

2012-09-04	[01] J. Tasich on site schedule TBD. [02] No safety issues reported. [03] Plant Brothers power pole installation - M. Wagstaff inquire about strap/chocker for pole installation. AAA indicated standard procedure. Rigging was inspected, new choker. Installation [using forklift], work progressing safety. Work completed - CLOSE [04] Humidity is high [increased temperatures], discussion about keeping hydrated. [05] wind has damaged AMS cooling stations. R. Porter indicated will repair. [06] AAA bringing 45 FT articulated lift on site [for power pole work].

2012-08-28 [01] J. Tasich on site schedule TBD.
[02] No safety issues reported.
[03] Plant Brothers power pole installation - M. Wagstaff inquire about strap/chocker for pole installation. AAA indicated standard procedure. Rigging was inspected, new choker. Installation [using forklift], work progressing safety.
[04] R. Porter has copy of forklift certification.

05 HOUSEKEEPING

2012-09-04 OPEN - No issues.

2012-08-28 OPEN - No issues.

06 PLANT ACCESS - CBT BADGE

2012-09-04 OPEN: No issues.
[01] R. Porter reports wire for transmission project being delivered. Inquired about when guard would go 24/7.
[02] R. Porter locking new gate, [no open areas to plant], and will provide updated lock count to AER.
[03] M. Wagstaff indicated need to have locks also for disconnects.

2012-08-28 OPEN - No issues.

08 OSHA LOG - WORK HOURS

2012-09-04 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-20.
No incidents or accidents.
8,854.00 RT
1,705.00 OT
10,559.00 TOTAL

2012-08-28 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13
No incidents or accidents.
8,354.00 RT
1,626.00 OT
9,980.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-09-04 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	0	0	0	0
05	CHI	0	0	0	1	0	1	0	0	1
06	FLT	0	0	0	0	14	0	0	0	0
07	FWI	0	0	0	0	0	0	0	0	0
08	GEO	0	1	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	2	0	1	0	0	0
11	STC	0	0	0	0	0	6	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 37

2012-08-28 Geotechnology [work hours not included in OSHA Log above]

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	1	0	0	0
05	CHI	0	0	0	1	0	1	0	0	1
06	FLT	0	0	0	0	14	0	0	0	0
07	FWI	0	0	0	0	0	0	2	0	0
08	GEO	0	2	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	2	0	1	0	0	0
11	STC	0	0	0	0	0	6	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 41

02 WORK HOURS AND OVERTIME

2012-09-04 OPEN: No issues.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting changed to 07:00 AM CT due to light [safety]
[02] Labor Day holiday 09-03 observed.

	2012-08-28	OPEN - Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting changed to 06:30 AM CT due to light [safety]. Labor Day holiday 09-03 - no work.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-09-04	OPEN: No issues. [01] R. Porter reports electric utility bill for trailers transferred to Miller Construction. [02] Look ahead to removing trailers on 09-28 to remain projected date.
2012-08-28	OPEN - no issues. Look ahead to removing trailers on 09-28.

07 PREVIOUS

01 SUBCONTRACTS

2012-09-04	OPEN - no issues. FWI CO in progress, will report when signature.
2012-08-28	OPEN - no issues. P. Zinsious to track FWI CO. In progress, FWI will have EOW.

02 SUBMITTALS

20120-09-04	Submittal log - no update. [01] M. Wagstaff indicated bolt pattern and sealant for the DS hatch required. AMS to provide accordingly. [02] P. Zinsious reports that AAA has confirmed receipt of everything needed to proceed with work. CLOSE [03] AMS has received digital reader submittal form FWI. P. Zinsious to forward. [04] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. Review in progress. [05] R. Porter reports not having information yet from subcontractors on record drawings. In progress.
20120-08-28	Submittal log was distributed as published by GEO on 08-25. [01] Submittal log review, and general conversation. [02] Wire insulation discussion previous to PM with M. Wagstaff, J. King, and P. Zinsious. CLOSE [03] P. Zinsious reports that AAA has confirmed receipt of everything needed to proceed with work. [04] AMS has received digital reader submittal form FWI. P. Zinsious to forward. [05] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. [06] R. Porter reports not having information yet from subcontractors on record drawings.

08 MATERIAL

01 GENERAL

2012-09-04	OPEN - listing for materials that have potential to impact schedule. [01] General discussion of Baro sensor to be in separate panel box. P. Zinsious recommended FWI research with vendor if placed is electrical panel would other signals/inductance create and issue. J. King has no feedback, but does not see this as an issue. CLOSE [02] AMS presented copies of letter dated 08-31 "Clay issue recovery - Schedule and work plan": [01] AMS committed to bring in additional clay to make grade elevations. [02] M. Wagstaff inquired about QA/QC of grade. AMS will grade to stake and have Lamac check grade before seed and straw and the Massmann survey. [03] Review of CQA requirement [page A-2] for tolerance is 0 FT to - 0.4 FT. The maximum coverage is 3 FT. [04] Clay recovery duration not shown as additional activities, the activity "fine grade" duration to be extended. [05] M. Wagstaff inquired about scheduling overtime for placement of clay. Review of schedule indicates float. Considering the rain day taken today [09-04], this leaves only one rain day for the next week [as only two were used the recovery duration calculation as noted in the letter]. General discussion that next PM review of progress to determine overtime.
2012-08-28	OPEN - listing for materials that have potential to impact schedule. [01] M. Burch reports Omega sensor to be ordered. AMS has submittal [ref. above 07.02.2012-08-28.04]. [02] General discussion of Baro sensor to be in separate panel box. P. Zinsious recommended FWI research with vendor if placed is electrical panel would other signals/inductance create and issue. J. King has no feedback, but does not see this as an issue. [03] J. Craven presented report from Massmann survey of the clay grade and the calculated thickness of the clay. Review of the report shows several areas that did not seem to have the correct in place clay thickness relative to what clay had been placed. No determination was made if the data showed settlement in ash, clay [or both], or if there was error. After general discussion of the issue, it was determined that AMS would check the clay thickness in several areas.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-09-04	OPEN - Discussion during Progress Meeting: [01] R. Porter reported that Wampler has requested that [field drain] line be plugged. This line is off site, and not part of the scope of work, and is an issue with the agreement between AER and Wampler. General discussion and M. Wagstaff approved proceed to plug line as indicated on drawings.
2012-08-28	OPEN - Discussion during Progress Meeting: [01] R. Porter reported that Wampler has requested that [field drain] line be plugged. This line is off site, and not part of the scope of work, and is an issue with the agreement between AER and Wampler. M. Wagstaff to investigate. In progress.

10 QUALITY CONTROL

2012-09-04	[01] AMS received concrete field reports, and forwarded them .P. Zinsious to check on break reports. [02] DS-3 ring height issues due to re-grade of the paved concrete ditch. R. Porter indicated will be delivered with other precast.
2012-08-28	[01] No results form concrete testing returned. P. Zinsious to call STC. [02] DS-3 ring height issues due to re-grade of the paved concrete ditch. R. Porter to call BTD for update.

11 SCHEDULE REVIEW

2012-09-04 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain date 09-04.
[02] Major changes commentary:
[01] Activities 221 and 222 activities to be scheduled out by software.
[02] Delete activities 185a, 185b, 186a, 186b, 187a, 187b, 188a, and 188b as the clay placement will not follow the original quadrant layout. Work for the additional clay placement is included in the "fine grade" activity, and not shown as additional activities, only extending the activity "fine grade" duration [ref. 08.01.2012-09-04.04 above].
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
	AAA-King	385	WPA at Existing Coal...		9/7/2012			
	AAA-King	385a	WPA for APD...		9/7/2012			
	AAA-King	375	Pull power...		9/10/2012	9/11/2012		
	AAA-King	395	Tie-in Electrical...		9/10/2012	9/11/2012		
	AAA-King	390	WPA to Disconnect...		9/10/2012			
	AAA-King	380	Install new Power cables...		9/10/2012	9/11/2012		
	AAA-King	390a	Release WPA to Energize New...		9/11/2012			
	AAA-King	124c	Install DS Baro...				75%	Waiting on DS-3 ring
	AAA-King	279a	DS3 - Electrical wiring...					Waiting on DS-3 ring
	AAA-King	301a	DS4 - Electrical...				100%	
	AAA-King	420	Install conduits...				100%	
	AAA-King	114	Procurement - receive - electrical...				100%	AAA possession
	AAA-King	420a	Pull cables...		9/6/2012	9/7/2012		
	AAA-King	313b	PCS - West - Mount...				100%	
	AAA-King	313c	PCS - West - Wire...		8/31/2012		25%	
	AAA-King	312a	PCS - East - Mount...			8/29/2012	100%	
	AMS-Boone	183	Site prep - CBS...			9/21/2012		
	AMS-Porter	191	Earthwork APD - slope diversion...				90%	
	AMS-Porter	193	Earthwork APD - rock chutes				100%	
	AMS-Zinsious	218	Commission Pump System		9/18/2012			
	AMS-Zinsious	217	Substantial...			9/25/2012		
	AMS-Zinsious	219	Punch List - Walk...		9/25/2012	9/25/2012		
	AMS-Zinsious	220	Punch List - Work...		9/26/2012			
	BTD-Boyer	237a	DS1 - Precast - set lid			9/10/2012		
	BTD-Boyer	252a	DS2 - Precast - set lid			9/10/2012		
	BTD-Boyer	252a	DS4 - Precast - set lid			9/10/2012		
	CHI-Williams	139	Fence - APD - install gate			8/29/2012	100%	R. Porter
	DLF-Ziliak	127	Procurement...				100%	
	DLF-Ziliak	210	Ground cover - mob...		9/17/2012	9/17/2012		
	DLF-Ziliak	211	Ground cover - hydro...		9/18/2012			
	DLF-Ziliak	212	Ground cover - TRM...		9/18/2012			
	DLF-Ziliak	120	Procurement...			9/4/2012	100%	
	FWI-Burch	316a	Hydro...			9/18/2012		
	GEO-Saindon	11	Survey - APD - vegetative...	1 [duration]	9/18/2012	9/19/2012		
	GEO-Saindon	50a	Clay - certification (Final)		9/19/2012	9/21/2012		
	LEC-Ridgely	15	Survey - APD - final			9/17/2012		
	LEC-Ridgely	13	Survey - CBS...			9/18/2012		
	STC-Hunt	207	Concrete - paved ditch - form and...			9/14/2012	75%	
	STC-Hunt	208	Concrete - paved ditch -			9/14/2012		

2012-08-28 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain day on 08-27 and 08-28.
[02] Major changes commentary:
[01] Add AID 401 "Testing"] S = 400, 218] P = 312b, 313c, 385, 395] D = 1D] Start 09-11
[02] Change LP form Zinsious to Porter on AID 111, 198, 198a, and 199
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
01	AAA-King	124c	Install DS Baro...				50%	
02	AAA-King	279a	DS3 - Electrical wiring...		9/7/2012	9/7/2012		
03	AAA-King	301a	DS4 - Electrical...			8/29/2012	50%	
04	AAA-King	420	Install conduits...			8/29/2012		
05	AAA-King	430	PCS - East Pull Cables..				100%	
06	AAA-King	312b	PCS - East Wire...			9/10/2012		
07	AAA-King	400	Energize Power...			9/12/2012		
08	AAA-King	116	Procurement Receive...Group 3				100%	
09	AAA-King	117	Procurement Receive...Group 4				100%	
10	AAA-King	114	Procurement Receive...Group 1			9/4/2012		

11	AAA-King	313c	PCS - West - Wire...			9/10/2012		
12	AAA-King	318	PCP-PCR - electrical final checkout		9/14/2012			
13	AER-Wagstaff	EWO15a	Ameren review AMS Fence...				100%	
14	AMS-Porter	188	Clay - Placement - SEC -D				100%	
15	AMS-Porter	199	Roadways - PCS access road	2	8/29/2012	8/30/2012		
16	AMS-Porter	198	Roadways - APD perimeter road		8/31/2012	9/6/2012		
17	AMS-Porter	111	Procurement - receive...aggregates			9/6/2012		
18	AMS-Porter	191	Earthwork APD - slope diversion...				50%	
19	AMS-Porter	193	Earthwork APD - rock chutes				75%	
20	BTD-Boyer	317	PCP-PCR - install discharge collector...				95%	J. Cravens
21	CHI-Williams	101	Procurement - issue - fence/gate				100%	R. Porter
22	CHI-Williams	119	Procurement - receive - fence/gate				100%	R. Porter
23	CHI-Williams	139	Fence - APD - install gate			8/31/2012	25%	R. Porter
24	FWI-Burch	316	PCP-PCR - Connect DS 1-4 piping...				100%	J. Cravens
25	FWI-Burch	300a	Install DS 1-4 external piping				100%	

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-09-04 No issues. AMS to submit EOM draft. Copy for M. Wagstaff today.

2012-08-28 No issues. AMS to submit EOM draft.

12.1 EXTRA WORK ORDERS

15 EWO-15 FENCE ALIGNMENT

2012-09-04 OPEN - AMS to provide back-up information. In progress.

2012-08-28 OPEN - AMS to provide back-up information.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-09-04 OPEN - In progress.

2012-08-28 OPEN - In progress. AMS brining in clay [to fill in adjacent area to make grade].

18 EWO-18 VENT PROTECTION RING

2012-09-04 OPEN - M. Wagstaff has approved.

2012-08-28 NEW - AMS to provide information for ring to protect HDPE vents from damage by [tractor] bush hog [and/or trimmers].

19 EWO-19 COMMISSIONING

2012-09-04 OPEN - AMS to provide cost for installing a manifold at the collector box to tie together the DS discharge lines to a single discharge line. The single line will then be routed along the east berm of Ash Pond D to the existing Bottom Ash Pond, where water will be able to gravity flow into existing Ash Pond C. This temporary configuration will utilize the new DS pumps, eliminate confined space entry [for now] and will not require a generator/pump combination.

2012-08-28 NEW - AMS to provide information for pumping Dewatering Sumps [DS] water from collector sump back to Ash Pond C during commissioning. This is due to IEPA permit not issued. Research what size pump [4 IN or 6 IN] or if a generator/pump combination is required. A confined space entry permit will be required to access the manhole for plugging to outfall line to the river. Projected duration is 2x WKS, operating 24/7 to be able to draw down the groundwater at the DS area for commissioning.

20 EWO-020 ADDITIONAL RIP-RAP

2012-09-04 OPEN - AMS to provide cost for installing additional rip-rap [RR-3] and geotextile material as necessary to accommodated for grade adjusted in the clay cap along the west slope adjacent to the paved gutter. M. Wagstaff indicated that a 1:1 slope is acceptable in this area. R. Porter and M. Wagstaff to review in the field today.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-09-04 No report.

2012-08-28 No report.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-09-04 No report.

2012-08-28 No report.

15 PRODUCTION

03 CLAY

2012-09-04 OPEN - no issues
[01] Placement as of 08-31 is 127,138 CY.
[02] Additional clay to be placed to make grade elevations [ref. above 08.01.2012-08-28.03].

2012-08-28	OPEN - no issues [01] Placement as of 08-27 is 121,968 CY. [02] R. Porter presented sketch M/U for review of placement area progress.

16 DOCUMENTS TRANSMITTED

2012-09-04	[01] AER - Last Planner schedule dated 08-28 [data date]. [02] AMS - letter dated 08-31 "Clay issue recovery - Schedule and work plan" [03] AMS - 1x 11x17 color copy of Lamac drawings from AMS letter dated 08-31 "Clay issue recovery - Schedule and work plan" to J. Cravens.
2012-08-28	[01] AER - Last Planner schedule dated 08-21 [data date]. [02] GEO - Submittal Log published 08-25. [03] GEO - Massmann survey packet with GEO spreadsheet elevation point comparison. [04] AMS - revised contact list HUT-APD-CON-2012-08-27

17 DOCUMENTS REVIEW ONLY

2012-09-04	None.
2012-08-28	[01] SK-HUT-APD-004-R0 "Project Site - Pond - Quadrant Layout" with M/U to show progress to date of clay placement

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, September 11, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Ash Pond C electric disconnect switch facing northwest



Photograph 2 - Guy wire installation facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 3 and September 7, 2012

JRC



Photograph 3 - Removing washout material from paved ditch facing east



Photograph 4 - Gravel road surfacing facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 3 and September 7, 2012

JRC



Photograph 5 - Gravel road surfacing facing west



Photograph 6 - Grading south of Ash Pond A facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 3 and September 7, 2012

JRC



Photograph 7 - Placing rip rap for paved gutter facing northwest



Photograph 8 - Placing rip rap for paved gutter facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 3 and September 7, 2012

JRC



Photograph 9 - Overview of Ash Pond D facing southeast



Photograph 10 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 3 and September 7, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: September 21, 2012

SUBJECT: Weekly Summary Report for September 10, 2012 to September 14, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally mostly cloudy to sunny with periods of rain. Temperature (°F) lows ranged from 58 to 66°F, and temperature highs ranged from 75 to 88°F. Weather delays did not occur this week.

Construction Activities

The following activities occurred this week: repairing impacts from storm events, rip rap wall construction, cap vent protective ring installation, rock chute and rip rap splash pad construction, paved ditch construction, manhole section and lid installation, cleanout concrete slab construction, electrical installations, clay placement, slope diversion berm and letdown channel construction, and finish grading. Ash Management Services, LLC repaired impacts to the rock chutes, swales, paved gutter, and paved ditch from the recent storm events. Construction of the rip rap wall continued along the paved gutter on the west side of Quadrant C. The cap vent precast protective rings were installed, a rock chute was constructed for the paved gutter culvert drainage to the paved ditch, and rip rap pads for the anchor trench outlet toe drains were built on the south embankment of Ash Pond D. B&T Drainage prepared subgrade for the paved ditch and installed precast manhole sections, redesigned manhole lids, and the collector box lid. ST Construction, Inc. completed concrete paved ditch construction on the east side of Ash Pond D and the pipe bollard and cleanout concrete slabs. Concrete testing was performed by Patriot Engineering, Inc. AAA Electric, Inc. installed various electrical lines and equipment. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued clay placement, construction of slope diversion berms and let-

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down channels, and finish grading on the south and east sides of Ash Pond D. Approximately 11 trucks were used to haul clay material to Ash Pond D. Refer to the daily reports for additional information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT D5G Bulldozer
CAT CS-323C Smooth Drum Roller
JLG 450AJ Articulating Boom Lift
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
John Deere 410J Backhoe
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
B&T Drainage (BTD) – Brian Schaefer and Michael Dashiell
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
ST Construction, Inc. (STC) – John Maetin, Gary Hedges, Scott Hilton, Robert Pressley, Kenneth Kientzel, and Mark Newlin
Patriot Engineering, Inc. (PEI) – Thad Simpson
Fawn Lane Transit, Inc. (FLT) – Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Tom Sager, Eric Bierman, Alan Ruholl, Patrick Wente, Frank Walton, and Greg Cornwell
Daylight Land Management (DLM) – Jon Ziliak
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, September 11, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: clay for the vegetative layer, four manhole sections, tops, and lids for the DS manholes, seven cap vent protective rings, precast top and aluminum hatch for the collector box, IDOT SI 4000 psi concrete, IDOT CA-6 gravel, IDOT CA-6 fill, and RR-03 rip rap.

Testing/Sampling

Patriot Engineering, Inc. performed concrete testing for the paved ditch, including slump and air entrainment testing. Four concrete cylinders were cast and retrieved each day for testing. Refer to the concrete testing records for additional information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer



Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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No. A 14897

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 9/10/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 60°AM, 80° PM | Contractor: AMS | Subcontr./Supplier: AAA, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 450AJ Lift, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Continued constructing the rip rap wall between the PGL and the paved gutter, as well as wrapped around the ends of the paved gutter, on the west side of Section C. RR-03 rip rap overlying 8 oz. nonwoven geotextile was used to build the wall and fill was placed behind the wall for bedding and to achieve ≈3' of cover at the PGL. Site remediation: This past weekend brought an additional 3" of rain to the rain that was received last week. AMS repaired the additional rock chute on the south end of Ash Pond D that was washed out, and began removing the washed out material burying the paved gutter on the west side of Ash Pond D. Other areas that contain gullies and washouts and will need repaired include the entire paved ditch, outfall swales to river, additional rock chutes on the northeast and west sides, and the drainage areas for the anchor trench outlet toe drains.

AAA:
Began hanging the three phase (A,B,C) Priority Wire 4/0AWG AL 600V XLPE aerial cables and messenger cable from the MCC-1 service pole onto the new power poles heading south towards the pump control service pole on the southeast corner of Ash Pond B.

FLT/BCI:
Began the additional clay placement based on the survey data. Clay placement began between the first 2 east/west slope diversion berms on the south end of Ash Pond D, heading westbound. Began constructing letdown channels between the slope diversion berms.

Other: Loads = 179
BTD delivery – 4 manhole sections for the DS manholes, 7 manhole sections for the cap vent rings, 4 manhole tops and aluminum hatch lids, and the collector box top and aluminum hatch.

Additional Comments:

Randy Poetra — Contractor Representative — AMS — Company — 9-10-12 — Date
Signature
Anna Saindon — Geotechnology Inc. — 9-19-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14898

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 9/11/12

TIME: Arrive: 6:00 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: 12.5 hrs (0.25 hr for lunch)
Weather: Sunny, 59°AM, 86°PM | Contractor: AMS | Subcontr./Supplier: AAA, BTD, STC, PEI, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 450AJ Lift, D5G Dozer, 410J Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Completed constructing the rip rap wall between the PGL and the paved gutter, as well as wrapped around the ends of the gutter, on the west side of Section C. Began installing the cap vent precast ring barriers. IDOT CA-6 fill was used as bedding for the ring barriers. Site remediation: Completed removing washed out material from the paved gutter.

AAA:
Continued hanging the three phase 4/0AWG aerial cables and messenger cable between the MCC-1 service pole and the pump control service pole on the southeast corner of Ash Pond B.

BTD:
Graded the washed out material on the south and east sides of Ash Pond D to allow vehicular traffic. Continued grading the paved ditch subgrade east of Ash Pond D.

STC:
Continued paved ditch concrete construction east of Ash Pond D. Three trucks delivered - 24 cy.

PEI:
Thad Simpson tested paved ditch concrete - Temp = 78°, Slump = 3", Air = 4.8%, and 4 cylinders cast.

FLT/BCI:
Ash Pond D was divided into 8 Sections to address the additional clay placement, or the clay issue recovery. Refer to the file - Clay Issue Recovery_JRC.pdf for the layout of the 8 Sections. Clay placement was completed in Section 1 and began in Section 2 heading westbound. Completed constructed letdown channels in Section 1 and Section 2.

Other:
Loads = 164
Pump commissioning has been extended to 9/28/12, which pushes substantial completion into the first week of October.

Additional Comments:

Randy Foertel — Contractor Representative — AMS — Company
Signature — 9-11-12 — Date
Anna Saindon — Geotechnology, Inc. — 9-19-12 — Date
Engineer's Signature

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No. A 14899

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: - | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: - | Client: Ameren ER | Date: 9/12/12

TIME: Arrive: 6:00 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: 12.25 hrs (0.25 hr for lunch)
Weather: Partly cloudy, 62°AM, 87°PM | Contractor: AMS | Subcontr./Supplier: AAA, BTD, STC, PEI, FLT, BCI, DLM
Equipment Working: D6N Dozer, 580 Backhoe, 450AJ Lift, D5G Dozer, 410J Backhoe, 450LC Excavator

Site Activities / Observations / Contacts / Notes:

AMS:
Completed installing the cap vent precast ring barriers with CA-6 fill bedding. Excavated and prepared the subgrade for the rock chute between the paved gutter culvert drain and the paved ditch. Excavated and built rip rap splash pads with class B2 rip rap for the anchor trench outlet toe drains on the south side of Ash Pond D. Refer to S-386, Sheet 10, Detail 2. Site remediation: Began removing washed out material from the paved ditch south of Ash Pond D.

AAA:
Continued hanging the three phase, 4/0AWG aerial cables and messenger wire between the MCC-1 and pump control service poles. Pulled fishing rope through the 2½" PVC conduit between the west and east pump control panels and the disconnect on the pump control service pole. Wired the floats from DS-4 in the pump control box on the east pump control panel.

BTD:
Continued grading the paved ditch subgrade and backfilling against the paved ditch on the east side of Ash Pond D. Completed constructing the bedding for the cleanout/bollard slabs. Grouted the bottom of the collector box with CW100 self-leveling grout up to the bottom of the 8" HDPE drainage outlet pipe. Installed manhole sections and tops onto the four DS manholes. Installed the collector box top and hatch onto the collector box. Site remediation: Rebuilt the outfall swale to river off of the northeast embankment of Ash Pond D.

STC:
Continued paved ditch concrete construction east of Ash Pond D. Four trucks delivered - 32 cy.

PEI: Tested paved ditch concrete - Temp = 78°, Slump = 3¼", 3", Air = 5.2%, and 4 cylinders cast.

FLT/BCI: Clay placement was completed in Section 2 and began in Section 3. Site remediation: Reconstructed slope diversion berms in Section 1, 2, and 3.

Additional Comments:

Landy Porter — AMS
Contractor Representative — Company
Signature — 9-12-12 Date
Anna Sandor — 9-19-12 Date
Geotechnology, Inc.
Engineer's Signature

Deliveries: CA-6 fill — Loads: 175
RR-03 rip rap
RR-04 rip rap

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No. A 14900

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: – | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: – | Client: Ameren ER | Date: 9/13/12

TIME: Arrive: 6:00 AM | Depart: 7:30 PM | Travel: 1.0 hr | Total: 14.25 hrs (0.25 hr for lunch)
Weather: Cloudy, 66°AM, Sunny 88° PM | Contractor: AMS | Subcontr./Supplier: AAA, BTD, STC, PEI, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 450AJ Lift, D5G Dozer, 410J Backhoe, 450 LC
Site Activities / Observations / Contacts / Notes: Excavator, 762B Scraper, CS-323C Roller, Water Truck

AMS:
Continued building rip rap splash pads with class B2 rip rap for the anchor trench outlet toe drains on the south end of Ash Pond D. Began constructing the additional rock chute, with RR-03 rip rap and 8 oz. non-woven geotextile between the paved gutter culvert and the beginning of the paved ditch on the southwest side of Ash Pond D. Installed the stainless steel threaded caps and mesh strainer caps onto the cap vents. Site Remediation: Repaired the box culvert swale and rock chute on the west side of Ash Pond D, and repaired and added length to the additional rock chute on the northeast embankment of Ash Pond D.

AAA:
Completed hanging the three phase 4/0AWG aerial cables and braided messenger cable between the MCC-1 and pump control service pole. Pulled the electric feeder, high voltage 4/0AWG cables with ground wire from the disconnect switch on the pump control service pole to the east pump control panel. Note- the overhead electric feed, three phase 480V is split into buried electric feed, single phase 240V when it leaves the disconnect and runs to the pump control panels. Pulled rope through the 2½" PVC conduit from the disconnect switch on the pump control service pole to the west pump control panel. When pulling the rope, the Powr-fish pull line broke inside the PVC conduit. The conduit had to be excavated on the southeast corner of Ash Pond A to get the string out. Anchored the high and low junction boxes onto the new section of DS-1 manhole. Ameren shut off the power to the MCC-1 and the building was tagged (LO/TO) for electrical installations. After disconnecting the power, the fire alarm went off on the Fire Protection Valve House north of the MCC-1. Greg Musch shut off the fire alarm/disconnected.

Additional Comments: NEXT PAGE

Randy Porter — AMS
Contractor Representative — Company
Signature — 9-13-12 Date
Anna Saindon — 9-19-12 Date
Geotechnology, Inc.
Engineer's Signature

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No. A 14901

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/13/12

TIME: Arrive: | Depart: | Travel: | Total:
Weather: | Contractor: | Subcontr/Supplier:
Equipment Working:
Site Activities / Observations / Contacts / Notes:

REFER TO PAGE 1

BTD:
Completed grading the paved ditch subgrade, placing CA-6 fill for bedding, and backfilling against the paved ditch east of Ash Pond D. Installed the aluminum lids onto the four manhole precast tops. All lids were sealed with ConSeal CS102 butyl rubber sealant. Released the inflated plug in the new 12" ADS field tile and poured the concrete plug in the existing 15" ADS field tile in the grade inlet southwest of DS-1. Site Remediation: Repaired the outfall swale to river at the end of the paved ditch on the east side of Ash Pond D.

STC:
Completed forming, stripping, pouring, finishing, curing, and saw cutting the paved ditch. Poured the cleanout/bollard slabs along the south property line. Three trucks delivered - 24 cy.

PEI:
Tested concrete for the paved ditch - Temp = 81°, Slump = 3", Air = 5%, and 4 cylinders cast.

FLT/BCI:
Additional clay placement was completed in Section 3 and began in Section 4. Fill material for Section 4 was also gained from cutting the east and northeast embankments of Ash Pond D. Began building letdown channels on the north end of Ash Pond D in Section 3 and 4. Added fill and backfilled against the paved ditch on the south side of Ash Pond D. Began finish grading on the south and east sides of Ash Pond D, as well as the embankments. Loads = 167

DLM:
Jon Ziliak arrived to prepare for landscaping/seeding and mulching.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company — 9-13-12
Signature — Date
Anna Sandon — Geotechnology, Inc. — 9-19-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14902

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/14/12

TIME: Arrive: 6:00 AM | Depart: 4:15 PM | Travel: 1.0 hr | Total: 11.0 hrs (0.25 hr for lunch)
Weather: Cloudy Rain, 58°AM, Sunny 75°PM | Contractor: AMS | Subcontr./Supplier: AAA, STC, FLT, BCI
Equipment Working: D6N Dozer, 450AJ Lift, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Equip. maint. and inspection, spotting trucks, and housekeeping across the site.

AAA:
Began pulling the high voltage, electric feeder 4/0AWG cables with ground wire from the disconnect switch on the pump control service pole to the west pump control panel. During the pull, the rope broke leaving the electrical lines abandoned. Various locations of the 2½" PVC conduit was excavated, but the buried electric was not found. More locations of the conduit will be excavated next week to retrieve the electrical lines and finish the pull. Pulled the three phase 4/0AWG aerial cables and messenger cable into the PVC and stainless steel 4" conduit on the MCC-1 service pole, into the MCC-1 building, to the spare bay. LPA was followed since the electric to the MCC-1 was disconnected. Anchored the 4" PVC conduit to the MCC-1 service pole. Pulled the high voltage, 4/0AWG electric feed through the 2½" stainless steel conduit on the Ash Pond C service pole, into the disconnect.

STC:
Sealed the expansion and contraction joints in the paved ditch with NP-1 sealant and stripped the hollard concrete slab forms. The slabs were cured after stripping. STC demobilized.

FLT/BCI:
Continued clay placement in Section 4 and began clay placement in Section 6. Continued cutting the east and northeast embankments of Ash Pond D for fill material in Section 4. Continued building letdown channels on the north end of Ash Pond D in Section 4. Loads = 121

Other:
The temporary discharge into the Bottom Ash Pond has been approved for commissioning.

Additional Comments:

Randy Patel — Contractor Representative — AMS — Company — 9-14-12 — Date
Signature
Geotechnology, Inc. — 9-19-12 — Date
Anna Sandra — Engineer's Signature

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MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 26 Minutes
Tuesday, September 11, 2012

01 PUBLICATION

Publish date:	2012-09-13	Submitted by:	PHZ
Distribution:	E-mail only	Notes taken by:	PHZ
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-09-11-PM-26
AER PO:	567523 R4	AMS-Charah Contract:	00030-01 AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
02	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
03	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
04	Mr.	Matt	Pugh	Charah - PCM	502-639-8075	mpugh@charah.com
05	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-09-11	OPEN: [01] no date set for WPA, M. Wagstaff sent e-mail to S. Bruner.
2012-09-04	OPEN: [01] J. King indicated that LOTO of MCC not sufficient, as other lines in. [02] M. Wagstaff to get with plant/local utility to review cut off power, and coordinate with J. King.

03 EMPLOYEE DRUG TESTING

2012-09-11	OPEN: [01] None projected. [02] AMS had random [company generated] drug test at the borrow site. No positives [return to work].
2012-09-04	OPEN - no issues. No testing scheduled.

04 AMS SAFETY

2012-09-11	[01] J. Tasich on site schedule TBD. P. Zinsious to check when Joko or Dave Valentine will be on site next. [02] No safety issues reported. [03] Damaged AMS cooling stations will have to replaced, not repaired. [04] AAA has 45 FT articulated lift on site [for power pole work]. Workers observe using harness and correct PPE. [05] P. Zinsious indicated report that safety recall for harnesses [involuntary safety recall from 3M on a self-retracting lanyard. The SRL is manufactured by IKAR under the THOR label]. R. porter indicated AMS does not have this style on site. [06] Brief discussion on the recent rains and muddy site.

2012-09-04 [01] J. Tasich on site schedule TBD.
[02] No safety issues reported.
[03] Plant Brothers power pole installation - M. Wagstaff inquire about strap/chocker for pole installation. AAA indicated standard procedure. Rigging was inspected, new choker. Installation [using forklift], work progressing safety. Work completed - CLOSE
[04] Humidity is high [increased temperatures], discussion about keeping hydrated.
[05] wind has damaged AMS cooling stations. R. Porter indicated will repair.
[06] AAA bringing 45 FT articulated lift on site [for power pole work].

05 HOUSEKEEPING

2012-09-11 OPEN - No issues, other than mud from the rains.

2012-09-04 OPEN - No issues.

06 PLANT ACCESS - CBT BADGE

2012-09-11 OPEN: No issues.
[01] Inquired about when guard would go 24/7. To be determined. M. Wagstaff indicated cameras still active on site.
[02] R. Porter locking new gate, [no open areas to plant], and will provide updated lock count to AER of approximately 7x locks, 2x keys. M. Wagstaff indicated will discuss with Greg Musch as Ameren has several locks available on site.
[03] M. Wagstaff indicated locks also for disconnects can come form the plant.

2012-09-04 OPEN: No issues.
[01] R. Porter reports wire for transmission project being delivered. Inquired about when guard would go 24/7.
[02] R. Porter locking new gate, [no open areas to plant], and will provide updated lock count to AER.
[03] M. Wagstaff indicated need to have locks also for disconnects.

08 OSHA LOG - WORK HOURS

2012-09-11 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13
No incidents or accidents.
9,085.00 RT
1,738.00 OT
10,823.00 TOTAL

2012-09-04 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-20.
No incidents or accidents.
8,854.00 RT
1,705.00 OT
10,559.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-09-11 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	1
06	FLT	0	0	0	0	10	0	0	0	0
07	FWI	0	0	0	0	0	0	0	0	0
08	GEO	0	1	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	0	0	0	0	0	0
11	STC	0	0	0	0	0	1	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 21

2012-09-04 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	0	0	0	0
05	CHI	0	0	0	1	0	1	0	0	1
06	FLT	0	0	0	0	14	0	0	0	0
07	FWI	0	0	0	0	0	0	0	0	0
08	GEO	0	1	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	2	0	1	0	0	0
11	STC	0	0	0	0	0	6	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 37

02 WORK HOURS AND OVERTIME

2012-09-11	OPEN: No issues. [01] Standard hours - 7:00 AM CT to 5:30 PM CT. Going back to subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.
2012-09-04	OPEN: No issues. [01] Standard hours - 7:00 AM CT to 5:30 PM CT. Some subcontractors starting changed to 07:00 AM CT due to light [safety] [02] Labor Day holiday 09-03 observed.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-09-11	OPEN: No issues. [01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. [02] Look ahead to removing GEO trailers on 09-28 to remain projected date. AMS to be determined.
2012-09-04	OPEN: No issues. [01] R. Porter reports electric utility bill for trailers transferred to Miller Construction. [02] Look ahead to removing trailers on 09-28 to remain projected date.

07 PREVIOUS

01 SUBCONTRACTS

2012-09-11	OPEN - no issues. P. Zinsious to tracked in legal. FWI pay application shows CO and approved. CLOSE
2012-09-04	OPEN - no issues. FWI CO in progress, will report when signature.

02 SUBMITTALS

20120-09-11	Submittal log dated 09-08 distributed and reviewed. [01] M. Wagstaff indicated review or geo roll inventory [Item No. 21]. [02] M. Wagstaff indicated bolt pattern and sealant for the DS hatch required. AMS submitted 09-11. [03] AMS has received digital reader submittal form FWI. AMS submitted 09-11. [04] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. Review in progress. [05] R. Porter reports not having information yet from subcontractors on record drawings. In progress.
20120-09-04	Submittal log - no update. [01] M. Wagstaff indicated bolt pattern and sealant for the DS hatch required. AMS to provide accordingly. [02] P. Zinsious reports that AAA has confirmed receipt of everything needed to proceed with work. CLOSE [03] AMS has received digital reader submittal form FWI. P. Zinsious to forward. [04] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. Review in progress. [05] R. Porter reports not having information yet from subcontractors on record drawings. In progress.

08 MATERIAL

01 GENERAL

2012-09-11	OPEN - listing for materials that have potential to impact schedule. [01] J. Cravens distributed sketch "Hutsonville Ash Pond D Closure - Clay Issue Recovery Layout" [not dated].
2012-09-04	OPEN - listing for materials that have potential to impact schedule. [01] General discussion of Baro sensor to be in separate panel box. P. Zinsious recommended FWI research with vendor if placed is electrical panel would other signals/inductance create and issue. J. King has no feedback, but does not see this as an issue. CLOSE [02] AMS presented copies of letter dated 08-31 "Clay issue recovery - Schedule and work plan": [01] AMS committed to bring in additional clay to make grade elevations. [02] M. Wagstaff inquired about QA/QC of grade. AMS will grade to stake and have Lamac check grade before seed and straw and the Massmann survey. [03] Review of CQA requirement [page A-2] for tolerance is 0 FT to - 0.4 FT. The maximum coverage is 3 FT. [04] Clay recovery duration not shown as additional activities, the activity "fine grade" duration to be extended. [05] M. Wagstaff inquired about scheduling overtime for placement of clay. Review of schedule indicates float. Considering the rain day taken today [09-04], this leaves only one rain day for the next week [as only two were used the recovery duration calculation as noted in the letter]. General discussion that next PM review of progress to determine overtime.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-09-11	OPEN - Discussion during Progress Meeting: [01] AMS to seal pipe with brick [8 IN ?] and mortar "long ways", and to cover face with non-shrink grout to seal pipe. This method is a no-cost change to Ameren.
2012-09-04	OPEN - Discussion during Progress Meeting: [01] R. Porter reported that Wampler has requested that [field drain] line be plugged. This line is off site, and not part of the scope of work, and is an issue with the agreement between AER and Wampler. General discussion and M. Wagstaff approved proceed to plug line as indicated on drawings.

10 QUALITY CONTROL

2012-09-11	No issues. [01] AMS received concrete break reports, and forwarded them on 09-11.
2012-09-04	[01] AMS received concrete field reports, and forwarded them .P. Zinsious to check on break reports. [02] DS-3 ring height issues due to re-grade of the paved concrete ditch. R. Porter indicated will be delivered with other precast.

11 SCHEDULE REVIEW

2012-09-11 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]

[01] Rain dates as listed.

[02] Major changes commentary:

- [01] Activities 220, 221 and 222 activities to be scheduled out by software.
- [02] AAA to meet with AMS after PM to review in detail electrical work schedule.
- [03] Change LP on 183 to Porter.

[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
	AAA-King	318	PCP-PCR - electrical final checkout		9/21/2012	9/21/2012		
	AAA-King	375	Pull power...		9/14/2012			
	AAA-King	380	Install new Power cables...		9/24/2012			
	AAA-King	385	WPA at Existing Coal...		9/14/2012			
	AAA-King	390	WPA to Disconnect...		9/24/2012			AAA - WPA LOTO
	AAA-King	395	Tie-in Electrical...		9/14/2012	9/17/2012		
	AAA-King	400	Energize...		9/21/2012			
	AAA-King	401	Testing of...		9/18/2012			
	AAA-King	124c	Install - DS Baro...			9/14/2012		
	AAA-King	279a	DS3 - Electrical wiring...		9/13/2012	9/13/2012		
	AAA-King	312b	PCS - East - Wire & Terminate...			9/20/2012	50%	
	AAA-King	313c	PCS - West - Wire...			9/6/2012	100%	
	AAA-King	385a	WPA for APD electrical...		9/14/2012			
	AAA-King	385b	Release WPA to Energize Ash...		9/17/2012			
	AAA-King	390a	Release WPA to Energize New...		9/26/2012			AAA - WPA LOTO
	AAA-King	390b	Commission Ash Pond C system		9/26/2012	9/27/2012		
	AAA-King	420a	Pull cables...	3	9/13/2012	9/17/2012		
	AER-Wagstaff	17	Permits - NPDES...			10/5/2012		
	AMS-Porter	111	Procure...			9/11/2012	100%	
	AMS-Porter	198	Perimeter...				50%	
	AMS-Porter	191	Earthwork APD - slope diversion...			9/7/2012	100%	
	AMS-Porter	192	Earthwork APD - let down				50%	
	AMS-Porter	193	Earthwork APD - rock chutes			9/17/2012	90%	
	AMS-Porter	196	Earthwork APD - fine grade				10%	Includes additional clay
	AMS-Porter	50a	Additional clay to Pass...			9/19/2012		
	AMS-Zinsious	189	Clay placement - Work List...		9/25/2012			
	AMS-Zinsious	217	Substantial...			10/2/2012		
	AMS-Zinsious	218	Commission Pump System		9/28/2012			
	AMS-Zinsious	219	Punch List - Walk...		10/2/2012			
	BTD-Boyer	237a	DS1 - Precast - set lid					Received 09-10
	BTD-Boyer	252a	DS2 - Precast - set lid					Received 09-10
	BTD-Boyer	272a	DS3 - Precast - set lid					Received 09-10
	BTD-Boyer	272c	Set DS3 upper ring section		9/13/2012	9/13/2012		
	BTD-Boyer	294a	DS4 - Precast - set lid					Received 09-10
	GEO-Saindon	11	Survey - APD - vegetative...	2 [duration]	9/20/2012	9/21/2012		
	GEO-Saindon	50b	Clay Certification (Final		9/21/2012	9/24/2012		
	LEC-Ridgely	15	Survey - APD - final			9/19/2012		

2012-09-04 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain date 09-04.
[02] Major changes commentary:
[01] Activities 221 and 222 activities to be scheduled out by software.
[02] Delete activities 185a, 185b, 186a, 186b, 187a, 187b, 188a, and 188b as the clay placement will not follow the original quadrant layout. Work for the additional clay placement is included in the "fine grade" activity, and not shown as additional activities, only extending the activity "fine grade" duration [ref. 08.01.2012-09-04.04 above].
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
	AAA-King	385	WPA at Existing Coal...		9/7/2012			
	AAA-King	385a	WPA for APD...		9/7/2012			
	AAA-King	375	Pull power...		9/10/2012	9/11/2012		
	AAA-King	395	Tie-in Electrical...		9/10/2012	9/11/2012		
	AAA-King	390	WPA to Disconnect...		9/10/2012			
	AAA-King	380	Install new Power cables...		9/10/2012	9/11/2012		
	AAA-King	390a	Release WPA to Energize New...		9/11/2012			
	AAA-King	124c	Install DS Baro...				75%	Waiting on DS-3 ring
	AAA-King	279a	DS3 - Electrical wiring...					Waiting on DS-3 ring
	AAA-King	301a	DS4 - Electrical...				100%	
	AAA-King	420	Install conduits...				100%	
	AAA-King	114	Procurement - receive - electrical...				100%	AAA possession
	AAA-King	420a	Pull cables...		9/6/2012	9/7/2012		
	AAA-King	313b	PCS - West - Mount...				100%	
	AAA-King	313c	PCS - West - Wire...		8/31/2012		25%	
	AAA-King	312a	PCS - East - Mount...			8/29/2012	100%	
	AMS-Boone	183	Site prep - CBS...			9/21/2012		
	AMS-Porter	191	Earthwork APD - slope diversion...				90%	
	AMS-Porter	193	Earthwork APD - rock chutes				100%	
	AMS-Zinsious	218	Commission Pump System		9/18/2012			
	AMS-Zinsious	217	Substantial...			9/25/2012		
	AMS-Zinsious	219	Punch List - Walk...		9/25/2012	9/25/2012		
	AMS-Zinsious	220	Punch List - Work...		9/26/2012			
	BTD-Boyer	237a	DS1 - Precast - set lid			9/10/2012		
	BTD-Boyer	252a	DS2 - Precast - set lid			9/10/2012		
	BTD-Boyer	252a	DS4 - Precast - set lid			9/10/2012		
	CHI-Williams	139	Fence - APD - install gate			8/29/2012	100%	R. Porter
	DLF-Ziliak	127	Procurement...				100%	
	DLF-Ziliak	210	Ground cover - mob...		9/17/2012	9/17/2012		
	DLF-Ziliak	211	Ground cover - hydro...		9/18/2012			
	DLF-Ziliak	212	Ground cover - TRM...		9/18/2012			
	DLF-Ziliak	120	Procurement...			9/4/2012	100%	
	FWI-Burch	316a	Hydro...			9/18/2012		
	GEO-Saindon	11	Survey - APD - vegetative...	1 [duration]	9/18/2012	9/19/2012		
	GEO-Saindon	50a	Clay - certification (Final)		9/19/2012	9/21/2012		
	LEC-Ridgely	15	Survey - APD - final			9/17/2012		
	LEC-Ridgely	13	Survey - CBS...			9/18/2012		
	STC-Hunt	207	Concrete - paved ditch - form and...			9/14/2012	75%	
	STC-Hunt	208	Concrete - paved ditch -			9/14/2012		

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-09-11 No issues. P. Zinsious inquired about retainage. Review of calculation on [draft as submitted to Ameren]. Balance over 90% billing to retainage. M. Wagstaff indicated will discuss with J. Skitt at Ameren.

2012-09-04 No issues. AMS to submit EOM draft. Copy for M. Wagstaff today.

12.1 EXTRA WORK ORDERS

AMS distributed HUT-APD-EWO-RPT-2012-09-06-R0 "EWO Basic Report". General discussions of EWO report, procedure, budget, and timing.

15	**EWO-15**	**FENCE ALIGNMENT**
	2012-09-11	OPEN - AMS to provide back-up information. [no report - work complete].
	2012-09-04	OPEN - AMS to provide back-up information. In progress.
17	**EWO-17**	**PAVED DITCH ALIGNMENT**
	2012-09-11	OPEN - Check grade to plan as possibly area included in grade.
	2012-09-04	OPEN - In progress.
18	**EWO-18**	**VENT PROTECTION RING**
	2012-09-11	OPEN - No report [in progress].
	2012-09-04	OPEN - M. Wagstaff has approved.
19	**EWO-19**	**COMMISSIONING**
	2012-09-11	M. Wagstaff indicated possible temporary discharge by IEPA, Ameren investigating. Transmitted packet of sketches and information for basic review of discharge piping option [ref. 16.2012-09-11.05 below for list].
	2012-09-04	OPEN - AMS to provide cost for installing a manifold at the collector box to tie together the DS discharge lines to a single discharge line. The single line will then be routed along the east berm of Ash Pond D to the existing Bottom Ash Pond, where water will be able to gravity flow into existing Ash Pond C. This temporary configuration will utilize the new DS pumps, eliminate confined space entry [for now] and will not require a generator/pump combination.
20	**EWO-20**	**ADDITIONAL RIP-RAP**
	2012-09-11	AMS provide cost.
	2012-09-04	OPEN - AMS to provide cost for installing additional rip-rap [RR-3] and geotextile material as necessary to accommodated for grade adjusted in the clay cap along the west slope adjacent to the paved gutter. M. Wagstaff indicated that a 1:1 slope is acceptable in this area. R. Porter and M. Wagstaff to review in the field today.
21	**EWO-21**	**FIELD TILE LOCATION - LENGTH [was EWO-14]**
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
22	**EWO-22**	**MECHANICAL CHANGES**
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
23	**EWO-23**	**CONCRETE CHANGES**
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
24	**EWO-24**	**CONDUIT AND PIPE SAND ENCASEMENT**
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
25	**EWO-25**	**ELECTRICAL OVERHEAD UTILITY CHANGES**
	2012-09-11	NEW - M. Wagstaff has approved.
26	**EWO-26**	**DS LID MODIFICATIONS FOR PIPING**
	2012-09-11	NEW - M. Wagstaff has approved.
27	**EWO-27**	**ADDITIONAL BOLLARDS FOR CLEANOUTS**
	2012-09-11	NEW - M. Wagstaff has approved.

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-09-11	No report.
	2012-09-04	No report.

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT [AMS]**	
	2012-09-11	No report.
	2012-09-04	No report.

15 PRODUCTION

03 CLAY

2012-09-11	OPEN - no issues [01] Placement as of 09-10 is 129,107 CY. [01] General discussion that CY count is "loose delivered" and that trucks CY count is 11 CY, but actually haul more. [02] Trucks were weighed in the beginning to make sure they are legal. [03] Overview of compaction requirements and lessons learned. [04] Estimated requirement to finish 17,000 CY in 8D projected [2,125 CY/D].
2012-09-04	OPEN - no issues [01] Placement as of 08-31 is 127,138 CY. [02] Additional clay to be placed to make grade elevations [ref. above 08.01.2012-08-28.03].

16 DOCUMENTS TRANSMITTED

2012-09-11	[01] AER - Last Planner schedule dated 09-04 [data date]. [02] GEO - Submittal Log dated 09-08. [03] AMS - HUT-APD-EWO-RPT-2012-09-06-R0 "EWO Basic Report" [04] GEO - "Hutsonville Ash Pond D Closure - Clay Issue Recovery Layout" [not dated]. [05] AMS - E-mail dated 2012-09-06-16:47 to M. Wagstaff "Hutsonville APD Closure - commissioning - DS discharge - temporary" wit the following attachments [full pump submittal not included only curve]: [01] SK-HUT-APD-025-R0 "Commissioning - DS discharge - Temporary discharge line route" [02] SK-HUT-APD-026-R0 "Commissioning - DS discharge - Collector box manifold" [03] SK-HUT-APD-027-R0 "Commissioning - DS discharge - Pump flow schematic' [04] 11x17 DS pump curve [05] MacAllister Cat Invoice R6873095800 [proposal] for 6 IN pump [06] FWI letter dated 2012-09-07 "Temporary discharge Drain Line"
2012-09-04	[01] AER - Last Planner schedule dated 08-28 [data date]. [02] AMS - letter dated 08-31 "Clay issue recovery - Schedule and work plan" [03] AMS - 1x 11x17 color copy of Lamac drawings from AMS letter dated 08-31 "Clay issue recovery - Schedule and work plan" to J. Cravens.

17 DOCUMENTS REVIEW ONLY

2012-09-11	B&T Drainage & Excavating letter dated 2012-09-04 to show cost of field collector tile [relative EWO-21].
2012-09-04	None.

18 NEXT PROGRESS MEETING

Next meeting will be held in one week - Tuesday, September 18, 2012 at Hutsonville

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Installing overhead electric lines facing south



Photograph 2 - Example of storm damage facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 10 and September 14, 2012

JRC



Photograph 3 - Vegetative layer placement facing northwest



Photograph 4 - Completed cap vent facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 10 and September 14, 2012

JRC



Photograph 5 - Manhole with lid facing south



Photograph 6 - Collector box hatch facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 10 and September 14, 2012

JRC



Photograph 7 - Clean out pipe slabs facing northwest



Photograph 8 - Paved ditch facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 10 and September 14, 2012

JRC

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Photograph 9 - Overview of Ash Pond D facing southeast



Photograph 10 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 10 and September 14, 2012

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: September 26, 2012

SUBJECT: Weekly Summary Report for September 17, 2012 to September 21, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally mostly cloudy to sunny with periods of rain. Temperature (°F) lows ranged from 39 to 63°F, and temperature highs ranged from 69 to 78°F. Weather delays did not occur this week.

Construction Activities

The following activities occurred this week: repairing impacts from storm events, additional rip rap wall and rock chute construction, PVC trench excavation and backfill, cap vent ring and cleanout concrete slab construction, finish grading, surveying, electrical installations, clay placement, and letdown channel construction. Ash Management Services, LLC repaired storm impacts to the rock chutes, swales, and paved ditch. The PVC trench between Ash Pond C service pole and pump control panel was excavated, PVC placed in the trench, and backfilled. The rip rap wall construction continued and the rock chute for the paved gutter culvert was completed. Geotextile and CA-6 stone was place inside the cap vent protective ring barriers. Rip rap was placed around the pipe bollard and cleanout concrete slabs and finish grading was performed south and east of Ash Pond D. Massmann Surveying and Lamac Engineering Co. surveyed the vegetative cover. AAA Electric, Inc. performed various electrical installations such as: junction boxes for the dewatering sumps, disconnect switches and electrical conduit for the service poles, high voltage buried electric feed, overhead electric, MCC-1 building, Ash Pond C service pole and pump control panel, dewatering sumps DS-1 and DS-2 junction boxes, and the west pump control panel. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued additional clay

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placement and completed construction of the letdown channels. Approximately 11 trucks were used to haul clay material to Ash Pond D. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT CS-323C Smooth Drum Roller
JLG 450AJ Articulating Boom Lift
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
Fawn Lane Transit, Inc. (FLT) – Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Tom Sager, Alan Ruholl, Patrick Wente, Frank Walton, Brian Griffith, and Greg Cornwell
Massmann Surveying (MMS) – Rick Koeac and Gary Delf
Lamac Engineering Co. (LEC) – Jake Lewis and Steve Anderson
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, September 18, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: RR-03 rip rap and IDOT CA-6 gravel.

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Testing/Sampling

AAA Electric, Inc. performed continuity testing on high voltage, single phase and three phase, 2/0 and 4/0 AWG electric cables. Refer to the electric testing records for additional information.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14906

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/20/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Partly Cloudy, 51° AM, Rain, Sunny, 73° PM | Contractor: AMS | Subcontr./Supplier: AAA, FLT, BCI, LEC, MMS
Equipment Working: D6N Dozer, 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS:

Backfilled the remaining trench between the Ash Pond C pump control panel and service pole, and transported the excess spoils to the south side of Ash Pond D to be used as fill. Began preparing and filling the bedding for an additional rip rap wall along the paved gutter on the west side of Section A. Continued disposing of the old fence materials in the construction yard.

AAA:

Pulled the high voltage, three phase 2/0AWG with 600V ground electrical feed from the Ash Pond C pump control panel to the Ash Pond C service pole. Installed the PVC conduit into the disconnect switch and installed the copper clad ground rod, with exothermic (CAD) welding the 600V ground, at the Ash Pond C service pole. Wired the three phase electrical feed in the disconnect switches on the Ash Pond C pump control panel and service pole, and locked out/tagged out the boxes. All electrical work is now completed for Ash Pond C. Wired the high voltage, single phase 4/0AWG electric feeder in the MPZ on the west pump control panel. Installed the copper clad ground rod, with exothermic (CAD) welding the 600V ground, at the pump control service pole, and locked out/tagged out the disconnect. All electrical work is now completed for the pump control service pole. Anchored the junction boxes onto the new manhole section at DS-2, and began wiring the joints for the sump pumps, floats, and paddlewheel (flow) sensor for the west system. Demobilized - JLG 450AJ Art. Lift.

FLT/BCI:

Continued additional clay placement in Section 6. Loads = 200

LEC/MMS:

Lamac and Massmann surveyed the certification grid points for Ash Pond D.

Additional Comments:

Randy Foster — Contractor Representative — AMS — Company
Signature — 9-20-12 — Date
Anna Saindon — Geotechnology, Inc. — 9-24-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14907

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 9/21/12

TIME: Arrive: 6:00 AM Depart: 5:45 PM Travel: 1.0 hr Total: 12.5 hrs (0.25 hr for lunch)
Weather: Cloudy, 50°AM, 78°PM Contractor: AMS Subcontr./Supplier: AAA, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS:
Continued preparing and filling the bedding for an additional rip rap wall along the paved gutter on the west side of Section A. Continued disposing of the old fence materials in the construction yard. Site Remediation: Completed repairing the box culvert rock chute and swale. Graded the plant access roads and performed housekeeping across the site.

AAA:
Dewatered around DS-3 and re-core drilled the holes for the high and low voltage junction boxes. Installed the junction boxes at a higher elevation at DS-3 and extended the PVC conduit to the junction boxes. Completed wiring all the connections for the pumps, floats, and flow sensors for DS-1, DS-2, and the west pump control panel. All the electrical work is now completed for the west end of the groundwater collection system, excluding the installation of the Baro-Readout Meter and activation of the Mini Divers.

FLT/BCI:
Completed additional clay placement in Section 6. Loads = 195

Additional Comments:

Contractor Representative: [signature] Company: AMS
Signature: [signature] Date: 9-21-12
Geotechnology, Inc.: Anna Saindon Date: 9-24-12
Engineer's Signature: [signature]

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 14903

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/17/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: 12.75 hrs (0.25 hr for lunch)
Weather: Cloudy, 63°AM, 73° PM | Contractor: AMS | Subcontr./Supplier: AAA, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 450AJ Lift, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Completed the additional rock chute, with RR-03 rip rap and 8 oz. non-woven geotextile, between the paved gutter culvert and the beginning of the paved ditch on the southwest side of Ash Pond D. Performed finish grading on the south and east sides of Ash Pond D. Backfilled the PVC conduit excavations on the southeast side of Ash Pond B from retrieving the broken lines from pulling electrical wires/cables. Site Remediation: Completed repairing and adding length to the additional rock chute on the northeast embankment of Ash Pond D, and removed washed out material from the paved ditch on the south side of Ash Pond D.

AAA:
Completed pulling the high voltage, electric feeder 4/0AWG, single phase cables with ground wire from the disconnect switch on the pump control service pole to the west pump control panel, through the 2½" PVC conduit. Repaired all PVC conduit from the excavations on the southeast side of Ash Pond B. Began wiring the connections for the ground on the Ash Pond C service pole. Installed an additional ceramic spool insulator on the power pole northwest of Ash Pond C to keep the overhead from coming into contact with the power pole. Installed the disconnect switch on the pump control service pole. Installed the ¾" x 10' copper clad ground rod at the pump control service pole. Cut #6 bare stranded aluminum cables for ground rods.

FLT/BCI:
Completed additional clay placement in Section 4 and began clay placement in Section 5. Completed the letdown channel in Section 4, completing all letdown channels. Loads = 176

Additional Comments:

Randy Potter — AMS
Contractor Representative — Company
Signature — 9-17-12 Date
Anna Saindon — 9-24-12
Geotechnology, Inc. — Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 14904

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/18/12

TIME: Arrive: 6:00 AM | Depart: 6:15 PM | Travel: 1.0 hr | Total: 13.0 hrs (0.25 hr for lunch)
Weather: Cloudy, 58°AM, Sunny, 69°PM | Contractor: AMS | Subcontr./Supplier: AAA, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 450AJ Lift, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Continued finish grading south of Ash Pond D. Placed 8oz. non-woven geotextile and CA-6 stone in the cap vent protective ring barriers, completing EWO-18. Built a gravel pad for the west pump control panel with 8 oz. non-woven geotextile and CA-6 stone. Placed RR-03 rip rap around the bollard/cleanout concrete slabs. Began disposing of the old fence materials stockpiled in the construction yard. Graded the plant access roads. Site Remediation: Continued removing washed out material from the paved ditch south of Ash Pond D. Delivery - CA-6.

AAA:
Wired the three phase and single phase 4/0AWG cables into the disconnect switch on the pump control service pole, completing all overhead electric and disconnect landings. Completed grounding all overhead messenger cables at the MCC-1, Ash Pond C, and pump control service poles. The ground was butt spliced at the pump control service pole, Kearney connected at the Ash Pond C service pole, and the messenger cable was grounded within the MCC-1 building for the MCC-1 service pole. Installed the stainless steel weather head and additional 2½" stainless conduit on the pump control service pole. Tightened all guy wires and straightened all power poles, completing all overhead electrical work. Drilled holes in disconnects for conduit and buried electric entry. Cut cables and prepared lugs for overhead electric landing to existing power in the spare breaker in the MCC-1 building. Tested the overhead electrical feeder, three phase 4/0AWG cables for continuity and shorts.

FLT/BCI:
Continued additional clay placement in Section 5. Loads = 178

Additional Comments:

Randy Patch — Contractor Representative — AMS — Company
Signature — 9-18-12 — Date
Anna Sanders — Geotechnology, Inc. — 9-24-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14905

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: –
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: –
Client: Ameren ER
Date: 9/19/12

TIME: Arrive: 6:00 AM Depart: 6:00 PM Travel: 1.0 hr Total: 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 39°AM, 73°PM Contractor: AMS Subcontr./Supplier: AAA, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS:
Excavated and backfilled the existing electrical feed between the Pump House and the Ash Pond C pump control panel. Excavated the new trench for the electrical conduit between the Ash Pond C service pole and pump control panel. The electrical conduit was haunched with FA-01 sand, detectable tape was placed over the conduit, and the trench was backfilled between the Ash Pond C service pole and pump control panel. Continued disposing of the old fence materials in the construction yard and grading the plant access roads.

AAA:
Installed lugs and wired the high voltage, thee phase 4/0AWG electrical feed in the spare breaker in the MCC-1 building. The WPA was released for the MCC-1 and Ameren reconnected the power supply to the building. The three phase 4/0AWG was tested for voltage and the spare breaker was turned off and locked out/tagged out to continue electrical work. All electrical work is now completed in the MCC-1 building. Removed the existing high voltage, three phase 2/0AWG w/600V ground buried electrical feed between the Pump House and the Ash Pond C pump control panel. The landing within the breaker box in the Pump House for the Ash Pond C pump control panel electrical feed was disconnected, and the breaker box remains in place to act as a spare breaker. All electrical work is now completed in the Pump House. Tied into the existing buried electrical conduit at the Ash Pond C pump control panel and installed new 2" PVC conduit from the Ash Pond C pump control panel to the Ash Pond C service pole. The existing buried electrical conduit was abandoned.

FLT/BCI: Completed clay placement in Section 5 and continued placement in Section 6. Site Remediation - graded the south and east embankments of Ash Pond D.

Additional Comments:
BTD: demobilized the D5G Dozer and 410J Backhoe.

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
9-19-12 — Date
Anna Sandu — Geotechnology, Inc.
9-24-12 — Date
[signature] — Engineer's Signature

Loads = 120

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 27 Minutes
Tuesday, September 18, 2012

01 PUBLICATION

Publish date:	2012-09-20	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-09-18-PM-27	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
04	Mr.	John	Denham	AMS - RM	502-609-0278	jdenham@ashmanagementservices.com
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-09-18	OPEN: [01] WPA opened on 09-13, work completed, AER [S. Bruner] to close. [02] J. King reports Ash Pond C pump station is on.
2012-09-11	OPEN: [01] no date set for WPA, M. Wagstaff sent e-mail to S. Bruner.

03 EMPLOYEE DRUG TESTING

2012-09-18	OPEN - no issues. No testing scheduled for worker screening. Post-incident drug testing in progress [ref. 04.2012-09-18.03 below].
2012-09-11	OPEN: [01] None projected. [02] AMS had random [company generated] drug test at the borrow site. No positives [return to work].

04 AMS SAFETY

2012-09-18

[01] J. Tasich on site schedule TBD. J. Tasich on site last week [Thu 09-13], and safety report [via e-mail]was published.
[02] No safety issues on site reported.
[03] J. Denham reports incident regarding Fawn Lane truck driver that ran truck off road into ditch on return to borrow site. Summary:
- [01] AMS to provide full report later today [09-18].
- [02] Truck was empty on way to borrow site. Driver had a bee get in the cab.
- [03] Driver had bee in cab. Truck ran of road in to ditch approximately 15:50 PM CT [yesterday 09-17].
- [04] Driver was not injured. Sent for post-incident drug testing.
- [05] Truck had to be removed form ditch by tow truck. First estimate of damage [by visual inspection], appears less than $ 500.
- [06] Incident not a "lost time" or "recordable".
- [07] AMS will address with the other subcontractors.
- [08] M. Wagstaff suggested this incident be part of Lessons Learned.

[04] Cooling stations not required, as weather turning.
[05] AAA bringing 45 FT articulated lift remains on site.

2012-09-ii

[01] J. Tasich on site schedule TBD. P. Zinsious to check when Joko or Dave Valentine will be on site next.
[02] No safety issues reported.
[03] Damaged AMS cooling stations will have to replaced, not repaired.
[04] AAA has 45 FT articulated lift on site [for power pole work]. Workers observe using harness and correct PPE.
[05] P. Zinsious indicated report that safety recall for harnesses [involuntary safety recall from 3M on a self-retracting lanyard. The SRL is manufactured by IKAR under the THOR label]. R. porter indicated AMS does not have this style on site.
[06] Brief discussion on the recent rains and muddy site.

05 HOUSEKEEPING

2012-09-18

OPEN: No issues.
[01] AMS begin cleaning up site to de-mob.
[02] R. Porter disposing of concrete and fence posts into dumpster. Will have to go form 40 CY to 30 CY due to weight.

2012-09-11

OPEN - No issues, other than mud from the rains.

06 PLANT ACCESS - CBT BADGE

2012-09-18

OPEN: No issues.
[01] General discussion on site security.
- [01] Guard now stationed on site on Fridays.
- [02] R. Porter reports no guard on Saturdays when there is work on the transmission project.
- [03] R. Porter also reports the guard doe not have a gate key, therefore when AMS leaves, so does the guard.
- [04] M. Wagstaff to investigate the situation.

[02] R. Porter locking new gate, [no open areas to plant], and will provide updated lock count to AER of approximately 7x locks, 2x keys. M. Wagstaff indicated will discuss with Greg Musch as Ameren has several locks available on site. M. Wagstaff has discussed with G. Musch, and R. Porter reports he was on site 09-13 and 09-14.

2012-09-11

OPEN: No issues.
[01] Inquired about when guard would go 24/7. To be determined. M. Wagstaff indicated cameras still active on site.
[02] R. Porter locking new gate, [no open areas to plant], and will provide updated lock count to AER of approximately 7x locks, 2x keys. M. Wagstaff indicated will discuss with Greg Musch as Ameren has several locks available on site.
[03] M. Wagstaff indicated locks also for disconnects can come form the plant.

08 OSHA LOG - WORK HOURS

2012-09-18 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-20.
No incidents or accidents.

9,540.00	RT
1,833.00	OT
11,373.00	**TOTAL**

2012-09-11 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13
No incidents or accidents.

9,085.00	RT
1,738.00	OT
10,823.00	**TOTAL**

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-09-18 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	FLT	0	0	0	0	11	0	0	0	0
07	FWI	0	0	0	0	0	0	0	0	0
08	GEO	0	1	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	0	0	0	0	0	0
11	STC	0	0	0	0	0	6	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 28

2012-09-11 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	1
06	FLT	0	0	0	0	10	0	0	0	0
07	FWI	0	0	0	0	0	0	0	0	0
08	GEO	0	1	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	0	0	0	0	0	0
11	STC	0	0	0	0	0	1	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 21

02 WORK HOURS AND OVERTIME

2012-09-18 OPEN: No issues. No change.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Going back to subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.

2012-09-11 OPEN: No issues.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Going back to subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-09-18 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
[02] GEO trailer to be removed around 10-19.
[03] AMS employee trailer to be removed 09-25.

2012-09-11 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction.
[02] Look ahead to removing GEO trailers on 09-28 to remain projected date. AMS to be determined.

07 PREVIOUS

01 SUBCONTRACTS

2012-09-18 OPEN - No issues.

2012-09-11 OPEN - no issues. P. Zinsious to tracked in legal. FWI pay application shows CO and approved. CLOSE

02 SUBMITTALS

20120-09-18 Submittal log dated 09-15 distributed and reviewed.
[01] Item No. 21 - M. Wagstaff indicated review or geo roll inventory. In progress.
[02] M. Wagstaff indicated bolt pattern and sealant for the DS hatch required. AMS submitted 09-11. CLOSE
[03] AMS has received digital reader submittal form FWI. AMS submitted 09-11. AMS to send submittal to AAA. CLOSE
[04] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. Review in progress.
[05] R. Porter gathering information from subcontractors on record drawings.
[06] AMS requiring all subcontractors' to have close-out information to AMS by 09-28 deadline.
[07] Item No. 26 - No longer required due to material change of the PCP.
[08] Item No. 81 - No longer required as information submitted under other submittals [and approved].

20120-09-11	Submittal log dated 09-08 distributed and reviewed. [01] M. Wagstaff indicated review or geo roll inventory [Item No. 21]. [02] M. Wagstaff indicated bolt pattern and sealant for the DS hatch required. AMS submitted 09-11. [03] AMS has received digital reader submittal form FWI. AMS submitted 09-11. [04] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. Review in progress. [05] R. Porter reports not having information yet from subcontractors on record drawings. In progress.

08 MATERIAL

01 GENERAL

2012-09-18	OPEN - listing for materials that have potential to impact schedule. [01] FLT not providing as many trucks [to haul clay], only 9x today [09-18], need 12x. Completion of the clay cap recovery potential to be done by next Tue [09-25] or Wed [09-26]. J. Denham to look into this matter with FLT.
2012-09-11	OPEN - listing for materials that have potential to impact schedule. [01] J. Cravens distributed sketch "Hutsonville Ash Pond D Closure - Clay Issue Recovery Layout" [not dated].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-09-18	OPEN - Discussion during Progress Meeting: [01] Pipe sealed with gap per GEO/AER e-mail earlier in the week. CLOSE
2012-09-11	OPEN - Discussion during Progress Meeting: [01] AMS to seal pipe with brick [8 IN ?] and mortar "long ways", and to cover face with non-shrink grout to seal pipe. This method is a no-cost change to Ameren.

10 QUALITY CONTROL

2012-09-18	No issues. [01] AMS received some Patriot billing that did not seem correct. P. Zinsious to research. [02] M. Wagstaff indicated the bill goes direct to GEO technology. No EWO.
2012-09-11	No issues. [01] AMS received concrete break reports, and forwarded them on 09-11.

11 SCHEDULE REVIEW

2012-09-18 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]

[01] Rain dates as listed. No change.

[02] Major changes commentary:

- [01] M. Wagstaff additional activities noted for Close Out.
- [02] Add milestone for hand-off on 10-05.
- [03] General discussion on Lamac survey before Massmann. No work on ground cover until after Massmann info back. Lamac is tentatively to be schedule on 09-19. Planning to have DLF mobilize on 09-24 for ground cover.

[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
	AAA-King	375	Pull power...			9/14/2012	100%	
	AAA-King	380	Install new Power cables...		9/21/2012			
	AAA-King	395	Tie-in Electrical...		9/21/2012	9/21/2012		
	AAA-King	124c	Install - DS Baro...			9/19/2012		
	AAA-King	279a	DS3 - Electrical wiring...			9/19/2012		
	AAA-King	385	WPA at Existing Coal...		9/13/2012		100%	
	AAA-King	385a	WPA for APD electrical...		7/1/1902		100%	
	AAA-King	385b	Release WPA to Energize Ash...		9/17/2012			Open - R. Porter to call.
	AAA-King	390	WPA to Disconnect...		9/21/2012			AAA - WPA LOTO
	AAA-King	390a	Release WPA to Energize New...		9/21/2012			AAA - WPA LOTO
	AAA-King	390b	Commission Ash Pond C system		9/21/2012			Dependent on 385b close.
	AAA-King	420a	Pull cables...				100%	
	AMS-Porter	198	Roadways - APD perimeter...			9/28/2012		
	AMS-Porter	199	Roadways - PCS -			9/28/2012		
	AMS-Porter	198a	Roadways on plant			9/28/2012		
	AMS-Porter	192	Earthwork APD - let down				100%	
	AMS-Porter	193	Earthwork APD - rock chutes				100%	
	AMS-Porter	196	Earthwork APD - fine grade			9/25/2012	50%	Includes additional clay
	AMS-Porter	50a	Additional clay to Pass...			9/25/2012	50%	
	AMS-Zinsious	189	Clay placement - Work List...		10/1/2012	10/1/2012		
	AMS-Zinsious	218	Commission Pump System	5	10/1/2012	10/5/2012		
	AMS-Zinsious	219	Punch List - Walk...		10/1/2012			
	AMS-Zinsious	217	Substantial Completion			10/1/2012		
	BTD-Boyer	237a	DS1 - Precast - set lid				100%	
	BTD-Boyer	252a	DS2 - Precast - set lid				100%	

	BTD-Boyer	272a	DS3 - Precast - set lid				100%	
	BTD-Boyer	272c	Set DS3 upper ring section				100%	
	BTD-Boyer	294a	DS4 - Precast - set lid				100%	
	DLF-Ziliak	201	Ground cover - mob...			9/24/2012		
	GEO-Saindon	11	Survey - APD - vegetative...		9/26/2012	9/27/2012		
	GEO-Saindon	50b	Clay Certification (Final			9/28/2012		
	STC-Hunt	207	Concrete - paved ditch...				100%	
	STC-Hunt	208	Concrete - paved ditch...				100%	

2012-09-11 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain dates as listed.
[02] Major changes commentary:
[01] Activities 220, 221 and 222 activities to be scheduled out by software.
[02] AAA to meet with AMS after PM to review in detail electrical work schedule.
[03] Change LP on 183 to Porter.
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
	AAA-King	318	PCP-PCR - electrical final checkout		9/21/2012	9/21/2012		
	AAA-King	375	Pull power...		9/14/2012			
	AAA-King	380	Install new Power cables...		9/24/2012			
	AAA-King	385	WPA at Existing Coal...		9/14/2012			
	AAA-King	390	WPA to Disconnect...		9/24/2012			AAA - WPA LOTO
	AAA-King	395	Tie-in Electrical...		9/14/2012	9/17/2012		
	AAA-King	400	Energize...		9/21/2012			
	AAA-King	401	Testing of...		9/18/2012			
	AAA-King	124c	Install - DS Baro...			9/14/2012		
	AAA-King	279a	DS3 - Electrical wiring...		9/13/2012	9/13/2012		
	AAA-King	312b	PCS - East - Wire & Terminate...			9/20/2012	50%	
	AAA-King	313c	PCS - West - Wire...			9/6/2012	100%	
	AAA-King	385a	WPA for APD electrical...		9/14/2012			
	AAA-King	385b	Release WPA to Energize Ash...		9/17/2012			
	AAA-King	390a	Release WPA to Energize New...		9/26/2012			AAA - WPA LOTO
	AAA-King	390b	Commission Ash Pond C system		9/26/2012	9/27/2012		
	AAA-King	420a	Pull cables...	3	9/13/2012	9/17/2012		
	AER-Wagstaff	17	Permits - NPDES...			10/5/2012		
	AMS-Porter	111	Procure...			9/11/2012	100%	
	AMS-Porter	198	Perimeter...				50%	
	AMS-Porter	191	Earthwork APD - slope diversion...			9/7/2012	100%	
	AMS-Porter	192	Earthwork APD - let down				50%	
	AMS-Porter	193	Earthwork APD - rock chutes			9/17/2012	90%	
	AMS-Porter	196	Earthwork APD - fine grade				10%	Includes additional clay
	AMS-Porter	50a	Additional clay to Pass...			9/19/2012		
	AMS-Zinsious	189	Clay placement - Work List...		9/25/2012			
	AMS-Zinsious	217	Substantial...			10/2/2012		
	AMS-Zinsious	218	Commission Pump System		9/28/2012			
	AMS-Zinsious	219	Punch List - Walk...		10/2/2012			
	BTD-Boyer	237a	DS1 - Precast - set lid					Received 09-10
	BTD-Boyer	252a	DS2 - Precast - set lid					Received 09-10
	BTD-Boyer	272a	DS3 - Precast - set lid					Received 09-10
	BTD-Boyer	272c	Set DS3 upper ring section		9/13/2012	9/13/2012		
	BTD-Boyer	294a	DS4 - Precast - set lid					Received 09-10
	GEO-Saindon	11	Survey - APD - vegetative...	2 [duration]	9/20/2012	9/21/2012		
	GEO-Saindon	50b	Clay Certification (Final		9/21/2012	9/24/2012		
	LEC-Ridgely	15	Survey - APD - final			9/19/2012		

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-09-18 No issues. M. Wagstaff indicated add note [as shown on e-mail], proceed with submission to AER AP. CLOSE

2012-09-11 No issues. P. Zinsious inquired about retainage. Review of calculation on [draft as submitted to Ameren]. Balance over 90% billing to retainage. M. Wagstaff indicated will discuss with J. Skitt at Ameren.

12.1 EXTRA WORK ORDERS

15	**EWO-15**	**FENCE ALIGNMENT**
	2012-09-18	OPEN - AMS to provide back-up information. In progress.
	2012-09-11	OPEN - AMS to provide back-up information. [no report - work complete].
17	**EWO-17**	**PAVED DITCH ALIGNMENT**
	2012-09-18	OPEN - AMS to provide back-up information. In progress.
	2012-09-11	OPEN - Check grade to plan as possibly area included in grade.
18	**EWO-18**	**VENT PROTECTION RING**
	2012-09-18	OPEN - All rings set in place, fabric and stone remains to be installed.
	2012-09-11	OPEN - No report [in progress].
19	**EWO-19**	**COMMISSIONING**
	2012-09-18	OPEN - M. Wagstaff gave oral approval to AMS. Work scheduled by FWI for Sat 09-28, this will allow for pumps to be operational on 10-01. AMS to provide written EWO request.
	2012-09-11	M. Wagstaff indicated possible temporary discharge by IEPA, Ameren investigating. Transmitted packet of sketches and information for basic review of discharge piping option [ref. 16.2012-09-11.05 below for list].
20	**EWO-20**	**ADDITIONAL RIP-RAP**
	2012-09-18	AMS provide cost. In progress.
	2012-09-11	AMS provide cost.
21	**EWO-21**	**FIELD TILE LOCATION - LENGTH [was EWO-14]**
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
22	**EWO-22**	**MECHANICAL CHANGES**
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
23	**EWO-23**	**CONCRETE CHANGES**
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
24	**EWO-24**	**CONDUIT AND PIPE SAND ENCASEMENT**
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
	2012-09-11	NEW - AMS to investigate addenda drawings to see if already included in the bid.
25	**EWO-25**	**ELECTRICAL OVERHEAD UTILITY CHANGES**
	2012-09-18	OPEN - AMS to provide written EWO request for processing.
	2012-09-11	NEW - M. Wagstaff has approved.
26	**EWO-26**	**DS LID MODIFICATIONS FOR PIPING**
	2012-09-18	OPEN - AMS to provide written EWO request for processing.
	2012-09-11	NEW - M. Wagstaff has approved.
27	**EWO-27**	**ADDITIONAL BOLLARDS FOR CLEANOUTS**
	2012-09-18	OPEN - AMS to provide written EWO request for processing.
	2012-09-11	NEW - M. Wagstaff has approved.
28	**EWO-28**	**TAX EXEMPTION**
	2012-09-18	NEW - General discussion for potential EWO due to City of Robinson not renewing tax exemption. AMS to verify no charges from subs.

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-09-18	No report.
	2012-09-11	No report.

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT [AMS]**	
	2012-09-18	No report.
	2012-09-11	No report.

15 PRODUCTION

03 CLAY

2012-09-18	OPEN - no issues [01] Placement as of 09-17 is 137,951 CY. [02] Additional clay to be placed to make grade elevations [ref. above 08.01.2012-08-28.03] in progress.
2012-09-11	OPEN - no issues [01] Placement as of 09-10 is 129,107 CY. [01] General discussion that CY count is "loose delivered" and that trucks CY count is 11 CY, but actually haul more. [02] Trucks were weighed in the beginning to make sure they are legal. [03] Overview of compaction requirements and lessons learned. [04] Estimated requirement to finish 17,000 CY in 8D projected [2,125 CY/D].

16 DOCUMENTS TRANSMITTED

2012-09-18	[01] AER - Last Planner schedule - Current date 09-14 - Data date 09-04 [02] GEO - "Hutsonville Ash Pond D Closure - Clay Issue Recovery Layout" [not dated]. [03] GEO - Submittal Log dated 09-15.
2012-09-11	[01] AER - Last Planner schedule dated 09-04 [data date]. [02] GEO - Submittal Log dated 09-08. [03] AMS - HUT-APD-EWO-RPT-2012-09-06-R0 "EWO Basic Report" [04] GEO - "Hutsonville Ash Pond D Closure - Clay Issue Recovery Layout" [not dated]. [05] AMS - E-mail dated 2012-09-06-16:47 to M. Wagstaff "Hutsonville APD Closure - commissioning - DS discharge - temporary" wit the following attachments [full pump submittal not included only curve]: [01] SK-HUT-APD-025-R0 "Commissioning - DS discharge - Temporary discharge line route" [02] SK-HUT-APD-026-R0 "Commissioning - DS discharge - Collector box manifold" [03] SK-HUT-APD-027-R0 "Commissioning - DS discharge - Pump flow schematic' [04] 11x17 DS pump curve [05] MacAllister Cat Invoice R6873095800 [proposal] for 6 IN pump [06] FWI letter dated 2012-09-07 "Temporary discharge Drain Line"

17 DOCUMENTS REVIEW ONLY

2012-09-18	None.
2012-09-11	B&T Drainage & Excavating letter dated 2012-09-04 to show cost of field collector tile [relative EWO-21].

18 MEETING SCHEDULE

2012-09-18 Changed category form "Next Progress Meeting" to "Meeting Schedule". Schedule for upcoming meetings:

[01] Progress Meeting	Tuesday	September 25, 2012	Standard.
[02] Progress Meeting	**Monday**	**October 1, 2012**	**Day earlier than normal schedule.**
[03] AMS-AER Operations Transfer	Friday	October 5, 2012	To be confirmed.
[03] Lesson Learned	TBD		

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01 S. Tincher	AAA
02 M. Burch	FWI
03 T. Boyer	BTD
04 T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 ⮝ - Rock chute for paved gutter culvert facing south



Photograph 2 ⮝ - Pulling electric to west pump control panel facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 17 and September 21, 2012.

JRC



Photograph 3 - Vegetative layer placement facing east



Photograph 4 - Rock bedding in cap vent protective barriers facing north

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 17 and September 21, 2012.

JRC



Photograph 5 - Gravel pad for west pump control panel facing northeast



Photograph 6 - Rip rap around cleanout concrete slabs facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 17 and September 21, 2012.

JRC



Photograph 7 - PVC conduit for Ash Pond C electrical feed facing south



Photograph 8 - Vegetative layer placement facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 17 and September 21, 2012.

JRC



Photograph 9 - Overview of Ash Pond D facing southeast



Photograph 10 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 17 and September 21, 2012.

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 1, 2012

SUBJECT: Weekly Summary Report for September 24, 2012 to September 29, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally mostly cloudy with rain, having periods of clear skies. Temperature (°F) lows ranged from 34 to 63°F, and temperature highs ranged from 70 to 75°F. Weather delays occurred on September 25, 26, 27, and 28.

Construction Activities

The following activities occurred this week: rip rap wall construction, finish grading, electrical installations, ground cover, temporary discharge line installation, and clay placement. Ash Management Services, LLC continued construction of the rip rap wall along the paved gutter on the west side of Quadrant A, and finish graded the vegetative cover. AAA Electric, Inc. completed the electrical installations for the groundwater collection system, excluding final installations for the Diver system and electrical testing, and installed the protective covers for the guy wires. Daylight Land Management began ground cover activities, such as seeding and fertilizing prior to installing the turf reinforcement mats. Freitag-Weinhardt, Inc. installed the headers, manifold, and flexible hose for the temporary discharge line from the collector box to the Bottom Ash Pond. Fawn Lane Transit, Inc. and Belt Construction, Inc. continued clay placement for the vegetative layer. Approximately 11 trucks were used to haul clay material to Ash Pond D. Refer to the daily reports for detailed information.

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Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT CS-323C Smooth Drum Roller
John Deere 762B Paddlewheel Scraper
John Deere 450 LC Excavator
John Deere 7330 Tractor
Case 580 Backhoe
Kubota L245DT Tractor
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
AAA Electric, Inc. (AAA) – Joseph King and Kyle Davidson
Fawn Lane Transit, Inc. (FLT) – Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Tom Sager, Alan Ruholl, Patrick Wente, Frank Walton, Brian Griffith, and Greg Cornwell
Daylight Land Management (DLM) – Jon Ziliak, Adam Ziliak, and Billy Georges
Freitag-Weinhardt, Inc. (FWI) – Scott Burch and Jarrod Barrett
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, September 25, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: RR-03 rip rap, Wyatt Seed Co. dry seed mix, Loveland Products 19-19-19 dry fertilizer, Western Excelsior Corp. Excel PP5-10 Turf Reinforcement Mat, and Western Excelsior Corp. Excel CC-4 Erosion Control Blanket.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer



Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

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No. A 14908

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/24/12

TIME: Arrive: 6:00 AM | Depart: 7:00 PM | Travel: 1.0 hr | Total: 13.75 hrs (0.25 hr for lunch)
Weather: Sunny, 34°AM, 72°PM | Contractor: AMS | Subcontr./Supplier: AAA, DLM, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 7330 Tractor
Site Activities / Observations / Contacts / Notes:

AMS:
Demobilized employee trailer. Filled and graded low areas of the vegetative cover and slope diversion berms. Completed disposing old fence materials in the construction yard.

AAA:
Installed PVC conduit over all the exothermic welded ground cables, and markers/protectors over all the guy wires for the new power poles. Pulled the high and low voltage electric from the east pump control panel to DS-3. Completed wiring all the connections and joints for the pumps, floats, and flow sensors for DS-3, DS-4, and the east pump control panel. All the electrical work is now completed for the east end of the groundwater collection system, excluding the installation of the Baro-Readout Meter and activation of the Mini Divers.

DLM:
Personnel - Jon Ziliak, Adam Ziliak, and Billy Georges. Mobilized - John Deere 7330 Tractor with Reveal 4in1 and 741 self-leveling lift. Began final ground cover for the letdown channels and the northwest groin. The subgrade was prepared, and was fertilized with 19-19-19 dry bagged fertilizer and seeded with turf type dry bagged seed. Excel PP5-10 turf reinforcement mat (100% synthetic) was installed by placing and stapling on the prepared letdown channels and northwest groin. Delivery - Wyatt Seed Co. dry seed mix, Loveland Products dry 19-19-19 fertilizer, and Western Excelsior Corp. Excel PP5-10 turf reinforcement mat rolled erosion control product (RECP) with 100% synthetic components.

FLT/BCI:
Began additional clay placement in Section 7, and filled/graded low areas. Loads = 176

Additional Comments: AMS: Began placing RR-03 rip rap and 8oz. non-woven geotextile for the additional rip rap wall along the paved gutter west of Section A.

Randy Foster — Contractor Representative — AMS — Company
Signature — 9-24-12 — Date
Anna Saindon — Geotechnology, Inc — 11-1-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14909

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/25/12

TIME: Arrive: 6:00 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 10.5 hrs (0.5 hr for lunch)
Weather: Rain, 54° AM, 70° PM | Contractor: AMS | Subcontr./Supplier: AAA
Equipment Working: None
Site Activities / Observations / Contacts / Notes:

AAA:
Patched unused core holes in DS-3 manhole. Performed housekeeping from electrical installations. All major electrical work items have been completed. Work items remaining include installation of the Baro-Readout meters, engraved name plates for labels, activation of the Diver level sensors, and commissioning of the system. Electrical testing remaining includes continuity and megger.

Other:
Weather Delay, no other work items occured.

Meeting:
Pump commissioning remains scheduled for 10/1/12. Substantial completion has been moved to 10/5/12, moving Project End to 10/17/12.

Note:
As-built drawings are currently being produced by Lamac/AMS and will require further editing and approval from myself before they are submitted to Ameren.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 9-25-12 — Date
Anna Saindon — Geotechnology, Inc. — 10-1-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14910

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/26/12

TIME: Arrive: 6:30 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 9.75 hrs (0.25 hr for lunch)
Weather: Rain, 56° AM, 73° PM | Contractor: AMS | Subcontr./Supplier: DLM
Equipment Working: 7330 Tractor
Site Activities / Observations / Contacts / Notes:

AMS:
Continued constructing the additional rip rap wall along the paved gutter west of Section A.

DLM:
Delivery - Western Excelsior Excel CC-4 extended term Erosion Control Blanket rolled erosion control product (RECP).

Misc.:
BTD demobilized the John Deere 450LC Excavator and 762B Paddlewheel Scraper.

Other:
Weather delay, no other work items occured.

Additional Comments:

Contractor Representative | Company AMS
Signature | Date 9-26-12
Anna Saindon
Geotechnology, Inc. | Date 10-1-12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14911

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: —
Client: Ameren ER
Date: 9/27/12

TIME: Arrive: 6:30 AM Depart: 3:15 PM Travel: 1.0 hr Total: 9.5 hrs (0.25 hr for lunch)
Weather: Rain, 63° AM, Partly 75° cloudy, PM Contractor: AMS Subcontr./Supplier: None
Equipment Working: None
Site Activities / Observations / Contacts / Notes:

AMS:
Delivery - RR-03 rip rap. Performed maint. on equipment.

Misc.:
James Griffith met with AMS to discuss the truck issue for completing clay placement in a timely manner. Clay placement will resume next Monday due to the wet conditions. Final surveying of the vegetative cover and other site features for the As-Built will begin on Wednesday.

Other:
Weather Delay, no productive work items occured.

Additional Comments:

Randy Porter
Contractor Representative
9-27-12
Company

Signature
9-27-12
Date

Anna Saindon
Geotechnology, Inc.
10-1-12
Date

Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 14912

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/28/12

TIME: Arrive: 6:30 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 9.75 hrs (0.25 hr for lunch)
Weather: Cloudy, 61°AM, Sunny, 75°PM | Contractor: AMS | Subcontr./Supplier: None
Equipment Working: 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS:
Continued constructing the additional rip rap wall along the paved gutter west of Section A. Performed housekeeping and graded the plant access roads.

Misc.:
BTD demobilized the Kubota L245DT Tractor and box blade, backhoe buckets, and remaining pipe.

Other:
Weather Delay, no other work items occured.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 9-28-12 — Date
Donna Saindon — Geotechnology, Inc. — 10-1-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 15002

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 9/29/12

TIME: Arrive: 6:30 AM | Depart: 3:30 PM | Travel: 1.0 hr | Total: 9.75 hrs (0.25 hr for lunch)
Weather: Sunny, 52° AM, 74° PM | Contractor: AMS | Subcontr./Supplier: FWI
Equipment Working: 580 Backhoe
Site Activities / Observations / Contacts / Notes:

Pump Commissioning Temporary Discharge:
FWI and AMS installed the temporary discharge line for sump pump commissioning for the groundwater collection system. The temporary discharge line runs from the collector box on the northeast corner of Ash Pond D, to the Bottom Ash Pond. Four 3" HDPE prefabricated headers were used to connect to the four 3" HDPE sump discharge pipes, inside the collector box, to bring the discharge to the top of the collector box. The headers were short and had to be extended by butt fusion welding additional 3" HDPE pipe. A McElroy Pitbull No. 14 was used for butt fusion. The headers were electrofusion welded to the sump discharge pipes with Central 3" couplings. A Central Easy Fuse Electrofusion Processor was used for electrofusion. The headers were connected to a steel 3" to 6" converter manifold on top of the collector box. The 6" flexible temporary discharge hose was also connected to the steel converter manifold. The headers and flexible hose was bolted to the manifold, and the manifold was anchored to the collector box. The 6" flexible temporary discharge hose was staged, connected by metal bands, and anchored approx. 1400' along the PGL on the northeast embankment of Ash Pond D from the collector box to the bottom ash pond.

AMS:
Continued constructing the rip rap wall along the paved gutter west of Section A.

Additional Comments:

Contractor Representative: [signature] | Company: AMS
Signature | Date: 9-29-12
Geotechnology, Inc | Date: 10-1-12
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 28 Minutes
Tuesday, September 25, 2012

01 PUBLICATION

Publish date:	2012-10-01	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-09-25-PM-28	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah C4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
04	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr.	Joko	Tasich	Charah	502-649-7633	jtasich@charah.com
06	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-09-25	OPEN: [01] WPA opened on 09-13, work completed, AER closed 09-18. [02] J. King indicated no WPA required for continuity or megger testing on 10-01. [03] J. King reported that conduit for connection at Ash Pond C was deep [6FT to 7FT below grade].
2012-09-18	OPEN: [01] WPA opened on 09-13, work completed, AER [S. Bruner] to close. [02] J. King reports Ash Pond C pump station is on.

03 EMPLOYEE DRUG TESTING

2012-09-25	OPEN: [01] None projected. DLM may have some workers to schedule [TBD]. [02] FLT driver involved in last week incident results for DT returned negative, and driver returned to work 09-19.
2012-09-18	OPEN - no issues. No testing scheduled for worker screening. Post-incident drug testing in progress [ref. 04.2012-09-18.03 below].

04 AMS SAFETY

2012-09-25	[01] Correct last week report date [Thu 09-19]. [02] No safety issues reported. [03] J. Tasich reported site down due to rain and lightning. No work, but be aware of muddy site, slips and trips. [04] FWI work this Saturday [09-29] in the collector box will not require confined space entry [permit]. [05] FLT incident DT - negative results [ref. 05.03.2012-09-18.02 above]. [06] R. Porter addressed FLT incident with workers [last week]. [07] R. Porter has to silence the fire pump system alarm at the plant periodically until AER personnel reset the system due to WPA. [08] AAA lift off-site.

2012-09-18 [01] J. Tasich on site schedule TBD. J. Tasich on site last week ~~[Thu 09-13]~~, [09-19] and safety report [via e-mail]was published.
[02] No safety issues on site reported.
[03] J. Denham reports incident regarding Fawn Lane truck driver that ran truck off road into ditch on return to borrow site. Summary:
[01] AMS to provide full report later today [09-18].
[02] Truck was empty on way to borrow site. Driver had a bee get in the cab.
[03] Driver had bee in cab. Truck ran of road in to ditch approximately 15:50 PM CT [yesterday 09-17].
[04] Driver was not injured. Sent for post-incident drug testing.
[05] Truck had to be removed form ditch by tow truck. First estimate of damage [by visual inspection], appears less than $ 500.
[06] Incident not a "lost time" or "recordable".
[07] AMS will address with the other subcontractors.
[08] M. Wagstaff suggested this incident be part of Lessons Learned.
[04] Cooling stations not required, as weather turning.
[05] AAA bringing 45 FT articulated lift remains on site.

05 HOUSEKEEPING

2012-09-25 OPEN: No issues.
[01] Excess fence material [used, in good condition] taken down during demolition to be moved on site by AMS to the storage yard.. R. Porter estimates about 750 FT of fence fabric, top rail, and one gate [double 8 FT].
[02] R. Porter disposing of concrete and fence posts into dumpster. Will have to go form 40 CY to 30 CY due to weight.

2012-09-18 OPEN: No issues.
[01] AMS begin cleaning up site to de-mob.
[02] R. Porter disposing of concrete and fence posts into dumpster. Will have to go form 40 CY to 30 CY due to weight.

06 PLANT ACCESS - CBT BADGE

2012-09-25 OPEN: No issues.
[01] General discussion on site security.
[01] Guard now stationed on site on 5D x 8HRS, which is less time than previous.
[02] Issue with site open, and no guard remains.
[03] M. Wagstaff to investigate the situation, and forward MM to B. Simmons [AER].
[02] Lock final count and distribution to be determined after SC, when AMS leaves site.

2012-09-18 OPEN: No issues.
[01] General discussion on site security.
[01] Guard now stationed on site on Fridays.
[02] R. Porter reports no guard on Saturdays when there is work on the transmission project.
[03] R. Porter also reports the guard doe not have a gate key, therefore when AMS leaves, so does the guard.
[04] M. Wagstaff to investigate the situation.
[02] R. Porter locking new gate, [no open areas to plant], and will provide updated lock count to AER of approximately 7x locks, 2x keys. M. Wagstaff indicated will discuss with Greg Musch as Ameren has several locks available on site. M. Wagstaff has discussed with G. Musch, and R. Porter reports he was on site 09-13 and 09-14.

08 OSHA LOG - WORK HOURS

2012-09-25 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-13
No incidents or accidents.
9,812.00 RT
1,911.00 OT
11,723.00 TOTAL

2012-09-18 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] 08-20.
No incidents or accidents.
9,540.00 RT
1,833.00 OT
11,373.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-09-25 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	3	0	0	0
07	FLT	0	0	0	0	11	0	0	0	0
08	FWI	0	0	0	0	0	0	0	0	0
09	GEO	0	1	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	1	1	2	12	5	0	2	0

Total on site: 23

2012-09-18 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	2	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	FLT	0	0	0	0	11	0	0	0	0
07	FWI	0	0	0	0	0	0	0	0	0
08	GEO	0	1	0	0	0	0	0	0	0
09	LEC	0	0	0	0	0	0	0	0	0
10	PLB	0	0	0	0	0	0	0	0	0
11	STC	0	0	0	0	0	6	0	0	0
12	Z-3	0	0	0	0	0	0	0	0	0

Total on site: 28

02 WORK HOURS AND OVERTIME

2012-09-25 OPEN: No issues. No change.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Continue early start some subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.
[02] AMS and FWI scheduled to work this Saturday 09-29 to install DS temporary discharge line.

2012-09-18 OPEN: No issues. No change.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Going back to subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-09-25 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
[02] GEO trailer to be removed around 10-19.
[03] AMS employee trailer off-site.
[04] DLM to bring equipment on site - "4N1", hydro seeder, and tractor.

2012-09-18 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
[02] GEO trailer to be removed around 10-19.
[03] AMS employee trailer to be removed 09-25.

07 PREVIOUS

01 SUBCONTRACTS

2012-09-25 OPEN - No issues.

2012-09-18 OPEN - No issues.

02 SUBMITTALS

20120-09-25 No Submittal log update issued.
[01] Item No. 21 - M. Wagstaff indicated review or geo roll inventory. In progress.
[02] M. Wagstaff has meeting set up today [09-25] with A. Ridgely [Lamac] to discuss record drawings.
[03] R. Porter gathering information from subcontractors on record drawings. AAA input on 09-25.
[04] AMS requiring all subcontractors' to have close-out information to AMS by 09-28 deadline. In progress.
[05] Item No. 26 - No longer required due to material change of the PCP.
[06] Item No. 81 - No longer required as information submitted under other submittals [and approved].

20120-09-18 Submittal log dated 09-15 distributed and reviewed.
[01] Item No. 21 - M. Wagstaff indicated review or geo roll inventory. In progress.
[02] M. Wagstaff indicated bolt pattern and sealant for the DS hatch required. AMS submitted 09-11. CLOSE
[03] AMS has received digital reader submittal form FWI. AMS submitted 09-11. AMS to send submittal to AAA. CLOSE
[04] M. Wagstaff indicated that Lamac not confirmed yet for record drawings in AutoCAD. Review in progress.
[05] R. Porter gathering information from subcontractors on record drawings.
[06] AMS requiring all subcontractors' to have close-out information to AMS by 09-28 deadline.
[07] Item No. 26 - No longer required due to material change of the PCP.
[08] Item No. 81 - No longer required as information submitted under other submittals [and approved].

08 MATERIAL

01 GENERAL

2012-09-25 OPEN - listing for materials that have potential to impact schedule.
[01] FLT current truck count for clay hauling down. Clay would have been done 09-26, but new date for clay hauling completion is 09-28 based on the weather. J. Denham involved with FLT to resolve. R. Porter indicated trucks working other areas.

2012-09-18 OPEN - listing for materials that have potential to impact schedule.
[01] FLT not providing as many trucks [to haul clay], only 9x today [09-18], need 12x. Completion of the clay cap recovery potential to be done by next Tue [09-25] or Wed [09-26]. J. Denham to look into this matter with FLT.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-09-25 OPEN - Discussion during Progress Meeting:
[01] Additional field tile installed to be located on the record drawings.

2012-09-18 OPEN - Discussion during Progress Meeting:
[01] Pipe sealed with gap per GEO/AER e-mail earlier in the week. CLOSE

10 QUALITY CONTROL

2012-09-25 No issues.
[01] P. Zinsious to researched Patriot billing, received only billing for hours, not analysis. Requested STC combine to one large billing.
[02] P. Zinsious reported STC offered to bill GEO direct. M. Wagstaff indicated billing to go direct to GEO from STC non-issue.
[03] Distribution and general discussion of AMS "Hutsonville APD Closure - Revision Matrix " HUT-APD-DWG-LST-2012-09-21-R0 relative EWO requests, and drawings associated with AER addenda. M. Wagstaff to forward copies of files AMS indicated could not find internally.

2012-09-18 No issues.
[01] AMS received some Patriot billing that did not seem correct. P. Zinsious to research.
[02] M. Wagstaff indicated the bill goes direct to GEO technology. No EWO.

11 SCHEDULE REVIEW

2012-09-25 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain date today [09-25].
[02] Major changes commentary:
[01] AAA checked out Ash Pond C pumps with phase meter.
[02] R. Porter spreadsheet with clay elevations relative Massmann survey.
[03] General discussion on Massmann survey and Lamac survey, as differences at some points both surveyed. Massmann used pointed rod, and GEO indicated that most representative of area within a foot of the stake was used as guideline.
[04] Add activity 10-15 "Finish Punch".
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
01	AAA-King	124c	Install - DS Baro...			9/24/2012	100%	
02	AAA-King	318	PCP -PCR...			9/24/2012	100%	
03	AAA-King	312	PCS - East...				100%	
04	AAA-King	401	Testing of PCS wire...				100%	
05	AAA-King	400	Energize...				100%	
06	AAA-King	380	Install new Power cables...			9/20/2012	100%	
07	AAA-King	390	WPA to Disconnect...				100%	
08	AAA-King	279a	DS3 - Electrical wiring...			9/21/2012	100%	
09	AAA-King	385b	Release WPA to Energize Ash...		9/19/2012		100%	
10	AAA-King	390a	Release WPA to Energize New...		9/19/2012		100%	
11	AAA-King	390b	Commission Ash Pond C system		9/20/2012		100%	
12	AER-Wagstaff	A4350	Punch List Items Resolved			10/15/2012		
13	AMS-Porter	50a	Additional clay...		9/28/2012		85%	
14	AMS-Porter	183	Site Prep - CBS - restore...		10/5/2012			
15	AMS-Porter	196	Earthwork APD - fine grade			9/28/2012	85%	
16	AMS-Porter	198	Roadways - APD perimeter...			10/5/2012		
17	AMS-Porter	198a	Roadways - Plant			10/5/2012		
18	AMS-Porter	199	Roadways - PCS -			10/5/2012		
19	AMS-Zinsious	189	Clay placement - Work List...			10/5/2012		
20	AMS-Zinsious	217	Substantial Completion			10/5/2012		
21	AMS-Zinsious	219	Punch List - Walk...			10/5/2012		
22	AMS-Zinsious	220	Punch List Work		10/8/2012	10/12/2012		
23	AMS-Zinsious	221	De-mobilize		10/16/2012	10/17/2012		
24	DLF-Ziliak	210	Ground cover - mob...			9/24/2012	100%	
25	DLF-Ziliak	211	Ground cover - hydro...			10/5/2012		
26	DLF-Ziliak	212	Ground cover - TRM or ECB			10/5/2012	20%	
27	GEO-Saindon	11	Survey - APD - vegetative...		10/1/2012			
28	GEO-Saindon	11a	Survey - APD - vegetative...				100%	
29	GEO-Saindon	50b	Clay - certification (final)		10/2/2012	10/3/2012		
30	LEC-Ridgely	13	Survey - CBS - final grade		10/5/2012			
31	LEC-Ridgely	15	Survey - APD - final (2nd half)			9/28/2012		
32	LEC-Ridgely	15a	Survey - APD - final (1st half)			9/20/2012	100%	

2012-09-18 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain dates as listed. No change.
[02] Major changes commentary:
[01] M. Wagstaff additional activities noted for Close Out.
[02] Add milestone for hand-off on 10-05.
[03] General discussion on Lamac survey before Massmann. No work on ground cover until after Massmann info back. Lamac is tentatively to be schedule on 09-19. Planning to have DLF mobilize on 09-24 for ground cover.
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
	AAA-King	375	Pull power...			9/14/2012	100%	
	AAA-King	380	Install new Power cables...		9/21/2012			
	AAA-King	395	Tie-in Electrical...		9/21/2012	9/21/2012		
	AAA-King	124c	Install - DS Baro...			9/19/2012		
	AAA-King	279a	DS3 - Electrical wiring...			9/19/2012		
	AAA-King	385	WPA at Existing Coal...		9/13/2012		100%	
	AAA-King	385a	WPA for APD electrical...		7/1/1902		100%	
	AAA-King	385b	Release WPA to Energize Ash...		9/17/2012			Open - R. Porter to call.
	AAA-King	390	WPA to Disconnect...		9/21/2012			AAA - WPA LOTO
	AAA-King	390a	Release WPA to Energize New...		9/21/2012			AAA - WPA LOTO
	AAA-King	390b	Commission Ash Pond C system		9/21/2012			Dependent on 385b close.
	AAA-King	420a	Pull cables...				100%	
	AMS-Porter	198	Roadways - APD perimeter...			9/28/2012		
	AMS-Porter	199	Roadways - PCS -			9/28/2012		
	AMS-Porter	198a	Roadways on plant			9/28/2012		
	AMS-Porter	192	Earthwork APD - let down				100%	
	AMS-Porter	193	Earthwork APD - rock chutes				100%	
	AMS-Porter	196	Earthwork APD - fine grade			9/25/2012	50%	Includes additional clay
	AMS-Porter	50a	Additional clay to Pass...			9/25/2012	50%	
	AMS-Zinsious	189	Clay placement - Work List...		10/1/2012	10/1/2012		
	AMS-Zinsious	218	Commission Pump System	5	10/1/2012	10/5/2012		
	AMS-Zinsious	219	Punch List - Walk...		10/1/2012			
	AMS-Zinsious	217	Substantial Completion			10/1/2012		
	BTD-Boyer	237a	DS1 - Precast - set lid				100%	
	BTD-Boyer	252a	DS2 - Precast - set lid				100%	
	BTD-Boyer	272a	DS3 - Precast - set lid				100%	
	BTD-Boyer	272c	Set DS3 upper ring section				100%	
	BTD-Boyer	294a	DS4 - Precast - set lid				100%	
	DLF-Ziliak	201	Ground cover - mob...			9/24/2012		
	GEO-Saindon	11	Survey - APD - vegetative...		9/26/2012	9/27/2012		
	GEO-Saindon	50b	Clay Certification (Final			9/28/2012		
	STC-Hunt	207	Concrete - paved ditch...				100%	
	STC-Hunt	208	Concrete - paved ditch...				100%	

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-09-25 No issues.
2012-09-18 No issues. M. Wagstaff indicated add note [as shown on e-mail], proceed with submission to AER AP. CLOSE

12.1 EXTRA WORK ORDERS

GENERAL

2012-09-25 Distribution and general discussion of AMS "Hutsonville APD Closure - Basic EWO Report" HUT-APD-EWO-RPT-2012-09-12-R0.

15 EWO-15 FENCE ALIGNMENT

2012-09-25 OPEN - AMS to provide back-up information. In progress.
2012-09-18 OPEN - AMS to provide back-up information. In progress.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-09-25 OPEN - AMS to provide back-up information. In progress.
2012-09-18 OPEN - AMS to provide back-up information. In progress.

18 EWO-18 VENT PROTECTION RING

2012-09-25 CLOSE
2012-09-18 OPEN - All rings set in place, fabric and stone remains to be installed.

19	EWO-19	**COMMISSIONING**
	2012-09-25	OPEN - M. Wagstaff approved 09-21.
	2012-09-18	OPEN - M. Wagstaff gave oral approval to AMS. Work scheduled by FWI for Sat 09-28, this will allow for pumps to be operational on 10-01. AMS to provide written EWO request.
20	EWO-20	**ADDITIONAL RIP-RAP**
	2012-09-25	OPEN - M. Wagstaff approved 09-21. Work in progress.
	2012-09-18	AMS provide cost. In progress.
21	EWO-21	**FIELD TILE LOCATION - LENGTH [was EWO-14]**
	2012-09-25	OPEN - Reviewed drawings and J. Craven sketch. AMS to further investigate information from BTD.
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
22	EWO-22	**MECHANICAL CHANGES**
	2012-09-25	OPEN - AMS to provide specific backup information. Change are FWI piping, associated cost in other EWO.
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
23	EWO-23	**CONCRETE CHANGES**
	2012-09-25	OPEN - AMS to provide specific backup information.
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
24	EWO-24	**CONDUIT AND PIPE SAND ENCASEMENT**
	2012-09-25	CLOSE - Scope was delineated in AER Addenda, AMS to rescind and delete EWO request.
	2012-09-18	OPEN - AMS to review EWO against AER Addenda and report.
25	EWO-25	**ELECTRICAL OVERHEAD UTILITY ~~CHANGES~~ LOCATION**
	2012-09-25	CLOSE - M. Wagstaff approved 09-21.
	2012-09-18	OPEN - AMS to provide written EWO request for processing.
26	EWO-26	**DS LID MODIFICATIONS FOR PIPING**
	2012-09-25	OPEN - AMS to provide written EWO request for processing.
	2012-09-18	OPEN - AMS to provide written EWO request for processing.
27	EWO-27	**ADDITIONAL BOLLARDS FOR CLEANOUTS**
	2012-09-25	CLOSE - M. Wagstaff approved 09-21.
	2012-09-18	OPEN - AMS to provide written EWO request for processing.
28	EWO-28	**TAX EXEMPTION**
	2012-09-25	OPEN - Close-out after Friday 09-28.
	2012-09-18	NEW - General discussion for potential EWO due to City of Robinson not renewing tax exemption. AMS to verify no charges from subs.

13 ACTION ITEMS - AER [25]

01	**AMEREN [AER]**	
	2012-09-25	[01] J. King request spreadsheet of electrical panel description tags.
	2012-09-18	No report.

14 ACTION ITEMS - AMS [21]

01	**ASH MANAGEMENT [AMS]**	
	2012-09-25	No report.
	2012-09-18	No report.

15 PRODUCTION

03	**CLAY**	
	2012-09-25	OPEN - no issues [01] Placement as of 09-24 is 147,510 CY. [02] Additional clay to be placed to make grade elevations [ref. above 08.01.2012-08-28.03] in progress.
	2012-09-18	OPEN - no issues [01] Placement as of 09-17 is 137,951 CY. [02] Additional clay to be placed to make grade elevations [ref. above 08.01.2012-08-28.03] in progress.

16 DOCUMENTS TRANSMITTED

2012-09-25	[01] AER - Last Planner schedule - Current date 09-20 - Data date 09-18. [02] AMS "Hutsonville APD Closure - Basic EWO Report" HUT-APD-EWO-RPT-2012-09-12-R0 [03] AMS "Hutsonville APD Closure - Revision Matrix " HUT-APD-DWG-LST-2012-09-21-R0
2012-09-18	[01] AER - Last Planner schedule - Current date 09-14 - Data date 09-04 [02] GEO - "Hutsonville Ash Pond D Closure - Clay Issue Recovery Layout" [not dated]. [03] GEO - Submittal Log dated 09-15.

17 DOCUMENTS REVIEW ONLY

2012-09-18	[01] GEO - "Field Tile Plan Layout-R1_JRC" second page [copy to P. Zinsious] [02] R. Porter spreadsheet with clay elevations relative Massmann survey.
2012-09-18	None.

18 MEETING SCHEDULE

2012-09-18 Schedule for upcoming meetings:

[01] Progress Meeting	Monday	October 1, 2012	Day earlier than normal schedule.
[02] AMS-AER Operations Transfer	Friday	October 5, 2012	Confirmed.
[03] NO MEETING THIS WEEK	**Tuesday**	**October 8, 2012**	
[04] Progress Meeting	Monday	October 15, 2012	Day earlier than normal schedule.
[05] Lesson Learned	TBD		

2012-09-18 Changed category form "Next Progress Meeting" to "Meeting Schedule". Schedule for upcoming meetings:

[01] Progress Meeting	Tuesday	September 25, 2012	Standard.
[02] Progress Meeting	**Monday**	**October 1, 2012**	**Day earlier than normal schedule.**
[03] AMS-AER Operations Transfer	Friday	October 5, 2012	To be confirmed.
[03] Lesson Learned	TBD		

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01 S. Tincher	AAA
02 M. Burch	FWI
03 T. Boyer	BTD
04 T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 ⮝ - Vegetative layer placement facing north



Photograph 2 ⮝ - Preparing for final ground cover at letdowns facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 24 and September 28, 2012.

JRC



Photograph 3 - Seed and fertilizer distribution facing southwest



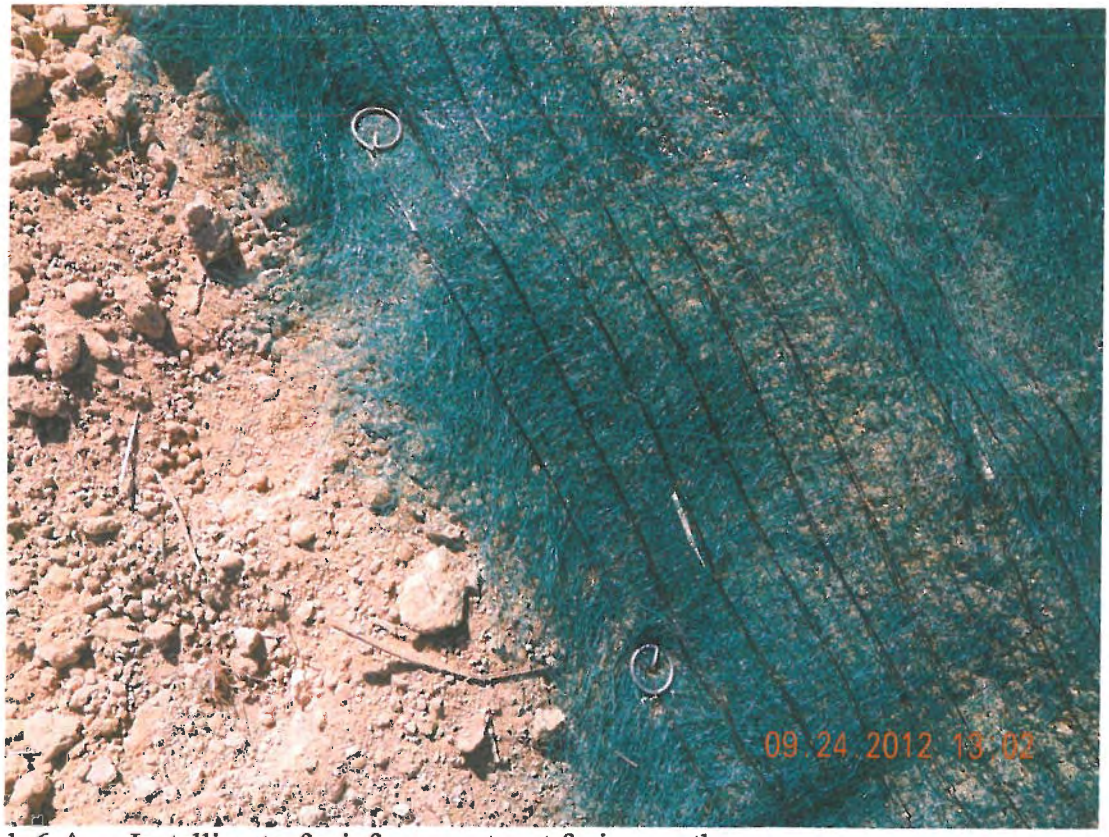
Photograph 4 - Fertilization and seeding letdowns facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 24 and September 29, 2012.

JRC



Photograph 5 ⮝ - Installing turf reinforcement mat facing north



Photograph 6 ⮝ - Installing turf reinforcement mat facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 24 and September 28, 2012.

JRC



Photograph 7 ⮝ - Installing turf reinforcement mat facing north



Photograph 8 ⮝ - HDPE butt fusion welding facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 24 and September 28, 2012.

JRC



Photograph 9 ⮝ - Flexible hose connected to manifold facing south



Photograph 10 ⮝ - Anchoring flexible hose for temporary discharge into bottom ash pond facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 24 and September 28, 2012.

JRC



Photograph 11 ⮝ - Overview of Ash Pond D facing southeast



Photograph 12 ⮝ - Overview of Ash Pond D facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between September 24 and September 28, 2012.

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 18, 2012

SUBJECT: Weekly Summary Report for October 1, 2012 to October 5, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally mostly cloudy with rain, having periods of clear skies. Temperature (°F) lows ranged from 49 to 58°F, and temperature highs ranged from 50 to 81°F. Weather delays occurred on October 3, 2012.

Construction Activities

The following activities occurred this week: commissioning of the groundwater collection trench system, rip rap placement, roadway restoration and construction, finish grading, repairing impacts from storm events, surveying, electrical installations, final ground cover, and clay placement. The pumps were commissioned for the groundwater collection trench system on October 1, 2012, and personnel from Ameren Energy Resources, Ash Management Services, LLC, AAA Electric, Inc., Freitag-Weinhardt, Inc. and Pine Environmental Services, Inc were present. Continuity testing was performed for the electrical components of the system prior to commissioning. Ash Management Services, LLC completed construction of the rip rap wall along the paved gutter on the west side of Quadrant A, performed roadway restoration, and continued construction of the east pump control panel and south property access roads. Finish grading occured south and east of Ash Pond D and storm impacts were repaired for the paved gutter, paved ditch, rip rap pads, rock chutes, and swales. Lamac Engineering, CO. surveyed quantities for the paved ditch backfill. Massmann Surveying surveyed the vegetative layer and site features for the as-built construction drawings. AAA Electric, Inc. installed the flowmeter readouts for the flow sensors. Daylight Land Management installed turf reinforcement mats, erosion control blankets

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for Ash Pond D, and performed other ground cover activities such as seeding for the vegetative layer and disturbed areas on-site. Fawn Lane Transit, Inc. and Belt Construction, Inc. completed clay placement for the vegetative layer and finish grading. Approximately 11 trucks were used to haul clay material to Ash Pond D. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT CS-323C Smooth Drum Roller
John Deere 7330 Tractor
John Deere 6430 Tractor
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ameren Energy Resources – Mike Wagstaff, Lionel Chambers, and Terry Hanratty
Pine Environmental Services, Inc. – Mark Winter
Ash Management Services, LLC (AMS) – Randy Porter, Paul Zinsious, John Denham, Robert Dunkley, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, Blake Bunting, and Eric Sefton
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
AAA Electric, Inc. (AAA) – Joseph King
Fawn Lane Transit, Inc. (FLT) – Lee Edington, Scott Comer, James Elledge, Jim Urfer, Gary Lamb, Tom Sager, Alan Ruholl, Patrick Wente, Frank Walton, Brian Griffith, and Greg Cornwell
Daylight Land Management (DLM) – Jon Ziliak, Adam Ziliak, Billy Georges, Eric Wells, Jacob Hoalt, Tracy Deisher, and Ivan York
Freitag-Weinhardt, Inc. (FWI) – Jarrod Barrett
Lamac Surveying – Austin Ridgely
Massmann Surveying – Rick Kopac
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Monday, October 1, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

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Materials

The following materials were delivered this week: Wyatt Seed Co. dry seed mix, Ceres Solutions 19-19-19 dry fertilizer, Western Excelsior Corp. Excel CC-4 Erosion Control Blanket, IDOT CA-6 aggregate, and clay for the vegetative layer.

Testing/Sampling

AAA Electric, Inc. performed continuity testing on the electrical components of the groundwater collection system. The megger testing requirement for the electrical components of the system was omitted by Ameren Energy Resources. Refer to the electrical testing records for additional information. The final welds of the sump discharge pipes were visually observed for leaks to complete the hydrostatic testing.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 15003

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/1/12

TIME: Arrive: 6:00 AM | Depart: 7:00 PM | Travel: 1.0 hr | Total: 14 hrs (no lunch)
Weather: Cloudy, 52° AM, Rain 61° PM | Contractor: AMS | Subcontr./Supplier: AAA, FWI, AER, DLM, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 7330 Tractor, 6430 Tractor
Site Activities / Observations / Contacts / Notes:

AMS/AER/AAA/FWI:

Personnel - Randy Porter, Paul Zinsious, Mike Waggstaff, Lionel Chambers, Joe King, and Jarrod Barrett. AAA installed the Omega Sensor Readouts for the paddlewheel flow sensors for DS-1, 2, 3, and 4, and performed continuity testing for the low and high voltage, 2/0 and 4/0 AWG electric lines for the groundwater collection system, as well as checked for voltage drops. The megger testing requirement, as stated in the project specifications, was omitted for the electric lines. AAA energized the sump pumps for pump commissioning of the groundwater collection system. AER, AMS, and FWI were present for commissioning. No leaks were observed in the exit butt fusion welds, completing the in-service visual inspection of the final welds. All pumps and floats were operational, and no leaks were observed in the temporary discharge line running from the collector box to the Bottom Ash Pond. The operation of the paddlewheel flow sensors will be checked at a later date. The Mini Divers for DS-1, 2, and 4, Baro Diver, and Diver Mate were activated and operational. The cable for DS-3's Mini Diver was cut and could not be activated. The cable will be replaced by operational training on Friday. The pumps will remain on 24/7 at this time, dependent on the NPDES Permit and operational training. The system will be inspected daily for the remainder of the project.

AMS:

Completed constructing the additional rip rap wall along the paved gutter on the west side of Section A. Performed finish grading south of Ash Pond D. Removed temporary fencing around the DS manholes and began final backfill against the manholes.

Additional Comments: NEXT PAGE

Randy Porter — Contractor Representative | AMS — Company
Signature | 10-1-12 — Date
Anna Saindon — Geotechnology, Inc.
10-8-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 15004

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/1/12

TIME: Arrive: _____ Depart: _____ Travel: _____ Total: _____
Weather: _____ Contractor: _____ Subcontr./Supplier: _____
Equipment Working: REFER TO PAGE 1
Site Activities / Observations / Contacts / Notes:

DLM:
Additional Personnel - Eric Wells, Jacob Hoalt, Tracy Deisher, and Ivan York. Mobilized - John Deere 6430 Tractor with 673 self-leveling lift and Haybuster 2564. Began final ground cover for the slope diversion berms. The subgrade was prepared, fertilized with 19-19-19 dry bagged fertilizer, and seeded with turf type dry bagged seed mix. Excel CC-4 erosion control blanket was installed by placing and stapling on the prepared slope diversion berms. Also, the western strip of vegetative cover between the access road and the most western slope diversion berm was fertilized, seeded, and covered with straw.

FLT/BCI:
Completed additional clay placement in Section 7, and began in Section 8. Reconstructed slope diversion berms, performed finish grading on the south embankment of Ash Pond D, and prepared the subgrade for the east pump control panel access road. Additional Personnel - Aaron Gullet, Jason Byers, Kim Edington, and Robby Sanders. Loads = 273

Additional Comments:

Randy Potter — AMS
Contractor Representative — Company
Signature — 10-1-12 Date
Anne Sandon — 10-8-12 Date
Geotechnology, Inc.
Engineer's Signature

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No. A 15005

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/2/12

TIME: Arrive: 6:30 AM | Depart: 6:45 PM | Travel: 1.0 hr | Total: 13 hrs (0.25 hr for lunch)
Weather: Cloudy; Rain; 49°AM, 60°PM | Contractor: AMS | Subcontr./Supplier: DLM, LEC, FLT, BCI
Equipment Working: D6N Dozer, 580 Backhoe, 7330 Tractor, 6430 Tractor
Site Activities / Observations / Contacts / Notes:

AMS/FLT/BCI:
Began the new access roadway for the east pump control panel southwest of Ash Pond D with gravel surfacing. Non-woven 8oz. geotextile and IDOT CA-6 gravel were used for the access road. Filled and performed finish grading south of Ash Pond D. Site Remediation- removed washed out material from the paved ditch and paved gutter. Attempted to continue additional clay placement in Section 8, but the excavator broke down at the clay borrow site. Clay placement will continue tomorrow.

DLM:
Completed installing the turf reinforcement mat on the northwest groin and the erosion control blankets on the slope diversion berms, excluding the most southwest slope diversion berm that is incomplete for the entrance to Ash Pond D. Began final ground cover for the vegetative layer and embankments of Ash Pond D, and the areas east and south of Ash Pond D, and south of Ash Pond A and Ash Pond B. Prepared, graded, aerated, fertilized, and seeded the vegetative layer and embankments of Ash Pond D, and the areas east and south of Ash Pond D, and south of Ash Pond A and Ash Pond B. Turf Type dry bagged seed mix was used from Wyatt Seed Co., and 19-19-19 fertilizer was used and delivered from Ceres Solutions in a WillMarr Super 600 buggy. Began straw mulching with a Haybuster on the vegetative layer and embankments of Ash Pond D.

LEC:
Austin surveyed the grid points for the vegetative layer and the fill area along the paved ditch south of Ash Pond D to estimate the quantity of clay used for fill.

Additional Comments: The site is highly saturated from the steady light rain the past two days.

Randy Poetter — Contractor Representative — AMS — Company
Signature — 10-8-12 — Date
Dana Saindon — Geotechnology, Inc. — 10-8-12 — Date
Engineer's Signature

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No. A 15006

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: ~ | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: ~ | Client: Ameren ER | Date: 10/3/12

TIME: Arrive: 6:30 AM | Depart: 5:15 PM | Travel: 1.0 hr | Total: 11.5 hrs (0.25 hr for lunch)
Weather: Cloudy, 58° AM, Sunny, 76° PM | Contractor: AMS | Subcontr./Supplier: BCI, MMS
Equipment Working: D6N Dozer, 580 Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Cleaned and graded the plant entrance and access roads. Backfilled against D5 manholes, filled low spots on the vegetative layer, and removed remaining temporary silt fence within the property limits. Completed constructing the anchor trench outlet toe drain rip rap splash pads on the south embankment of Ash Pond D. Reconstructed damaged rip rap pads, rock chutes, and swales. Performed finish grading south of Ash Pond D.

MMS:
Rick surveyed the certification grid points for the vegetative cover.

Other:
Weather Delay - The rain from Monday and Tuesday caused the site to become highly saturated and no other work items occured. Ground cover and clay placement will continue tomorrow, and the final ground cover will be crimped with a cultipacker.

Additional Comments:

Randy Porter — Contractor Representative — AMS — Company
Signature — 10-3-12 — Date
Anna Samelon — Geotechnology, Inc. — 10-8-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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No. A 15007

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: —
Client: Ameren ER
Date: 10/4/12

TIME: Arrive: 6:30 AM Depart: 7:30 PM Travel: 1.0 hr Total: 13.75 hrs (0.25 hr for lunch)
Weather: Sunny, 57° AM, 81° PM Contractor: AMS Subcontr./Supplier: DLM, FLT, BCI, MMS, LEC
Equipment Working: D6N Dozer, 580 Backhoe, 7330 Tractor, 6430 Tractor, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS/FLT/BCI:
Completed backfilling around DS manholes and finish grading south of Ash Pond D. Added additional fill along the top of the rip rap wall and along the paved gutter adjacent to the plant access road. Continued removing washed out material from the paved gutter and paved ditch. Cleaned and graded plant entrance and access roads. Placed additional fill south of Ash Pond D. Completed additional clay placement in Section 8, completing the 3.0' vegetative layer, Loads = 145. The last slope diversion berm that was left open for an entrance to the pond was completed.

DLM:
Continued seeding and straw mulching on the vegetative layer of Ash Pond D, the embankments of Ash Pond D, east and south areas of Ash Pond D, and south areas of Ash Pond A and Ash Pond B. Completed installing the last set of erosion control blankets on the most southwestern slope diversion berm. Crimping of the straw mulch will begin tomorrow with a disc and cultipacker.

MMS:
The survey of the certification grid points for the vegetative layer was completed. The vegetative thickness was field verified to have thicknesses greater than or equal to 3.00' by comparing to the as-built ash elevations. Began surveying the modified and new site features for the as-built construction drawings.

LEC:
Completed surveying the additional quantity of fill for the paved ditch backfill.

Additional Comments: DLM completed straw mulching in the late PM.

Randy Porter — Contractor Representative
AMS — Company
[signature] — Signature
10-4-12 — Date
Anna Saindon — Geotechnology, Inc.
10-8-12 — Date
[signature] — Engineer's Signature

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No. A 15008

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/5/12

TIME: Arrive: 6:00 AM | Depart: 4:00 PM | Travel: 1.0 hr | Total: 11 hrs (no lunch)
Weather: Cloudy, 54°AM, Rain 50°PM | Contractor: AMS | Subcontr./Supplier: DLM, BCI, AAA, AER, FWI, MMS
Equipment Working: D6N Dozer, 580 Backhoe, 7330 Tractor, 6430 Tractor, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Began roadway improvement/gravel surfacing for the existing roadway south of Ash Pond D along the south property line. Non-woven 8 oz. geotextile and IDOT CA-6 gravel was used for the roadway improvement. Placed additional rip rap along the new access road to the east pump control panel to mitigate erosion. Removed warning signs from Hwy. 1 pertaining to the dump trucks entering and leaving the highway. Cleaned plant access roads.

DLM:
Completed crimping the straw mulch on Ash Pond D, and all other areas on the site disturbed from construction, by utilizing a disc and cultipacker. Demobilized equipment and materials.

AAA:
Began installing the engraved nameplates for the electrical devices.

Pump Commissioning (follow-up) Meeting:
Personnel - Mike Waggoff and Terry Hanratty (AER), Paul Zinsious and John Denham (AMS), Mark Winter (Pine Environmental Services, Inc.), Jarrod Barrett (FWI), and Joe King (AAA). The four sump pumps were evaluated after being in operation since 10/1/12. The data was downloaded, reviewed, and the methodology of the data reduction for the Diver system was discussed. The Diver data provided that DS-1, DS-3, and DS-4 are cycling. DS-2 has yet to reach a low enough water level to cause the pump to cycle. The groundwater collection system was found to be fully operational, and the system was turned over to Ameren's control. The Omega totalizers will be activated next Tuesday when the pumps are re-energized. Note: the pumps will remain off over the weekend.

MMS: Completed surveying the modified and new site features for the as-built construction drawings.

Additional Comments:

Contractor Representative | Company: AMS
Signature | Date: 10-5-12
Geotechnology, Inc. | Date: 10-8-12
Engineer's Signature

only 3 new items remain.

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

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MEETING MINUTES

Electronic Filing: Received, Clerk's Office 09/28/2020

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 29 Minutes
Monday, October 1, 2012

01 PUBLICATION

Publish date:	2012-10-02	Submitted by:	PHZ
Distribution:	E-mail only	Notes taken by:	PHZ
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-10-01-PM-29
AER PO:	567523 R4	AMS-Charah Contract:	00030-01 AMS-Charah C 4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Joe	King	AAA Electric	812-208-0464	sandy.tincher@aaaelectricofth.com
02	Mr.	Lionel	Chambers	Ameren	618-301-8969	lchambers@ameren.com
03	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
04	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
05	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
06	Mr.	Joko	Tasich	Charah	502-649-7633	jtasich@charah.com
07	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-10-01	OPEN: [01] AMS removed LOTO at Collector Box for DS temporary discharge [ref. new Item No. 15.1 below]. [02] AAA monitoring operation of pumps for start-up. [03] No future WPA's projected.
2012-09-25	OPEN: [01] WPA opened on 09-13, work completed, AER closed 09-18. [02] J. King indicated no WPA required for continuity or megger testing on 10-01. [03] J. King reported that conduit for connection at Ash Pond C was deep [6FT to 7FT below grade].

03 EMPLOYEE DRUG TESTING

2012-10-01	OPEN: [01] None projected. [02] DLM had 4x workers tested today [10-01], and results negative.
2012-09-25	OPEN: [01] None projected. DLM may have some workers to schedule [TBD]. [02] FLT driver involved in last week incident results for DT returned negative, and driver returned to work 09-19.

04 AMS SAFETY

2012-10-01 [01] J. Tasich on site - observations and commentary:
- [01] No safety issues.
- [02] Clay hauling truck operations going well.
- [03] Observed good communications between laborers [spotters] and dozer operators.
- [04] Performed site specific training for 4x workers for DLM.
- [05] Tentative next site visit schedule -10-15 possibly for close out.
- [06] Site drying up. DLM operations brought 2x tractors on site.

[02] Continuing effort to silence the fire pump system alarm at the plant periodically until AER personnel reset the system due to WPA.

2012-09-25 [01] Correct last week report date [Thu 09-19].
[02] No safety issues reported.
[03] J. Tasich reported site down due to rain and lightning. No work, but be aware of muddy site, slips and trips.
[04] FWI work this Saturday [09-29] in the collector box will not require confined space entry [permit].
[05] FLT incident DT - negative results [ref. 05.03.2012-09-18.02 above].
[06] R. Porter addressed FLT incident with workers [last week].
[07] R. Porter has to silence the fire pump system alarm at the plant periodically until AER personnel reset the system due to WPA.
[08] AAA lift off-site.

05 HOUSEKEEPING

2012-10-01 OPEN: No issues.
[01] R. Porter to schedule moving excess fence material.
[02] During cleanup at de-mobilizing, AMS will wash streets one-time when leaving site.
[03] R. Porter reports - appears transmission subcontractor concrete truck washed out at entrance to plant. AMS has washed out at close proximity to the Ash Pond D and placed the concrete in a dumpster to haul off site.

2012-09-25 OPEN: No issues.
[01] Excess fence material [used, in good condition] taken down during demolition to be moved on site by AMS to the storage yard.. R. Porter estimates about 750 FT of fence fabric, top rail, and one gate [double 8 FT].
[02] R. Porter disposing of concrete and fence posts into dumpster. Will have to go form 40 CY to 30 CY due to weight.

06 PLANT ACCESS - CBT BADGE

2012-10-01 OPEN: No issues.
[01] General discussion on site security.
- [01] Guard stationed on site on 5D x 8HRS continues.
- [02] When on site Saturday R. Porter indicated no guard was present.
- [03] M. Wagstaff to investigate the situation, and forward MM to B. Simmons [AER] in progress.

2012-09-25 OPEN: No issues.
[01] General discussion on site security.
- [01] Guard now stationed on site on 5D x 8HRS, which is less time than previous.
- [02] Issue with site open, and no guard remains.
- [03] M. Wagstaff to investigate the situation, and forward MM to B. Simmons [AER].

[02] Lock final count and distribution to be determined after SC, when AMS leaves site.

08 OSHA LOG - WORK HOURS

2012-10-01 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to start of today 10-01 due to meeting change].
No incidents or accidents.
9,900.00 RT
1,964.00 OT
11,864.00 TOTAL

2012-09-25 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to EOD Monday] ~~08-13~~ 09-24 [corrected 10-01].
No incidents or accidents.
9,812.00 RT
1,911.00 OT
11,723.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-10-01 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site. Last week 4x rain days.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	3	0	0	0
07	FLT	0	0	0	0	11	0	0	0	0
08	FWI	0	0	0	0	0	0	2	0	0
09	GEO	0	1	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	1	1	2	12	5	2	2	0

Total on site: 25

2012-09-25 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	3	0	0	0
07	FLT	0	0	0	0	11	0	0	0	0
08	FWI	0	0	0	0	0	0	0	0	0
09	GEO	0	1	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	1	1	2	12	5	0	2	0

Total on site: 23

02 WORK HOURS AND OVERTIME

2012-10-01 OPEN: No issues. No change.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Continue early start some subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.
[02] AMS and FWI work this Saturday 09-29 to install DS temporary discharge line. Work completed.

2012-09-25 OPEN: No issues. No change.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Continue early start some subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.
[02] AMS and FWI scheduled to work this Saturday 09-29 to install DS temporary discharge line.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-10-01 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
[02] DLM equipment on site - "4N1", hydro seeder, tractor, and straw blower.

2012-09-25 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
[02] GEO trailer to be removed around 10-19.
[03] AMS employee trailer off-site.
[04] DLM to bring equipment on site - "4N1", hydro seeder, and tractor.

07 PREVIOUS

01 SUBCONTRACTS

2012-10-01 OPEN - No issues.

2012-09-25 OPEN - No issues.

02 SUBMITTALS

20120-10-01 No Submittal log update issued.
[01] Item No. 21 - M. Wagstaff indicated review or geo roll inventory. In progress.
[02] M. Wagstaff meeting 09-25 with A. Ridgely [Lamac] to discuss record drawings. CLOSE
[03] R. Porter gathering information from subcontractors on record drawings. FWI delivered "red lines" 09-28.
[04] AMS subcontractors' to have close-out information to AMS by 09-28 deadline. No tax information received, AMS to close.

20120-09-25 No Submittal log update issued.
[01] Item No. 21 - M. Wagstaff indicated review or geo roll inventory. In progress.
[02] M. Wagstaff has meeting set up today [09-25] with A. Ridgely [Lamac] to discuss record drawings. Procedure is half-size drawings to be marked up by AMS send to GEO for review and secondary mark up for AER.
[03] R. Porter gathering information from subcontractors on record drawings. AAA input on 09-25.
[04] AMS requiring all subcontractors' to have close-out information to AMS by 09-28 deadline. In progress.
[05] Item No. 26 - No longer required due to material change of the PCP.
[06] Item No. 81 - No longer required as information submitted under other submittals [and approved].

08 MATERIAL

01 GENERAL

2012-10-01 OPEN - listing for materials that have potential to impact schedule.
[01] R. Porter reports FLT has 14x trucks hauling today 10-01 making good progress. Clay hauling projected completion for 10-02.

2012-09-25 OPEN - listing for materials that have potential to impact schedule.
[01] FLT current truck count for clay hauling down. Clay would have been done 09-26, but new date for clay hauling completion is 09-28 based on the weather. J. Denham involved with FLT to resolve. R. Porter indicated trucks working other areas.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-10-01 OPEN - No report.

2012-09-25 OPEN - Discussion during Progress Meeting:
[01] Additional field tile installed to be located on the record drawings.

10 QUALITY CONTROL

2012-10-01 No issues.
[01] Patriot billing that STC is to combine to one large billing in progress.
[02] M. Wagstaff to forward copies of files AMS indicated could not find internally. In progress.

2012-09-25 No issues.
[01] P. Zinsious to researched Patriot billing, received only billing for hours, not analysis. Requested STC combine to one large billing.
[02] P. Zinsious reported STC offered to bill GEO direct. M. Wagstaff indicated billing to go direct to GEO from STC non-issue.
[03] Distribution and general discussion of AMS "Hutsonville APD Closure - Revision Matrix " HUT-APD-DWG-LST-2012-09-21-R0 relative EWO requests, and drawings associated with AER addenda. M. Wagstaff to forward copies of files AMS indicated could not find internally.

11 SCHEDULE REVIEW

2012-10-01 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain date 4x last week.
[02] Major changes commentary:
[01] DS temporary discharge line operational [ref. new Item No. 15.1 below].
[02] Punch list walk through date to be determined, tentative 10-08 or 10-09.
[03] AID A4300 change LP to M. Wagstaff and AMS delete.
[04] Operations transfer remains scheduled for 10-05.
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
01	AMS-Porter	50a	Additional clay...			10/2/2012	95%	
02	AMS-Porter	196	Earthwork APD - fine grade			10/2/2012		
03	AMS-Wagstaff	A4300	Final As-built...					[see note above]
04	AMS-Zinsious	A4600	AMS as-built drawing mark-ups...				10/5/2012	
05	AMS-Zinsious	A4620	AMS submit O&M ...				10/5/2012	
06	AMS-Zinsious	217	Substantial Completion			10/9/2012		
07	AMS-Zinsious	219	Punch List - Walk...			10/9/2012		
08	AMS-Zinsious	220	Punch List Work		10/9/2012			
09	DLF-Ziliak	211	Ground cover - hydro...			10/5/2012	50%	
10	DLF-Ziliak	212	Ground cover - TRM or ECB			10/5/2012	50%	
11	FWI-Burch	316a	Extend temporary...				100%	
12	GEO-Saindon	11	Survey - APD - vegetative...		10/3/2012	10/5/2012		
13	GEO-Saindon	50b	Clay - certification (final)			10/8/2012		
14	LEC-Ridgely	15	Survey - APD - final (2nd half)			10/2/2012		

2012-09-25 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain days - 4x last week for total 20xD
[02] Major changes commentary:
[01] AAA checked out Ash Pond C pumps with phase meter.
[02] R. Porter spreadsheet with clay elevations relative Massmann survey.
[03] General discussion on Massmann survey and Lamac survey, as differences at some points both surveyed. Massmann used pointed rod, and GEO indicated that most representative of area within a foot of the stake was used as guideline.
[04] Add activity 10-15 "Finish Punch".
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
01	AAA-King	124c	Install - DS Baro...			9/24/2012	100%	
02	AAA-King	318	PCP -PCR...			9/24/2012	100%	
03	AAA-King	312	PCS - East...				100%	
04	AAA-King	401	Testing of PCS wire...				100%	
05	AAA-King	400	Energize...				100%	
06	AAA-King	380	Install new Power cables...			9/20/2012	100%	
07	AAA-King	390	WPA to Disconnect...				100%	
08	AAA-King	279a	DS3 - Electrical wiring...			9/21/2012	100%	
09	AAA-King	385b	Release WPA to Energize Ash...		9/19/2012		100%	
10	AAA-King	390a	Release WPA to Energize New...		9/19/2012		100%	
11	AAA-King	390b	Commission Ash Pond C system		9/20/2012		100%	
12	AER-Wagstaff	A4350	Punch List Items Resolved			10/15/2012		
13	AMS-Porter	50a	Additional clay...		9/28/2012		85%	
14	AMS-Porter	183	Site Prep - CBS - restore...		10/5/2012			
15	AMS-Porter	196	Earthwork APD - fine grade			9/28/2012	85%	
16	AMS-Porter	198	Roadways - APD perimeter...			10/5/2012		
17	AMS-Porter	198a	Roadways - Plant			10/5/2012		

18	AMS-Porter	199	Roadways - PCS -			10/5/2012		
19	AMS-Zinsious	189	Clay placement - Work List...			10/5/2012		
20	AMS-Zinsious	217	Substantial Completion			10/5/2012		
21	AMS-Zinsious	219	Punch List - Walk...			10/5/2012		
22	AMS-Zinsious	220	Punch List Work		10/8/2012	10/12/2012		
23	AMS-Zinsious	221	De-mobilize		10/16/2012	10/17/2012		
24	DLF-Ziliak	210	Ground cover - mob...			9/24/2012	100%	
25	DLF-Ziliak	211	Ground cover - hydro...			10/5/2012		
26	DLF-Ziliak	212	Ground cover - TRM or ECB			10/5/2012	20%	
27	GEO-Saindon	11	Survey - APD - vegetative...		10/1/2012			
28	GEO-Saindon	11a	Survey - APD - vegetative...				100%	
29	GEO-Saindon	50b	Clay - certification (final)		10/2/2012	10/3/2012		
30	LEC-Ridgely	13	Survey - CBS - final grade		10/5/2012			
31	LEC-Ridgely	15	Survey - APD - final (2nd half)			9/28/2012		
32	LEC-Ridgely	15a	Survey - APD - final (1st half)			9/20/2012	100%	

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-10-01	No issues. AMS to develop draft next pay-app.
2012-09-25	No issues.

12.1 EXTRA WORK ORDERS

GENERAL

2012-10-01	No issues.
2012-09-25	Distribution and general discussion of AMS "Hutsonville APD Closure - Basic EWO Report" HUT-APD-EWO-RPT-2012-09-12-R0.

15 EWO-15 FENCE ALIGNMENT

2012-10-01	OPEN - AMS to provide back-up information. In progress.
2012-09-25	OPEN - AMS to provide back-up information. In progress.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-10-01	OPEN - Lamac to survey area, and provide information for delta between plan and new elevations for fill.
2012-09-25	OPEN - AMS to provide back-up information. In progress.

19 EWO-19 COMMISSIONING

2012-10-01	CLOSE - Work completed. Reference new Item No. 15.1 below.
2012-09-25	OPEN - M. Wagstaff approved 09-21.

20 EWO-20 ADDITIONAL RIP-RAP

2012-10-01	CLOSE - Work completed.
2012-09-25	OPEN - M. Wagstaff approved 09-21. Work in progress.

21 EWO-21 FIELD TILE LOCATION - LENGTH [was EWO-14]

2012-10-01	OPEN - AMS to provide back-up information. In progress.
2012-09-25	OPEN - Reviewed drawings and J. Craven sketch. AMS to further investigate information from BTD.

22 EWO-22 MECHANICAL CHANGES

2012-10-01	OPEN - AMS to provide back-up information. In progress.
2012-09-25	OPEN - AMS to provide specific backup information. Change are FWI piping, associated cost in other EWO.

23 EWO-23 CONCRETE CHANGES

2012-10-01	OPEN - AMS to provide back-up information. In progress.
2012-09-25	OPEN - AMS to provide specific backup information.

26 EWO-26 DS LID MODIFICATIONS FOR PIPING

2012-10-01	OPEN - AMS to provide written EWO request for processing.
2012-09-25	OPEN - AMS to provide written EWO request for processing.

28 EWO-28 TAX EXEMPTION

2012-10-01	CLOSE - No response from subcontractors. AMS to provide notice and documentation.
2012-09-25	OPEN - Close-out after Friday 09-28.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-10-01	[01] J. King indicated after meeting with L. Chambers on site, will forward spreadsheet of electrical panel description tags.
2012-09-25	[01] J. King request spreadsheet of electrical panel description tags.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-10-01	No report.
2012-09-25	No report.

15 PRODUCTION

03 CLAY

2012-10-01	OPEN - no issues [01] Placement as of today [10-01] is no change from 147,510 CY last week due to weather delay - rain days. [02] FLT hauling today [10-01].
2012-09-25	OPEN - no issues [01] Placement as of 09-24 is 147,510 CY. [02] Additional clay to be placed to make grade elevations [ref. above 08.01.2012-08-28.03] in progress.

15.1 CLOSE OUT

01 START UP AND COMMISSION

2012-10-01	NEW [01] Cable to Baro Mini Diver 502 at DS-3 not operational. FWI to obtain replacement before Friday meeting. [02] DS temporary discharge line in place. Line secure. Pumps operational, no issues. [03] Operation of the pumps per plan 24/7 until Friday 10-05, which determination will be made by Ameren if necessary to continue.

16 DOCUMENTS TRANSMITTED

2012-10-01	[01] AER - Last Planner schedule - Current date 09-26 - Data date 09-26
2012-09-25	[01] AER - Last Planner schedule - Current date 09-20 - Data date 09-18. [02] AMS "Hutsonville APD Closure - Basic EWO Report" HUT-APD-EWO-RPT-2012-09-12-R0 [03] AMS "Hutsonville APD Closure - Revision Matrix " HUT-APD-DWG-LST-2012-09-21-R0

17 DOCUMENTS REVIEW-ONLY

2012-10-01	None.
2012-09-25	[01] GEO - "Field Tile Plan Layout-R1_JRC" second page [copy to P. Zinsious] [02] R. Porter spreadsheet with clay elevations relative Massmann survey.

18 MEETING SCHEDULE

2012-10-01	Schedule for upcoming meetings:			
	[01] AMS-AER Operations Transfer	Friday	October 5, 2012	Confirmed.
NOTE>>>>>>>	**[02] Punch List Walkthrough**	**TBD**	**TBD**	**Possible 10-08, or 10-09.**
	[03] Progress Meeting	Monday	October 15, 2012	Day earlier than normal schedule.
	[04] Lesson Learned	TBD		
2012-09-25	Schedule for upcoming meetings:			
	[01] Progress Meeting	Monday	October 1, 2012	Day earlier than normal schedule.
	[02] AMS-AER Operations Transfer	Friday	October 5, 2012	Confirmed.
	[03] NO MEETING THIS WEEK	**Tuesday**	**October 8, 2012**	
	[04] Progress Meeting	Monday	October 15, 2012	Day earlier than normal schedule.
	[05] Lesson Learned	TBD		

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 ⮝ - Vegetative cover placement facing north



Photograph 2 ⮝ - Aerating slope diversion berms facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC



Photograph 3 ⮝ - Groundwater collection system pump commissioning facing southeast



Photograph 4 ⮝ - Groundwater collection system pump commissioning facing southwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC



Photograph 5 ⮝ - Installing erosion control blankets on berms facing east



Photograph 6 ⮝ - Installing erosion control blankets on berms facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC



Photograph 7 - Straw mulch placement facing south



Photograph 8 - Gravel surfacing for new access road facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC



Photograph 9 ⮝ - Straw mulch placement facing northeast



Photograph 10 ⮝ - Overview of Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC



Photograph 11 - Overview of Ash Pond D facing south



Photograph 12 - Overview of Ash Pond D facing south

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC



Photograph 13 - Overview of Ash Pond D facing east



Photograph 14 - Overview of Ash Pond D facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 1 and October 5, 2012.

JRC

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GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 18, 2012

SUBJECT: Weekly Summary Report for October 8, 2012 to October 13, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally clear and sunny. Temperature (°F) lows ranged from 31 to 50°F, and temperature highs ranged from 55 to 74°F. Weather delays did not occur this week.

Construction Activities

The following activities occurred this week: roadway restoration and gravel surfacing, repairing impacts from storm events, performing tasks on the punch list, electrical installations, and surveying. Ash Management Services, LLC and Belt Construction, Inc. completed roadway restoration, construction of plant access roads, addressed impacts from storm events, and performed tasks from the punch list. AAA Electric, Inc. installed the engraved nameplates for the electrical components for the groundwater collection system and resistors for the Omega flowmeter readouts. Massmann Surveying completed surveying the new and modified site features for the as-built construction drawings. Refer to the daily reports for detailed information.

Equipment and Personnel On-Site

CAT D6N Bulldozer
CAT CS-323C Smooth Drum Roller
Case 580 Backhoe
Water Truck (Dust Control)

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Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Robert Dunkley, Brad Bolenbaugh, Greg Siverly, Jeremy Shorter, and Blake Bunting
Charah, Inc. – Joe Tasich
Belt Construction, Inc. (BCI) – Jared Belt
AAA Electric, Inc. (AAA) – Joseph King
Massmann Surveying – Rick Kopac
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, October 9, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: IDOT CA-6 aggregate.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DAILY REPORTS

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GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 15009

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/8/12

TIME: Arrive: 6:00 AM | Depart: 6:00 PM | Travel: 1.0 hr | Total: * 12.75 hrs (0.25 hr for lunch)
Weather: Sunny, 31°AM, 60° PM | Contractor: AMS | Subcontr./Supplier: BCI
Equipment Working: D6N Dozer, 580 Backhoe
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Continued removing washed out material in paved ditch and performed final grading of the plant entrance and access roads. Continued roadway improvement / gravel surfacing for the existing roadway south of Ash Pond D along the south property line. Disposed excess materials in the construction yard. Tightened all the bolts/nuts on the aluminum hatches for the DS manholes. Completed installing the rodent guards in the anchor trench outlet toe drains for Ash Pond D. Delivery - CA-6.

Additional Comments: * +2 hrs for As-Built Drawings
Total = 14.75 hrs

Randy Peter — Contractor Representative — AMS — Company
Signature — 10-8-12 — Date
Anna Saindon — Geotechnology, Inc.
12-15-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

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No. A 15010

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/9/12

TIME: Arrive: 6:30 AM | Depart: 5:45 PM | Travel: 1.0 hr | Total: * 12.25 hrs (no lunch)
Weather: Sunny, 39°AM, 67°PM | Contractor: AMS | Subcontr./Supplier: BCI, AAA
Equipment Working: D6N Dozer, 580 Backhoe, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Continued disposing of excess materials in the construction yard and stockpiling materials to remain. Completed removing washed out material from the paved ditch. Placed rip rap on the south side of the east pump control panel to mitigate erosion of the panel's gravel pad. Cleaned all cap vents/ protective rings aross Ash Pond D. Began dressing the rip rap wall along the paved gutter and removing excess lathe stakes from Ash Pond D.

AAA:
Completed installing all the engraved nameplates for the new electrical devices, drilled holes in the bottom of the west and east pump control panel junction boxes for drainage, and completed wiring and mounting the Omega DPF75 totalizers. Note: a ¼ Watt, 2000 ohm resistor will have to be added to the totalizers to read flow properly.

Pumps:
All four pumps were turned back on, and the Diver data was downloaded. The temporary discharge line will remain in place.

Additional Comments: * +1.25 hrs for Manual
Total = 13.5 hrs

Randy Porter — Contractor Representative — AMS — Company
Signature — 10-9-12 — Date
Anna Saindon — Geotechnology, Inc. — 10-15-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 15011

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/10/12

TIME: Arrive: 6:30 AM | Depart: 7:15 PM | Travel: 1.0 hr | Total: * 13.5 hrs (0.25 hr for lunch)
Weather: Sunny, 48°AM, 55°PM | Contractor: AMS | Subcontr./Supplier: BCI, MMS
Equipment Working: D6N Dozer, 580 Backhoe, Water Truck, CS-323C Roller
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Cleaned the paved gutter and paved ditch by utilizing the water truck. Watered the embankments of Ash Pond D to promote vegetative growth. Fixed ruts across the vegetative cover from seeding and mulching. Completed dressing rip rap wall along the paved gutter. Gravel surfacing on the east side of Ash Pond D, the north/south access road on the west side of Ash Pond D, and the access road from the pump house to Ash Pond D. Removed remaining lathe stakes from the vegetative cover. Flushed out clogged anchor trench outlet toe drains on the east side of Ash Pond D. Began compacting gravel surface with a smooth drum roller.

MMS:
Rick Kopac finished surveying the new and modified site features for the as-built construction drawings.

Additional Comments: * 11 hrs for Site Activities
1.75 hrs for Manual

Randy Poetel — Contractor Representative — AMS — Company — 10-10-12 — Date
Signature
Anna Sandon — Geotechnology Inc. — 10-15-12 — Date
Engineer's Signature

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Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 15012

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J0198896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/11/12

TIME: Arrive: 6:15 AM | Depart: 8:45 PM | Travel: 1.0 hr | Total: * 15.25 hrs (0.25 hr for lunch)
Weather: Sunny, 35°AM, 68°PM | Contractor: AMS | Subcontr./Supplier: BCI
Equipment Working: D6N Dozer, CS-323C Roller, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Watered the embankments of Ash Pond D to promote vegetative growth. Installed confined space entry signs on the tops of the DS manholes. Flagged the fence post marking the tee for the field tile across the south property line. Continued gravel surfacing on the south and east side of Ash Pond D, the north/south access road on the west side of Ash Pond D, and the access road from the pump house to Ash Pond D.

Additional Comments: * 12.25 hrs for Site Activities
2.25 hrs for Manual

Randy Foster — Contractor Representative | AMS — Company
Signature | 10-11-12 — Date
Anna Saindon — Geotechnology, Inc.
Anna Saindon — Engineer's Signature | 10-15-12 — Date

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 15013

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/12/12

TIME: Arrive: 6:15 AM | Depart: 10:15 PM | Travel: 1.0 hr | Total: * 16.75 hrs (0.25 hr for lunch)
Weather: Sunny, 41°AM, 65°PM | Contractor: AMS | Subcontr./Supplier: BCI
Equipment Working: D6N Dozer, CS-323C Roller, 35D Mini Excavator, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS/BCI:
Completed roadway improvement / gravel surfacing for the south and east access roads, east pump control panel access road, and the plant entrance and access roads. Cut and removed excess fabric from the geotextile, turf reinforcement mat, and erosion control blanket across Ash Pond D. Continued fixing ruts on the vegetative cover from the seeding and mulching. Mobilized John Deere 35D Mini Excavator.

Additional Comments: * 12.75 hrs for Site Activities
3.25 hrs for Manual

Randy Pieper — Contractor Representative — Company
Signature — 10-12-12 — Date
Anna Saindon — Geotechnology, Inc. — 10-15-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

No. A 15014

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/13/12

TIME: Arrive: 6:30 AM | Depart: 5:30 PM | Travel: 1.0 hr | Total: * 11.75 hrs (0.25 hr for lunch)
Weather: Sunny, 50° AM, Cloudy, 74° PM | Contractor: AMS | Subcontr./Supplier: None
Equipment Working: 580 Backhoe, CS-323C Roller, 35D Mini Excavator, Water Truck
Site Activities / Observations / Contacts / Notes:

AMS:
Completed fixing ruts on the vegetative cover. Grouted the floor of the collector box to promote drainage to the outlet pipe from the sump discharge pipes. Installed a confined space entry sign on the collector box. Dressed rip rap on the new site features. Removed all supplies from the storm shelter. Began demobilizing materials from the site.

Additional Comments: * 10.75 hrs for Site Activities
1.0 hr for Manual

Randy Poelma — Contractor Representative — AMS — Company
Signature — 10-13-12 — Date
Anna Saindon — Geotechnology, Inc. — 10-15-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 30 Minutes
Tuesday, October 9, 2012

01 PUBLICATION

Publish date:	2012-10-15	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-10-09-PM-30	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah (4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
03	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
04	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
05	Mr.	Joko	Tasich	Charah	502-649-7633	jtasich@charah.com
06	Ms.	Anna	Saindon	Geotechnology	314-997-7440	a_saindon@geotechnology.com
07	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-10-09 OPEN:
[01] None
[02] Pumps to be turned on today [01-09] no WPA required.

2012-10-01 OPEN:
[01] AMS removed LOTO at Collector Box for DS temporary discharge [ref. new Item No. 15.1 below].
[02] AAA monitoring operation of pumps for start-up.
[03] No future WPA's projected.

03 EMPLOYEE DRUG TESTING

2012-10-09 OPEN:
[01] None projected.

2012-10-01 OPEN:
[01] None projected.
[02] DLM had 4x workers tested today [10-01], and results negative.

04 AMS SAFETY

2012-10-09 [01] J. Tasich on site - observations and commentary:
[01] No safety issues.
[02] General awareness.
[03] Focus on not being complacent during close-out process.
[04] General discussion for Charah cell phone and electronic use policy.
[02] Continuing daily effort to silence fire pump system alarm at the plant until AER personnel reset the system due to WPA.

2012-10-01 [01] J. Tasich on site - observations and commentary:
- [01] No safety issues.
- [02] Clay hauling truck operations going well.
- [03] Observed good communications between laborers [spotters] and dozer operators.
- [04] Performed site specific training for 4x workers for DLM.
- [05] Tentative next site visit schedule -10-15 possibly for close out.
- [06] Site drying up. DLM operations brought 2x tractors on site.

[02] Continuing effort to silence the fire pump system alarm at the plant periodically until AER personnel reset the system due to WPA.

05 HOUSEKEEPING

2012-10-09 OPEN: No issues.
[01] Continuing picking up trash and clean-up for demobilization.
[02] Clean-up of streets in progress.
[03] R. Porter reports - appears transmission subcontractor using APD Closure temporary toilets.

2012-10-01 OPEN: No issues.
[01] R. Porter to schedule moving excess fence material.
[02] During cleanup at de-mobilizing, AMS will wash streets one-time when leaving site.
[03] R. Porter reports - appears transmission subcontractor concrete truck washed out at entrance to plant. AMS has washed out at close proximity to the Ash Pond D and placed the concrete in a dumpster to haul off site.

06 PLANT ACCESS - CBT BADGE

2012-10-09 OPEN: No issues.
[01] General discussion on site security.
- [01] Guard stationed on site on 24/7 now.

2012-10-01 OPEN: No issues.
[01] General discussion on site security.
- [01] Guard stationed on site on 5D x 8HRS continues.
- [02] When on site Saturday R. Porter indicated no guard was present.
- [03] M. Wagstaff to investigate the situation, and forward MM to B. Simmons [AER] in progress.

08 OSHA LOG - WORK HOURS

2012-10-09 OPEN - total all hours [including subcontractors]
No incidents or accidents.
10,113.00 RT
2,015.50 OT
12,128.50 TOTAL

2012-10-01 OPEN - total all hours [including subcontractors] [Point of clarification: Hours are to start of today 10-01 due to meeting change].
No incidents or accidents.
9,900.00 RT
1,964.00 OT
11,864.00 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-10-09 AMS laid off 1x laborer project close-out.

2012-10-09 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	1	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	3	0	0	0
07	FLT	0	0	0	0	14	0	0	0	0
08	FWI	0	0	0	0	0	0	1	0	0
09	GEO	0	2	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	2	1	2	15	5	1	1	0

Total on site: 27

2012-10-01 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site. Last week 4x rain days.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	2	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	3	0	0	0
07	FLT	0	0	0	0	11	0	0	0	0
08	FWI	0	0	0	0	0	0	2	0	0
09	GEO	0	1	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	1	1	2	12	5	2	2	0

Total on site: 25

02 WORK HOURS AND OVERTIME

2012-10-09 OPEN: No issues.
[01] Standard hours - 7:00 AM CT to 3:30 PM CT. Overtime reduced unless required as of 10-08.

2012-10-01 OPEN: No issues. No change.
[01] Standard hours - 7:00 AM CT to 5:30 PM CT. Continue early start some subcontractors starting 06:00 AM CT [at borrow site] to get started. Trucks to begin later. Safety awareness will be diligent regarding the time period.
[02] AMS and FWI work this Saturday 09-29 to install DS temporary discharge line. Work completed.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-10-09 OPEN: No issues.
[01] AMS to pull [small office] trailer next week.
[02] Power to trailers to be disconnected.
[03] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.

2012-10-01 OPEN: No issues.
[01] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
[02] DLM equipment on site - "4N1", hydro seeder, tractor, and straw blower.

07 PREVIOUS

01 SUBCONTRACTS

2012-10-09 OPEN - No issues.

2012-10-01 OPEN - No issues.

02 SUBMITTALS

20120-10-09 Submittal log update issued.
[01] GEO - Marked up original of AMS record drawings dated 2012-10-08 [blue ink] to M. Wagstaff only. P. Zinsious request scan copy.
[02] Insert to Item No. 73 for AAA OM submittal. Should have 10-13.
[03] M. Wagstaff to send Baro software info back to P. Zinsious.
[04] Flow totalizer submittal AMS 036-02 logged in OM manual.
[05] M. Wagstaff to send tag information as sent to L. Chambers by AAA back to P. Zinsious.

20120-10-01 No Submittal log update issued.
[01] Item No. 21 - M. Wagstaff indicated review or geo roll inventory. In progress.
[02] M. Wagstaff meeting 09-25 with A. Ridgely [Lamac] to discuss record drawings. CLOSE
[03] R. Porter gathering information from subcontractors on record drawings. FWI delivered "red lines" 09-28.
[04] AMS subcontractors' to have close-out information to AMS by 09-28 deadline. No tax information received, AMS to close.

08 MATERIAL

01 GENERAL

2012-10-09 OPEN - listing for materials that have potential to impact schedule.
[01] GEO requested the sign-off for contractor acceptance of line for clay placement. R. Porter to sign for AMS and scan.
[02] AMS to receive 1x roll IDOT 8oz geotextile on site 10-10 to finish the roadway.
[03] A. Saindon indicated one more CQA certification due, for the final survey, should have 10-10.
[04] FLT work complete [as clay hauling done].

2012-10-01 OPEN - listing for materials that have potential to impact schedule.
[01] R. Porter reports FLT has 14x trucks hauling today 10-01 making good progress. Clay hauling projected completion for 10-02.

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-10-09 OPEN - Discussion during Progress Meeting:
[01] J. Cravens reports post for field tile location to be better delineated.
[02] All work finished on Wampler property.

2012-10-01 OPEN - No report.

10 QUALITY CONTROL

2012-10-09 No issues.
[01] M. Wagstaff to forward copies of files AMS indicated could not find internally. In progress.
[02] P. Zinsious to investigate closing SWP3.
[03] Patriot billing that STC is to combine to one large billing in progress to less than $ 4K.
[04] P. Zinsious to look into 28D break information.

2012-10-01 No issues.
[01] Patriot billing that STC is to combine to one large billing in progress.
[02] M. Wagstaff to forward copies of files AMS indicated could not find internally. In progress.

11 SCHEDULE REVIEW

2012-10-09 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain days - 10-03
[02] Major changes commentary:
[01] AID A4300 LP change to LEC-Ridgely
[02] Project date of Substantial Completion 10-09.

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
02	LEC-Ridgely	13	Survey - CBS - final grade			10/12/2012		
03	LEC-Ridgely	15	Survey - APD - final (2nd half)			10/5/2012		
04	AMS-Porter	183	Site Prep - CBS - restore...			10/12/2012		
06	AMS-Porter	196	Earthwork APD - fine grade			10/4/2012		
07	AMS-Porter	198	Roadways - APD perimeter...			10/12/2012		
08	AMS-Porter	199	Roadways - PCS -			10/12/2012		
10	DLF-Ziliak	211	Ground cover - hydro...				100%	
11	DLF-Ziliak	212	Ground cover - TRM or ECB				100%	
12	AMS-Zinsious	217	Substantial Completion				100%	
13	AMS-Zinsious	A4620				10/12/2012		
14	AMS-Zinsious	A4600					100%	
15	AER-Wagstaff	A1900			10/16/2012			
16	AER-Wagstaff	A1880	Lessons Learned..		10/16/2012			
01	AMS-Porter	50a	Additional clay...			10/4/2012		
13	GEO-Saindon	50b	Clay - certification (final)			10/10/2012		
23	AMS-Zinsious	218	Commission APD Pump Station				100%	
25	AMS-Porter	198a	Roadways - Plant			10/12/2012		
26	FWI-Burch	HPA1030	Remove temporary...			12/3/2012		

2012-10-01 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain date 4x last week.
[02] Major changes commentary:
[01] DS temporary discharge line operational [ref. new Item No. 15.1 below].
[02] Punch list walk through date to be determined, tentative 10-08 or 10-09.
[03] AID A4300 change LP to M. Wagstaff and AMS delete.
[04] Operations transfer remains scheduled for 10-05.
[03] All change were made to the LP sheet and full report submitted to AER. Below is highlight of changes/updates [alpha by LP]:

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
01	AMS-Porter	50a	Additional clay...			10/2/2012	95%	
02	AMS-Porter	196	Earthwork APD - fine grade			10/2/2012		
03	AMS-Wagstaff	A4300	Final As-built...					[see note above]
04	AMS-Zinsious	A4600	AMS as-built drawing mark-ups...				10/5/2012	
05	AMS-Zinsious	A4620	AMS submit O&M ...				10/5/2012	
06	AMS-Zinsious	217	Substantial Completion			10/9/2012		
07	AMS-Zinsious	219	Punch List - Walk...			10/9/2012		
08	AMS-Zinsious	220	Punch List Work		10/9/2012			
09	DLF-Ziliak	211	Ground cover - hydro...			10/5/2012	50%	
10	DLF-Ziliak	212	Ground cover - TRM or ECB			10/5/2012	50%	
11	FWI-Burch	316a	Extend temporary...				100%	
12	GEO-Saindon	11	Survey - APD - vegetative...		10/3/2012	10/5/2012		
13	GEO-Saindon	50b	Clay - certification (final)			10/8/2012		
14	LEC-Ridgely	15	Survey - APD - final (2nd half)			10/2/2012		

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-10-09	Draft Pay Application No. 7 [HUT-APD-Pay-App-7-R0] to M. Wagstaff and J. Cravens for review [after meeting].
2012-10-01	No issues. AMS to develop draft next pay-app.

12.1 EXTRA WORK ORDERS

GENERAL

2012-10-09	No issues.
2012-10-01	No issues.

15 EWO-15 FENCE ALIGNMENT

2012-10-09	OPEN - AMS to provide back-up information. In progress.
2012-10-01	OPEN - AMS to provide back-up information. In progress.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-10-09	OPEN - AMS submitted. AER review. Additional review for existing to plan to revised grade.
2012-10-01	OPEN - Lamac to survey area, and provide information for delta between plan and new elevations for fill.

21 EWO-21 FIELD TILE LOCATION - LENGTH [was EWO-14]

2012-10-09	CLOSE - non-issue.
2012-10-01	OPEN - AMS to provide back-up information. In progress.

22 EWO-22 MECHANICAL CHANGES

2012-10-09	OPEN - AMS to provide back-up information. In progress.
2012-10-01	OPEN - AMS to provide back-up information. In progress.

23 EWO-23 CONCRETE CHANGES

2012-10-09	OPEN - AMS submitted. AER review.
2012-10-01	OPEN - AMS to provide back-up information. In progress.

26 EWO-26 DS LID MODIFICATIONS FOR PIPING

2012-10-09	OPEN - AMS submitted. AER review.
2012-10-01	OPEN - AMS to provide written EWO request for processing.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-10-09	[01] CLOSE - L. Chambers approved spreadsheet of electrical panel description tags per M. Wagstaff.
2012-10-01	[01] J. King indicated after meeting with L. Chambers on site, will forward spreadsheet of electrical panel description tags.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-10-09	No report.
2012-10-01	No report.

15 PRODUCTION

03 CLAY

2012-10-09	CLOSE - work completed.
2012-10-01	OPEN - no issues [01] Placement as of today [10-01] is no change from 147,510 CY last week due to weather delay - rain days. [02] FLT hauling today [10-01].

15.1 CLOSE OUT

01 START UP AND COMMISSION

2012-10-09	General discussion: [01] Cable to Baro Mini Diver 502 at DS-3 not operational. CLOSE - wire installed. [02] Check drawings for electrical box lock requirements. [03] DS temporary discharge line to remain in place, Ameren to remove at their discretion. [04] Distributed AMS - "Hutsonville Power Station - Ash Pond D Closure - Status Report - Turnover" dated 2012-10-05 [05] Omega totalizer to be reviewed today [10-09] by AER for operation. [06] Reviewed both AER and AMS punch list documents, Punch List to be completed 10-16: [01] AER - "Hutsonville Ash Pond D Closure: Project Completion - Punch List Field Items - October 2012" [02] AMS - "Hutsonville Ash Pond D Closure - Punch List - AMS Remaining Work" HUT-APD-PNCH-LST-2012-10-08-R0 [07] Record drawings for DS vents West control Panel had DS-1, and DS-2. East Control Panel has DS-3, DS-4 and CO-3. CO-4 independent. [08] Operation of the pumps per AER.
2012-10-01	NEW [01] Cable to Baro Mini Diver 502 at DS-3 not operational. FWI to obtain replacement before Friday meeting. [02] DS temporary discharge line in place. Line secure. Pumps operational, no issues. [03] Operation of the pumps per plan 24/7 until Friday 10-05, which determination will be made by Ameren if necessary to continue.

16 DOCUMENTS TRANSMITTED

2012-10-09	[01] AER - Last Planner schedule - Current date 10-03 - Data date 10-02.
	[02] AER - "Hutsonville Ash Pond D Closure: Project Completion - Punch List Field Items - October 2012"
	[03] AMS - "Hutsonville Ash Pond D Closure - Punch List - AMS Remaining Work" HUT-APD-PNCH-LST-2012-10-08-R0
	[04] GEO - "Submittal Log - Hutsonville Power Station Ash Pond Closure" dated WE 2012-10-13
	[05] GEO - Marked up original of AMS record drawings dated 2012-10-08 [blue ink] to M. Wagstaff only.
	[06] AMS - "Hutsonville Power Station - Ash Pond D Closure - Status Report - Turnover" dated 2012-10-05
	[07] AMS - Pay Application No. 7 [HUT-APD-Pay-App-7-R0] to M. Wagstaff and J. Cravens for review [after meeting].
2012-10-01	[01] AER - Last Planner schedule - Current date 09-26 - Data date 09-26

17 DOCUMENTS REVIEW ONLY

2012-10-09	None.
2012-10-01	None.

18 MEETING SCHEDULE

2012-10-09 Schedule for upcoming meetings:

[01] Progress Meeting	Monday	October 16, 2012	
[02] Lesson Learned	TBD		

2012-10-01 Schedule for upcoming meetings:

	[01] AMS-AER Operations Transfer	Friday	October 5, 2012	Confirmed.
NOTE>>>>>>>	**[02] Punch List Walkthrough**	**TBD**	**TBD**	**Possible 10-08, or 10-09.**
	[03] Progress Meeting	Monday	October 15, 2012	Day earlier than normal schedule.
	[04] Lesson Learned	TBD		

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

Electronic Filing: Received, Clerk's Office 09/28/2020

PHOTOGRAPH LOG



Photograph 1 - Cleaning paved ditch facing northeast



Photograph 2 - Cleaned paved gutter facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 8 and October 13, 2012.

JRC



Photograph 3 - Restoration of plant access roads facing west



Photograph 4 - Confined entry sign on manhole facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 8 and October 13, 2012.

JRC



Photograph 5 - Restored plant access roads facing northeast



Photograph 6 - Repairing ruts on vegetative cover facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 8 and October 13, 2012.

JRC



Photograph 7 - Overview of Ash Pond D facing southeast



Photograph 8 - Overview of Ash Pond D facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 8 and October 13, 2012.

JRC

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

MEMORANDUM

TO: Mike Wagstaff, P.E.
Ameren Energy Resources

FROM: Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

DATE: October 19, 2012

SUBJECT: Weekly Summary Report for October 15, 2012 to October 17, 2012

PROJECT: Hutsonville Ash Pond D Closure
Crawford County, Hutsonville, Illinois
Geotechnology Project No. J019896.01

The following is a weekly summary of the site activities at the referenced site.

Weather

The weather was generally clear and sunny, with periods of cloudy skies. Temperature (°F) lows ranged from 49 to 53°F, and temperature highs ranged from 65 to 76°F. Weather delays did not occur this week.

Construction Activities

The following activities occurred this week: tasks on the punch list, electrical work, and demobilization. AAA Electric, Inc. completed final wiring of the groundwater collection system and installed locks for the electrical components of the system. Ash Management Services, LLC completed the tasks on the punch list. Equipment, materials, and job trailers were demobilized. Refer to the daily reports for detailed information.

The leaning power poles for groundwater collection system have not been repaired. This will be repaired at a later date and Ash Management Services, LLC will be present for the repairs.

Equipment and Personnel On-Site

CAT CS-323C Smooth Drum Roller
Case 580 Backhoe
Water Truck (Dust Control)

Geotechnology, Inc. – Joe Cravens
Ash Management Services, LLC (AMS) – Randy Porter, Brad Bolenbaugh, and Blake Bunting
Belt Construction, Inc. (BCI) – Jared Belt
AAA Electric, Inc. (AAA) – Joseph King
Visitors – Refer to the Visitor's Log for visitors, dates, and times.
Refer to the meeting minutes for additional personnel.

Meetings

The weekly progress meeting was held on Tuesday, October 16, 2012. Refer to the attached meeting minutes for additional information.

Photographs

A photograph log with select photographs obtained this week is attached.

Materials

The following materials were delivered this week: Western Excelsior Double-Net Straw Blanket.

Testing/Sampling

Testing and sampling did not occur this week.

Calibration Records

Calibration information was not obtained this week.

Signature of CQA Officer

Anna Saindon, P.E., R.G., Ph.D.
Geotechnology, Inc.

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DAILY REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

No. A 15015

FIELD OBSERVATION REPORT

Representative: Joe Cravens | Project No.: J019896.01 | Task: 2370
Equipment & ID No.: — | Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103 | Zone: — | Client: Ameren ER | Date: 10/15/12

TIME: Arrive: 6:00 AM | Depart: 8:45 PM | Travel: 1.0 hr | Total: * 15.25 hrs (0.5 hr for lunch)
Weather: Sunny, 53°AM, 65°PM | Contractor: AMS | Subcontr./Supplier: BCI, AAA
Equipment Working: 580 Backhoe, CS323C Roller
Site Activities / Observations / Contacts / Notes:

AMS:
Completed dressing rip rap on the new site features. Re-rolled all new gravel surfaced plant access roads. Continued demobilizing materials in the construction yard. Demobilized job trailer. Continued housekeeping across site. Delivery - Round Top staples and Western Excelsior Double Net Straw Blanket.

BCI:
Demobilized D6N Dozer and materials.

AAA:
Evaluated the solution to the leaning power poles.

Additional Comments: * 12.25 hrs for Site Activities
3.00 hrs for Manual

Randy Porter — Contractor Representative — AMS — Company — 10-15-12 — Date
Signature
Anna Saindon — Geotechnology, Inc. — 10-18-12 — Date
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

No. A 15016

GEOTECHNOLOGY INC
FROM THE GROUND UP

FIELD OBSERVATION REPORT

Representative: Joe Cravens
Project No.: J019896.01
Task: 2370
Equipment & ID No.: —
Project Name: Hutsonville Ash Pond D Closure
Vehicle: 4103
Zone: —
Client: Ameren ER
Date: 10/16/12

TIME: Arrive: 6:30 AM Depart: 5:30 PM Travel: 1.0 hr Total: 12 hrs (no lunch)
Weather: Sunny, 49°AM, 76°PM Contractor: AMS Subcontr./Supplier: AAA
Equipment Working: None
Site Activities / Observations / Contacts / Notes:

AMS:
Seeded and installed straw blanket on remaining construction areas. Completed housekeeping and demobilizing all remaining equipment and materials. Final walk-thru and punchlist reviewed. All work completed except for fixing the leaning power poles. This will be completed at a later date.

AAA:
Installed resistors for the Omega DPF75 readouts and locks for the junction boxes.

* PROJECT END * AMEN

Additional Comments:

Randy Porter AMS
Contractor Representative Company 10-16-12
Signature Date
Anna Saindon 10-18-12
Geotechnology, Inc. Date
Anna Saindon
Engineer's Signature

Notice: The Geotechnology representative is on site solely to observe operations of the contractor identified, form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the Geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequence of construction.

ORIGINAL - FILE COPIES: 1-JOB SITE 1-ACCOUNTING

Electronic Filing: Received, Clerk's Office 09/28/2020

MEETING MINUTES

Hutsonville Power Station - Ash Pond D Closure
Progress Meeting No. 31 Minutes
Tuesday, October 16, 2012

01 PUBLICATION

Publish date:	2012-10-31	Submitted by:	PHZ	
Distribution:	E-mail only	Notes taken by:	PHZ	
Location:	Hutsonville Power	AMS-Charah File No.	HUT-APD-MTG-MIN-2012-10-16-PM-31	
AER PO:	567523 R4	AMS-Charah Contract:	00030-01	AMS-Charah C4116-06-6120

02 ATTENDEES [ALPHA BY COMPANY]

NO.	SAL	FIRST	LAST	COMPANY	PHONE	E-MAIL
01	Mr.	Mike	Wagstaff	Ameren	618-406-3478	mwagstaff@ameren.com
02	Mr.	Paul	Zinsious	AMS - PCM	502-640-2918	pzinsious@ashmanagementservices.com
03	Mr.	Randy	Porter	AMS - SM	502-554-5230	rporter@ashmanagementservices.com
04	Mr.	Joe	Cravens	Geotechnology	314-568-6628	j_cravens@geotechnology.com

03 ABBREVIATIONS

AER	Ameren Energy Resources	OSHA	Occupational Safety Health Administration
AMS	Ash Management Services	PCP	Perforated Collector Pipe
BNSF	Burlington	PO	Purchase Order
CBT	Computer Based Training	RHOM	Routine Handling, Operation, and Maintenance
EAP	Emergency Action Plan	SPOC	Single Point
EOD	End of [the] Day	T/M	Time and
EOM	End of [the] month	TBD	To Be
EOW	End of [the] week	TD	Transmission Dispatch
EDTS	Energy Delivery Transmission Services	WPA	Worker Protection Assurance
EDC	Estimated Date [of] Completion		
EWO	Extra Work Order		
HDPE	High Density Polyethylene		
HRS	Hours		
LOTO	Lock Out Tag Out		
NMA	National Maintenance Agreement		

04 DOCUMENTATION

Minutes are documented weekly, and the publication have a "rolling record" of the immediate past two weeks. Each week the oldest drops off and the current week is added to the minutes. Items are categorized as either "NEW", "OPEN", "CLOSE", or in case the an item has to be re-published after closed the previous week - "REOPEN". Minutes format changed for Progress Meeting No. 13 deleting and combining certain items for brevity and to abbreviate documentation. Currently the item numbers remained the same for tracking purposes.

05 SAFETY - HOUSEKEEPING

02 WORKER PROTECTION ASSURANCE

2012-10-16 OPEN:
[01] None projected.
[02] Pumps to be shut off when GEO leaves [de-mobs] from site. Shut off at rack and MPZ and pump control panel.

2012-10-09 OPEN:
[01] None
[02] Pumps to be turned on today ~~[01-09]~~ 10-09 no WPA required. [corrected 10-16]

03 EMPLOYEE DRUG TESTING

2012-10-16 OPEN:
[01] None projected.

2012-10-09 OPEN:
[01] None projected.

04 AMS SAFETY

2012-10-16 OPEN:
[01] No safety issues.

2012-10-09 [01] J. Tasich on site - observations and commentary:
[01] No safety issues.
[02] General awareness.
[03] Focus on not being complacent during close-out process.
[04] General discussion for Charah cell phone and electronic use policy.
[02] Continuing daily effort to silence fire pump system alarm at the plant until AER personnel reset the system due to WPA.

05 HOUSEKEEPING

2012-10-16 OPEN: No issues.
[01] R. Porter notified Miller Construction of AMS de-mob.

2012-10-09 OPEN: No issues.
[01] Continuing picking up trash and clean-up for demobilization.
[02] Clean-up of streets in progress.
[03] R. Porter reports - appears transmission subcontractor using APD Closure temporary toilets.

06 PLANT ACCESS - CBT BADGE

2012-10-16 OPEN: No issues.
[01] None projected.

2012-10-09 OPEN: No issues.
[01] General discussion on site security.
[01] Guard stationed on site on 24/7 now.

08 OSHA LOG - WORK HOURS

2012-10-16 OPEN - total all hours [including subcontractors]
No incidents or accidents.
10,257.00 RT
2,113.00 OT
12,370.00 TOTAL

2012-10-09 OPEN - total all hours [including subcontractors]
No incidents or accidents.
10,113.00 RT
2,015.50 OT
12,128.50 TOTAL

06 MANPOWER [HEAD COUNT]

01 CREW SIZE [Alpha by Company]

2012-10-16 Project completion.
2012-10-09 AMS laid off 1x laborer project close-out.

2012-10-16 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	0	0
02	AMS	0	0	1	2	1	1	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	0	0	0	0
07	FLT	0	0	0	0	0	0	0	0	0
08	FWI	0	0	0	0	0	0	0	0	0
09	GEO	0	1	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	1	1	3	1	1	0	0	0

Total on site: 7

2012-10-09 Geotechnology [work hours not included in OSHA Log above] Exact count in daily reports, make note if on site.

NO.	COMPANY	SURVEYOR	TECHNICIAN	FOREMEN	OPERATORS	TEAMSTERS	LABORERS	PIPE FITTERS	ELECTRICIANS	IRON WRK
01	AAA	0	0	0	0	0	0	0	1	0
02	AMS	0	0	1	1	1	2	0	0	0
03	BCI	0	0	0	1	0	0	0	0	0
04	BTD	0	0	0	0	0	0	0	0	0
05	CHI	0	0	0	0	0	0	0	0	0
06	DLM	0	0	0	0	0	3	0	0	0
07	FLT	0	0	0	0	14	0	0	0	0
08	FWI	0	0	0	0	0	0	1	0	0
09	GEO	0	2	0	0	0	0	0	0	0
10	LEC	0	0	0	0	0	0	0	0	0
11	PLB	0	0	0	0	0	0	0	0	0
12	STC	0	0	0	0	0	0	0	0	0
	TOTAL COUNT	0	2	1	2	15	5	1	1	0

Total on site: 27

02 WORK HOURS AND OVERTIME

2012-10-16	OPEN: No issues. [01] Standard hours - 7:00 AM CT to 3:30 PM CT to 8HR days. Work completion.
2012-10-09	OPEN: No issues. [01] Standard hours - 7:00 AM CT to 3:30 PM CT. Overtime reduced unless required as of 10-08.

04 TRAILER - GENERAL CONDITIONS - COORDINATION - VEHICLES

2012-10-16	OPEN: No issues. [01] AMS trailer gone 10-16. [02] Power to trailers to be disconnected by leaving conduit with wire inside. Coil up spare wire. [03] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.
2012-10-09	OPEN: No issues. [01] AMS to pull [small office] trailer next week. [02] Power to trailers to be disconnected. [03] M. Wagstaff to check if electric utility bill for trailers transferred to Miller Construction. In progress.

07 PREVIOUS

01 SUBCONTRACTS

2012-10-16	OPEN - No issues.
2012-10-09	OPEN - No issues.

02 SUBMITTALS

20120-10-16	Submittal log update issued. [01] GEO - Marked up original of AMS record drawings to be reviewed by AMS. [02] Insert to Item No. 73 for AAA OM submittal. AMS received 10-15, will send hardcopy and PDF scan. [03] M. Wagstaff to send Baro software info back to P. Zinsious. AMS to check receipt. [04] Flow totalizer submittal AMS 036-02 logged in OM manual. In progress. [05] M. Wagstaff to send tag information as sent to L. Chambers by AAA back to P. Zinsious. In progress. [06] Conversation power pole burial depth 5 FT verse 5.5 FT.
20120-10-09	Submittal log update issued. [01] GEO - Marked up original of AMS record drawings dated 2012-10-08 [blue ink] to M. Wagstaff only. P. Zinsious request scan copy. [02] Insert to Item No. 73 for AAA OM submittal. Should have 10-13. [03] M. Wagstaff to send Baro software info back to P. Zinsious. [04] Flow totalizer submittal AMS 036-02 logged in OM manual. [05] M. Wagstaff to send tag information as sent to L. Chambers by AAA back to P. Zinsious.

08 MATERIAL

01 GENERAL

2012-10-16	OPEN - listing for materials that have potential to impact schedule. [01] GEO requested the sign-off for contractor acceptance of line for clay placement. R. Porter to sign for AMS and scan. Done - CLOSE. [02] AMS to receive 1x roll IDOT 8oz geotextile on site 10-10 to finish the roadway. Done - CLOSE. [03] A. Saindon indicated one more CQA certification due, for the final survey, should have 10-10. In progress, J. Cravens sent preliminary to M. Wagstaff who subsequently reviewed with A. Saindon - no issues. [04] R. Porter patching material for seed/straw is Western Excelsior double straw matt.
2012-10-09	OPEN - listing for materials that have potential to impact schedule. [01] GEO requested the sign-off for contractor acceptance of line for clay placement. R. Porter to sign for AMS and scan. [02] AMS to receive 1x roll IDOT 8oz geotextile on site 10-10 to finish the roadway. [03] A. Saindon indicated one more CQA certification due, for the final survey, should have 10-10. [04] FLT work complete [as clay hauling done].

09 ADJACENT PROPERTIES AND PCP LINE

01 GENERAL

2012-10-16	Done - CLOSE.
2012-10-09	OPEN - Discussion during Progress Meeting: [01] J. Cravens reports post for field tile location to be better delineated. [02] All work finished on Wampler property.

10 QUALITY CONTROL

2012-10-16	No issues. [01] M. Wagstaff to forward copies of files AMS indicated could not find internally. Done - CLOSE. [02] P. Zinsious to investigate closing SWP3. Discussed possible issue with run-off into the paved ditch. [03] Patriot billing that STC is to combine to one large billing in progress to less than $ 4K. In progress. [04] P. Zinsious to look into 28D break information. In progress.
2012-10-09	No issues. [01] M. Wagstaff to forward copies of files AMS indicated could not find internally. In progress. [02] P. Zinsious to investigate closing SWP3. [03] Patriot billing that STC is to combine to one large billing in progress to less than $ 4K. [04] P. Zinsious to look into 28D break information.

11 SCHEDULE REVIEW

2012-10-16 OPEN - no report [work is substantially complete].

2012-10-09 OPEN - Review of last planner by M. Wagstaff. [AID = Activity Identification, S = successor, P = Predecessor, D = Duration and day]
[01] Rain days - 10-03
[02] Major changes commentary:
[01] AID A4300 LP change to LEC-Ridgely
[02] Project date of Substantial Completion 10-09.

NO.	LAST PLANNER	AID	ACTIVITY NAME	RDU	START	FINISH	PERCENT	COMMENT
02	LEC-Ridgely	13	Survey - CBS - final grade			10/12/2012		
03	LEC-Ridgely	15	Survey - APD - final (2nd half)			10/5/2012		
04	AMS-Porter	183	Site Prep - CBS - restore...			10/12/2012		
06	AMS-Porter	196	Earthwork APD - fine grade			10/4/2012		
07	AMS-Porter	198	Roadways - APD perimeter...			10/12/2012		
08	AMS-Porter	199	Roadways - PCS -			10/12/2012		
10	DLF-Ziliak	211	Ground cover - hydro...				100%	
11	DLF-Ziliak	212	Ground cover - TRM or ECB				100%	
12	AMS-Zinsious	217	Substantial Completion				100%	
13	AMS-Zinsious	A4620				10/12/2012		
14	AMS-Zinsious	A4600					100%	
15	AER-Wagstaff	A1900			10/16/2012			
16	AER-Wagstaff	A1880	Lessons Learned..		10/16/2012			
01	AMS-Porter	50a	Additional clay...			10/4/2012		
13	GEO-Saindon	50b	Clay - certification (final)			10/10/2012		
23	AMS-Zinsious	218	Commission APD Pump Station				100%	
25	AMS-Porter	198a	Roadways - Plant			10/12/2012		
26	FWI-Burch	HPA1030	Remove temporary...			12/3/2012		

12.0 COST AND BUDGET

02 AMS PAY APPLICATION - CHANGE REQUEST

2012-10-16 No issues. AER to review holding $ 20K for vegetative growth, erosion control, and power pole issue.

2012-10-09 Draft Pay Application No. 7 [HUT-APD-Pay-App-7-R0] to M. Wagstaff and J. Cravens for review [after meeting].

12.1 EXTRA WORK ORDERS

GENERAL

2012-10-16 No issues.

2012-10-09 No issues.

15 EWO-15 FENCE ALIGNMENT

2012-10-16 OPEN - AMS provided revised backup information, AER to review.

2012-10-09 OPEN - AMS to provide back-up information. In progress.

17 EWO-17 PAVED DITCH ALIGNMENT

2012-10-16 OPEN - AMS provided revised backup information, AER to review.

2012-10-09 OPEN - AMS submitted. AER review. Additional review for existing to plan to revised grade.

22 EWO-22 MECHANICAL CHANGES

2012-10-16 OPEN - AMS provided revised backup information, AER to review.

2012-10-09 OPEN - AMS to provide back-up information. In progress.

23 EWO-23 CONCRETE CHANGES

2012-10-16 OPEN - AMS provided revised backup information, M. Wagstaff indicated acceptable.

2012-10-09 OPEN - AMS submitted. AER review.

26 EWO-26 DS LID MODIFICATIONS FOR PIPING

2012-10-16 OPEN - AMS provided revised backup information, M. Wagstaff indicated acceptable.

2012-10-09 OPEN - AMS submitted. AER review.

13 ACTION ITEMS - AER [25]

01 AMEREN [AER]

2012-10-16 No report.

2012-10-09 [01] CLOSE - L. Chambers approved spreadsheet of electrical panel description tags per M. Wagstaff.

14 ACTION ITEMS - AMS [21]

01 ASH MANAGEMENT [AMS]

2012-10-16 No report.

2012-10-09 No report.

15.1 CLOSE OUT

01 START UP AND COMMISSION

2012-10-16	General discussion: [01] Brief conversation on leaving the blue hose for the DS temporary discharge. The hose will have water in line due to changes in grade [elevation]. The hose can be cut and clamps can be purchased at Rural King. [02] Check drawings for electrical box lock requirements. AAA to bring out locks. [03] DS temporary discharge line to remain in place, Ameren to remove at their discretion. No change. [04] Reviewed GEO "Hutsonville Ash Pond D Closure - Project Completion - Punch List Field Items - October 2012" [05] Omega totalizer to be reviewed today [10-09] by AER for operation. In progress, AAA to install resistor. [07] Vents are remote [flood plain] for CO1, CO1A, CO1B, and CO2, with remaining 2x 3/8 IN holes in the cap. [08] Discussion AAA scheduled for today, no show for Items No. 02 and 05 above.
2012-10-09	General discussion: [01] Cable to Baro Mini Diver 502 at DS-3 not operational. CLOSE - wire installed. [02] Check drawings for electrical box lock requirements. [03] DS temporary discharge line to remain in place, Ameren to remove at their discretion. [04] Distributed AMS - "Hutsonville Power Station - Ash Pond D Closure - Status Report - Turnover" dated 2012-10-05 [05] Omega totalizer to be reviewed today [10-09] by AER for operation. [06] Reviewed both AER and AMS punch list documents, Punch List to be completed 10-16: [01] AER - "Hutsonville Ash Pond D Closure: Project Completion - Punch List Field Items - October 2012" [02] AMS - "Hutsonville Ash Pond D Closure - Punch List - AMS Remaining Work" HUT-APD-PNCH-LST-2012-10-08-R0 [07] Record drawings for DS vents West control Panel had DS-1, and DS-2. East Control Panel has DS-3, DS-4 and CO-3. CO-4 independent. [08] Operation of the pumps per AER.

16 DOCUMENTS TRANSMITTED

2012-10-16	[01] GEO - "Hutsonville Ash Pond D Closure - Project Completion - Punch List Field Items - October 2012"
2012-10-09	[01] AER - Last Planner schedule - Current date 10-03 - Data date 10-02. [02] AER - "Hutsonville Ash Pond D Closure: Project Completion - Punch List Field Items - October 2012" [03] AMS - "Hutsonville Ash Pond D Closure - Punch List - AMS Remaining Work" HUT-APD-PNCH-LST-2012-10-08-R0 [04] GEO - "Submittal Log - Hutsonville Power Station Ash Pond Closure" dated WE 2012-10-13 [05] GEO - Marked up original of AMS record drawings dated 2012-10-08 [blue ink] to M. Wagstaff only. [06] AMS - "Hutsonville Power Station - Ash Pond D Closure - Status Report - Turnover" dated 2012-10-05 [07] AMS - Pay Application No. 7 [HUT-APD-Pay-App-7-R0] to M. Wagstaff and J. Cravens for review [after meeting].

17 DOCUMENTS REVIEW ONLY

2012-10-16	None.
2012-10-09	None.

18 MEETING SCHEDULE

2012-10-16 Schedule for upcoming meetings: None projected, this is last Progress Meeting.

[01] Lesson Learned	Cancelled	

2012-10-09 Schedule for upcoming meetings:

[01] Progress Meeting	Monday	October 16, 2012
[02] Lesson Learned	TBD	

19 DISTRIBUTION - STANDARD

AER

01 Mr. Mike Wagstaff
02 Mr. Mike Stewart
03 Mr. Bob Muesenfechter
04 Mr. Steve Bluemner

GEO

01 Ms. Anna Saindon
02 Mr. Eric Neuner
03 Mr. Joe Cravens

AMS

01 Mr. Jimmy Boone
02 Mr. John Denham
03 Mr. Joko Tasich
04 Mr. Randy Porter

SUBCONTRACTORS

01	S. Tincher	AAA
02	M. Burch	FWI
03	T. Boyer	BTD
04	T. Hunt	STC

If there are any corrections, modifications, additions, or deletions please notify the sender by e-mail at pzinsious@ashmanagementservices.com

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PHOTOGRAPH LOG



Photograph 1 - Installing straw blankets facing south



Photograph 2 - Ash Pond D Project – Post Construction facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 3 - Ash Pond D Project – Post Construction facing south



Photograph 4 - Ash Pond D Project – Post Construction facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 5 ⮝ - Ash Pond D Project – Post Construction facing southwest



Photograph 6 ⮝ - Ash Pond D Project – Post Construction facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 7 ⮝ - Ash Pond D Project – Post Construction facing southwest



Photograph 8 ⮝ - Ash Pond D Project – Post Construction facing northwest

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 9 - Ash Pond D Project – Post Construction facing west



Photograph 10 - Ash Pond D Project – Post Construction facing west

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 11 - Ash Pond D Project – Post Construction facing southeast



Photograph 12 - Ash Pond D Project – Post Construction facing southeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 13 - Ash Pond D Project – Post Construction facing east



Photograph 14 - Ash Pond D Project – Post Construction facing east

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC



Photograph 15 - Ash Pond D Project – Post Construction facing northeast

All photographs taken by Joseph Cravens of Geotechnology, Inc. between October 15 and October 17, 2012.

JRC

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Prequalification testing of 40 mil high density polyethylene (HDPE) geomembrane for Ash Pond D closure. Information reviewed for compliance with the CQA plan includes the manufacturer liner product data, manufacturer liner quality control data, and third party testing. GSE manufactured the geomembrane and TRI/Environmental Inc. performed third party testing on samples from twelve rolls in accordance with the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

GSE Lining Technology Inc. manufactured the geomembrane and TRI/Environmental Inc. performed third party testing on twelve samples.

3. NEW SEQUENTIAL WORK TO BEGIN:

Deliver 40 mil HDPE geomembrane to the job site for installation per the manufacturers handling instructions.

By CQA Officer-in-Absentia: (if applicable) _____ (Signature) **Date:** _____

By CQA Officer: James Saindon (Signature) **Date:** 4-27-12

Distribution: Original To: Document Controller Copies To: Mike Wagstaff (Ameren), Paul Zinsious (AMS)

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

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1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Field moisture density testing using a nuclear gauge (compaction testing) was performed on the upper one foot of the subgrade for Ash Pond D. In addition, an as-built survey was performed on the subgrade for Ash Pond D closure. The compaction testing and survey were performed in compliance with the CQA plan and project specifications.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

The compaction testing was performed by Geotechnology, Inc. and the as-built survey of the subgrade was performed by Massmann Surveying.

3. NEW SEQUENTIAL WORK TO BEGIN:

Chesapeake Containment Systems, Inc. (CCS) will approve the subgrade and install 40 mil high density polyethylene (HDPE) geomembrane on- site (product previously approved). The CCS certificate of acceptance for the subgrade will be provided daily to the CQA officer on-site.

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** May 30, 2012
(Signature)

Distribution: Original To: Document Controller Copies To: Mike Wagstaff (Ameren), Paul Zinsious (AMS)

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Chesapeake Containment Systems, Inc. (CCS) installed 40 mil high density polyethylene (HDPE) geomembrane on- site (product previously approved) on the north and north east portion of Ash Pond D. Field and laboratory testing for Panels P1 through P17 (not including the southernmost or easternmost seams for this area) were performed in compliance with the CQA plan and project specifications.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Geotechnology, Inc. performed field quality control of the geomembrane and TRI Environmental provided third party testing of geomembrane destruct samples.

3. NEW SEQUENTIAL WORK TO BEGIN:

The three foot vegetative layer will be placed over the installed 40 mil HDPE geomembrane in the location of P1 through P17 on the north west portion of Ash Pond D by Ash Management Services (AMS).

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 6-9-12
(Signature)

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Ash Management Services, LLC (AMS) installed an anchor trench around the perimeter of Ash Pond D. The anchor trench in section view is approximately two feet deep and two feet wide. The anchor trench was observed to be free of unsuitable material. Chesapeake Containment Systems, Inc. (CCS) installed 40 mil high density polyethylene (HDPE) geomembrane on-site (product previously approved) on the approved Ash Pond D subgrade. The edges of the geomembrane were laid into the anchor trench. Geomembrane installation into the anchor trenches were performed in compliance with the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Geotechnology, Inc. performed field quality control of the geomembrane and observed the geomembrane installation in the anchor trench.

3. NEW SEQUENTIAL WORK TO BEGIN:

AMS will install four-inch HDPE perforated drainage pipe with filter sock (product previously approved) in the anchor trench, where applicable, and will backfill the anchor trench with drainage course.

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 6-13-12
(Signature)

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Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Prequalification testing of the groundwater collection trench course aggregate for Ash Pond D closure was provided by Ash Management Services (AMS). Particle size distribution analysis (AASHTO T27 and T11) for one sample of the course aggregate from the Van Tarble & Sons Quarries was provided. The provided aggregate sample meets the IDOT CA-7 classification as specified in the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Van Tarble & Sons Quarries provided the aggregate sample and particle size distribution analysis.

3. NEW SEQUENTIAL WORK TO BEGIN:

The submitted course aggregate may be used for the groundwater collection trench.

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 6-14-12
(Signature)

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Chesapeake Containment Systems, Inc. (CCS) installed 40 mil high density polyethylene (HDPE) geomembrane on- site (product previously approved) on the north and north east portion of Ash Pond D. Field and laboratory testing for Panels P18 through P45 (not including the southernmost seams for this area) were performed in compliance with the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Geotechnology, Inc. performed field quality control of the geomembrane and TRI Environmental provided third party testing of geomembrane destruct samples.

3. NEW SEQUENTIAL WORK TO BEGIN:

The three foot vegetative layer will be placed over the installed 40 mil HDPE geomembrane in the location of P18 through P45 on the north and north east portion of Ash Pond D by Ash Management Services (AMS).

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 6-15-12
(Signature)

Distribution: Original To: Document Controller Copies To: _____

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Chesapeake Containment Systems, Inc. (CCS) installed 40 mil high density polyethylene (HDPE) geomembrane on- site (product previously approved) on the south portion of Ash Pond D. Field and laboratory testing for Panels P46 through P105 were performed in compliance with the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Geotechnology, Inc. performed field quality control of the geomembrane and TRI Environmental provided third party testing of geomembrane destruct samples.

3. NEW SEQUENTIAL WORK TO BEGIN:

The three foot vegetative layer will be placed over the installed 40 mil HDPE geomembrane in the location of P46 through P105 on the south portion of Ash Pond D by Ash Management Services (AMS).

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 6/20/12
(Signature)

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Prequalification testing of the roadway gravel surfacing aggregate for Ash Pond D closure was provided by Ash Management Services (AMS). Particle size distribution analysis (AASHTO T27 and T11) for one sample of the course aggregate from the Van Tarble & Sons Quarries was provided. The provided aggregate sample meets the IDOT CA-6 classification as specified in the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Van Tarble & Sons Quarries provided the aggregate sample and particle size distribution analysis.

3. NEW SEQUENTIAL WORK TO BEGIN:

The submitted course aggregate is IDOT CA-6 and may be used for the roadway gravel resurfacing.

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 7/26/12
(Signature)

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

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1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

The material warranty, geomembrane installation warranty, and the installation record drawing was provided in the Closeout Submittals (revision August 9, 2012) by Chesapeake Containment Systems, Inc. for the installation of the 40 mil high density polyethylene (HDPE) geomembrane at the Ash Pond D closure. Information provided in the revised submittal was reviewed for compliance with the CQA plan. The documents in the revised submittal are in accordance with the CQA plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

Representatives of Chesapeake Containment Systems, Inc. performed the 40 mil HDPE geomembrane installation and provided the revised submittals for review.

3. NEW SEQUENTIAL WORK TO BEGIN:

Sequential work was not impacted by this approval.

By CQA Officer-in-Absentia: **(if applicable)** _____ (Signature) **Date:** _____

By CQA Officer: _____ (Signature) **Date:** 8/14/2012

Distribution: Original To: Document Controller Copies To: Mike Wagstaff (Ameren), Paul Zinsious (AMS)

Electronic Filing: Received, Clerk's Office 09/28/2020

CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

Chemical analysis and soil index testing were performed on five representative samples of the installed vegetative layer at Ash Pond D. The chemical analysis and soil index testing results are in compliance with the revised CQA plan and project specifications.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

The soil index testing was performed by Geotechnology, Inc. and the chemical analysis of the vegetative layer was performed by Teklab, Inc.

3. NEW SEQUENTIAL WORK TO BEGIN:

The vegetative layer and surface water structures will be graded and the final survey will be performed.

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: _____ **Date:** 8/22/2012
(Signature)

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CQA CERTIFICATION
(Form CQAP-2.1)

The CQA certification as provided herein is based on a review of available inspection, testing and sampling results for the subject Work and is for the sole purpose of noting compliance of these results with established design parameters and taking no exceptions to initiation of new sequential Work . CQA certification by the Owner's Representative does not relieve the Contractor of its obligations to furnish all Work in accordance with the Contract.

---

1. LOCATION AND DESCRIPTION OF THE SUBJECT WORK:

The vegetative layer was surveyed on a 100 foot grid by Massmann Surveying and Engineering Company for Ash Pond D. The vegetative layer thickness was calculated from survey data to be a minimum of three feet thick in accordance with the CQA Plan.

2. CONTRACTOR COMPLETING THE SUBJECT WORK:

The survey was performed by Massmann Surveying and Engineering Company. Geotechnology, Inc. verified the vegetative layer thickness calculations.

3. NEW SEQUENTIAL WORK TO BEGIN:

The ground cover activities (including mulching, seeding, etc) will be performed.

By CQA Officer-in-Absentia: _____ **Date:** _____
(if applicable) (Signature)

By CQA Officer: Anna Sandlin **Date:** Oct 11, 2012
(Signature)

Distribution: Original To: Document Controller Copies To: Mike Wagstaff (Ameren), Paul Zinsious (AMS)

Standard Proctor Summary for Ash Samples
Ameren Energy Resources
Hutsonville Ash Pond D Closure

Presented in Table 1 are the results of the standard Proctor tests and Atterberg limits performed on the collected ash samples. The ash varies in composition. Ash compaction will require a minimum of 90 percent of the maximum dry density as determined by the standard Proctor test in laboratory (ASTM D 698). For non-plastic ash material, use the average ash maximum dry density from samples Ash 1, 3 and 4, and the average optimum moisture content (presented in Table 2). For ash material that has some plasticity or has characteristics similar to that of "silt", use the value presented in Table 3. The target value to be used in the field will depend on the type of ash that is encountered at the location of testing and will be based upon the judgment of the CQA Technician. In areas that embankment material was used, use the average embankment material value. The contractor will be notified immediately of compaction tests not in conformance.

Table 1
Summary of Laboratory Tests for Collected Ash Samples

Sample	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
Ash 1	74.3	38.3	25	24	1
Ash 2	92.4	19.4	37	34	3
Ash 3	75.5	31.0	NP	NP	NP
Ash 4	76.3	33.5	NP	NP	NP
S Embankment	115.2	10.1	-	-	-
E Embankment	116.4	10.9	-	-	-

Table 2
Standard Proctor Summary for Non-Plastic Ash

Reference Proctor	Average Maximum Dry Density (pcf)	Average Optimum Moisture Content (%)
Average of Ash 1, 3 and 4 (NP)	75.4	34.4
90% Max Dry Density	67.9	NA

Table 3
Standard Proctor Summary for Plastic Ash

Reference Proctor	Average Maximum Dry Density (pcf)	Average Optimum Moisture Content (%)
Ash 2 (LP)	92.4	19.4
90% Max Dry Density	83.2	NA

Table 4
Standard Proctor Summary for Embankment Material

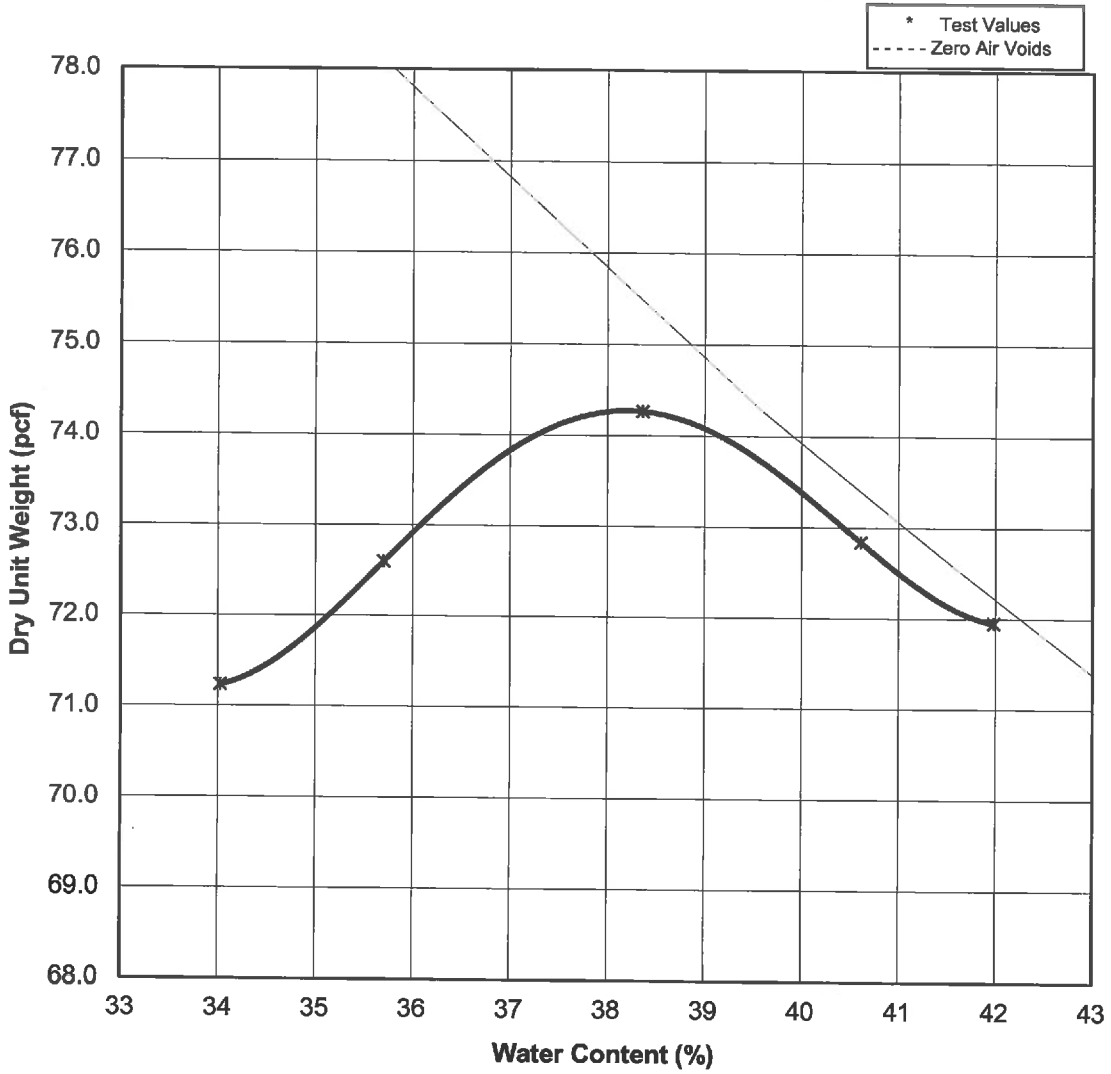
Reference Proctor	Average Maximum Dry Density (pcf)	Average Optimum Moisture Content (%)
Average Embankment	115.8	10.5
90% Max Dry Density	104.2	NA

11816 Lackland Road, Suite 150
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond Closure
Client: Ameren UE
Sample Source: North Side of Pond D
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.01.7310
Test Date:	04/04/12
Proctor No.:	P-6613-1 (Ash 1)
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Flyash w/ Bottom Ash

Sample Properties		
Moisture Content	--	
Liquid Limit	25	
Plastic Limit	24	
Plasticity Index	1	
Specific Gravity:	2.250	Estimated
Classification	ML	

Test Results:	
Maximum Dry Unit Weight (pcf):	74.3
Optimum Water Content (%):	38.3
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	--
Optimum Water Content (%):	--

Tested By: PAR
Date: 04/04/12

Input By: ZRB
Date: 04/05/12

Checked By: JPK
Date: 04/05/12

Electronic Filing: Received, Clerk's Office 09/28/2020

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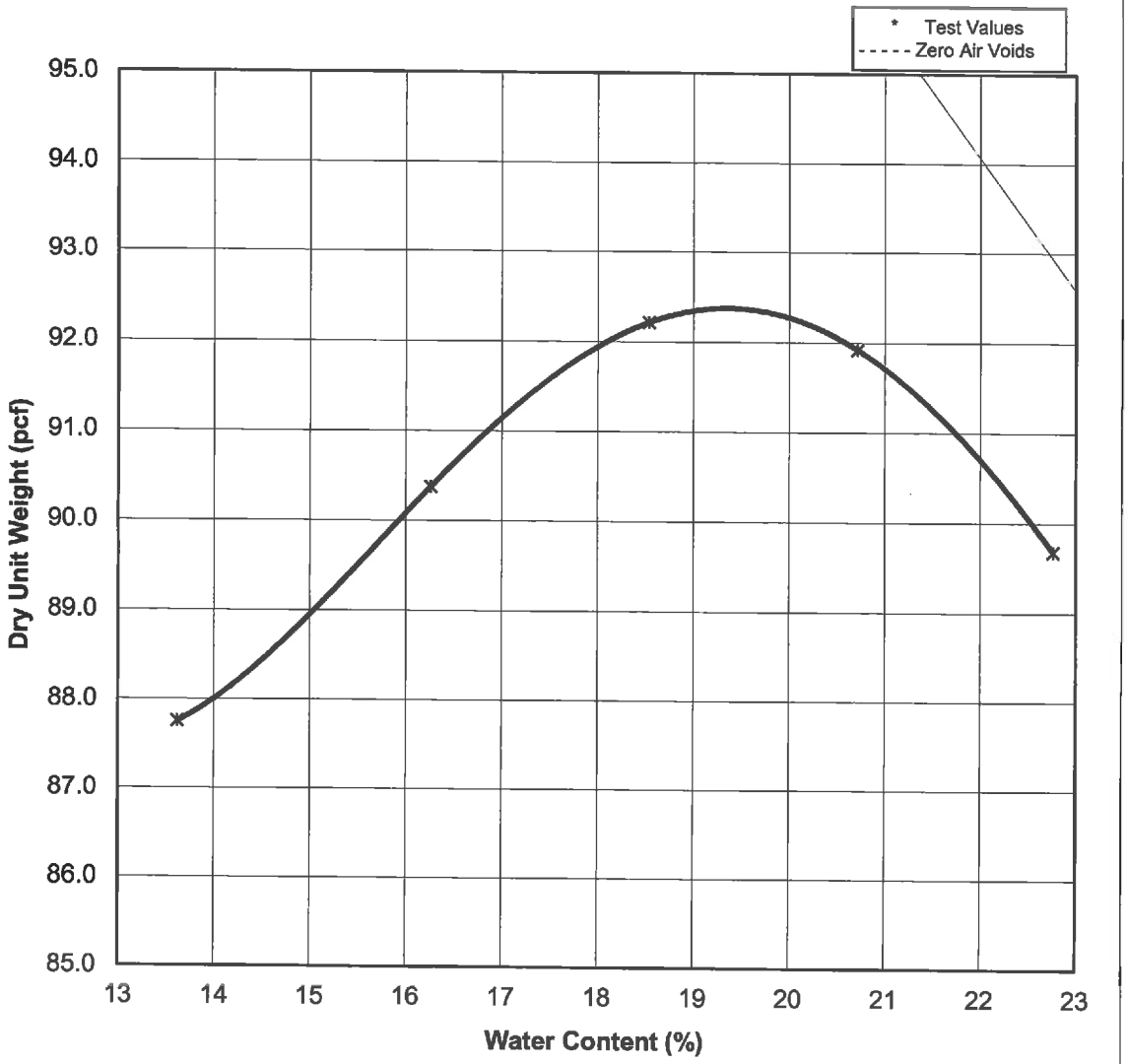
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond Closure
Client: Ameren UE
Sample Source: South Side of Pond D
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.01.7310
Test Date:	04/04/12
Proctor No.:	P-6613-2 (Ash 2)
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Flyash w/ Bottom Ash

Sample Properties	
Moisture Content	36.2
Liquid Limit	37
Plastic Limit	34
Plasticity Index	3
Specific Gravity:	2.250 Actual
Classification	ML

Test Results:	
Maximum Dry Unit Weight (pcf):	92.4
Optimum Water Content (%):	19.4
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	--
Optimum Water Content (%):	--

Tested By: PAR
Date: 04/04/12

Input By: ZRB
Date: 04/05/12

Checked By: JPK
Date: 04/05/12

Electronic Filing: Received, Clerk's Office 09/28/2020

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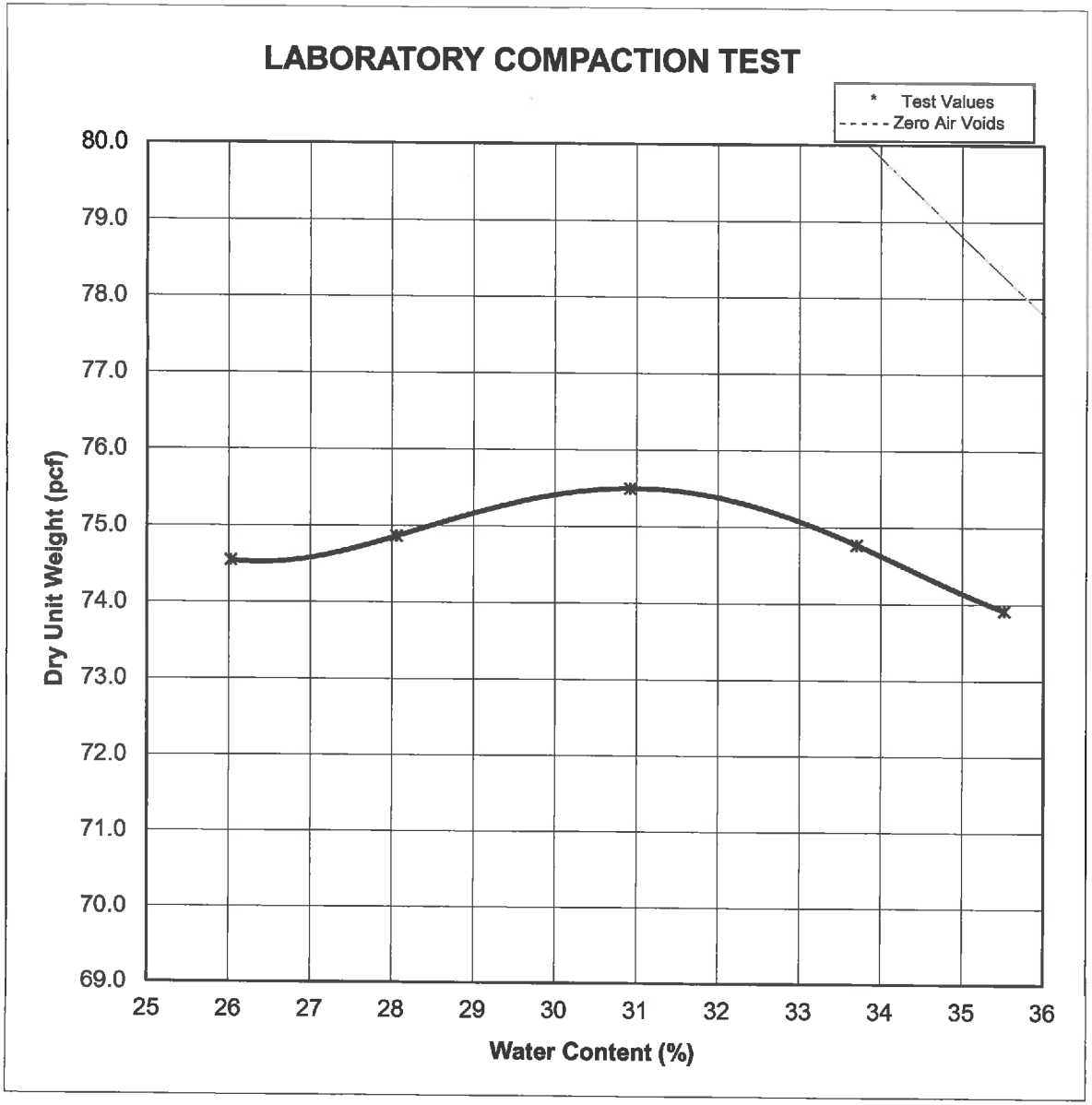
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond Closure
Client: Ameren UE
Sample Source: West Side of Pond D
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.01.7310
Test Date:	04/11/12
Proctor No.:	P-6625-1 (Ash 3)
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Flyash w/ Bottom Ash

Sample Properties	
Moisture Content	
Liquid Limit	
Plastic Limit	
Plasticity Index	
Specific Gravity:	2.250 Actual
Classification	ML

Test Results:	
Maximum Dry Unit Weight (pcf):	75.5
Optimum Water Content (%):	31.0
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	--
Optimum Water Content (%):	--

Tested By: PAR
Date: 04/11/12

Input By: ZRB
Date: 04/12/12

Checked By: JPK
Date: 01/00/00

Electronic Filing: Received, Clerk's Office 09/28/2020

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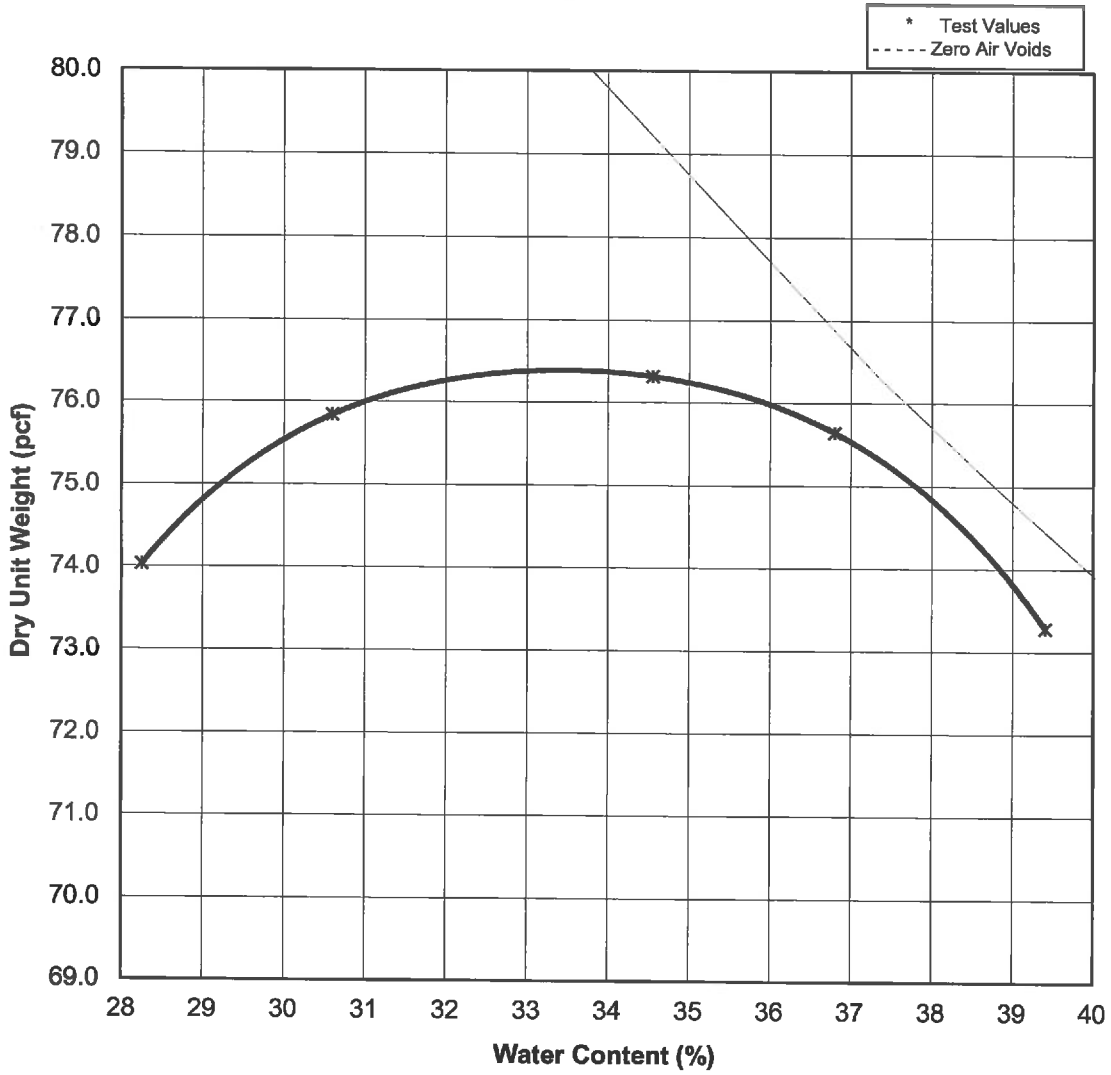
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond Closure
Client: Ameren UE
Sample Source: East Side of Pond D
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.01.7310
Test Date:	04/11/12
Proctor No.:	P-6625-2 (Ash 4)
Test Method:	ASTM D 698 Method A
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Flyash w/ Bottom Ash

Sample Properties	
Moisture Content	
Liquid Limit	
Plastic Limit	
Plasticity Index	
Specific Gravity:	2.250 Actual
Classification	ML

Test Results:	
Maximum Dry Unit Weight (pcf):	76.3
Optimum Water Content (%):	33.5
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	--
Optimum Water Content (%):	--

Tested By: PAR
Date: 04/11/12

Input By: ZRB
Date: 04/12/12

Checked By: JPK
Date: 01/00/00

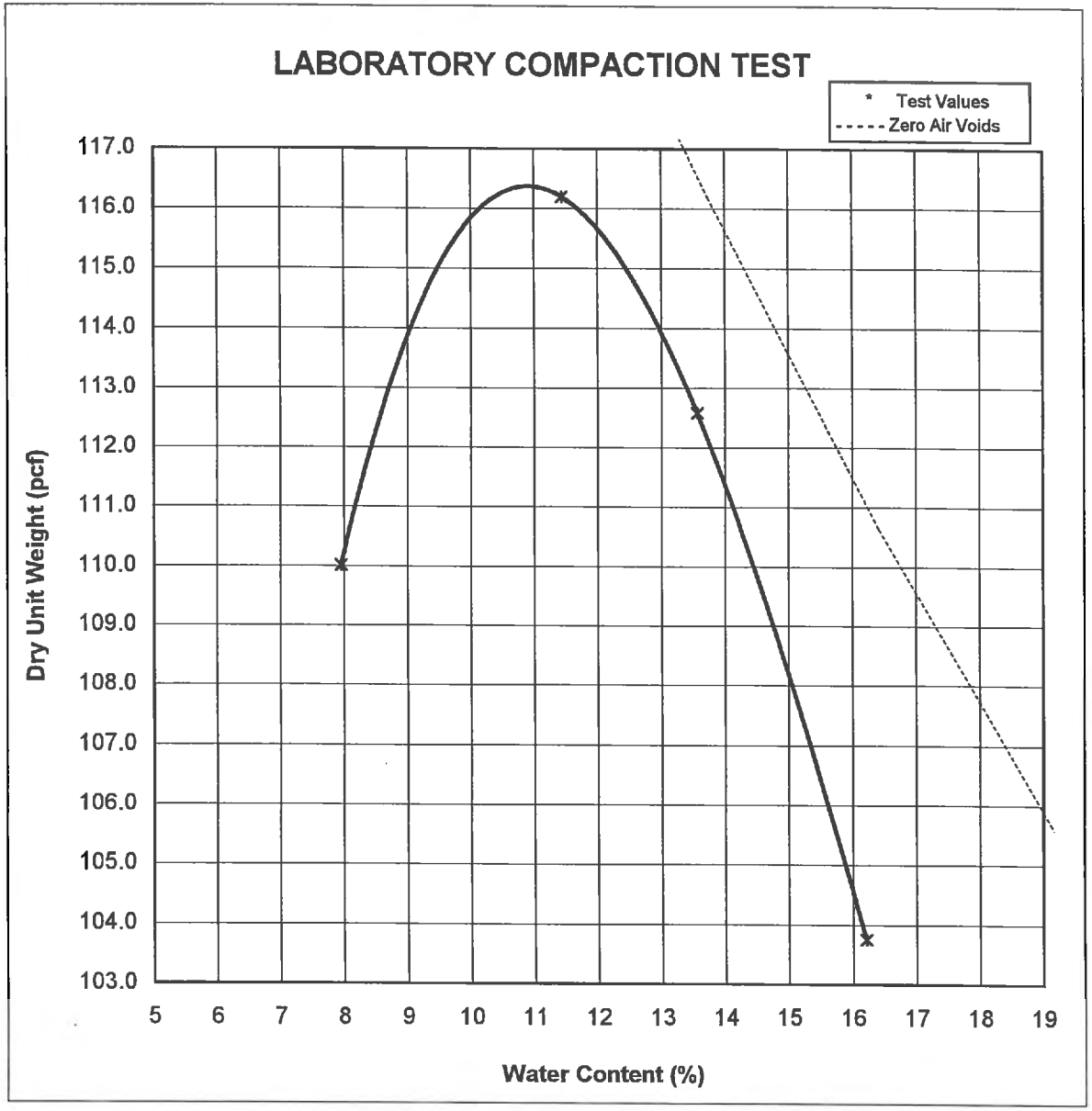
Electronic Filing: Received, Clerk's Office 09/28/2020

11816 Lackland Road, Suite 150
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond D
Client: Ameren UE
Sample Source: East Embankment
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.01.7310
Test Date:	05/03/12
Proctor No.:	P-6650-1
Test Method:	ASTM D 698 Method C
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Sandy Lean Clay With Gravel

Sample Properties	
Moisture Content	--
Liquid Limit	
Plastic Limit	
Plasticity Index	
Specific Gravity:	2.500 Estimated
Classification	N/A

Test Results:	
Maximum Dry Unit Weight (pcf):	116.4
Optimum Water Content (%):	10.9
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	--
Optimum Water Content (%):	--

Tested By: ZRB
Date: 05/03/12

Input By: ZRB
Date: 05/04/12

Checked By: JPK
Date: 05/04/12

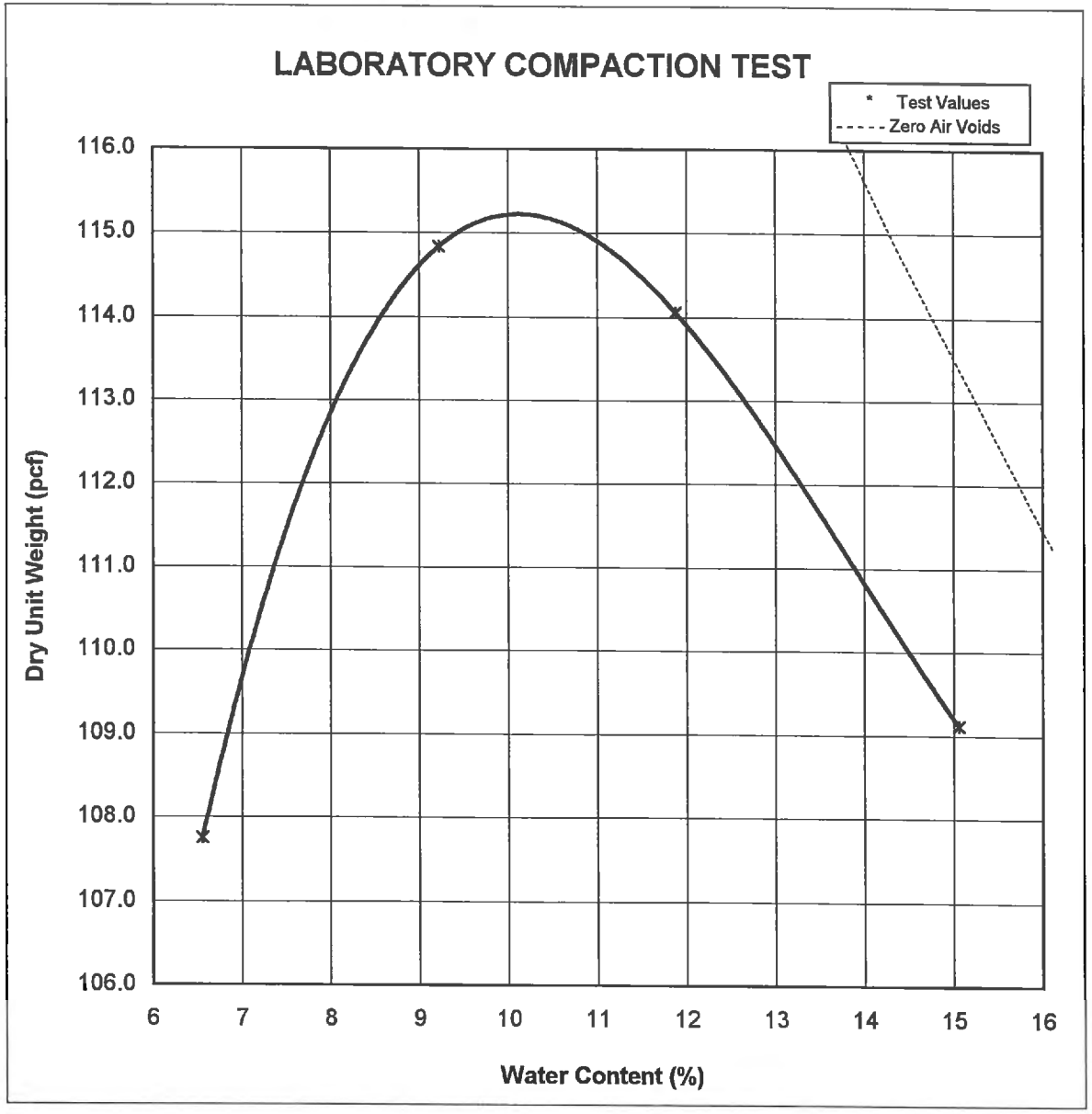
Electronic Filing: Received, Clerk's Office 09/28/2020

11816 Lackland Road, Suite 150
St. Louis, MO 63146
Ph: 314-997-7740
Fax: 314-997-2067

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Hutsonville Ash Pond D
Client: Ameren UE
Sample Source: South Embankment
Supplier: N/A

LABORATORY COMPACTION TEST



Test Information	
Project No.:	J019896.01.7310
Test Date:	05/03/12
Proctor No.:	P-6650-2
Test Method:	ASTM D 698 Method C
Rammer Type:	Mechanical
Prep. Method:	Dry

Sample Description
Sandy Lean Clay With Gravel

Sample Properties	
Moisture Content	--
Liquid Limit	
Plastic Limit	
Plasticity Index	
Specific Gravity:	2.500 Estimated
Classification	N/A

Test Results:	
Maximum Dry Unit Weight (pcf):	115.2
Optimum Water Content (%):	10.1
Oversize Correction Values:	
Maximum Dry Unit Weight (pcf):	--
Optimum Water Content (%):	--

Tested By: ZRB
Date: 05/03/12

Input By: ZRB
Date: 05/04/12

Checked By: JPK
Date: 05/04/12

Electronic Filing: Received, Clerk's Office 09/28/2020

Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

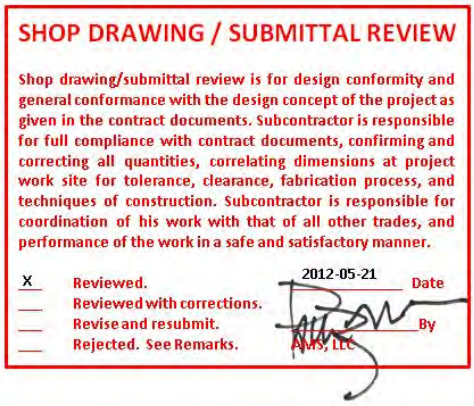
Hutsonville APD Closure

HUT-APD-SUB-007-01-Borrow material

02200-1.8.A Material Test Reports – Classification…Material
02200-2.1.A Soil Analysis of Clay
02200-3.4.A Product Data – Vegetative Cover

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-007-01	2012-05-21	Paul Zinsious AMS	502-640-2918



Holcomb Foundation Engineering Co., Inc.

Electronic Filing: Received, Clerk's Office 09/28/2020

SOILS • BITUMINOUS • CONCRETE • ENGINEERING AND TESTING

SHIPPING ADDRESS
393 Wood Road
Carbondale, IL 62901

MAILING ADDRESS
PO Box 88
Carbondale, IL 62903

PHONE 618-529-5262
TOLL FREE 800-333-1740
FAX 618-457-8991

May 18, 2012

Lamac Engineering Company
PO Box 160
Mt. Carmel, Illinois 62863

Attention: Mr. Pat Gould

Re: Laboratory Soil Tests – Borrow Sample
Hutsonville APD Closure
Hutsonville, Illinois
HFE File H-12097

Dear Sir:

Results of laboratory tests performed on a soil sample delivered to our laboratory are as follows:

% Pass #4 Sieve	99.1
% Pass #200 Sieve	77.7
Atterberg Limits	
Liquid Limit:	30
Plastic Limit:	18
Plasticity Index:	12
Soil Classification:	Silty CLAY with sand (CL)

The grain size graph is attached. If you have any questions, please feel free to contact me at your convenience.

Sincerely,

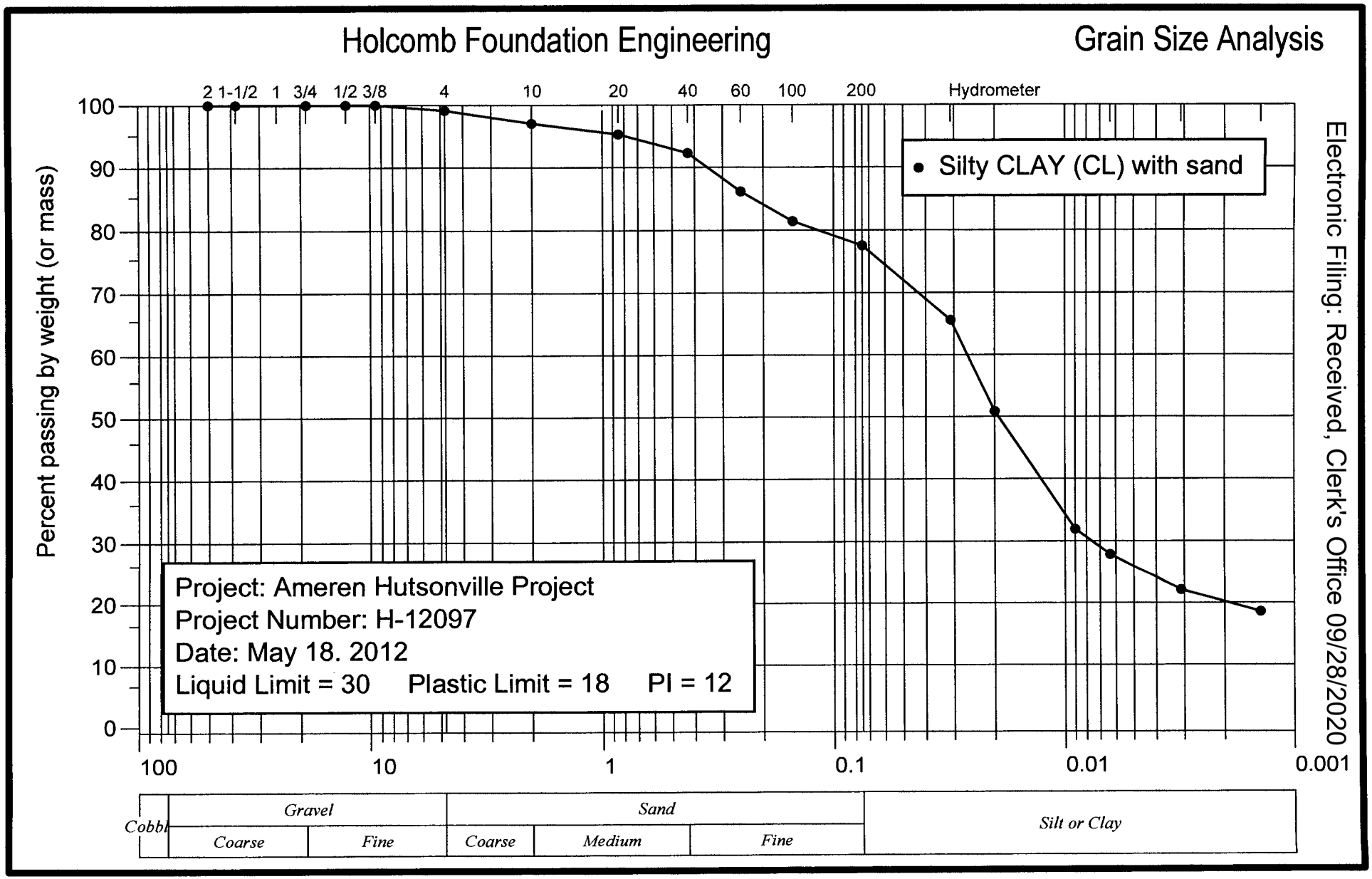
HOLCOMB FOUNDATION ENGINEERING CO.

Timothy J. Holcomb, P.E.

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY J. HOLCOMB
062-042149
Exp 11-30-13
ILLINOIS

Holcomb Foundation Engineering

Grain Size Analysis



Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

LABORATORY REPORT

ARDL, Inc.
Applied Research and Development Laboratory

ARDL Number: 134021-01 ********** Report Date: 05/18/2012

Customer: LAMAC ENGINEERING
323 W 3RD STREET
MT CARMEL, IL 62863
Attention: PATRICK GOULD
Collected By: ARDL

Matrix: SOIL
Date Logged In: 05/15/2012
Hour Logged In: 09:06:59
Sampling Point: COMPOSITE/2 SITES
Collection Date: 05/14/2012 Hour: 1600

ANALYTE	RESULT
Benzene	<6.0 UG/KG
Toluene	<6.0 UG/KG
Ethyl Benzene	<6.0 UG/KG
m & p-Xylene	<12.0 UG/KG
o-Xylene	<6.0 UG/KG
Boron	<3.61 MG/KG
Mercury, TCLP	<0.000200 MG/L
Arsenic, TCLP	<0.0030 MG/L
Barium, TCLP	0.28 MG/L
Cadmium, TCLP	<0.0020 MG/L
Chromium, TCLP	<0.0050 MG/L
Lead, TCLP	0.0056 MG/L
Selenium, TCLP	0.0052 MG/L
Silver, TCLP	<0.0050 MG/L
Flash Point (Closed)	>200 DEG F
Chloride	<24.1 MG/KG
Sulfate	<60.2 MG/KG
pH	5.9 PH UNITS
Solids, Percent	83.0%

Respectfully submitted: (For)
Dean S. Dickerson
Technical Services Manager

P.O. Box 1566 Rte 15E Mt. Vernon Airport Mt.Vernon, Illinois 62864 (618)244-3235

"Test everything. Keep the good." 1 Thes. 5:21

Compliant with NELAC

ARDL, Inc.

P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 Fax

134021

CHAIN OF CUSTODY RECORD

PROJECT: LAMAC Engineering Barrow Pit samples

SAMPLERS: (Signature)

SAMPLE NUMBER	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	BTEX	TCLP	RCRA Metals	CCW	pH	Flashpoint	REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
~~134~~ Hutsonville Borrow Pit	5/14/12	~~18:30~~ 1600	✓		3	2	✓	✓	✓	✓	✓	Composite of two sites	✓	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5/14/12	1820	5-14-12
Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Received for Laboratory by: (Signature)	Date	Time	Shipping Ticket No.

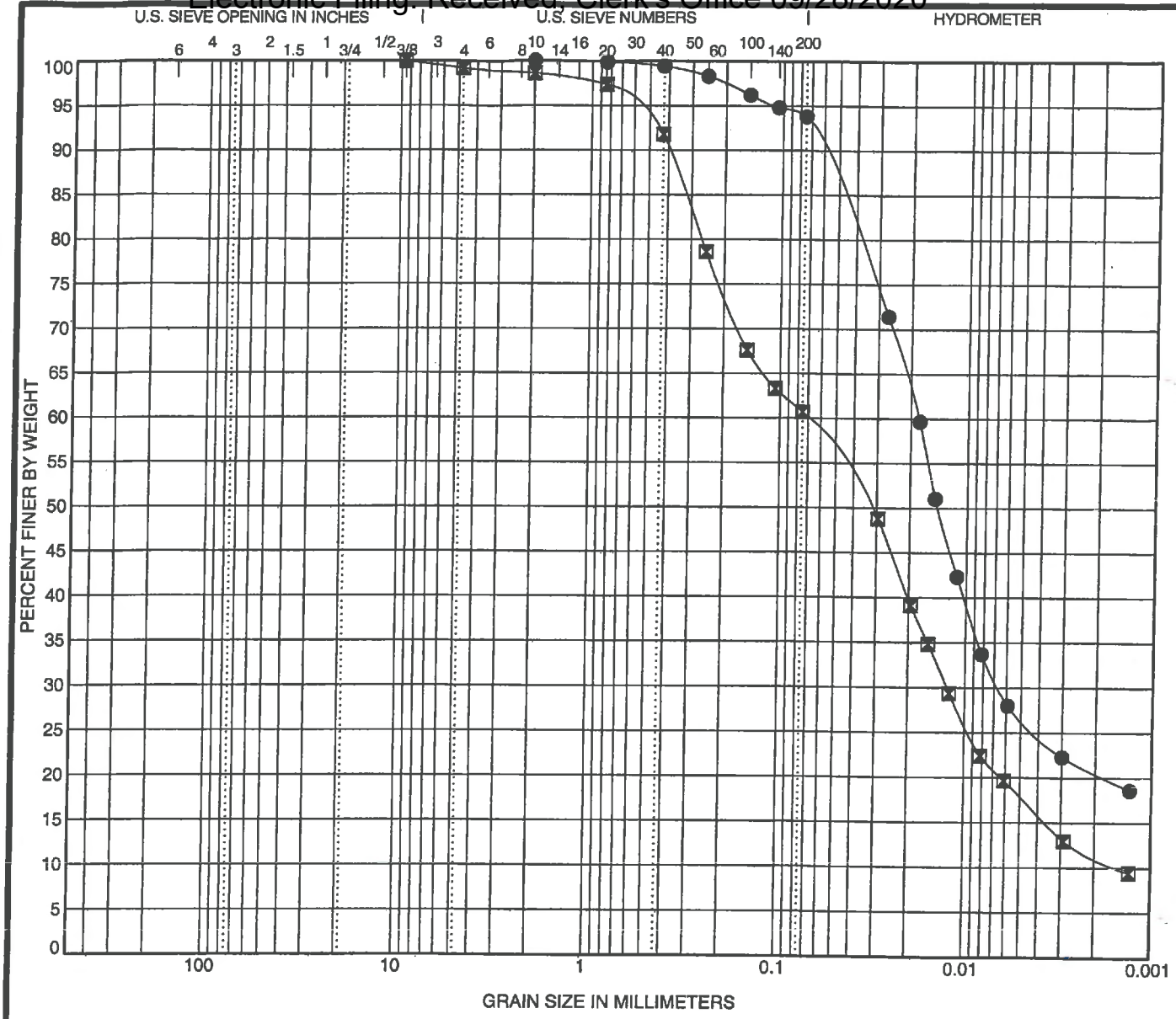
REMARKS/SPECIAL INSTRUCTIONS:

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	CS-1	1.0	LEAN CLAY(CL)	39	20	19		
⊠	CS-2	1.0	SANDY LEAN CLAY(CL)	23	15	8	1.48	47.82

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CS-1	1.0	2	0	0		0.0	6.2	67.2	26.6
⊠	CS-2	1.0	9.5	0.1	0	0	0.8	38.5	42.8	17.9

GEOTECHNOLOGY INC
FROM THE GROUND UP

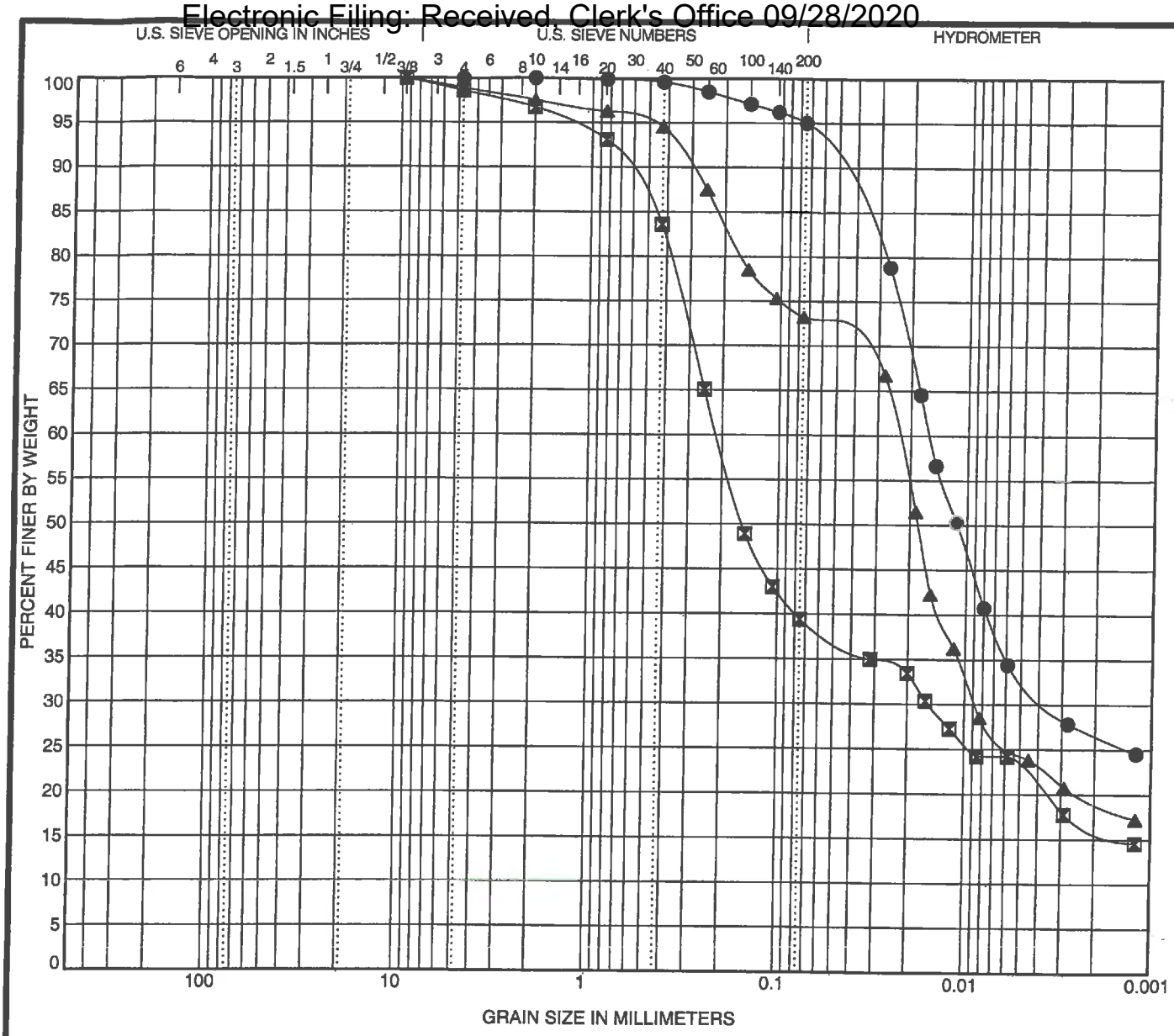
GRAIN SIZE DISTRIBUTION

Hutsonville

J019896.01

US_GRAIN_SIZE_J019896.01 - HUTSONVILLE.GPJ_00 CLONE ME.GPJ_7/17/12

Electronic Filing: Received, Clerk's Office 09/28/2020



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	CS-3	1.0	LEAN CLAY(CL)	47	24	23		
⊠	CS-4	1.0	CLAYEY SAND(SC)	28	15	13		
▲	CS-5	1.0	LEAN CLAY with SAND(CL)	42	18	24		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CS-3	1.0	4.75	0	0		0.0	5.0	62.0	33.0
⊠	CS-4	1.0	9.5	0.2	0		1.4	59.2	16.6	22.8
▲	CS-5	1.0	9.5	0	0		1.1	25.7	48.6	24.6

GEOTECHNOLOGY INC
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Hutsonville

J019896.01

US_GRAIN_SIZE J019896.01 - HUTSONVILLE.GPJ 00 CLONE ME.GPJ 8/14/12

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

July 18, 2012

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: J019896.01

WorkOrder: 12070427

Dear Anna Saindon:

TEKLAB, INC received 2 samples on 7/11/2012 4:33:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070427
Report Date: 18-Jul-12

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	4
Laboratory Results	5
Quality Control Results	7
Receiving Check List	15
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: J019896.01

Work Order: 12070427

Report Date: 18-Jul-12

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- X - Value exceeds Maximum Contaminant Level

Teklab, Inc.
Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070427
Report Date: 18-Jul-12

Cooler Receipt Temp: 4.6 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	kmcclain@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Arkansas	ADEQ	88-0966		3/14/2013	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		5/26/2013	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2012	Collinsville

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 12070427
Client Project: J019896.01
Report Date: 18-Jul-12
Lab ID: 12070427-001
Client Sample ID: CS1
Matrix: SOLID
Collection Date: 07/10/2012 12:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**11.3**	%	1	07/12/2012 10:47	R165754
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride		11		**< 11**	mg/Kg-dry	1	07/16/2012 11:15	79748
SW-846 1010								
Ignitability, Closed Cup	NELAP	60		**>200**	°F	1	07/12/2012 9:45	R165724
SW-846 9036 (TOTAL)								
Sulfate		112	S	**< 112**	mg/Kg-dry	1	07/16/2012 11:15	79749
Matrix interference present in sample.								
SW-846 9045C								
pH (1:1)	NELAP	1.00		**5.22**		1	07/12/2012 12:45	R165730
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	07/16/2012 18:55	79724
Barium	NELAP	0.0500		**0.592**	mg/L	1	07/16/2012 18:55	79724
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	07/16/2012 18:55	79724
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	07/16/2012 18:55	79724
Lead	NELAP	0.400		**< 0.400**	mg/L	1	07/16/2012 18:55	79724
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	07/16/2012 18:55	79724
Silver	NELAP	0.100		**< 0.100**	mg/L	1	07/16/2012 18:55	79724
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	07/17/2012 9:58	79752
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	2.00		**3.33**	mg/Kg-dry	1	07/16/2012 21:33	79708
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.2		**ND**	µg/Kg-dry	1	07/12/2012 10:01	79735
Ethylbenzene	NELAP	5.8		**ND**	µg/Kg-dry	1	07/12/2012 10:01	79735
Toluene	NELAP	5.8		**ND**	µg/Kg-dry	1	07/12/2012 10:01	79735
Xylenes, Total	NELAP	5.8		**ND**	µg/Kg-dry	1	07/12/2012 10:01	79735
Surr: 1,2-Dichloroethane-d4		72.2-131		**100.2**	%REC	1	07/12/2012 10:01	79735
Surr: 4-Bromofluorobenzene		82.1-116		**101.2**	%REC	1	07/12/2012 10:01	79735
Surr: Dibromofluoromethane		77.7-120		**100.1**	%REC	1	07/12/2012 10:01	79735
Surr: Toluene-d8		86-116		**98.1**	%REC	1	07/12/2012 10:01	79735

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 12070427
Client Project: J019896.01
Report Date: 18-Jul-12
Lab ID: 12070427-002
Client Sample ID: CS2
Matrix: SOLID
Collection Date: 07/10/2012 12:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**12.8**	%	1	07/12/2012 10:48	R165754
STANDARD METHODS 4500-CL E (TOTAL)								
Chloride		11		**< 11**	mg/Kg-dry	1	07/16/2012 13:17	79748
SW-846 1010								
Ignitability, Closed Cup	NELAP	60		**>200**	°F	1	07/12/2012 9:45	R165724
SW-846 9036 (TOTAL)								
Sulfate		114		**< 114**	mg/Kg-dry	1	07/16/2012 13:17	79749
SW-846 9045C								
pH (1:1)	NELAP	1.00		**5.38**		1	07/12/2012 12:46	R165730
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	07/16/2012 19:07	79724
Barium	NELAP	0.0500		**0.679**	mg/L	1	07/16/2012 19:07	79724
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	07/16/2012 19:07	79724
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	07/16/2012 19:07	79724
Lead	NELAP	0.400		**< 0.400**	mg/L	1	07/16/2012 19:07	79724
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	07/16/2012 19:07	79724
Silver	NELAP	0.100		**< 0.100**	mg/L	1	07/16/2012 19:07	79724
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	07/17/2012 10:08	79752
SW-846 3050B, 6010B, METALS BY ICP								
Boron	NELAP	1.82		**1.86**	mg/Kg-dry	1	07/16/2012 21:50	79708
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.9		**ND**	µg/Kg-dry	1	07/12/2012 10:31	79735
Ethylbenzene	NELAP	4.7		**ND**	µg/Kg-dry	1	07/12/2012 10:31	79735
Toluene	NELAP	4.7		**ND**	µg/Kg-dry	1	07/12/2012 10:31	79735
Xylenes, Total	NELAP	4.7		**ND**	µg/Kg-dry	1	07/12/2012 10:31	79735
Surr: 1,2-Dichloroethane-d4		72.2-131		**97.5**	%REC	1	07/12/2012 10:31	79735
Surr: 4-Bromofluorobenzene		82.1-116		**100.6**	%REC	1	07/12/2012 10:31	79735
Surr: Dibromofluoromethane		77.7-120		**99.8**	%REC	1	07/12/2012 10:31	79735
Surr: Toluene-d8		86-116		**97.2**	%REC	1	07/12/2012 10:31	79735

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070427
Report Date: 18-Jul-12

EPA SW846 3550C, 5035A, ASTM D2974

Batch R165754 **SampType:** LCS Units %
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		99.0	99.0	0	100	90	110	07/12/2012

Batch R165754 **SampType:** LCSQC Units %
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		99.0	99.0	0	100	90	110	07/12/2012

Batch R165754 **SampType:** DUP Units % RPD Limit 15
SampID: 12070429-002A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		17.6				17.09	2.66	07/12/2012

Batch R165754 **SampType:** DUP Units % RPD Limit 15
SampID: 12070443-004A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		13.0				13.35	2.27	07/12/2012

Batch R165754 **SampType:** DUP Units % RPD Limit 15
SampID: 12070494-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		10.4				10.36	0.19	07/12/2012

STANDARD METHODS 4500-CL E (TOTAL)

Batch 79748 **SampType:** MBLK Units mg/Kg
SampID: MB-79748

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	10		< 10						07/16/2012

Batch 79748 **SampType:** LCS Units mg/Kg
SampID: LCS-79748

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	10		20	20	0	100.1	90	110	07/16/2012
Chloride	100		192	200	0	96.0	90	110	07/16/2012

Batch 79748 **SampType:** MS Units mg/Kg-dry
SampID: 12070427-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	11		219	224	0	97.4	85	115	07/16/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.
Work Order: 12070427
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STANDARD METHODS 4500-CL E (TOTAL)

Batch 79748 **SampType:** MSD Units mg/Kg-dry RPD Limit 15
SampID: 12070427-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	11		214	224	0	95.4	218.7	2.02	07/16/2012

SW-846 1010

Batch R165724 **SampType:** LCS Units °F
SampID: LCS-R165724

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ignitability, Closed Cup	60		81	81	0	100	97	103	07/12/2012

Batch R165724 **SampType:** DUP Units °F RPD Limit 5
SampID: 12070427-002ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Closed Cup	60		>200				0	0.00	07/12/2012

SW-846 9036 (TOTAL)

Batch 79749 **SampType:** MBLK Units mg/Kg
SampID: MB-79749

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		< 10						07/16/2012

Batch 79749 **SampType:** LCS Units mg/Kg
SampID: LCS-79749

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		19	20	0	93.5	90	110	07/16/2012
Sulfate	100		183	200	0	91.7	90	110	07/16/2012

Batch 79749 **SampType:** MS Units mg/Kg-dry
SampID: 12070427-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	112	S	148	112	60.84	77.4	85	115	07/16/2012

Batch 79749 **SampType:** MSD Units mg/Kg-dry RPD Limit 10
SampID: 12070427-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	112	S	148	112	60.84	77.8	147.7	0.30	07/16/2012

SW-846 9045C

Batch R165730 **SampType:** LCS Units
SampID: LCS-R165730

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH (1:1)	1.00		6.98	7.00	0	99.7	99.1	100.8	07/12/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: J019896.01

Work Order: 12070427

Report Date: 18-Jul-12

SW-846 9045C

Batch R165730 **SampType:** DUP Units RPD Limit 10

SampID: 12070427-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		5.06				5.220	3.11	07/12/2012

Batch R165730 **SampType:** DUP Units RPD Limit 10

SampID: 12070427-002ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		5.16				5.380	4.17	07/12/2012

Batch R165730 **SampType:** DUP Units RPD Limit 10

SampID: 12070395-001ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		4.32				4.300	0.46	07/12/2012

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 79724 **SampType:** MBLK Units mg/L

SampID: MB-79724

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		< 0.250	0.250	0	0	-100	100	07/16/2012
Barium	0.0500		< 0.0500	0.0500	0	0	-100	100	07/16/2012
Cadmium	0.0200		< 0.0200	0.0200	0	0	-100	100	07/16/2012
Chromium	0.100		< 0.100	0.100	0	0	-100	100	07/16/2012
Lead	0.400		< 0.400	0.400	0	0	-100	100	07/16/2012
Selenium	0.500		< 0.500	0.500	0	0	-100	100	07/16/2012
Silver	0.100		< 0.100	0.100	0	0	-100	100	07/16/2012

Batch 79724 **SampType:** LCS Units mg/L

SampID: LCS-79724

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		19.0	20.0	0	95.0	85	115	07/16/2012
Barium	0.0500		17.8	20.0	0	89.0	85	115	07/16/2012
Cadmium	0.0200		0.487	0.500	0	97.4	85	115	07/16/2012
Chromium	0.100		1.87	2.00	0	93.7	85	115	07/16/2012
Lead	0.400		4.86	5.00	0	97.2	85	115	07/16/2012
Selenium	0.500		19.1	20.0	0	95.6	85	115	07/16/2012
Silver	0.100		0.453	0.500	0	90.6	85	115	07/16/2012

Teklab, Inc.
Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.

Work Order: 12070427

Client Project: J019896.01

Report Date: 18-Jul-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 79724 **SampType:** MS Units mg/L
SampID: 12070427-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.6**	20.0	0	97.8	75	125	07/16/2012
Barium	0.0500		**18.8**	20.0	0.5920	90.8	75	125	07/16/2012
Cadmium	0.0200		**0.501**	0.500	0	100.2	75	125	07/16/2012
Chromium	0.100		**1.93**	2.00	0	96.3	75	125	07/16/2012
Lead	0.400		**4.95**	5.00	0	99.1	75	125	07/16/2012
Selenium	0.500		**19.7**	20.0	0	98.7	75	125	07/16/2012
Silver	0.100		**0.479**	0.500	0	95.8	75	125	07/16/2012

Batch 79724 **SampType:** MS Units mg/L
SampID: 12070427-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.0**	20.0	0	95.1	75	125	07/16/2012
Barium	0.0500		**18.3**	20.0	0.6790	88.0	75	125	07/16/2012
Cadmium	0.0200		**0.487**	0.500	0	97.4	75	125	07/16/2012
Chromium	0.100		**1.86**	2.00	0	93.1	75	125	07/16/2012
Lead	0.400		**5.12**	5.00	0.2660	97.2	75	125	07/16/2012
Selenium	0.500		**19.3**	20.0	0	96.4	75	125	07/16/2012
Silver	0.100		**0.452**	0.500	0	90.4	75	125	07/16/2012

Batch 79724 **SampType:** MS Units mg/L
SampID: 12070488-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.7**	20.0	0	98.4	75	125	07/16/2012
Barium	0.0500		**19.3**	20.0	0.8650	**92.2**	75	125	07/16/2012
Cadmium	0.0200		**0.495**	0.500	0	99.0	75	125	07/16/2012
Chromium	0.100		**1.97**	2.00	0	98.7	75	125	07/16/2012
Lead	0.400		**4.92**	5.00	0	98.3	75	125	07/16/2012
Selenium	0.500		**19.8**	20.0	0	99.1	75	125	07/16/2012
Silver	0.100		**0.476**	0.500	0	95.2	75	125	07/16/2012

Batch 79724 **SampType:** MS Units mg/L
SampID: 12070488-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.7**	20.0	0	98.6	75	125	07/16/2012
Barium	0.0500		**18.9**	20.0	0.5110	91.8	75	125	07/16/2012
Cadmium	0.0200		**0.498**	0.500	0	99.6	75	125	07/16/2012
Chromium	0.100		**1.98**	2.00	0	98.8	75	125	07/16/2012
Lead	0.400		**4.94**	5.00	0	98.7	75	125	07/16/2012
Selenium	0.500		**20.0**	20.0	0	100.2	75	125	07/16/2012
Silver	0.100		**0.481**	0.500	0	96.2	75	125	07/16/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: J019896.01

Work Order: 12070427

Report Date: 18-Jul-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 79724 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 12070488-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**19.8**	20.0	0	98.8	19.73	0.20	07/16/2012
Barium	0.0500		**19.0**	20.0	0.5110	92.4	18.87	0.69	07/16/2012
Cadmium	0.0200		**0.492**	0.500	0	98.4	0.4980	1.21	07/16/2012
Chromium	0.100		**1.97**	2.00	0	98.5	1.975	0.30	07/16/2012
Lead	0.400		**4.92**	5.00	0	98.3	4.937	0.43	07/16/2012
Selenium	0.500		**20.0**	20.0	0	99.8	20.03	0.30	07/16/2012
Silver	0.100		**0.479**	0.500	0	95.8	0.4810	0.42	07/16/2012

Batch 79724 **SampType:** MS Units mg/L

SampID: 12070488-003AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.4**	20.0	0	97.1	75	125	07/16/2012
Barium	0.0500		**19.1**	20.0	0.8860	91.1	75	125	07/16/2012
Cadmium	0.0200		**0.492**	0.500	0	98.4	75	125	07/16/2012
Chromium	0.100		**1.96**	2.00	0	97.8	75	125	07/16/2012
Lead	0.400		**4.90**	5.00	0	98.0	75	125	07/16/2012
Selenium	0.500		**19.7**	20.0	0	98.4	75	125	07/16/2012
Silver	0.100		**0.473**	0.500	0	94.6	75	125	07/16/2012

Batch 79724 **SampType:** MS Units mg/L

SampID: 12070495-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.3**	20.0	0	96.6	75	125	07/16/2012
Barium	0.0500		**17.6**	20.0	0.2440	86.6	75	125	07/16/2012
Cadmium	0.0200		**0.496**	0.500	0	99.2	75	125	07/16/2012
Chromium	0.100		**1.87**	2.00	0	93.7	75	125	07/16/2012
Lead	0.400		**4.90**	5.00	0	98.0	75	125	07/16/2012
Selenium	0.500		**19.5**	20.0	0	97.4	75	125	07/16/2012
Silver	0.100		**0.452**	0.500	0	90.4	75	125	07/16/2012

Batch 79724 **SampType:** MS Units mg/L

SampID: 12070497-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.3**	20.0	0	96.3	75	125	07/16/2012
Barium	0.0500		**19.4**	20.0	1.594	88.8	75	125	07/16/2012
Cadmium	0.0200		**0.793**	0.500	0.3130	96.0	75	125	07/16/2012
Chromium	0.100		**1.90**	2.00	0	95.1	75	125	07/16/2012
Lead	0.400		**4.88**	5.00	0	97.5	75	125	07/16/2012
Selenium	0.500		**19.5**	20.0	0	97.5	75	125	07/16/2012
Silver	0.100		**0.460**	0.500	0	92.0	75	125	07/16/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: J019896.01

Work Order: 12070427

Report Date: 18-Jul-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 79724 **SampType:** MS Units mg/L
SampID: 12070513-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		4.90	5.00	0	97.9	75	125	07/16/2012

Batch 79724 **SampType:** MS Units mg/L
SampID: 12070513-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		4.98	5.00	0	99.6	75	125	07/16/2012

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 79752 **SampType:** MBLK Units mg/L
SampID: MB-79752

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		< 0.00020	0.00020	0	0	-100	100	07/17/2012

Batch 79752 **SampType:** LCS Units mg/L
SampID: LCS-79752

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		0.00467	0.00500	0	93.3	85	115	07/17/2012

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070427-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		0.00441	0.00500	0	88.3	75	125	07/17/2012

Batch 79752 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 12070427-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		0.00458	0.00500	0	91.7	0.004414	3.78	07/17/2012

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070427-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		0.00475	0.00500	0	95.0	75	125	07/17/2012

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070488-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		0.00467	0.00500	0	93.4	75	125	07/17/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: J019896.01

Work Order: 12070427

Report Date: 18-Jul-12

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070488-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00462**	0.00500	0	92.4	75	125	07/17/2012

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070488-003AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00460**	0.00500	0	92.0	75	125	07/17/2012

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070495-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00450**	0.00500	0	90.1	75	125	07/17/2012

Batch 79752 **SampType:** MS Units mg/L
SampID: 12070497-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.0100		**0.0703**	0.00500	0.06625	81.4	75	125	07/17/2012

SW-846 3050B, 6010B, METALS BY ICP

Batch 79708 **SampType:** MBLK Units mg/Kg-dry
SampID: MB-79708

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**< 2.00**	2.00	0	0	-100	100	07/16/2012

Batch 79708 **SampType:** LCS Units mg/Kg-dry
SampID: LCS-79708

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	2.00		**47.4**	50.0	0	94.8	85	115	07/16/2012

Batch 79708 **SampType:** MS Units mg/Kg-dry
SampID: 12070510-003AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	1.92	S	**27.8**	48.1	1.240	55.2	75	125	07/16/2012

Batch 79708 **SampType:** MSD Units mg/Kg-dry RPD Limit 20
SampID: 12070510-003AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	1.92	S	**28.2**	48.1	1.240	56.0	27.80	1.37	07/16/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.

Work Order: 12070427

Client Project: J019896.01

Report Date: 18-Jul-12

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 79735 **SampType:** MBLK Units µg/Kg

SampID: MBLK-A120712-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		ND						07/12/2012
Ethylbenzene	5.0		ND						07/12/2012
Toluene	5.0		ND						07/12/2012
Xylenes, Total	5.0		ND						07/12/2012
Surr: 1,2-Dichloroethane-d4			48.5	50.0		97.0	72.2	131	07/12/2012
Surr: 4-Bromofluorobenzene			50.9	50.0		101.9	82.1	116	07/12/2012
Surr: Dibromofluoromethane			49.2	50.0		98.5	77.7	120	07/12/2012
Surr: Toluene-d8			48.3	50.0		96.6	86	116	07/12/2012

Batch 79735 **SampType:** LCS Units µg/Kg

SampID: LCS-A120712-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		47.6	50.0	0	95.2	73.9	109	07/12/2012
Ethylbenzene	5.0		48.6	50.0	0	97.3	84.1	115	07/12/2012
Toluene	5.0		46.6	50.0	0	93.3	79.1	112	07/12/2012
Xylenes, Total	5.0		146	150	0	97.6	79.1	117	07/12/2012
Surr: 1,2-Dichloroethane-d4			46.0	50.0		92.0	72.2	131	07/12/2012
Surr: 4-Bromofluorobenzene			52.9	50.0		105.7	82.1	116	07/12/2012
Surr: Dibromofluoromethane			49.6	50.0		99.2	77.7	120	07/12/2012
Surr: Toluene-d8			48.0	50.0		96.0	86	116	07/12/2012

Batch 79735 **SampType:** LCSD Units µg/Kg RPD Limit 40

SampID: LCSD-A120712-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		49.9	50.0	0	99.8	47.58	4.72	07/12/2012
Ethylbenzene	5.0		50.5	50.0	0	101.0	48.65	3.71	07/12/2012
Toluene	5.0		49.0	50.0	0	97.9	46.64	4.87	07/12/2012
Xylenes, Total	5.0		152	150	0	101.2	146.4	3.64	07/12/2012
Surr: 1,2-Dichloroethane-d4			45.6	50.0		91.1			07/12/2012
Surr: 4-Bromofluorobenzene			51.9	50.0		103.8			07/12/2012
Surr: Dibromofluoromethane			49.4	50.0		98.9			07/12/2012
Surr: Toluene-d8			48.2	50.0		96.5			07/12/2012

Teklab, Inc.
Environmental Laboratory

Receiving Check List

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Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070427
Report Date: 18-Jul-12

Carrier: Josh Cerar

Completed by: On: 11-Jul-12 — Heather L. Riley

Received By: SRH

Reviewed by: On: 11-Jul-12 — Elizabeth A. Hurley

Pages to follow: Chain of custody [1] Extra pages included [1]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	4.6
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials	☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers	☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐		
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA	☑

Any No responses must be detailed below or on the COC.

Analyze for all parameters on attached e-mail per Anna Saindon. SAH 7/12/12

CHAIN OF CUSTODY

pg. 1 of 1 Work Order # 12070427

TEKLAB, INC. 5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618) 344-1004 ~ Fax: (618) 344-1005

Client: Geotechnology
Address: 11816 Lackland Rd st 150
City / State / Zip: St Louis MO 63146
Contact: Anna Saindon Phone: 314-997-7440
E-Mail: a-saindon@geotechnology.com Fax:

Samples on: X Ice ☐ Blue Ice ☐ No Ice 4.6 °C
Preserved in: ☐ Lab ☐ Field FOR LAB USE ONLY
Lab Notes:
Comments:

- Are these samples known to be involved in litigation? If yes, a surcharge will apply. ☐ Yes X No
- Are these samples known to be hazardous? ☐ Yes X No
- Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in comment section. ☐ Yes X No

Project Name / Number: JD19896.01
Sample Collector's Name: Anna Saindon
Results Requested: X Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)
Billing Instructions: PO36506

Lab Use Only	Sample Identification	Date/Time Sampled	# and Type of Containers: UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	Other	MATRIX: Water	Drinking Water	Soil	Sludge	Sp. Waste	INDICATE ANALYSIS REQUESTED: BTEX	Metals (see list)	Ignitability	pH
12070427.01	CS1	7/10/12 1255	3					1	2				X			X	X	X	X
.02	CS2	↓ 1240	3					1	2				X			X	X	X	X

Teklab Inc. Courier Pick Up

Relinquished By	Date / Time	Received By	Date / Time
	7/10/12 1400		7/11/12 1900
	7/11/12 1633	Stephanie Haynes	7/11/12 16:33

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse side, and that he/she has the authority to sign on behalf of client.

WHITE – LAB YELLOW – SAMPLER'S COPY

Electronic Filing: Received, Clerk's Office 09/28/2020

Shelly A. Hennessy

From: Saindon, Anna [A_Saindon@geotechnology.com]
Sent: Thursday, June 21, 2012 11:08 AM
To: Shelly A. Hennessy
Subject: Bottle order

Good morning Shelly,

I would like the following bottle order delivered by next Monday afternoon if practicable. If you can give me an estimate on how much it costs for 6 of these I'll get a PO worked up for you too.

Thanks!

Hutsonville Ash Pond D Closure
J019896.01
6 sets in two coolers

RCRA Metals (as TCLP):
SW 846 1311 - Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver
SW 846 7478 - Mercury

CCW Ions (as Totals):
SW 846 6010B - Boron
SW 846 M4500-CLE - Chloride
SW 846 9036- Sulfate

BETX Constituents:
SW 846 8260B - Benzene, Ethylbenzene, Toluene, Xylene

pH - SW 846 9045C Every 25,000 cubic yards per borrow source

Flash Point (Pensky-Martens Closed Cup) - SW 846 1010

Anna Saindon, PE, RG
Senior Engineer

GEOTECHNOLOGY, INC.
11816 Lackland Road, Suite 150
St. Louis, MO 63146
(314) 997-7440 phone
(314) 997-2067 fax
www.geotechnology.com

Please consider the environment before printing this email.

IMPORTANT INFORMATION ABOUT THIS COMMUNICATION This electronic communication (and any attachments) is intended solely for the use of the person or entity to which it is addressed. If you are not the intended recipient, please notify the sender by email and delete this message from your system. This communication has not been subjected to our customary internal review. DO NOT RELY on professional recommendations and opinions, plans, specifications, or other instruments of professional service that are delivered electronically. RELY ONLY on the hard copy that our firm will issue.

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

July 30, 2012

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: J019896.01

WorkOrder: 12070752

Dear Anna Saindon:

TEKLAB, INC received 2 samples on 7/11/2012 4:33:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Electronic Filing: Received, Clerk's Office 09/28/2020

Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070752
Report Date: 30-Jul-12

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	4
Laboratory Results	5
Quality Control Results	7
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: J019896.01

Work Order: 12070752

Report Date: 30-Jul-12

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
E - Value above quantitation range	H - Holding times exceeded
J - Analyte detected below quantitation limits	M - Manual Integration used to determine area response
ND - Not Detected at the Reporting Limit	R - RPD outside accepted recovery limits
S - Spike Recovery outside recovery limits	X - Value exceeds Maximum Contaminant Level

Teklab, Inc.
Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070752
Report Date: 30-Jul-12

Cooler Receipt Temp: °C

This report contains additional analysis for work order #12070427.

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	kmcclain@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2013	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		5/26/2013	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2012	Collinsville

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 12070752
Client Project: J019896.01
Report Date: 30-Jul-12
Lab ID: 12070752-001
Client Sample ID: CS1
Matrix: SOLID
Collection Date: 07/10/2012 12:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)								
Sulfate, SHAKE		10	J	**8**	mg/L	1	07/20/2012 12:06	R166040
ASTM D3987, SW-846 9251, IN SHAKE EXTRACT								
Chloride, SHAKE		1		**9**	mg/L	1	07/20/2012 12:06	R166041
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Boron		0.100		**0.474**	mg/L	5	07/30/2012 14:38	79912

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 12070752
Client Project: J019896.01
Report Date: 30-Jul-12
Lab ID: 12070752-002
Client Sample ID: CS2
Matrix: SOLID
Collection Date: 07/10/2012 12:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)								
Sulfate, SHAKE		10	J	6	mg/L	1	07/20/2012 12:14	R166040
ASTM D3987, SW-846 9251, IN SHAKE EXTRACT								
Chloride, SHAKE		1		5	mg/L	1	07/20/2012 12:14	R166041
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Boron		0.100		0.431	mg/L	5	07/30/2012 14:44	79912

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: J019896.01

Work Order: 12070752
Report Date: 30-Jul-12

ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)

Batch R166040 **SampType:** MBLK Units mg/L
SampID: MB-R166040

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate, SHAKE	10		< 10						07/20/2012

Batch R166040 **SampType:** LCS Units mg/L
SampID: LCS-R166040

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate, SHAKE	10		19	20	0	97.3	90	110	07/20/2012

ASTM D3987, SW-846 9251, IN SHAKE EXTRACT

Batch R166041 **SampType:** MBLK Units mg/L
SampID: MB-R166041

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride, SHAKE	1		< 1						07/20/2012

Batch R166041 **SampType:** LCS Units mg/L
SampID: LCS-R166041

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride, SHAKE	1		21	20	0	104.4	90	110	07/20/2012

ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP

Batch 79912 **SampType:** MBLK Units mg/L
SampID: MB-79912

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.0200	J	0.016	0.0200	0	79.5	-100	100	07/30/2012
Boron	0.0200		< 0.0200	0.0200	0	0	-100	100	07/24/2012

Batch 79912 **SampType:** LCS Units mg/L
SampID: LCS-79912

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.0200		0.518	0.500	0	103.5	85	115	07/30/2012
Boron	0.0200		0.467	0.500	0	93.4	85	115	07/24/2012

Batch 79912 **SampType:** MS Units mg/L
SampID: 12070752-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.100		0.948	0.500	0.4310	103.3	75	125	07/30/2012

Batch 79912 **SampType:** MSD Units mg/L RPD Limit 20
SampID: 12070752-002AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.100		0.950	0.500	0.4310	103.8	0.9475	0.26	07/30/2012

TEKLAB, INC
5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
TEL: (618) 344-1004
FAX: (618) 344-1005

CHAIN-OF-CUSTODY RECORD

12070752

WorkOrder: 12070752

Client:
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146

TEL: (314) 997-7440
FAX: (314) 997-2067
Project: J019896.01

19-Jul-12

					Requested Tests		
Sample ID	ClientSampID	Matrix	Date Collected	Bottle	D3987/6010B	D3987/SW9036	D3987/SW9251
12070752-001	CS1	Solid	7/10/2012 12:55:00 PM		A	A	A
12070752-002	CS2	Solid	7/10/2012 12:40:00 PM		A	A	A

Comments: Per Anna Saindon; additional analysis on WO #12070427

	Date/Time		Date/Time
Relinquished by:		**Received by:**	7-19-12
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Electronic Filing: Received, Clerk's Office 09/28/2020

August 15, 2012

Anna Saindon
Geotechnology, Inc.
11816 Lackland Road
St. Louis, MO 63146
TEL: (314) 997-7440
FAX: (314) 997-2067

RE: Hutsonville J019896.01

WorkOrder: 12080406

Dear Anna Saindon:

TEKLAB, INC received 3 samples on 8/8/2012 1:03:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Electronic Filing: Received, Clerk's Office 09/28/2020

Client: Geotechnology, Inc.
Work Order: 12080406

Client Project: Hutsonville J019896.01
Report Date: 15-Aug-12

This reporting package includes the following:

Cover Letter	1
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Quality Control Results	8
Receiving Check List	21
Chain of Custody	Appended

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.01

Work Order: 12080406
Report Date: 15-Aug-12

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
E - Value above quantitation range	H - Holding times exceeded
M - Manual Integration used to determine area response	ND - Not Detected at the Reporting Limit
R - RPD outside accepted recovery limits	S - Spike Recovery outside recovery limits
X - Value exceeds Maximum Contaminant Level	

Teklab, Inc.
Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.01

Work Order: 12080406
Report Date: 15-Aug-12

Cooler Receipt Temp: 4.2 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	kmcclain@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2013	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		5/26/2013	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2012	Collinsville

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Work Order: 12080406
Client Project: Hutsonville J019896.01
Report Date: 15-Aug-12
Lab ID: 12080406-001
Client Sample ID: CS-3
Matrix: SOLID
Collection Date: 08/07/2012 9:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)								
Sulfate, SHAKE		10		**11**	mg/L	1	08/14/2012 14:44	R166928
ASTM D3987, SW-846 9251, IN SHAKE EXTRACT								
Chloride, SHAKE		1		**19**	mg/L	1	08/13/2012 17:18	R166873
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**14.2**	%	1	08/08/2012 17:39	R166726
SW-846 1010								
Ignitability, Closed Cup	NELAP	60		**>200**	°F	1	08/09/2012 11:00	R166734
SW-846 9045C								
pH (1:1)	NELAP	1.00		**4.60**		1	08/09/2012 10:04	R166723
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Boron		0.0200		**< 0.0200**	mg/L	1	08/13/2012 22:07	80495
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	08/11/2012 4:42	80476
Barium	NELAP	0.0500		**0.526**	mg/L	1	08/11/2012 4:42	80476
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	08/11/2012 4:42	80476
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	08/11/2012 4:42	80476
Lead	NELAP	0.400		**< 0.400**	mg/L	1	08/11/2012 4:42	80476
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	08/11/2012 4:42	80476
Silver	NELAP	0.100		**< 0.100**	mg/L	1	08/11/2012 4:42	80476
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	08/10/2012 14:17	80479
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.0		**ND**	µg/Kg-dry	1	08/09/2012 23:55	80490
Ethylbenzene	NELAP	5.2		**ND**	µg/Kg-dry	1	08/09/2012 23:55	80490
Toluene	NELAP	5.2		**ND**	µg/Kg-dry	1	08/09/2012 23:55	80490
Xylenes, Total	NELAP	5.2		**ND**	µg/Kg-dry	1	08/09/2012 23:55	80490
Surr: 1,2-Dichloroethane-d4		72.2-131		**107.3**	%REC	1	08/09/2012 23:55	80490
Surr: 4-Bromofluorobenzene		82.1-116		**97.4**	%REC	1	08/09/2012 23:55	80490
Surr: Dibromofluoromethane		77.7-120		**101.0**	%REC	1	08/09/2012 23:55	80490
Surr: Toluene-d8		86-116		**101.7**	%REC	1	08/09/2012 23:55	80490

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Laboratory Results

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Client: Geotechnology, Inc.
Work Order: 12080406
Client Project: Hutsonville J019896.01
Report Date: 15-Aug-12
Lab ID: 12080406-002
Client Sample ID: CS-4
Matrix: SOLID
Collection Date: 08/07/2012 9:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)								
Sulfate, SHAKE		10		**< 10**	mg/L	1	08/14/2012 14:46	R166928
ASTM D3987, SW-846 9251, IN SHAKE EXTRACT								
Chloride, SHAKE		1		**2**	mg/L	1	08/13/2012 17:22	R166873
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**10.6**	%	1	08/08/2012 17:40	R166726
SW-846 1010								
Ignitability, Closed Cup	NELAP	60		**>200**	°F	1	08/09/2012 11:00	R166734
SW-846 9045C								
pH (1:1)	NELAP	1.00		**6.55**		1	08/09/2012 10:08	R166723
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Boron		0.0200		**< 0.0200**	mg/L	1	08/13/2012 22:24	80495
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	08/11/2012 4:54	80476
Barium	NELAP	0.0500		**0.295**	mg/L	1	08/11/2012 4:54	80476
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	08/11/2012 4:54	80476
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	08/11/2012 4:54	80476
Lead	NELAP	0.400		**< 0.400**	mg/L	1	08/11/2012 4:54	80476
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	08/11/2012 4:54	80476
Silver	NELAP	0.100		**< 0.100**	mg/L	1	08/11/2012 4:54	80476
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	08/10/2012 14:43	80479
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	1.1		**1.4**	µg/Kg-dry	1	08/10/2012 0:21	80490
Ethylbenzene	NELAP	5.4		**ND**	µg/Kg-dry	1	08/10/2012 0:21	80490
Toluene	NELAP	5.4		**ND**	µg/Kg-dry	1	08/10/2012 0:21	80490
Xylenes, Total	NELAP	5.4		**ND**	µg/Kg-dry	1	08/10/2012 0:21	80490
Surr: 1,2-Dichloroethane-d4		72.2-131		**107.4**	%REC	1	08/10/2012 0:21	80490
Surr: 4-Bromofluorobenzene		82.1-116		**101.6**	%REC	1	08/10/2012 0:21	80490
Surr: Dibromofluoromethane		77.7-120		**103.2**	%REC	1	08/10/2012 0:21	80490
Surr: Toluene-d8		86-116		**99.3**	%REC	1	08/10/2012 0:21	80490

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Client: Geotechnology, Inc.
Work Order: 12080406
Client Project: Hutsonville J019896.01
Report Date: 15-Aug-12
Lab ID: 12080406-003
Client Sample ID: CS-5
Matrix: SOLID
Collection Date: 08/07/2012 10:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)								
Sulfate, SHAKE		10		**17**	mg/L	1	08/14/2012 14:49	R166928
ASTM D3987, SW-846 9251, IN SHAKE EXTRACT								
Chloride, SHAKE		1		**35**	mg/L	1	08/13/2012 17:25	R166873
EPA SW846 3550C, 5035A, ASTM D2974								
Percent Moisture		0.1		**18.2**	%	1	08/08/2012 17:40	R166726
SW-846 1010								
Ignitability, Closed Cup	NELAP	60		**>200**	°F	1	08/09/2012 11:00	R166734
SW-846 9045C								
pH (1:1)	NELAP	1.00		**4.67**		1	08/09/2012 10:11	R166723
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Boron		0.0200		**< 0.0200**	mg/L	1	08/13/2012 22:42	80495
SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP								
Arsenic	NELAP	0.250		**< 0.250**	mg/L	1	08/11/2012 5:05	80476
Barium	NELAP	0.0500		**0.425**	mg/L	1	08/11/2012 5:05	80476
Cadmium	NELAP	0.0200		**< 0.0200**	mg/L	1	08/11/2012 5:05	80476
Chromium	NELAP	0.100		**< 0.100**	mg/L	1	08/11/2012 5:05	80476
Lead	NELAP	0.400		**< 0.400**	mg/L	1	08/11/2012 5:05	80476
Selenium	NELAP	0.500		**< 0.500**	mg/L	1	08/11/2012 5:05	80476
Silver	NELAP	0.100		**< 0.100**	mg/L	1	08/11/2012 5:05	80476
SW-846 1311, 7470A IN TCLP EXTRACT								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	08/10/2012 14:20	80479
SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS								
Benzene	NELAP	0.9		**ND**	µg/Kg-dry	1	08/13/2012 20:04	80586
Ethylbenzene	NELAP	4.7		**ND**	µg/Kg-dry	1	08/13/2012 20:04	80586
Toluene	NELAP	4.7		**ND**	µg/Kg-dry	1	08/13/2012 20:04	80586
Xylenes, Total	NELAP	4.7		**ND**	µg/Kg-dry	1	08/13/2012 20:04	80586
Surr: 1,2-Dichloroethane-d4		72.2-131		**94.3**	%REC	1	08/13/2012 20:04	80586
Surr: 4-Bromofluorobenzene		82.1-116		**113.1**	%REC	1	08/13/2012 20:04	80586
Surr: Dibromofluoromethane		77.7-120		**101.8**	%REC	1	08/13/2012 20:04	80586
Surr: Toluene-d8		86-116		**98.4**	%REC	1	08/13/2012 20:04	80586

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Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

ASTM D3987, SW-846 9036, IN SHAKE EXTRACT (TOTAL)

Batch R166928 **SampType:** MBLK Units mg/L
SampID: MB-R166928

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate, SHAKE	10		< 10						08/14/2012

Batch R166928 **SampType:** LCS Units mg/L
SampID: LCS-R166928

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate, SHAKE	10		21	20	0	104.1	90	110	08/14/2012

Batch R166928 **SampType:** MS Units mg/L
SampID: 12080534-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate, SHAKE	10	S	14	10	5.420	84.5	85	115	08/14/2012

Batch R166928 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 12080534-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate, SHAKE	10	S	14	10	5.420	82.4	13.87	1.53	08/14/2012

ASTM D3987, SW-846 9251, IN SHAKE EXTRACT

Batch R166873 **SampType:** MBLK Units mg/L
SampID: MB-R166873

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride, SHAKE	1		< 1						08/13/2012

Batch R166873 **SampType:** LCS Units mg/L
SampID: LCS-R166873

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride, SHAKE	1		21	20	0	104.4	90	110	08/13/2012

EPA SW846 3550C, 5035A, ASTM D2974

Batch R166726 **SampType:** LCS Units %
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		99.0	99.0	0	100	90	110	08/08/2012

Batch R166726 **SampType:** LCSQC Units %
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Percent Moisture	0.1		99.0	99.0	0	100	90	110	08/08/2012

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Client Project: Hutsonville J019896.01

Work Order: 12080406

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EPA SW846 3550C, 5035A, ASTM D2974

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080406-002B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		11.5				10.65	7.33	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080281-004A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		19.3				19.42	0.72	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080281-014A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		20.5				20.44	0.44	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080302-003A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		6.2				6.040	2.94	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080322-002A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		18.0				18.68	3.54	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080355-001A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		1.4				1.400	2.12	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080356-006A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		17.2				17.59	2.30	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080360-005A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		17.0				18.35	7.76	08/08/2012

Batch R166726 **SampType:** DUP Units % RPD Limit 15

SampID: 12080373-008A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		81.0				81.37	0.46	08/08/2012

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Quality Control Results

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Client Project: Hutsonville J019896.01

Work Order: 12080406
Report Date: 15-Aug-12

EPA SW846 3550C, 5035A, ASTM D2974

Batch R166726 **SampType:** DUP Units % RPD Limit 15
SampID: 12080403-007A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Percent Moisture	0.1		**16.5**				16.12	2.15	08/08/2012

SW-846 1010

Batch R166734 **SampType:** LCS Units °F
SampID: LCS-R166734

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ignitability, Closed Cup	60		**81**	81	0	100	97	103	08/09/2012

Batch R166734 **SampType:** DUP Units °F RPD Limit 5
SampID: 12080406-003BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ignitability, Closed Cup	60		**>200**				0	0.00	08/09/2012

SW-846 9045C

Batch R166723 **SampType:** LCS Units
SampID: LCS-R166723

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH (1:1)	1.00		**6.99**	7.00	0	99.9	99.1	100.8	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10
SampID: 12080406-001BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**4.78**				4.600	3.84	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10
SampID: 12080406-002BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**6.68**				6.550	1.97	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10
SampID: 12080406-003BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**4.63**				4.670	0.86	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10
SampID: 12080373-008ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		**6.88**				7.060	2.58	08/09/2012

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Quality Control Results

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Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

SW-846 9045C

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080428-001CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		6.81				6.740	1.03	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080428-002CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		7.11				7.160	0.70	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080428-003CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		7.38				7.190	2.61	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080428-004CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		7.93				7.760	2.17	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080428-005CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		7.06				7.150	1.27	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080429-001CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		6.93				6.880	0.72	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080429-007CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		5.20				5.140	1.16	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080429-008CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		6.13				6.090	0.65	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10

SampID: 12080429-009ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		7.08				7.020	0.85	08/09/2012

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Quality Control Results

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Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.01

Work Order: 12080406
Report Date: 15-Aug-12

SW-846 9045C

Batch R166723 **SampType:** DUP Units RPD Limit 10
SampID: 12080429-010CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		6.88				6.900	0.29	08/09/2012

Batch R166723 **SampType:** DUP Units RPD Limit 10
SampID: 12080429-013CDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH (1:1)	1.00		7.16				7.090	0.98	08/09/2012

ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP

Batch 80495 **SampType:** MBLK Units mg/L
SampID: MB-80495

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.0200		< 0.0200	0.0200	0	71.5	-100	100	08/13/2012

Batch 80495 **SampType:** LCS Units mg/L
SampID: LCS-80495

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.0200		0.493	0.500	0	98.7	85	115	08/13/2012

Batch 80495 **SampType:** MS Units mg/L
SampID: 12080406-001BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.0200		0.496	0.500	0.01170	97.0	75	125	08/13/2012

Batch 80495 **SampType:** MSD Units mg/L RPD Limit 20
SampID: 12080406-001BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.0200		0.506	0.500	0.01170	98.9	0.4965	1.95	08/13/2012

Batch 80495 **SampType:** MS Units mg/L
SampID: 12080406-002BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.0200		0.487	0.500	0.007300	96.0	75	125	08/13/2012

Batch 80495 **SampType:** MSD Units mg/L RPD Limit 20
SampID: 12080406-002BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.0200		0.492	0.500	0.007300	96.9	0.4872	0.92	08/13/2012

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Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 80476 **SampType:** MBLK Units mg/L
SampID: MB-80476

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		< 0.250	0.250	0	0	-100	100	08/10/2012
Barium	0.0500		< 0.0500	0.0500	0	0	-100	100	08/10/2012
Cadmium	0.0200		< 0.0200	0.0200	0	0	-100	100	08/10/2012
Chromium	0.100		< 0.100	0.100	0	0	-100	100	08/10/2012
Lead	0.400		< 0.400	0.400	0	0	-100	100	08/10/2012
Selenium	0.500		< 0.500	0.500	0	0	-100	100	08/10/2012
Silver	0.100		< 0.100	0.100	0	0	-100	100	08/10/2012

Batch 80476 **SampType:** LCS Units mg/L
SampID: LCS-80476

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		19.7	20.0	0	98.4	85	115	08/10/2012
Barium	0.0500		19.3	20.0	0	96.6	85	115	08/10/2012
Cadmium	0.0200		0.482	0.500	0	96.4	85	115	08/10/2012
Chromium	0.100		1.95	2.00	0	97.6	85	115	08/10/2012
Lead	0.400		4.89	5.00	0	97.9	85	115	08/10/2012
Selenium	0.500		20.1	20.0	0	100.2	85	115	08/10/2012
Silver	0.100		0.495	0.500	0	99.0	85	115	08/10/2012

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080386-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	0.400		5.56	5.00	0.5830	99.5	75	125	08/13/2012

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080406-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		19.7	20.0	0	98.4	75	125	08/11/2012
Barium	0.0500		19.4	20.0	0.5260	94.3	75	125	08/11/2012
Cadmium	0.0200		0.482	0.500	0	96.4	75	125	08/11/2012
Chromium	0.100		1.90	2.00	0	95.2	75	125	08/11/2012
Lead	0.400		4.79	5.00	0	95.8	75	125	08/11/2012
Selenium	0.500		19.9	20.0	0	99.3	75	125	08/11/2012
Silver	0.100		0.489	0.500	0	97.8	75	125	08/11/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc. **Work Order:** 12080406

Client Project: Hutsonville J019896.01 **Report Date:** 15-Aug-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080406-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		18.4	20.0	0	92.0	75	125	08/11/2012
Barium	0.0500		18.3	20.0	0.2950	90.1	75	125	08/11/2012
Cadmium	0.0200		0.458	0.500	0	91.6	75	125	08/11/2012
Chromium	0.100		1.82	2.00	0	91.2	75	125	08/11/2012
Lead	0.400		4.63	5.00	0	92.6	75	125	08/11/2012
Selenium	0.500		18.4	20.0	0	92.2	75	125	08/11/2012
Silver	0.100		0.474	0.500	0	94.8	75	125	08/11/2012

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080406-003AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		19.9	20.0	0	99.6	75	125	08/11/2012
Barium	0.0500		19.9	20.0	0.4250	97.4	75	125	08/11/2012
Cadmium	0.0200		0.479	0.500	0	95.8	75	125	08/11/2012
Chromium	0.100		1.92	2.00	0	96.2	75	125	08/11/2012
Lead	0.400		4.85	5.00	0	96.9	75	125	08/11/2012
Selenium	0.500		20.2	20.0	0	100.8	75	125	08/11/2012
Silver	0.100		0.493	0.500	0	98.6	75	125	08/11/2012

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080407-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		19.4	20.0	0.1090	96.6	75	125	08/11/2012
Barium	0.0500		19.4	20.0	0.5750	94.3	75	125	08/11/2012
Cadmium	0.0200		8.01	0.500	7.510	100.6	75	125	08/11/2012
Chromium	0.100		1.87	2.00	0	93.4	75	125	08/11/2012
Lead	0.400		4.78	5.00	0	95.5	75	125	08/11/2012
Selenium	0.500		19.6	20.0	0	98.0	75	125	08/11/2012
Silver	0.100		0.480	0.500	0	96.0	75	125	08/11/2012

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080468-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		19.5	20.0	0	97.6	75	125	08/11/2012
Barium	0.0500		18.7	20.0	0	93.4	75	125	08/11/2012
Cadmium	0.0200		0.479	0.500	0	95.8	75	125	08/11/2012
Chromium	0.100		1.90	2.00	0	95.2	75	125	08/11/2012
Lead	0.400		4.80	5.00	0	96.0	75	125	08/11/2012
Selenium	0.500		19.9	20.0	0	99.4	75	125	08/11/2012
Silver	0.100		0.492	0.500	0	98.4	75	125	08/11/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 80476 **SampType:** MS Units mg/L

SampID: 12080477-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.5**	20.0	0	97.5	75	125	08/10/2012
Barium	0.0500		**19.6**	20.0	0.2350	96.8	75	125	08/10/2012
Cadmium	0.0200		**0.483**	0.500	0	96.6	75	125	08/10/2012
Chromium	0.100		**2.58**	2.00	0.6420	96.9	75	125	08/10/2012
Lead	0.400		**4.96**	5.00	0	99.2	75	125	08/10/2012
Selenium	0.500		**19.6**	20.0	0	98.2	75	125	08/10/2012
Silver	0.100		**0.492**	0.500	0	98.4	75	125	08/10/2012

Batch 80476 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 12080477-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**19.3**	20.0	0	96.5	19.50	1.08	08/10/2012
Barium	0.0500		**19.6**	20.0	0.2350	96.8	19.60	0.00	08/10/2012
Cadmium	0.0200		**0.475**	0.500	0	95.0	0.4830	1.67	08/10/2012
Chromium	0.100		**2.56**	2.00	0.6420	95.8	2.580	0.82	08/10/2012
Lead	0.400		**4.89**	5.00	0	97.8	4.960	1.38	08/10/2012
Selenium	0.500		**19.5**	20.0	0	97.4	19.64	0.77	08/10/2012
Silver	0.100		**0.490**	0.500	0	98.0	0.4920	0.41	08/10/2012

Batch 80476 **SampType:** MS Units mg/L

SampID: 12080477-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.4**	20.0	0	97.2	75	125	08/10/2012
Barium	0.0500		**19.3**	20.0	0.2970	94.9	75	125	08/10/2012
Cadmium	0.0200		**0.475**	0.500	0	95.0	75	125	08/10/2012
Chromium	0.100		**5.06**	2.00	3.166	94.9	75	125	08/10/2012
Lead	0.400		**4.87**	5.00	0	97.4	75	125	08/10/2012
Selenium	0.500		**19.6**	20.0	0	98.2	75	125	08/10/2012
Silver	0.100		**0.488**	0.500	0	97.6	75	125	08/10/2012

Batch 80476 **SampType:** MS Units mg/L

SampID: 12080481-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.1**	20.0	0	95.7	75	125	08/11/2012
Barium	0.0500		**19.9**	20.0	1.363	92.9	75	125	08/11/2012
Cadmium	0.0200		**0.464**	0.500	0	92.8	75	125	08/11/2012
Chromium	0.100		**1.99**	2.00	0.1400	92.4	75	125	08/11/2012
Lead	0.400		**5.37**	5.00	0.6200	95.0	75	125	08/11/2012
Selenium	0.500		**19.3**	20.0	0	96.6	75	125	08/11/2012
Silver	0.100		**0.481**	0.500	0	96.2	75	125	08/11/2012

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.01

Work Order: 12080406
Report Date: 15-Aug-12

SW-846 1311, 3010A, 6010B, METALS IN TCLP EXTRACT BY ICP

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080482-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.2**	20.0	0	96.2	75	125	08/11/2012
Barium	0.0500		**19.6**	20.0	0.7680	94.3	75	125	08/11/2012
Cadmium	0.0200		**0.469**	0.500	0	93.8	75	125	08/11/2012
Chromium	0.100		**1.88**	2.00	0	94.2	75	125	08/11/2012
Lead	0.400		**4.73**	5.00	0	94.6	75	125	08/11/2012
Selenium	0.500		**19.3**	20.0	0	96.6	75	125	08/11/2012
Silver	0.100		**0.484**	0.500	0	96.8	75	125	08/11/2012

Batch 80476 **SampType:** MSD Units mg/L RPD Limit 20
SampID: 12080482-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic	0.250		**19.6**	20.0	0	97.8	19.23	1.75	08/11/2012
Barium	0.0500		**19.8**	20.0	0.7680	95.0	19.63	0.66	08/11/2012
Cadmium	0.0200		**0.477**	0.500	0	95.4	0.4690	1.69	08/11/2012
Chromium	0.100		**1.91**	2.00	0	95.4	1.883	1.32	08/11/2012
Lead	0.400		**4.81**	5.00	0	96.2	4.731	1.64	08/11/2012
Selenium	0.500		**19.7**	20.0	0	98.7	19.31	2.20	08/11/2012
Silver	0.100		**0.490**	0.500	0	98.0	0.4840	1.23	08/11/2012

Batch 80476 **SampType:** MS Units mg/L
SampID: 12080490-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic	0.250		**19.1**	20.0	0	95.6	75	125	08/11/2012
Barium	0.0500		**19.9**	20.0	1.168	93.6	75	125	08/11/2012
Cadmium	0.0200		**0.469**	0.500	0	93.8	75	125	08/11/2012
Chromium	0.100		**1.87**	2.00	0	93.4	75	125	08/11/2012
Lead	0.400		**4.71**	5.00	0	94.2	75	125	08/11/2012
Selenium	0.500		**19.4**	20.0	0	97.0	75	125	08/11/2012
Silver	0.100		**0.482**	0.500	0	96.4	75	125	08/11/2012

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 80479 **SampType:** MBLK Units mg/L
SampID: MB-80479

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**< 0.00020**	0.00020	0	0	-100	100	08/10/2012

Batch 80479 **SampType:** LCS Units mg/L
SampID: LCS-80479

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00511**	0.00500	0	102.3	85	115	08/10/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080406-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00509**	0.00500	0	101.8	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080406-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00497**	0.00500	0	99.4	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080406-003AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00503**	0.00500	0	100.6	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080407-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00396**	0.00500	0.0001355	76.6	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080468-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00510**	0.00500	0	101.9	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080477-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00484**	0.00500	0	96.9	75	125	08/10/2012

Batch 80479 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 12080477-001AMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury	0.00020		**0.00502**	0.00500	0	100.4	0.004843	3.64	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080477-002AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00484**	0.00500	0	96.8	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080481-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00491**	0.00500	0	98.3	75	125	08/10/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.
Work Order: 12080406
Client Project: Hutsonville J019896.01
Report Date: 15-Aug-12

SW-846 1311, 7470A IN TCLP EXTRACT

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080482-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00487**	0.00500	0	97.4	75	125	08/10/2012

Batch 80479 **SampType:** MS Units mg/L
SampID: 12080490-001AMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury	0.00020		**0.00492**	0.00500	0	98.5	75	125	08/10/2012

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 80490 **SampType:** MBLK Units µg/Kg
SampID: MBLK-G120809-2

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**ND**						08/09/2012
Ethylbenzene	5.0		**ND**						08/09/2012
Toluene	5.0		**ND**						08/09/2012
Xylenes, Total	5.0		**ND**						08/09/2012
Surr: 1,2-Dichloroethane-d4			**52.0**	50.0		104.1	72.2	131	08/09/2012
Surr: 4-Bromofluorobenzene			**48.0**	50.0		96.0	82.1	116	08/09/2012
Surr: Dibromofluoromethane			**48.3**	50.0		96.6	77.7	120	08/09/2012
Surr: Toluene-d8			**51.4**	50.0		102.7	86	116	08/09/2012

Batch 80490 **SampType:** LCSD Units µg/Kg RPD Limit 40
SampID: LCSD-G120809-2

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		**46.6**	50.0	0	93.1	49.47	6.06	08/09/2012
Ethylbenzene	5.0		**45.2**	50.0	0	90.3	47.81	5.68	08/09/2012
Toluene	5.0		**43.4**	50.0	0	86.9	45.83	5.33	08/09/2012
Xylenes, Total	5.0		**137**	150	0	91.5	146.4	6.47	08/09/2012
Surr: 1,2-Dichloroethane-d4			**49.4**	50.0		98.8			08/09/2012
Surr: 4-Bromofluorobenzene			**49.2**	50.0		98.4			08/09/2012
Surr: Dibromofluoromethane			**48.3**	50.0		96.7			08/09/2012
Surr: Toluene-d8			**50.2**	50.0		100.4			08/09/2012

Batch 80490 **SampType:** LCS Units µg/Kg
SampID: LCS-G120809-2

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**49.5**	50.0	0	98.9	73.9	109	08/09/2012
Ethylbenzene	5.0		**47.8**	50.0	0	95.6	84.1	115	08/09/2012
Toluene	5.0		**45.8**	50.0	0	91.7	79.1	112	08/09/2012
Xylenes, Total	5.0		**146**	150	0	97.6	79.1	117	08/09/2012
Surr: 1,2-Dichloroethane-d4			**49.7**	50.0		99.4	72.2	131	08/09/2012
Surr: 4-Bromofluorobenzene			**50.1**	50.0		100.2	82.1	116	08/09/2012
Surr: Dibromofluoromethane			**48.6**	50.0		97.1	77.7	120	08/09/2012
Surr: Toluene-d8			**50.1**	50.0		100.2	86	116	08/09/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 80586 **SampType:** MBLK Units µg/Kg

SampID: MBLK-F120813-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		ND						08/13/2012
Benzene	1.0		ND						08/13/2012
Ethylbenzene	5.0		ND						08/13/2012
Ethylbenzene	5.0		ND						08/13/2012
Toluene	5.0		ND						08/13/2012
Toluene	5.0		ND						08/13/2012
Xylenes, Total	5.0		ND						08/13/2012
Xylenes, Total	5.0		ND						08/13/2012
Surr: 1,2-Dichloroethane-d4			43.6	50.0		87.3	72.2	131	08/13/2012
Surr: 1,2-Dichloroethane-d4			43.6	50.0		87.3	72.2	131	08/13/2012
Surr: 4-Bromofluorobenzene			56.5	50.0		113.0	82.1	116	08/13/2012
Surr: 4-Bromofluorobenzene			56.5	50.0		113.0	82.1	116	08/13/2012
Surr: Dibromofluoromethane			52.1	50.0		104.2	77.7	120	08/13/2012
Surr: Toluene-d8			47.4	50.0		94.9	86	116	08/13/2012
Surr: Toluene-d8			47.4	50.0		94.9	86	116	08/13/2012

Batch 80586 **SampType:** LCSD Units µg/Kg RPD Limit 40

SampID: LCSD-F120813-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Benzene	1.0		45.7	50.0	0	91.3	49.21	7.46	08/13/2012
Benzene	1.0		45.7	50.0	0	91.3	49.21	7.46	08/13/2012
Ethylbenzene	5.0		46.8	50.0	0	93.5	49.18	5.07	08/13/2012
Ethylbenzene	5.0		46.8	50.0	0	93.5	49.18	5.07	08/13/2012
Toluene	5.0		45.4	50.0	0	90.7	49.80	9.33	08/13/2012
Toluene	5.0		45.4	50.0	0	90.7	49.80	9.33	08/13/2012
Xylenes, Total	5.0		143	150	0	95.6	152.9	6.43	08/13/2012
Xylenes, Total	5.0		143	150	0	95.6	152.9	6.43	08/13/2012
Surr: 1,2-Dichloroethane-d4			43.0	50.0		86.0			08/13/2012
Surr: 1,2-Dichloroethane-d4			43.0	50.0		86.0			08/13/2012
Surr: 4-Bromofluorobenzene			57.3	50.0		114.6			08/13/2012
Surr: 4-Bromofluorobenzene			57.3	50.0		114.6			08/13/2012
Surr: Dibromofluoromethane			51.2	50.0		102.3			08/13/2012
Surr: Toluene-d8			47.1	50.0		94.2			08/13/2012
Surr: Toluene-d8			47.1	50.0		94.2			08/13/2012

Teklab, Inc. Environmental Laboratory

Quality Control Results

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Client: Geotechnology, Inc.

Client Project: Hutsonville J019896.01

Work Order: 12080406

Report Date: 15-Aug-12

SW-846 5035, 8260B, VOLATILE ORGANIC COMPOUNDS BY GC/MS

Batch 80586 **SampType:** LCS Units µg/Kg

SampID: LCS-F120813-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Benzene	1.0		**49.2**	50.0	0	98.4	73.9	109	08/13/2012
Benzene	1.0		**49.2**	50.0	0	98.4	73.9	109	08/13/2012
Ethylbenzene	5.0		**49.2**	50.0	0	98.4	84.1	115	08/13/2012
Ethylbenzene	5.0		**49.2**	50.0	0	98.4	84.1	115	08/13/2012
Toluene	5.0		**49.8**	50.0	0	99.6	79.1	112	08/13/2012
Toluene	5.0		**49.8**	50.0	0	99.6	79.1	112	08/13/2012
Xylenes, Total	5.0		**153**	150	0	101.9	79.1	117	08/13/2012
Xylenes, Total	5.0		**153**	150	0	101.9	79.1	117	08/13/2012
Surr: 1,2-Dichloroethane-d4			**42.2**	50.0		84.5	72.2	131	08/13/2012
Surr: 1,2-Dichloroethane-d4			**42.2**	50.0		84.5	72.2	131	08/13/2012
Surr: 4-Bromofluorobenzene			**58.0**	50.0		115.9	82.1	116	08/13/2012
Surr: 4-Bromofluorobenzene			**58.0**	50.0		115.9	82.1	116	08/13/2012
Surr: Dibromofluoromethane			**50.5**	50.0		101.0	77.7	120	08/13/2012
Surr: Toluene-d8			**48.7**	50.0		97.5	86	116	08/13/2012
Surr: Toluene-d8			**48.7**	50.0		97.5	86	116	08/13/2012

Batch 80586 **SampType:** LCSGD Units %REC RPD Limit 0

SampID: LCSGD-F120813-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**42.4**	50.0		84.8			08/13/2012
Surr: 1,2-Dichloroethane-d4			**42.4**	50.0		84.8			08/13/2012
Surr: 4-Bromofluorobenzene			**57.2**	50.0		114.5			08/13/2012
Surr: 4-Bromofluorobenzene			**57.2**	50.0		114.5			08/13/2012
Surr: Dibromofluoromethane			**49.9**	50.0		99.8			08/13/2012
Surr: Toluene-d8			**48.2**	50.0		96.5			08/13/2012
Surr: Toluene-d8			**48.2**	50.0		96.5			08/13/2012

Batch 80586 **SampType:** LCSG Units %REC

SampID: LCSG-F120813-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 1,2-Dichloroethane-d4			**42.3**	50.0		84.5	61	128	08/13/2012
Surr: 1,2-Dichloroethane-d4			**42.3**	50.0		84.5	61	128	08/13/2012
Surr: 4-Bromofluorobenzene			**57.0**	50.0		114.1	78.2	117	08/13/2012
Surr: 4-Bromofluorobenzene			**57.0**	50.0		114.1	78.2	117	08/13/2012
Surr: Dibromofluoromethane			**50.3**	50.0		100.6	66.6	130	08/13/2012
Surr: Toluene-d8			**48.1**	50.0		96.3	80.1	122	08/13/2012
Surr: Toluene-d8			**48.1**	50.0		96.3	80.1	122	08/13/2012

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Geotechnology, Inc.
Client Project: Hutsonville J019896.01

Work Order: 12080406
Report Date: 15-Aug-12

Carrier: Josh Cerar

Completed by: Timothy W. Mathis
On: 08-Aug-12

Received By: SRH

Reviewed by: Shelly A. Hennessy
On: 08-Aug-12

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	4.2	
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐	
Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Samples in proper container/bottle?	Yes ☑	No ☐				
Sample containers intact?	Yes ☑	No ☐				
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑			
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐				
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.						
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑			
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑			
Water - pH acceptable upon receipt?	Yes ☑	No ☐				
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑			

Any No responses must be detailed below or on the COC.

CHAIN OF CUSTODY

pg. 1 of 1 Work Order # 12080406

TEKLAB, INC. 5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618) 344-1004 ~ Fax: (618) 344-1005

Client: Geotechnology
Address: 11816 Lackland Rd Ste 150
City / State / Zip: St. Louis, MO 63146
Contact: Anna Saindon Phone: 314-997-7440
E-Mail: a_saindon@geotechnology.com Fax: —

Samples on: ☒ Ice ☐ Blue Ice ☐ No Ice 4.2 °C
Preserved in: ☐ Lab ☐ Field FOR LAB USE ONLY
Lab Notes:

Comments: IEPA DLs

- Are these samples known to be involved in litigation? If yes, a surcharge will apply. ☐ Yes ☒ No
- Are these samples known to be hazardous? ☐ Yes ☒ No
- Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in comment section. ☒ Yes ☐ No

Project Name / Number: Hutsonville / J019896.01
Sample Collector's Name: AMS
Results Requested: ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other_____ ☐ 3 Day (50% Surcharge)
Billing Instructions: PO 36506

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	Other	Water	Drinking Water	Soil	Sludge	Sp. Waste	RCRA metals TCLP Ar, Ba, Ca, Chrom, Pb, Se, Silver, Hg	Shake test Boron, Ch, Sulfate	BTEX	PH	Flash Point
12080406 001	CS-3	0930 / 8/7/12	3					1		2			X			X	X	X	X	X
002	CS-4	0945 / ↓	↓					↓		↓			X			X	X	X	X	X
003	CS-5	1000 / ↓	↓					↓		↓			X			X	X	X	X	X

Teklab, Inc. Courier Pick Up

Relinquished By	Date / Time	Received By	Date / Time
[signature]	8/8/12 1303	[signature] Stephanie Haynes	8/8/12 1145 8/8/12 13:03

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse side, and that he/she has the authority to sign on behalf of client.

WHITE – LAB YELLOW – SAMPLER'S COPY

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Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

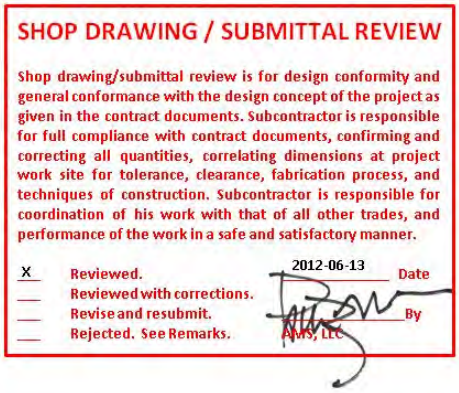
Hutsonville APD Closure

HUT-APD-SUB-015-01-PCP granular material

02204-1.4.A 25 LB Sample – foundation, bedding and haunch material [on site 2012-06-13]

02620-2.2.C Coarse aggregate – drainage course [CA-7]

Submittal No.	Date	Contact	Phone no.
SUB-015-01	2012-06-13	Paul Zinsious AMS	502-640-2918



Van Tarble & Sons Quarries

Quality Test Report

CA-7

Plant 01-Quality Lime
Product C-025-042CM11
Specification 042CM11

11955402

Sample Information

Sample No 11955402
Date Sampled 03/28/2012 12:10
Date Completed 03/28/2012 12:10
Sampled By Jay Tarble
Tested By Jay Tarble
Type Production
Method Screen Chute Discharge
Location
Process 09 (Washing Roadpack)
Ledge (002) East Bottom
Other

Weather Sunny
Temp 70
Split Sample ☐
Resample ☐
Lot / Sublot
Quad / Quantity

Sequence 707
Code

Test Note

Gradation Results

Unit	Moist Mass	Dry Mass	Wash Mass	Moisture %	Wash Loss %	Procedure
g	6002.10	5883.80	5875.90	2.0	0.1	AASHTO T27 & T11

Sieve	Mass Retained	Cum Mass Retained	Ind % Retained	% Retained	% Passing	Target	Specification	Comment
1" (25mm)	0.0	0.0	0.0	0.0	100.0		100-100	
3/4" (19mm)	202.9	202.9	3.4	3.4	96.6		84-100	
5/8" (16mm)	1047.6	1250.5	17.8	21.2	78.8			
1/2" (12.5mm)	1942.8	3193.3	33.1	54.3	45.7		37-53	
3/8" (9.5mm)	1791.3	4984.6	30.4	84.7	15.3			
1/4" (6.3mm)	864.6	5849.2	14.7	99.4	0.6			
#4 (4.75mm)	17.5	5866.7	0.3	99.7	0.3		0-12	
#8 (2.36mm)	2.2	5868.9	0.0	99.7	0.3			
#16 (1.18mm)	2.0	5870.9	0.0	99.7	0.3		0-8	
#200 (75um)	3.7	5874.6	0.10	99.80	0.20			
Pan	1.2	5875.8	0.20	100.00	0.00			

05/02/2012 06:14 FAX 217 826 2345 Quality Lime Co. 0002/0002

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GEOTECHNOLOGY INC
FROM THE GROUND UP

June 26, 2012

J019896.01.7310L

Mr. Andrew Antonik
Ameren Energy Generating Company
PO Box 66892
St. Louis, Missouri 63166

Re: Hutsonville Ash Pond Closure

Dear Mr. Antonik:

Submitted within this report are the test results from a sample of aggregate from the above referenced project. The sample was received in our laboratory on June 21, 2012 and tested in general accordance with the test method below.

Test To Determine	Method of Test
Standard Test Method for Sieve Analysis of Fine and Course Aggregates	ASTM C 136

We trust this is the information you require. Please contact the undersigned if you have any questions regarding this report.

Respectfully submitted,

GEOTECHNOLOGY, INC.
Construction Materials Testing Group

Zachary R. Bullock, CET
CMT Laboratory Manager

ZRB/JPK:zrb

Copies Submitted: (1)

Attachment: Test Results

J019896.01.7310L

Material: Crushed Limestone (IDOT CA 7)

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES– ASTM C 136

Sieve Size	Total Passing, %	Specification Requirements
1 ½ in.	100.0	100
1 in.	100.0	95±5
¾ in.	94.9	
½ in.	44.3	45±15
⅜ in.	14.0	
No.4	2.4	5±5
No.8	1.9	
No.16	1.8	
No.30	1.7	
No. 50	1.6	
No.100	1.5	
No.200	1.5	

The above sieve analysis satisfies project specifications as Illinois Department of Transportation CA 7 Aggregate (Art. 1004.01).

Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

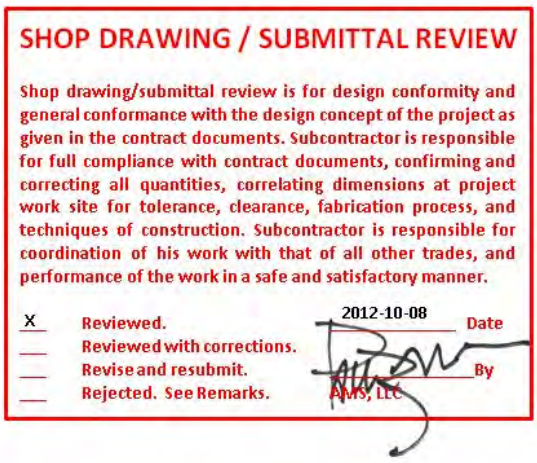
Hutsonville APD Closure

HUT-APD-SUB-038-01 Concrete Placement

03300-3.2.D Maintain Records of Concrete Placement

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-038-01	2012-10-08	Paul Zinsious AMS	502-640-2918



Paul H. Zinsious, PMP

From: reinrodfarms@hotmail.com on behalf of Nicole Hunt <nhuntstconstruction@live.com>
Sent: Monday, October 08, 2012 11:25 AM
To: Paul H. Zinsious, PMP; Travis Hunt
Attachments: Concrete Placement Log Hutsonville.xlsx

Paul,

Attached is the Concrete Ditch Placement Log. Each section started on the uphill side.

Nicole Findley Hunt
S T Construction, Inc.
1423 Buckeye Street
Terre Haute, IN 47804
Phone 812-234-2243
Fax 812-235-0080
www.stconstruction.biz
Please consider the environment before printing this email

A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty.
Winston Churchill

Electronic Filing: Received, Clerk's Office 09/28/2020

S T Construction, Inc.

Concret Ditch Placement Log

Project: Hutsonville Power Plant

4' Ditch

Date	Yardage	Location
7/17/2012	22.0	0-230.34'
7/19/2012	22.5	230.34'-465.92'
7/20/2012	19.0	465.92'-664.85'
7/23/2012	24.0	664.84'-916.12'
7/24/2012	8.0	916.12'-1000'
Total	95.5	1000'

8' Ditch

Date	Yardage	Location
8/16/2012	15.0	0'-91.5'
8/20/2012	24.0	91.5'-146.4'
8/21/2012	25.0	146.4'-298.9'
8/22/2012	26.5	298.9'-460.55'
8/23/2012	24.0	460.55'-606.95'
8/24/2012	32.0	606.95'-802.15'
8/29/2012	16.0	802.15'-899.75'
8/30/2012	24.0	899.75'-1046.15'
8/31/2012	24.0	1046.15'-1192.55'
9/11/2012	16.0	1192.5'-1320.2'
9/12/2012	40.0	1320.2'-1594.2'
9/13/2012	17.0	1594.2'-1730.3'
Total	283.5	1730.3'

PATRIOT ENGINEERING
and ENVIRONMENTAL, INC.
1359 N. Aberdeen Ave.
Terre Haute IN 47804
(812) 466-5559 FAX: (812) 466-5509
PatriotEng.com

REPORT OF COMPRESSIVE STRENGTH
ASTM C39

■ Original
□ Amended

Addressed To:
ST Construction
1423 Buckeye Street
Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/20/2012
Structure type:	Slab
Total cubic yards:	24 cy
Location of placement:	Ditch liner- southside, pour #1
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48626
Truck Number:	n/a
Batch Time:	7:02 AM
Mix Duration: (mins)	85

Plastic Concrete Data

Air Temp:	63 °F	
Concrete Temp:	75 °F	ASTM C1064
Slump:	3	ASTM C143
Air Content:	5.50%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	TS/BM
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
4998	8/21/2012	8/27/2012	7	4.000	8	12.56	58080	**4620**	4
4999	8/21/2012	9/17/2012	28	3.990	8	12.50	72410	**5790**	3
5000	8/21/2012	9/17/2012	28	3.990	8	12.50	72980	**5840**	2
5001	8/21/2012		Spare						

28 day average	**5820**

Remarks:

Reported By: Timothy C. Gauntt

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/21/2012
Structure type:	Slab
Total cubic yards:	24 cy
Location of placement:	Ditch liner- southside, pour #2
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48662
Truck Number:	n/a
Batch Time:	6:58 AM
Mix Duration: (mins)	122

Plastic Concrete Data

Air Temp:	66 °F	
Concrete Temp:	78 °F	ASTM C1064
Slump:	2	ASTM C143
Air Content:	4.20%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BM
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5019	8/22/2012	8/28/2012	7	4.000	8	12.56	55160	**4390**	4
5020	8/22/2012	9/18/2012	28	3.990	8	12.50	63550	**5080**	3
5021	8/22/2012	9/18/2012	28	3.990	8	12.50	62750	**5020**	3
5022	8/22/2012		Spare						

28 day average	**5050**

Remarks:

Reported By: Timothy C. Gauvitte

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ST Construction
1423 Buckeye Street
Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/22/2012
Structure type:	Slab
Total cubic yards:	24 cy
Location of placement:	Ditch liner- southside, pour 3
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48676
Truck Number:	n/a
Batch Time:	n/a
Mix Duration: (mins)	n/a

Plastic Concrete Data

Air Temp:	68 °F	
Concrete Temp:	75 °F	ASTM C1064
Slump:	3	ASTM C143
Air Content:	4.50%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BM
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5076	8/23/2012	8/29/2012	7	4.000	8	12.56	57810	**4600**	2
5077	8/23/2012	9/19/2012	28	4.000	8	12.56	68450	**5450**	4
5078	8/23/2012	9/19/2012	28	4.000	8	12.56	68830	**5480**	4
5079	8/23/2012		Spare						

28 day average	**5470**

Remarks:

Reported By: Timothy C. Gauvitte

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□ Amended

Addressed To:
ST Construction
1423 Buckeye Street
Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/23/2012
Structure type:	Slab
Total cubic yards:	24 cy
Location of placement:	Ditch liner- southside, pour #4
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48687
Truck Number:	n/a
Batch Time:	6:46 AM
Mix Duration: (mins)	75

Plastic Concrete Data

Air Temp:	71 °F	
Concrete Temp:	73 °F	ASTM C1064
Slump:	3.75	ASTM C143
Air Content:	4.70%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	JW
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5080	8/24/2012	8/30/2012	7	4.000	8	12.56	65340	**5200**	4
5081	8/24/2012	9/20/2012	28	4.000	8	12.56	74100	**5900**	3
5082	8/24/2012	9/20/2012	28	4.000	8	12.56	73040	**5810**	4
5083	8/24/2012		Spare						

28 day average	**5860**

Remarks:

Reported By: Timothy C. Gauvitte

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Addressed To:
ST Construction
1423 Buckeye Street
Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/24/2012
Structure type:	Slab
Total cubic yards:	32 cy
Location of placement:	Ditch liner- southside, pour 5
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48705
Truck Number:	n/a
Batch Time:	6:38 AM
Mix Duration: (mins)	84

Plastic Concrete Data

Air Temp:	69 °F	
Concrete Temp:	73 °F	ASTM C1064
Slump:	3	ASTM C143
Air Content:	3.80%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	JW/BM
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5108	8/25/2012	8/31/2012	7	4.000	8	12.56	67850	**5400**	4
5109	8/25/2012	9/21/2012	28	4.000	8	12.56	74400	**5920**	2
5110	8/25/2012	9/21/2012	28	4.000	8	12.56	75430	**6000**	2
5111	8/25/2012		Spare						

28 day average	**5960**

Remarks:

Reported By: Timothy C. Gauntt

PATRIOT ENGINEERING
and ENVIRONMENTAL, INC.
1359 N. Aberdeen Ave.
Terre Haute IN 47804
(812) 466-5559 FAX: (812) 466-5509
PatriotEng.com

REPORT OF COMPRESSIVE STRENGTH
ASTM C39

■ Original
□ Amended

Addressed To:
ST Construction
1423 Buckeye Street
Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/29/2012
Structure type:	Slab
Total cubic yards:	24 cy
Location of placement:	Ditch liner- southside pour #6
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48730
Truck Number:	n/a
Batch Time:	7:30
Mix Duration: (mins)	82

Plastic Concrete Data

Air Temp:	69 °F	
Concrete Temp:	75 °F	ASTM C1064
Slump:	3.5	ASTM C143
Air Content:	4.50%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	NF/BM
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5147	8/30/2012	9/5/2012	7	4.000	8	12.56	63240	**5030**	4
5148	8/30/2012	9/26/2012	28	3.990	8	12.50	71790	**5740**	4
5149	8/30/2012	9/26/2012	28	3.990	8	12.50	75890	**6070**	5
5150	8/30/2012		Spare						

28 day average	**5910**

Remarks:

Reported By: Timothy C. Gauntt

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/30/2012
Structure type:	Slab
Total cubic yards:	8 cy
Location of placement:	Ditch liner-southwest side
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48748
Truck Number:	n/a
Batch Time:	6:34 AM
Mix Duration: (mins)	85

Plastic Concrete Data

Air Temp:	61 °F	
Concrete Temp:	82 °F	ASTM C1064
Slump:	4.5	ASTM C143
Air Content:	5.25%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	J. Wade
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BM
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5217	8/31/2012	9/6/2012	7	4.000	8	12.56	67360	**5360**	4
5218	8/31/2012	9/27/2012	28	4.000	8	12.56	82740	**6590**	1
5219	8/31/2012	9/27/2012	28	4.000	8	12.56	76600	**6100**	2
5220	8/31/2012		Spare						

28 day average	**6350**

Remarks:

Reported By: Timothy C. Gauvitte

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	8/31/2012
Structure type:	Ditch Liner
Total cubic yards:	24 cy
Location of placement:	8' ditch
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	n/a
Ticket Number:	48759
Truck Number:	3
Batch Time:	6:19 AM
Mix Duration: (mins)	21

Plastic Concrete Data

Air Temp:	71 °F	
Concrete Temp:	75 °F	ASTM C1064
Slump:	2	ASTM C143
Air Content:	5.50%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	M. Whooten
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	JW
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5221	9/6/2012	9/7/2012	7	4.000	8	12.56	58460	**4650**	4
5222	9/6/2012	9/28/2012	28	3.990	8	12.50	68320	**5470**	4
5223	9/6/2012	9/28/2012	28	3.990	8	12.50	70130	**5610**	3
5224	9/6/2012		Spare						

28 day average	**5540**

Remarks:

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	7/17/2012
Structure type:	Ditch Liner
Total cubic yards:	6 cy
Location of placement:	South drainage ditch
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Glass ST
Ticket Number:	48391
Truck Number:	3
Batch Time:	1:23 PM
Mix Duration: (mins)	60

Plastic Concrete Data

Air Temp:	93 °F	
Concrete Temp:	85 °F	ASTM C1064
Slump:	4.5	ASTM C143
Air Content:	5.20%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:		

Hardened Concrete Data

Test Cylinders Cast By:	B. McDonald
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	NF/BMcD
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
4554	7/18/2012	7/24/2012	7	4.000	8	12.56	62790	**5000**	2
4555	7/18/2012	8/14/2012	28	4.000	8	12.56	69800	**5560**	3
4556	7/18/2012	8/14/2012	28	4.000	8	12.56	67540	**5380**	3
4557	7/18/2012		Spare						

28 day average	**5470**

Remarks:

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Addressed To:
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1423 Buckeye Street
Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	7/19/2012
Structure type:	Slab
Total cubic yards:	22.5 cy
Location of placement:	Ditch liner pour 2
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48406
Truck Number:	n/a
Batch Time:	6:27 AM
Mix Duration: (mins)	85

Plastic Concrete Data

Air Temp:	78 °F	
Concrete Temp:	78 °F	ASTM C1064
Slump:	5	ASTM C143
Air Content:	5.50%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BMcD
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
4600	7/20/2012	7/26/2012	7	4.000	8	12.56	53390	**4250**	2
4601	7/20/2012	8/16/2012	28	4.000	8	12.56	67760	**5390**	4
4602	7/20/2012	8/16/2012	28	4.000	8	12.56	63250	**5030**	4
4603	7/20/2012		Spare						

28 day average	**5210**

Remarks:

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Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	7/20/2012
Structure type:	Slab
Total cubic yards:	19 cy
Location of placement:	Ditch liner, pour 3
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48418
Truck Number:	n/a
Batch Time:	6:06 AM
Mix Duration: (mins)	85

Plastic Concrete Data

Air Temp:	75 °F	
Concrete Temp:	77 °F	ASTM C1064
Slump:	4.5	ASTM C143
Air Content:	6.00%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BMcD
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
4632	7/21/2012	7/27/2012	7	4.000	8	12.56	56060	**4460**	4
4633	7/21/2012	8/17/2012	28	3.990	8	12.50	66770	**5340**	4
4634	7/21/2012	8/17/2012	28	3.990	8	12.50	66640	**5330**	4
4635	7/21/2012		Spare						

28 day average	**5340**

Remarks:

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	7/23/2012
Structure type:	Ditch Liner
Total cubic yards:	24 cy
Location of placement:	West section A south of box culvert
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SE
Ticket Number:	48431
Truck Number:	3
Batch Time:	6:15 AM
Mix Duration: (mins)	80

Plastic Concrete Data

Air Temp:	75 °F	
Concrete Temp:	79 °F	ASTM C1064
Slump:	4.75	ASTM C143
Air Content:	5.00%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	B. McDonald
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	MH/BMcD
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
4644	7/24/2012	7/30/2012	7	4.000	8	12.56	50690	**4030**	4
4645	7/24/2012	8/20/2012	28	3.990	8	12.50	57950	**4640**	4
4646	7/24/2012	8/20/2012	28	3.990	8	12.50	60520	**4840**	2
4647	7/24/2012		Spare						

28 day average	**4740**

Remarks:

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	7/24/2012
Structure type:	Ditch liner
Total cubic yards:	8 cy
Location of placement:	West section A, south of box culvert (pour 2)
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48437
Truck Number:	3
Batch Time:	6:24 AM
Mix Duration: (mins)	80

Plastic Concrete Data

Air Temp:	82 °F	
Concrete Temp:	83 °F	ASTM C1064
Slump:	3.5	ASTM C143
Air Content:	5.00%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	B. McDonald
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BMcD/JW
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
4692	7/25/2012	7/31/2012	7	4.000	8	12.56	58420	**4650**	4
4693	7/25/2012	8/21/2012	28	4.000	8	12.56	65560	**5220**	4
4694	7/25/2012	8/21/2012	28	4.000	8	12.56	69420	**5530**	4
4695	7/25/2012		Spare						

28 day average	**5380**

Remarks:

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Terre Haute, IN 47804

Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	9/11/2012
Structure type:	Slab
Total cubic yards:	24 cy
Location of placement:	Ditch liner- eastside, pour 3
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48838
Truck Number:	n/a
Batch Time:	10:20 AM
Mix Duration: (mins)	82

Plastic Concrete Data

Air Temp:	78 °F	
Concrete Temp:	78 °F	ASTM C1064
Slump:	3	ASTM C143
Air Content:	4.80%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	BM/JB
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5301	9/12/2012	9/18/2012	7	3.990	8	12.50	50660	**4050**	2
5302	9/12/2012	10/9/2012	28	4.000	8	12.56	70150	**5580**	4
5303	9/12/2012	10/9/2012	28	4.000	8	12.56	64880	**5160**	2
5304	9/12/2012		Spare						

28 day average	**5370**

Remarks:

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Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	9/12/2012
Structure type:	Slab
Total cubic yards:	32 cy
Location of placement:	Ditch liner- eastside, pour 4
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48848
Truck Number:	n/a
Batch Time:	n/a
Mix Duration: (mins)	n/a

Plastic Concrete Data

Air Temp:	55 °F	
Concrete Temp:	78 °F	ASTM C1064
Slump:	3.25	ASTM C143
Air Content:	5.20%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	JW/JB
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5328	9/13/2012	9/19/2012	7	4.000	8	12.56	56440	**4490**	4
5329	9/13/2012	10/10/2012	28	4.000	8	12.56	67990	**5410**	5
5330	9/13/2012	10/10/2012	28	4.000	8	12.56	68260	**5430**	4
5331	9/13/2012		Spare						

28 day average	**5420**

Remarks:

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Distributed To:
Travis Hunt (stdirt1@hotmail.com)

Project Name:	Hutsonville Cell Closure
Client:	ST Construction
Project Number	02-12-0910

Project Information

Date of concrete placement:	9/13/2012
Structure type:	Slab
Total cubic yards:	8+/- cy
Location of placement:	Ditch liner- eastside, pour 5 (final pour)
Concrete contractor:	ST Construction

Supplier Information

Concrete Supplier:	R&L Ready Mix
Mix Number:	Class SI
Ticket Number:	48862
Truck Number:	n/a
Batch Time:	7:02 AM
Mix Duration: (mins)	86

Plastic Concrete Data

Air Temp:	67 °F	
Concrete Temp:	81 °F	ASTM C1064
Slump:	3	ASTM C143
Air Content:	5.00%	ASTM C173/C231
Concrete Yield:	n/a	ASTM C138
Ad Mixtures:	WR	

Hardened Concrete Data

Test Cylinders Cast By:	T. Simpson
Specified Strength at 28 days:	4000 (psi)
Sample Size:	4x8
Tested By:	T. Simpson
Set Number:	1

Compressive Strength Information

Cylinder Number	Date Received	Date Tested	Age (Days)	Diameter (inches)	Length (inches)	Area (sq in)	Load (lbs)	**Comp Str (psi)**	Break Type
5348	9/14/2012	9/20/2012	7	4.000	8	12.56	66650	**5300**	4
5349	9/14/2012	10/11/2012	28	4.000	8	12.56	77390	**6160**	4
5350	9/14/2012	10/11/2012	28	4.000	8	12.56	75140	**5980**	4
5351	9/14/2012		Spare						

28 day average	**6070**

Remarks:

Reported By: Timothy C. Gauvitte

Hutsonville Ash Pond D Closure - Paved Gutter Grades

Point Number	Elevation	Run	Difference (ft)	Distance (ft)	*Grade (+/-)	
138	451.500					Gutter @ Culvert
			1.290	26.8	**4.81%**	
139	452.790					Gutter
			1.149	24.0	**4.79%**	
140	453.939					Gutter
			0.522	26.0	**2.01%**	
141	454.461					Gutter
			0.145	68.2	**0.21%**	
142	454.606					Gutter
			0.394	185.3	**0.21%**	
143	455.000					End of Gutter
			0.000	50.0	**0.00%**	
144	455.000					Begin Gutter
			-0.221	32.0	**-0.69%**	
145	454.779					Gutter
			-0.481	69.0	**-0.70%**	
146	454.298					Gutter
			-0.094	37.5	**-0.25%**	
147	454.204					Gutter
			-0.091	35.0	**-0.26%**	
148	454.113					Gutter
			-0.312	125.0	**-0.25%**	
149	453.801					Gutter
			-0.068	27.0	**-0.25%**	
150	453.733					Gutter @ Stilling Basin
			Stilling Basin	Stilling Basin	**Stilling Basin**	
151	453.780					Gutter @ Stilling Basin
			0.653	39.0	**1.67%**	
152	454.433					Gutter
			0.567	226.5	**0.25%**	
153	455.000					End of Gutter

*Positive or Negative Grade (+/-) running South to North along Paved Gutter on APD

Electronic Filing: Received, Clerk's Office 09/28/2020

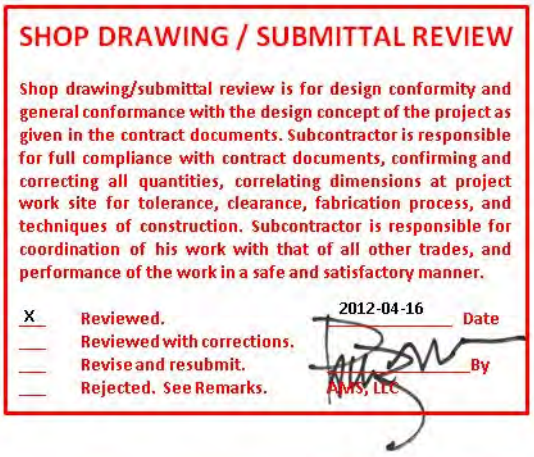
Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

HUT-APD-SUB-003-01-GSE-liner-product-data

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-003-01	2012-04-16	Paul Zinsious AMS	502-640-2918



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CHESAPEAKE
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SUBMITTAL

Date: March 30, 2012

COVER SHEET

Project: Hutsonville Ash Pond

General Contractor: **Charah, Inc**
12601 Plantside Drive
Louisville, KY 40299

Spec Section: 02800 HDPE Geomembrane Liner
Submittal Ref: 40 Mil LLDPE Geomembrane Liner- Product Data and Manufacturer Qualifications.

NOTES: This submittal is for the initial review of the proposed GSE HDPE Geomembrane Liner. Manufacture of materials will not commence until after a Manufacturer and Product are approved.

Inclusions:

1) Product Data Sheet
2) Manufacturers Quality Assurance
3) Installation Project List
4) Manufacturing Capabilites
5) Manufacturer's Material Warranty

REVIEWER NOTES

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The Pioneer Of Geosynthetics

S I N C E 1 9 7 2

GSE HD Textured Geomembrane

GSE HD Textured is a co-extruded textured high density polyethylene (HDPE) geomembrane available on one or both sides. It is manufactured from the highest quality resin specifically formulated for flexible geomembranes. This product is used in applications that require increased frictional resistance, excellent chemical resistance and endurance properties.

Product Specifications

These product specifications meet or exceed GRI GM13.

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE VALUE				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, (minimum average) mil (mm)	ASTM D 5994	every roll	29 (0.73)	38 (0.96)	57 (1.45)	76 (1.93)	95 (2.41)
Lowest individual for 8 out of 10 values			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Lowest individual for any of the 10 values			26 (0.66)	34 (0.86)	51 (1.30)	68 (1.73)	85 (2.16)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		45 (8)	60 (11)	90 (16)	120 (21)	150 (27)
Strength at Yield, lb/in-width (N/mm)			63 (11)	84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. 2.0 in (51 mm)		100	100	100	100	100
Elongation at Yield, %	G.L. 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	45 (200)	60 (267)	90 (400)	120 (534)	150 (667)
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lb	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	Note[1]	Note[1]	Note[1]	Note[1]	Note[1]
Asperity Height, mil (mm)[2]	ASTM D 7466	second roll	10	10	10	10	10
Notched Constant Tensile Load[3], hr	ASTM D 5397, Appendix	200,000 lb	1,000	1,000	1,000	1,000	1,000
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>140	>140	>140	>140	>140
TYPICAL ROLL DIMENSIONS							
Roll Length[4], ft (m)	Double-Sided Textured		830 (253)	700 (213)	520 (158)	400 (122)	330 (101)
	Single-Sided Textured		840 (256)	650 (198)	420 (128)	320 (98)	250 (76)
Roll Width[4], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)	Double-Sided Textured		18,675 (1,735)	15,750 (1,463)	11,700 (1,087)	9,000 (836)	7,425 (690)
	Single-Sided Textured		18,900 (1,755)	14,625 (1,359)	9,450 (878)	7,200 (669)	5,625 (523)

NOTES:

- [1]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- [2]8 of 10 readings ≥ 7 mils. Lowest individual ≥ 5 mils.
- [3]NCTL for GSE HD Textured is conducted on representative smooth membrane samples.
- [4]Roll lengths and widths have a tolerance of ± 1%.
- GSE HD Textured Double-Sided is available in rolls weighing approximately 4,000 lb (1,800 kg) and Single-Sided weighing approximately 3,000 lb (1,360 kg).
- All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
- *Modified.

OTDSGM13 HDT R07/21/09

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Geomembranes

GSE HD • GSE HD Textured • GSE White • GSE White Textured • GSE Conductive • GSE Conductive Textured • GSE Conductive White
GSE Green Textured • GSE HD Weld Edge Textured • GSE UltraFlex • GSE UltraFlex Textured • GSE UltraFlex White • GSE UltraFlex White Textured

Manufacturing Quality Assurance Manual

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I. QUALITY MANIFEST

GSE Lining Technology, Inc. is committed to providing the highest quality products and services to our customers. This requires a firm, total quality commitment from all individuals within our organization that we will only supply materials that meet or exceed the requirements and specifications of GSE and our customers.

GSE's commitment to quality starts with the highest quality raw materials. The quality of incoming raw materials is controlled at the supplier level with a complete vendor evaluation program in place. This means purchasing only from suppliers who are committed to statistical process control thereby providing a consistent, high level of quality assurance of their products.

II. MANUFACTURING QUALITY ASSURANCE

GSE Lining Technology, Inc. has an on-site Manufacturing Quality Assurance Laboratory at each manufacturing plant. Having a fully equipped, well staffed, dedicated laboratory at each of the manufacturing facilities allows GSE to maintain a high level of quality and up-to-the-minute results on finished products. Each facility follows the same guidelines for evaluating the quality of GSE products and is capable of adapting to market-driven requirements.

A. Objective

The objective of the GSE Quality Assurance program is to define implementation of basic manufacturing quality assurance (MQA) procedures necessary to ensure consistent production of quality products supplied to the geosynthetic market. Note that at this time, these procedures are limited to polyethylene geomembranes.

B. Scope

In order to achieve GSE's stated purpose, a rigorous set of minimum standards and an effective test program to assure compliance has been established. These procedures and requirements are frequently reviewed and adjusted to assure compliance with current market demands and/or predetermined project specifications. These procedures assure that raw materials and process parameters are controlled to provide products complying with GSE's pre-defined minimum characteristics.

III. MANUFACTURING QUALITY ASSURANCE ORGANIZATION

This organization consists of the Manufacturing Quality Assurance Laboratories as well as the manufacturing personnel. The combination of expertise and experience from these groups provides GSE with the proper tools to maintain the highest level of quality and customer service in the industry.

The Quality Assurance Department at GSE is charged by the President to assure that only products meeting both GSE's and the customer's requirements are released for shipment. The Quality Assurance personnel are directly responsible for monitoring testing and providing feedback to the manufacturing department to ensure the production of the specified product quality. Each member of the Quality Assurance team must participate in detailed training that includes factory exposure.

IV. STAFF AND SCHEDULING

The Quality Assurance Laboratories are staffed whenever manufacturing is occurring; this is usually 24 hours per day, 365 days per year. This minimizes the amount of potentially inferior product produced before a manufacturing problem is identified.

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V. PRODUCT IDENTIFICATION AND DOCUMENTATION

A. Roll Numbering

Each roll of geomembrane is assigned a unique roll number. The Quality Assurance Laboratory maintains records documenting the raw materials and resulting product quality information.

B. Approval Procedure

Results for each tested roll of product are checked against both GSE and customer specifications for compliance. The Quality Assurance Laboratory approves those materials that meet both of these requirements for shipment.

C. Non-Conformance

Material that does not meet GSE minimum standards is given a roll number but is rejected and not placed into inventory. The material is identified as scrap and will not be utilized.

Material that meets GSE minimum standards but does not meet a stricter customer specification is not allocated to that customer but is placed into inventory as GSE standard material.

D. Documentation

Individual Quality Assurance Certificates are generated and supplied for each roll of geomembrane product to include all relevant quality assurance information about the material(s).

VI. RECORDS RETENTION

GSE maintains reports and/or samples for products produced and sold. Records and/or samples are maintained according to GSE's standard retention policy according to the item.

MATERIAL	ITEM	YEARS
Raw materials	Resin Supplier Test Reports and Certifications	≥2
	GSE Resin Test Reports	≥2
	Resin Sample Retain (Archive)	≥2
Geomembrane	Raw Test Data (in computer database)	≥5
	Quality Control Certificates (in computer database)	≥5
	Sample Retain (approximately one square foot)	≥3

VII. TESTING CAPABILITIES

GSE maintains high capacity, state-of-the-art laboratory equipment suitable for performing the procedures listed in Appendices A-D. GSE's Houston laboratories are accredited by the GAI-LAP program. GSE's Houston laboratories, as part of GSE's Product Division, also hold ISO certification. The appropriate certificates are maintained for review upon request by authorized parties.

A. Routine Testing

Through careful investigation, GSE has developed a strict and thorough Quality Assurance program that exceeds the vast majority of customer specifications including GRI GM13, "Test Properties, Testing

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Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes" and GRI GM17 "Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes". The testing program covers raw materials (see Appendix A) and finished goods (see Appendix B) and is adhered to at all GSE laboratories. The laboratory equipment used by GSE represents the most modern equipment available and meets or exceeds the requirements of all the test standards used.

B. Other Testing Capabilities

In addition to routine testing, GSE laboratories are equipped to perform a wide variety of other tests as required for unusual requests or product development. Further, although the GSE Quality Assurance Laboratories are fully equipped and able to perform most routinely specified tests in the industry, there are some tests that are more economically performed by a dedicated testing facility. GSE believes requirements for such testing should be carefully considered and defined in terms of specific design requirements if they are found to be necessary.

VIII. MATERIAL QUALITY ASSURANCE

GSE Lining Technology, Inc. has established strict specifications for all raw materials and finished products. Test results must fall within the acceptable limits of GSE and customer specifications.

A. Raw Material

GSE primarily uses two types of raw materials, "natural resin" and "masterbatch" in the manufacture of geomembrane products. Natural resin is the base material that is used to make a geomembrane. It contains stabilizers to prevent degradation from occurring during and after extrusion. "Masterbatch" is the term referring to the concentrated carbon black material used with the natural resin to produce the finished product. The natural resin and masterbatch are blended at the appropriate ratio at the manufacturing stage. The masterbatch can contain other additives depending upon the geomembrane product to be produced. GSE verifies the properties of each lot of raw material prior to their utilization.

When natural resin is received, samples are taken and subjected to the tests outlined in Appendix A. All test data are entered into the computer database and checked for accuracy, consistency and compliance with GSE specifications. The material is not accepted unless all standard test requirements are met and the GSE test values meet the requirements set forth in the raw material specifications.

Copies of the supplier's certificate of analysis (COA) for each lot of resin utilized in the production of the materials supplied to a specific project are supplied as standard documentation. In addition, the GSE test results for each lot of resin are provided in a separate report upon request.

Virgin resin is normally received in rail car lots. If resin is received by other transport and/or in other quantities, an equivalent suitable sampling procedure is provided (i.e. not less than one sample per shipment or one sample for each 50,000 lb., 23,000 kg)

B. Geomembrane Products

GSE has implemented a strict and thorough Quality Assurance program for all geomembrane products. The geomembrane product line can be broken into two primary categories: smooth and textured products. Tables containing GSE minimum properties and test frequencies for all GSE geomembrane products includ-

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ing specialty products such as GSE White (light-reflective geomembrane) and GSE Conductive (field spark-testable geomembrane) are in Appendix B.

1. *On-Line Manufacturing Quality Assurance*

The Quality Assurance program for finished product begins during the manufacturing process. Each manufacturing line is equipped with state-of-the-art monitoring devices that provide feedback on the physical quality of the materials being produced. Each geomembrane production line is equipped with both a thickness gage and spark-testing device.

a) Thickness Measurement

As geomembrane is being produced, thickness readings are taken continuously over the length and width of the roll. These data are used to establish the minimum, maximum and average thickness values for each roll and are verified by thickness testing upon sampling of the finished goods.

b) Spark Testing

An electrical spark detector is in place on each manufacturing sheet line. This apparatus provides immediate notification of holes in the finished product. If a hole is detected, an alarm is triggered and the hole is identified. Rolls containing holes are rejected from standard product inventory.

2. *Smooth Geomembrane Materials*

Smooth geomembrane products available include high density and linear low density polyethylene materials with 2-3% carbon black. Specialty materials include White, electrically conductive, green surfaced, and smooth edge textured geomembranes.

a) Sampling

Geomembrane rolls are sampled for QA testing according to the frequencies in Appendix B. An approximate one-foot by roll width sample is cut for Quality Assurance testing. Specimens for testing are taken from five predetermined positions across the width of the roll. Specimens are cut for testing the machine direction and transverse direction. A "retain" or archive sample approximately 12 x 12 inch (30 x 30 cm) is taken from the corresponding transverse direction position from the laboratory sample. The retain is labeled and kept for future reference (see Section VI).

b) Evaluation of Results

All data are entered into a computer database for calculation and comparison to GSE and customer-specific specifications. If materials do not meet GSE minimums and/or the customer specifications, the manufacturing personnel are immediately notified in order for the appropriate adjustments to be made. Only products meeting GSE minimums and customer specifications will be approved for shipment.

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c) Reporting

Every roll of material has a quality assurance roll certificate or Roll Test Data Report (RTDR). This report identifies the standards on which the GSE approval is based along with the actual test results demonstrated by the material.

3. Coextruded Textured Geomembranes

Textured geomembrane is produced utilizing a round die with coextrusion technology. The texture is produced in a process in which one or two of the outer layers of a three-layer extrusion are blended with nitrogen gas. Nitrogen bubbles form in the molten resin and escape upon exiting the die, creating a rough, textured surface. Regular, White, green surfaced, and conductive geomembranes are available with coextruded texturing.

a) Sampling

Geomembrane rolls are sampled for QA testing according to the frequencies in Appendix B. An approximate one-foot by roll width sample is cut for Quality Assurance testing. Specimens for testing are taken from five predetermined positions across the width of the roll. Specimens for testing the machine and transverse direction tensile are cut from each of the five positions. A "retain" or archive sample approximately 12 x 12 inch (30 x 30 cm) is taken from the corresponding transverse direction position from the laboratory sample. The retain is labeled and kept for future reference (see Section VI).

Evaluation of results and reporting practices are the same as for smooth geomembranes.

C. Third Party Conformance Sampling

Some specifications require independent Quality Assurance and/or conformance testing. GSE can provide assistance with the sampling of products by arranging for the conformance samples to be taken during production. By taking samples during production rather than on site, the customer can be assured that the samples are clean and available for conformance testing in a timely manner.

GSE encourages customers to audit GSE manufacturing and manufacturing quality assurance operations and/or to collect samples and conduct independent conformance testing prior to shipment of materials.

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MINIMUM TESTING FREQUENCIES FOR GSE RAW MATERIALS

Property	Test Method[1]	Natural Resin
Density	ASTM D 1505	once per rail car compartment
Melt Flow Index	ASTM D 1238 (190/2.16)	once per rail car compartment
OIT	ASTM D 3895 (1 ATM at 200° C)	once per resin lot
Carbon Black Content	ASTM D 1603*/4218	N/A
Carbon Black Dispersion	ASTM D 5596	NA

[1] GSE utilizes test equipment and procedures that enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
*Modified.

MINIMUM PROPERTIES FOR GSE RAW MATERIALS

Property	Test Method[1]	HDPE	LLDPE
Density [g/cm^3]	ASTM D 1505	0.932	0.915
Melt Flow Index [g/10 min]	ASTM D 1238 (190/2.16)	≤ 1.0	≤ 1.0
OIT [minutes]	ASTM D 3895 (1 ATM at 200° C)	100	100

[1] GSE utilizes test equipment and procedures that enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE HD

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE				
Product Code			HDE 030A000	HDE 040A000	HDE 060A000	HDE 080A000	HDE 100A000
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	30 (0.75)	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest individual reading (-10%)			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		114 (20)	152 (27)	228 (40)	304 (53)	380 (67)
Strength at Yield, lb/in-width (N/mm)			63 (11)	84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. 2.0 in (51 mm)		700	700	700	700	700
Elongation at Yield, %	G.L. 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	54 (240)	72 (320)	108 (480)	144 (640)	180 (800)
Carbon Black Content, %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**				
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100	>100
Roll Length[(1)] (approximate), ft (m)			1,120 (341)	870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[(1)], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			25,200 (2,341)	19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE HD is available in rolls weighing about 3,900 lb (1,769 kg)
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [(1)]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE WHITE

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE				
Product Code			HDE 030A010	HDE 040A010	HDE 060A010	HDE 080A010	HDE 100A010
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	30 (0.75)	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest individual reading (-10%)			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density[2], g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		114 (20)	152 (27)	228 (40)	304 (53)	380 (67)
Strength at Yield, lb/in-width (N/mm)			63 (11)	84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		700	700	700	700	700
Elongation at Yield, %	G.L. = 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	54 (240)	72 (320)	108 (480)	144 (640)	180 (800)
Carbon Black Content[1] [2], %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**				
Oxidative Induction Time[2], min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100	>100
Roll Length[3] (approximate), ft (m)			1,120 (341)	870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[3], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			25,200 (2,341)	19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE White is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]GSE White may have an overall ash content greater than 3.0% due to the white layer.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [2]The values apply to the black layer only.
- [3]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE CONDUCTIVE

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE			
Product Code			HDC 040A000	HDC 060A000	HDC 080A000	HDC 100A000
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest individual reading (-10%)			36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94
Tensile Properties (each direction)[1]	ASTM D 6693, Type IV	20,000 lb				
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		152 (27)	228 (40)	304 (53)	380 (67)
Strength at Yield, lb/in-width (N/mm)			84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		700	700	700	700
Elongation at Yield, %	G.L. = 1.3 in (33 mm)		12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	72 (320)	108 (480)	144 (640)	180 (800)
Carbon Black Content[2], %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**			
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100
Roll Length[3] (approximate), ft (m)			870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[3], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE Conductive is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]Due to surface effects caused by the conductive layer, these tensile properties are minimum average values.
- [2]GSE Conductive may have an overall carbon black percentage above 3.0% due to the high carbon black loadings in the conductive layer.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [3]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE CONDUCTIVE WHITE

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE			
Product Code			HDC 040A010	HDC 060A010	HDC 080A010	HDC 100A010
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest individual reading (-10%)			36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density[3], g/cm³	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94
Tensile Properties (each direction)[1]	ASTM D 6693, Type IV	20,000 lb				
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		152 (27)	228 (40)	304 (53)	380 (67)
Strength at Yield, lb/in-width (N/mm)			84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		700	700	700	700
Elongation at Yield, %	G.L. = 1.3 in (33 mm)		12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	72 (320)	108 (480)	144 (640)	180 (800)
Carbon Black Content[2] [3], %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**			
Oxidative Induction Time[3], min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100
Roll Length[4] (approximate), ft (m)			870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[4], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft² (m²)			19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE Conductive White is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]Due to surface effects caused by the conductive layer, these tensile properties are minimum average values.
- [2]GSE Conductive White may have an overall ash content greater than 3.0% due to the white and conductive outer layers.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [3]The values apply to the black layer only.
- [4]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE HD TEXTURED

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE				
Product Code			HDT 030G000	HDT 040G000	HDT 060G000	HDT 080G000	HDT 100G000
Thickness, (minimum average) mil (mm)	ASTM D 5994	every roll	29 (0.73)	38 (0.96)	57 (1.45)	76 (1.93)	95 (2.41)
Lowest individual for 8 out of 10 values			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Lowest individual for any of the 10 values			26 (0.66)	34 (0.86)	51 (1.30)	68 (1.73)	85 (2.16)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)[1]	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		45 (8)	60 (11)	90 (16)	120(21)	150 (27)
Strength at Yield, lb/in-width (N/mm)			63 (11)	84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		100	100	100	100	100
Elongation at Yield, %	G.L. = 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	45 (200)	60 (267)	90 (400)	120 (534)	150 (667)
Carbon Black Content, %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1	+Note 1
Asperity Height	GRI GM 12	second roll	+Note 2	+Note 2	+Note 2	+Note 2	+Note 2
Notched Constant Tensile Load[2], hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**				
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100	>100
Roll Length[3] (approximate), ft (m)	Standard Textured		830 (253)	700 (213)	520 (158)	400 (122)	330 (101)
Roll Width[3], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			18,674 (1,735)	15,750 (1,463)	11,700 (1,087)	9,000 (836)	7,425 (690)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- +Note 2: 10 mil average. 8 of 10 readings ≥7 mils. Lowest individual ≥ 5 mils.
- GSE HD Standard Textured is available in rolls weighing about 4,000 lb (1,800 kg).
- [1]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are minimum average values.
- [2]NCTL for HD Textured is conducted on representative smooth membrane samples.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [3]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE WHITE TEXTURED

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE			
Product Code			HDT 040G010	HDT 060G010	HDT 080G010	HDT 100G010
Thickness, (minimum average) mil (mm)	ASTM D 5994	every roll	38 (0.96)	57 (1.45)	76 (1.93)	95 (2.41)
Lowest individual for 8 out of 10 values			36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Lowest individual for any of the 10 values			34 (0.86)	51 (1.30)	68 (1.73)	85 (2.16)
Density[4], g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94
Tensile Properties (each direction)[1]	ASTM D 6693, Type IV	20,000 lb				
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		60 (11)	90 (16)	120 (21)	150 (27)
Strength at Yield, lb/in-width (N/mm)			84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		100	100	100	100
Elongation at Yield, %	G.L. = 1.3 in (33 mm)		12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	60 (267)	90 (400)	120 (534)	150 (667)
Carbon Black Content[2] [4], %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1
Asperity Height	GRI GM 12	second roll	+Note 2	+Note 2	+Note 2	+Note 2
Notched Constant Tensile Load[3], hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**			
Oxidative Induction Time[4], min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100
Roll Length[5] (approximate), ft (m)			700 (213)	520 (158)	400 (122)	330 (101)
Roll Width[5], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			15,750 (1,463)	11,700 (1,087)	9,000 (836)	7,425 (690)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 or 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- +Note 2: 10 mil average. 8 of 10 readings ≥7 mils. Lowest individual ≥ 5 mils.
- GSE White Textured is available in rolls weighing about 4,000 lb (1,800 kg).
- [1]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are minimum average values.
- [2]GSE White Textured may have an overall ash content greater than 3.0% due to the white layer.
- [3]NCTL is conducted on representative smooth membrane samples.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [4]The values apply to the black layer only.
- [5]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE ULTRAFLEX

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE			
Product Code			LLD 030A000	LLD 040A000	LLD 060A000	LLD 080A000
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	30 (0.75)	40 (1.00)	60 (1.50)	80 (2.00)
Lowest individual reading (-10%)			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.92	0.92	0.92	0.92
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb				
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		114 (20)	152 (27)	228 (40)	304 (53)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		800	800	800	800
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	16 (71)	22 (98)	33 (147)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	42 (190)	56 (250)	84 (370)	112 (500)
Carbon Black Content, %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**			
Oxidative Induction Time, min	ASTM D 3895, 200° C, 1 atm	200,000 lb	>100	>100	>100	>100
Roll Length (approximate), ft (m)			1,120 (341)	870 (265)	560 (171)	430 (131)
Roll Width[(1)], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area[(1)], ft^2 (m^2)			25,200 (2,341)	19,575 (1,819)	12,600 (1,171)	9,675 (899)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE UltraFlex is available in rolls weighing about 3,800 lb (1,724 kg) respectively.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [(1)]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE ULTRAFLEX WHITE

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE	
Product Code			LLD040A010	LLD060A010
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	40 (1.00)	60 (1.50)
Lowest individual reading (-10%)			36 (0.91)	54 (1.40)
Density[2], g/cm^3	ASTM D 1505	200,000 lb	0.92	0.92
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb		
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		152 (27)	228 (40)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		800	800
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	22 (98)	33 (147)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	56 (250)	84 (370)
Carbon Black Content[1] [2], %	ASTM D 1603*/4218	20,000 lb	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**	
Oxidative Induction Time[2], min	ASTM D 3895, 200° C; 0_2 1 atm	200,000 lb	>100	>100
Roll Length[3] (approximate), ft (m)			870 (265)	560 (171)
Roll Width[3], ft (m)			22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			19,575 (1,819)	12,600 (1,171)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE UltraFlex White is available in rolls weighing about 3,800 lb (1,724 kg).
- [1]GSE UltraFlex White may have an overall ash content greater than 3.0% due to the white layer.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [2]The values apply to the black layer only.
- [3]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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MINIMUM PROPERTIES FOR GSE ULTRAFLEX TEXTURED

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE		
Product Code			LUT040G000	LUT060G000	LUT080G000
Thickness, (minimum average) mil (mm) Lowest individual for 8 out of 10 values Lowest individual for any of the 10 values	ASTM D 5994	every roll	38 (0.96) 36 (0.91) 34 (0.86)	57 (1.45) 54 (1.40) 51 (1.30)	76 (1.93) 72 (1.80) 68 (1.73)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.92	0.92	0.92
Tensile Properties (each direction)[1] Strength at Break, lb/in-width (N/mm) Elongation at Break, %	ASTM D 6693, Type IV Dumbell, 2 ipm G.L. = 2.0 in (51 mm)	20,000 lb	 60 (11) 250	 90 (16) 250	 120 (21) 250
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	22 (98)	33 (147)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	44 (200)	66 (300)	88 (400)
Carbon Black Content, %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1
Asperity Height	GRI GM 12	second roll	+Note 2	+Note 2	+Note 2
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**		
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100
Roll Length[2] (approximate), ft (m)			700 (213)	520 (158)	400 (122)
Roll Width[2], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			15,750 (1,463)	11,700 (1,087)	9,000 (836)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- +Note 2: 10 mil average. 8 of 10 readings ≥7 mils. Lowest individual ≥ 5 mils.
- GSE UltraFlex Textured is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are average roll values.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [2]Roll lengths and widths have a tolerance of ± 1%.
- Modified.

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Appendix B - Minimum Testing Frequencies and Properties for GSE Geomembranes

MINIMUM PROPERTIES FOR GSE ULTRAFLEX WHITE TEXTURED

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE		
Product Code			LUT040G010	LUT060G010	LUT080G010
Thickness, (minimum average) mil (mm) Lowest individual for 8 out of 10 values Lowest individual for any of the 10 values	ASTM D 5994	every roll	38 (0.96) 36 (0.91) 34 (0.86)	57 (1.45) 54 (1.40) 51 (1.30)	76 (1.93) 72 (1.80) 68 (1.73)
Density[3], g/cm³	ASTM D 1505	200,000 lb	0.92	0.92	0.92
Tensile Properties (each direction)[1] Strength at Break, lb/in-width (N/mm) Elongation at Break, %	ASTM D 6993, Type IV Dumbell, 2 ipm G.L. = 2.0 in (51 mm)	20,000 lb	 60 (11) 250	 90 (16) 250	 120 (21) 250
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	22 (98)	33 (147)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	44 (200)	66 (300)	88 (400)
Carbon Black Content[2] [3], %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1
Asperity Height	GRI GM 12	second roll	+Note 2	+Note 2	+Note 2
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**		
Oxidative Induction Time[3], min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100
Roll Length[4] (approximate), ft (m)			700 (213)	520 (158)	400 (122)
Roll Width[4], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft² (m²)			15,750 (1,463)	11,700 (1,087)	9,000 (836)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- +Note 2: 10 mil average. 8 of 10 readings ≥7 mils. Lowest individual ≥ 5 mils.
- GSE UltraFlex White Textured is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are average roll values.
- [2]GSE UltraFlex White Textured may have an overall ash content greater than 3.0% due to the white layer.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [3]The values apply to the black layer only.
- [4]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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MINIMUM WELD PROPERTIES FOR STANDARD HDPE GEOMEMBRANES[1]

Property	Test Method	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)	120 (3.0)
Peel Strength (fusion), ppi (kN/m)	ASTM D 6392	49 (8.6)	65 (11.4)	98 (17.2)	130 (22.8)	162 (28.4)	196 (34.3)
Peel Strength (extrusion), ppi (kN/m)	ASTM D 6392	39 (6.8)	52 (9.1)	78 (13.7)	104 (18.2)	130 (22.8)	157 (27.5)
Shear Strength (fusion & ext), ppi (kN/m)	ASTM D 6392	61 (10.7)	81 (14.2)	121 (21.2)	162 (28.4)	203 (35.5)	242 (42.4)

[1] These values apply to both coextruded and flat cast produced geomembranes and white-surfaced and conductive products.

MINIMUM WELD PROPERTIES FOR STANDARD LLDPE GEOMEMBRANES[1]

Property	Test Method	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Peel Strength (extrusion) ppi (kN/m)	ASTM D 6392	36 (6.3)	48 (8.4)	72 (12.6)	96 (16.8)	120 (21.0)
Peel Strength (fusion), ppi (kN/m)	ASTM D 6392	38 (6.7)	50 (8.8)	75 (13.1)	100 (17.5)	125 (21.9)
Shear Strength (fusion & ext), ppi (kN/m)	ASTM D 6392	45 (7.9)	60 (10.5)	90 (15.8)	120 (21.0)	150 (26.3)

[1] These values apply to both coextruded and flat cast produced geomembranes to include white-surfaced products.

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Middle East	GSE Lining Technology-Egypt	The 6th of October City, Egypt		202 2 828 8888	Fax: 202 2 828 8889

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GSE Installation Project List - Landfills & Caps

Project Name:	Waste Management/Cedar Ridge Landfill Cell 5		
Site Location:	Lewisburg, TN	**GSE No.:**	**519388**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	John Workman	770 805-3363	
General Contractor:	WMI Cedar Ridge Landfill		
GC Contact:	Keith May	931 359-9032	
Engineering Firm:	Triad Environmental Consultants, Ltd.		
Engineer Contact:	Nancy Sullivan	615 889-6888	
Products:	GSE HD Textured 60 mil	526,500	sq. ft.
	GSE FabriNet DS HF 6 oz	524,900	sq. ft.
	Bentofix NWL	524,116	sq. ft.
Amount:	$845,013		
Date completed:	7/9/2006		

Project Name:	Waste Management/Pheasant RUN RDF Phase 3A		
Site Location:	Briston, WI	**GSE No.:**	**519471**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Luci Altieri	630 218-1821	
General Contractor:	WMI Pheasant Run RDF		
GC Contact:	Casey Furlong	262 857-7956	
Engineering Firm:	CQM, Inc.		
Engineer Contact:	Pete Rammer	920 465-3911	
Products:	GSE HD Textured 60 mil	795,600	sq. ft.
	GSE FabriNet DS 6 oz	163,415	sq. ft.
	GSE Geotextile 12 oz	91,000	sq. ft.
Amount:	$621,746		
Date completed:	10/15/2006		

Project Name:	Waste Management/Phoenix Resources Lnadfill 2006 Cap		
Site Location:	Wellsboro, PA	**GSE No.:**	**518568**
Application:	Sanitary LF Cap		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Phoenix Resources Landfill		
GC Contact:	RonWilson	570 353-2406	
Engineering Firm:	Blazosky Associates, Inc.		
Engineer Contact:	Karen Finlan	814 238-2060	
Products:	GSE HD Textured 40 mil	740,250	sq. ft.
	GSE FabriNet HS DS 6 oz	720,900	sq. ft.
	GSE Geotextile 6 oz	2,000	sq. ft.
Amount:	$685,287		
Date completed:	8/11/2006		

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Project Name:	Onyx/Orchard Hills Landfill Phase IV Cell Composite Cover		
Site Location:	Davis Junction, IL	**GSE No.:**	**519872**
Application:	Sanitary LF Cap		
Owner:	**Onyx Waste Services, Inc.**		
Owner Contact:	Randy Frank	262 971-1391	
General Contractor:	Onyx Waste Services, Inc.		
GC Contact:	Randy Frank	262 971-1391	
Engineering Firm:	CQM, Inc.		
Engineer Contact:	Pat Drossaart	920 465-3911	
Products:	GSE UltraFlex Textured 40 mil	1,370,250	sq. ft.
	GSE FabriNet 6 oz	1,023,265	sq. ft.
Amount:	$899,809		
Date completed:	9/10/2006		

Project Name:	Allied/Sauk Trail Hills Landfill Cell K		
Site Location:	Canton, MI	**GSE No.:**	**519723**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Christina Pearse-Bossick	734 397-4323	
General Contractor:	Allied Waste Industries		
GC Contact:	Christina Pearse-Bossick	734 397-4323	
Engineering Firm:	Midwestern Consulting, LLC.		
Engineer Contact:	Chris Sullivan	734 995-0200	
Products:	GSE HD Textured 60 mil	854,100	sq. ft.
	Bentofix NSL	809,284	sq. ft.
	GSE FabriNet DS 8 oz	513,300	sq. ft.
	GSE HyperNet 200 mil Geonet	261,000	sq. ft.
	GSE Geotextile 8 oz	30,000	sq. ft.
Amount:	$860,580		
Date completed:	7/24/2006		

Project Name:	Allied/Roosevelt Regional Landfill Ash Stage 1		
Site Location:	Roosevelt, WA	**GSE No.:**	**519255**
Application:	Sanitary LF		
Owner:	**Allied RABANCO Regional Disposal Company**		
Owner Contact:	Bill Borlaug	800 375-5641	
General Contractor:	Allied RABANCO Regional Disposal Company		
GC Contact:	Art Mains	800 375-5641	
Engineering Firm:	Thiel Engineering		
Engineer Contact:	Richard Thiel	530 692-9114	
Products:	GSE HD 80 mil	976,793	sq. ft.
	GSE Geotextile 4 oz	132,000	sq. ft.
	GSE Geotextile 14 oz	116,895	sq. ft.
	GSE HyperNet 200 mil Geonet	31,725	sq. ft.
Amount:	$735,085		
Date completed:	5/6/2006		

Project Name:	Waste Management/Menominee Phase III Landfill Cell 9		
Site Location:	Menominee, MI	**GSE No.:**	**518901**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 572-8800	
General Contractor:	WMI Menominee Landfill		
GC Contact:	Bob Pliska	906 228-4000	
Engineering Firm:	CQM, Inc.		
Engineer Contact:		920 465-3911	

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Products:	GSE HD 60 mil	705,600	sq. ft.
	Bentofix NSL	708,143	sq. ft.
	GSE HyperNet	355,500	sq. ft.
	GSE Geotextile 8 oz	39,000	sq. ft.
	GSE Geotextile 12 oz	39,000	sq. ft.
Amount:	$937,396		
Date completed:	6/26/2006		

Project Name:	Waste Management/K&W Sanitary Landfill Phase II Cell 3		
Site Location:	Ontonagon, MI	**GSE No.:**	**519375**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 572-8800	
General Contractor:	WMI K&W Sanitary Landfill		
GC Contact:	Robert Pliska	906 228-4000	
Engineering Firm:	Wenck Associates, Inc.		
Engineer Contact:	Dave Parenteau	763 479-4243	
Products:	GSE HD 60 mil	635,670	sq. ft.
	GSE HyperNet 200 mil Geonet	608,385	sq. ft.
	Bentofix NSL	595,864	sq. ft.
	GSE Geotextile 8 oz	70,032	sq. ft.
Amount:	$864,883		
Date completed:	8/18/2006		

Project Name:	Waste Management/McGill Road Landfill Phase V Cell 1A		
Site Location:	Jackson, MI	**GSE No.:**	**519555**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 218-1821	
General Contractor:	WMI McGill Road LF		
GC Contact:	Paul Mazanec	734 326-8230	
Engineering Firm:	McNeely & Lincoln Associates, Inc.		
Engineer Contact:	Allen Visel	734 432-9777	
Products:	GSE HD 60 mil	340,200	sq. ft.
	GSE HD Textured 60 mil	289,100	sq. ft.
	Bentofix NWL	570,733	sq. ft.
	GSE HyperNet 200 mil Geonet	346,500	sq. ft.
	GSE FabriNet DS 8 oz	246,500	sq. ft.
	GSE Geotextile 8 oz	43,000	sq. ft.
	GSE Geotextile 10 oz	1,000	sq. ft.
Amount:	$870,702		
Date completed:	7/3/2006		

Project Name:	Waste Management/Waters Landfill Cell D South		
Site Location:	Frederic, MI	**GSE No.:**	**519560**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 218-1821	
General Contractor:	WMI Waters LF		
GC Contact:	Debora Johnston	989 539-6111	
Engineering Firm:	Midwestern Consulting, LLC.		
Engineer Contact:	J. Chris Sullivan	734 995-0200	
Products:	GSE HD Textured 60 mil	702,000	sq. ft.
	Bentofix NSL	629,482	sq. ft.
	GSE FabriNet DS 6 oz	498,699	sq. ft.
	GSE HyperNet 200 mil Geonet	166,500	sq. ft.
	GSE Geotextile 10 oz	19,500	sq. ft.
Amount:	$995,929		

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Date completed:	6/12/2006		

Project Name:	Waste Management/Lancaster Landfill and Recycling Center Phase 1B		
Site Location:	Lancaster, CA	**GSE No.:**	**519547**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI Lancaster Landfill and Recycling Center		
GC Contact:	Bo McCoy	714 685-6485	
Engineering Firm:	Bryan Stirrat & Associates		
Engineer Contact:	Janet Paul	909 860-7777	
Products:	GSE HD Textured 60 mil	409,500	sq. ft.
	GSE HD Textured Single-Sided 60 mil	113,400	sq. ft.
	Bentofix NWL	492,995	sq. ft.
	GSE Geotextile 8 oz	46,000	sq. ft.
	GSE Geotextile 12 oz	45,500	sq. ft.
	GSE Geotextile 16 oz	10,000	sq. ft.
Amount:	$769,071		
Date completed:	9/5/2006		

Project Name:	Waste Management/Holyoke Landfill Stage 2		
Site Location:	Granby, MA	**GSE No.:**	**516696**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Holyoke Landfill		
GC Contact:	Bob Magnusson	413 539-9036	
Engineering Firm:	Golder Associates		
Engineer Contact:	Richard Wesenberg	603 668-0880	
Products:	GSE HD Textured 60 mil	924,300	sq. ft.
	GSE FabriNet HF 8 oz	506,920	sq. ft.
	Bentofix NWL	441,056	sq. ft.
Amount:	$750,861		
Date completed:	2/3/2006		

Project Name:	Waste Management/Maplewood Landfill Cell 16B		
Site Location:	Jetersville, VA	**GSE No.:**	**519528**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	MWI Maplewood LF (Amelia)		
GC Contact:	Mike Thomas	804 240-1710	
Engineering Firm:	Terra Engineering		
Engineer Contact:	Andrew Miller	608 221-3501	
Products:	GE HD 60 mil	743,400	sq. ft.
	Bentofix NSE	260,400	sq. ft.
	GSE HyperNet 200 mil Geonet	256,500	sq. ft.
	GSE FabriNet 10 oz	10,440	sq. ft.
	GSE Geotextile 10 oz	3,537	sq. ft.
Amount:	$608,361		
Date completed:	5/24/2006		

Project Name:	Allied/C & C Landfill Cell VA-2 and VB		
Site Location:	Marshall, MI	**GSE No.:**	**519714**

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Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Debbie Nurmi		616 837-7316
General Contractor:	Allied Waste Industries		
GC Contact:	Debbie Nurmi		616 837-7316
Engineering Firm:	STS Consultants, Ltd.		
Engineer Contact:	Chris Jaquet		616 940-3077
Products:	GSE HD Textured 60 mil	1,052,550	sq. ft.
	GSE Bentofix NSL	1,035,670	sq. ft.
	GSE FabriNet HF DS 6 oz	516,200	sq. ft.
Amount:	$948,420		
Date completed:	10/18/2006		

Project Name:	Allied/Forward and Austin Road Landfill Cell FU-06		
Site Location:	Manteca, CA	**GSE No.:**	**519757**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Lochlin Caffey		925 458-9800
General Contractor:	Allied Waste Industries		
GC Contact:	Lochlin Caffey		925 458-9800
Engineering Firm:	Lewis Engineering		
Engineer Contact:	Sangeeta Lewis		510 601-7223
Products:	GSE HD Textured 60 mil	491,400	sq. ft.
	GSE HD 60 mil	425,250	sq. ft.
	Bentofix NWL	476,625	sq. ft.
	GSE FabriNet HF 8 oz	411,510	sq. ft.
	GSE Geotextile 8 oz	191,000	sq. ft.
	GSE Geotextile 12 oz	52,000	sq. ft.
Amount:	$988,115		
Date completed:	10/18/2006		

Project Name:	Waste Mgt/Fitchburg Landfill Section 3 Phase 2 Expansion		
Site Location:	Westminster, MA	**GSE No.:**	**519518**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith		215 269-2143
General Contractor:	WMI RCI Fitchburg Landfill		
GC Contact:	Bob Magnusson		603 929-5435
Engineering Firm:	Brown & Caldwell		
Engineer Contact:	Bob Forgette		508 923-0879
Products:	GSE HD Textured 60 mil	573,300	sq. ft.
	Bentofix NWL	503,226	sq. ft.
	GSE FabriNet DS 8 oz	407,740	sq. ft.
	HSE HD 40 mil	19,575	sq. ft.
Amount:	$848,142		
Date completed:	11/20/2006		

Project Name:	Waste Mgt/Bethel Landfill Phase 3 Cell 1C		
Site Location:	Hampton, VA	**GSE No.:**	**519530**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith		215 269-2143
General Contractor:	WMI Bethel LF		
GC Contact:	Jim Loveland		804 834-8300
Engineering Firm:	Earth Tech		
Engineer Contact:	Bryan Schwartzott		215 244-7100
Products:	GSE HD Textured 60 mil	760,500	sq. ft.

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	GSE HD Textured 40 mil	693,000	sq. ft.
	GSE FabriNet DS 6 oz	760,380	sq. ft.
	GE Geotextile 10 oz	2,500	sq. ft.
Amount:	$957,382		
Date completed:	11/13/2006		

Project Name:	NEWS Mostoller Landfill Cell 4A		
Site Location:	Somerset, PA	**GSE No.:**	**514596**
Application:	Sanitary LF		
Owner:	**North East Waste Services Company**		
Owner Contact:	Rob Sochovka	717 423-5917	
General Contractor:	NEWS Mostoller Landfill, Inc.		
GC Contact:	Rob Sochovka	814 444-0112	
Engineering Firm:	CQA Services		
Engineer Contact:	John Hanak	717 245-9100	
Products:	GSE HD Textured 60 mil	888,300	sq. ft.
	BentoFix NSL	394,298	sq. ft.
	GSE FabriNet 10 oz	292,320	sq. ft.
	GSE FabriNet DS 10 oz	93,960	sq. ft.
	GSE HyperNet 200 mil GeoNet	288,000	sq. ft.
	GSE Geotextile 16 oz	55,500	sq. ft.
Amount:	$829,073		
Date completed:	6/17/2006		

Project Name:	Chestnut Valley Landfill (CBF) Area 4B		
Site Location:	McClellandtown, PA	**GSE No.:**	**520259**
Application:	Sanitary LF		
Owner:	**Veolia Environmental Services**		
Owner Contact:	Bill Binnie	814 265-1744	
General Contractor:	Veolia Environmental Services		
GC Contact:	Bill Binnie	814 265-1744	
Engineering Firm:	Blazosky Associates		
Engineer Contact:	Jim Echard	814 238-2060	
Products:	GSE HD Textured 100 mil	497,475	sq. ft.
	GSE FabriNet DS 10 oz	247,950	sq. ft.
	BentoFix NWL	247,888	sq. ft.
	GSE Geotextile 10 oz	28,500	sq. ft.
Amount:	$625,108		
Date completed:	11/13/2006		

Project Name:	NEWS/Moretown Landfill Cell 3A		
Site Location:	Waterbury, VT	**GSE No.:**	**514599**
Application:	Sanitary LF		
Owner:	**North East Waste Services**		
Owner Contact:	Rob Sochovka	717 729-5227	
General Contractor:	WSI/Moretown Landfill, Inc.		
GC Contact:	Rob Sochovka	717 729-5227	
Engineering Firm:	Tighe & Bond, Inc.		
Engineer Contact:	Doris Atkinson	413 572-3238	
Products:	GSE HD Textured 60 mil	877,500	sq. ft.
	GSE HD Textured 40 mil	63,000	sq. ft.
	GSE FabriNet 8 oz	174,000	sq. ft.
	GSE Geotextile 4 oz	3,000	sq. ft.
Amount:	$987,221		
Date completed:	6/18/2005		

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Project Name:	Waste Management/Liberty Landfill Cell		
Site Location:	Monticello, IN	**GSE No.:**	**514695**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Luci Altieri	630 281-1821	
General Contractor:	WMI Liberty Landfill		
GC Contact:	Barry Ledbetter	574 278-7138	
Products:	GSE HD 60 mil	466,200	sq. ft.
	GSE HD Textured 60 mil	35,100	sq. ft.
	GSE FabriNet HF 10 oz	527,220	sq. ft.
	GSE Geotextile 6 oz	59,000	sq. ft.
	GSE Geotextile 16 oz	57,158	sq. ft.
Amount:	$702,275		
Date completed:	8/5/2005		

Project Name:	Waste Management/DSI Landfill Cell 4 Stage 1		
Site Location:	Hurricane, WV	**GSE No.:**	**514740**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	John Workman	770 805-3363	
General Contractor:	WMI Disposal Services, Inc.		
GC Contact:	Jon Webster	304 562-3262	
Engineering Firm:	Alliance Consulting, Inc.		
Engineer Contact:	Engineer	304 255-0491	
Products:	GSE FabriNet 6 oz	1,055,528	sq. ft.
	GSE HD Textured 60 mil	439,425	sq. ft.
	Bentofix NS	395,250	sq. ft.
Amount:	$963,025		
Date completed:	7/22/2005		

Project Name:	Waste Management/TLR-III (Turnkey) Landfill Phase 8B		
Site Location:	Rochester, NH	**GSE No.:**	**514752**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2219	
General Contractor:	WMI OF NH - TREE (Turnkey) LF		
GC Contact:	Anne Reichert	603 330-2140	
Engineering Firm:	Sanborn Head & Associates, Inc.		
Engineer Contact:	James Chabot	603 229-1900	
Products:	GSE HD Textured 60 mil	795,600	sq. ft.
	Bentofix NS	86,025	sq. ft.
	GSE FabriNet 6 oz	753,710	sq. ft.
	GSE Geotextile 10 oz	500	sq. ft.
Amount:	$772,350		
Date completed:	7/22/2005		

Project Name:	Waste Management/ Maplewood Landfill Cell 6A		
Site Location:	Jetersville, VA	**GSE No.:**	**516022**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Maplewood Landfill		
GC Contact:	Mike Thomas	804 561-5787	
Engineering Firm:	Terra Engineering		
Engineer Contact:	Andrew Miller	608 221-3501	
Products:	GSE HD 60 mil	768,600	sq. ft.
Amount:	$681,996		

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Date completed:	5/27/2005		

Project Name:	Waste Management/ Columbia Ridge Landfill Module 11		
Site Location:	Arlington, OR	**GSE No.:**	**516629**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI Columbia Ridge Landfill		
GC Contact:	Roger North	503 242-9493	
Engineering Firm:	Thiel Engineering		
Engineer Contact:	Richard Thiel	530 692-9114	
Products:	GSE HD Textured 60 mil	865,800	sq. ft.
	GSE HD Textured 40 mil Single-Sided	13,095	sq. ft.
	GSE HD 40 mil	39,150	sq. ft.
	GSE Conductive 80 mil	76,725	sq. ft.
	GSE FabriNet 4 oz	48,720	sq. ft.
	GSE FabriNet HF 8 oz	2,755	sq. ft.
	GSE Geotextiles	180,135	sq. ft.
Amount:	$873,150		
Date completed:	7/29/2005		

Project Name:	Waste Mgt/Riverbend Landfill Module 8B and Phase 2 Overliner		
Site Location:	McMinnville, OR	**GSE No.:**	**516632**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI Riverbend Landfill		
GC Contact:	Roger North	503 242-9493	
Engineering Firm:	Shaw Group Emcon/OWT		
Engineer Contact:	Weston Gavett	503 603-1000	
Products:	GSE HD Textured 60 mil	702,000	sq. ft.
	GSE FabriNet HF 6 oz	162,400	sq. ft.
	GSE HyperNet HF	67,320	sq. ft.
	GSE Geotextile 8 oz	50,083	sq. ft.
	GSE Geotextile 16 oz	60,458	sq. ft.
Amount:	$626,190		
Date completed:	8/30/2005		

Project Name:	Waste Mgt/Fitchburg Landfill Section 3 Phase 1 Stage 2		
Site Location:	Westminster, MA	**GSE No.:**	**516695**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI RCI Fitchburg Landfill		
GC Contact:	Bob Magnusson	603 929-5435	
Engineering Firm:	Brown & Caldwell, Inc.		
Engineer Contact:	Bob Forgette	508 923-0879	
Products:	GSE HD Textured 60 mil	690,300	sq. ft.
	Bentofix NWL35	342,617	sq. ft.
	GSE FabriNet HF 8 oz	162,545	sq. ft.
	GSE HyperNet	13,200	sq. ft.
	GSE Geotextile 8 oz	1,000	sq. ft.
	GSE Geotextile 24 oz	43,560	sq. ft.
Amount:	$766,504		
Date completed:	9/9/2005		

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Project Name:	Waste Management/Arden Landfill Cell 1C4		
Site Location:	Washington, PA	**GSE No.:**	**516705**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Arden Landfill		
GC Contact:	Rick Smitsky	412 893-4962	
Engineering Firm:	Civil Design Solutions		
Engineer Contact:	David Murray	412 299-2700	
Products:	GSE HD Textured 60 mil	737,100	sq. ft.
	Bentofix NSL	365,025	sq. ft.
	GSE HyperNet	220,500	sq. ft.
	GSE FabriNet 8 oz	318,798	sq. ft.
	GSE FabriNet 10 oz Single-Sided	297,540	sq. ft.
	GSE Geotextile 10 oz	16,500	sq. ft.
Amount:	$919,050		
Date completed:	8/2/2005		

Project Name:	Waste Management/Laurel Highlands Landfill Cell 5A		
Site Location:	Johnstown, PA	**GSE No.:**	**516706**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Laurel Highlands Landfill		
GC Contact:	Brian Stewart	814 749-9065	
Engineering Firm:	Civil & Environmental Consultants		
Engineer Contact:	Engineer	724 327-5200	
Products:	GSE HD Textured 60 mil	631,800	sq. ft.
	Bentofix NSL	288,300	sq. ft.
	GSE HyperNet	576,000	sq. ft.
	GSE Geotextile 10 oz	66,413	sq. ft.
Amount:	$698,636		
Date completed:	10/31/2005		

Project Name:	Waste Management/Shade Landfill Cell 2A Northern Expansion		
Site Location:	Cairnbrook, PA	**GSE No.:**	**516708**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI RCC (Shade) Landfill		
GC Contact:	Brian Stewart	814 754-4587	
Engineering Firm:	Blazosky Associates, Inc.		
Engineer Contact:	Engineer	724 733-2060	
Products:	GSE HD 60 mil	1,146,600	sq. ft.
	GSE HyperNet	710,850	sq. ft.
	GSE HD Textured 60 mil	81,900	sq. ft.
	GSE FabriNet 6oz	80,040	sq. ft.
	GSE Geotextile 10 oz	79,000	sq. ft.
Amount:	$954,550		
Date completed:	10/24/2005		

Project Name:	Waste Management/ Southern Alleghenies Landfill Phase III Cell 2B/2C		
Site Location:	Davidsville, PA	**GSE No.:**	**516709**
Application:	Sanitary LF		
Owner:	**Waste Management**		

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Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Southern Alleghenies Landfill		
GC Contact:	Brian Stewart	814 479-2537	
Engineering Firm:	Civil Design Solutions		
Engineer Contact:	Engineer	412 299-2700	
Products:	GSE HD Textured 60 mil	374,400	sq. ft.
	GSE HD 60 mil	322,268	sq. ft.
	Bentofix NSL	175,392	sq. ft.
	GSE FabriNet 6 oz	230,115	sq. ft.
	GSE FabriNet 6 oz Single-Sided	201,115	sq. ft.
	GSE Geotextile 10 oz	36,592	sq. ft.
Amount:	$818,775		
Date completed:	8/29/2005		

Project Name:	Allied Waste/Roosevelt Regional Landfill MSW 13		
Site Location:	Roosevelt, WA	**GSE No.:**	**516808**
Application:	Sanitary LF		
Owner:	**Allied RABANCO Regional Disposal Co.**		
Owner Contact:	Art Mains	800 375-5641	
General Contractor:	Allied RABANCO Regional Disposal Co.		
GC Contact:	Art Mains	800 375-5641	
Engineering Firm:	Thiel Engineering		
Engineer Contact:	Richard Thiel	530 692-9114	
Products:	GSE White 80 mil	803,025	sq. ft.
	GSE White Textured 80 mil	323,325	sq. ft.
	GSE HyperNet	36,000	sq. ft.
Amount:	$652,300		
Date completed:	5/3/2005		

Project Name:	Waste Mgt/Waimanalo Gulch Landfill Cell 2-1		
Site Location:	Kapolei, HI	**GSE No.:**	**516815**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI Waimanalo Gulch Landfill		
GC Contact:	Joe Hernandez	808 668-2985	
Engineering Firm:	A-Mehr, Inc.		
Engineer Contact:	Ali Mehr	714 633-5757	
Products:	GSE White Textured 60 mil	234,000	sq. ft.
	Bentofix NWL	197,625	sq. ft.
	GSE Geotextile 16 oz	27,000	sq. ft.
Amount:	$614,200		
Date completed:	9/27/2005		

Project Name:	Dow Salzburg Landfill Cell 17-19 Cap		
Site Location:	Midland, MI	**GSE No.:**	**516854**
Application:	Sanitary LF Cap		
Owner:	**Dow Chemical Company**		
Owner Contact:	Todd Konechne	517 638-1639	
General Contractor:	Dow Chemical Company		
GC Contact:	John Allen	517 636-6085	
Engineering Firm:	In House		
Products:	GSE White Textured 40 mil	482,625	sq. ft.
	Bentofix NWL	336,634	sq. ft.
	GSE FabriNet UF 6 oz Single-Sided	243,000	sq. ft.
	GSE FabriNet UF 6 oz	122,400	sq. ft.
	GSE Geotextile 6 oz	9,000	sq. ft.
Amount:	$601,760		

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Date completed:	6/8/2005		

Project Name:	Allied Waste/Forward Landfill WMU FU-05		
Site Location:	Manteca, CA	**GSE No.:**	**517128**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Lochlin Caffey	925 458-9800	
General Contractor:	Allied Waste Industries		
GC Contact:	Lochlin Caffey	925 458-9800	
Engineering Firm:	Bryan A. Stirrat & Associates		
Engineer Contact:	Richard Genzel	909 860-7777	
Products:	GSE HD Textured 60 mil	456,300	sq. ft.
	GSE HD Textured 60 mil Single-Sided	255,150	sq. ft.
	Bentofix NW35	166,625	sq. ft.
	GSE FabriNet HF 8 oz Single-Sided	153,120	sq. ft.
	GSE Geotextile 8 oz	182,934	sq. ft.
	GSE Geotextile 12 oz	57,267	sq. ft.
Amount:	$697,213		
Date completed:	7/25/2005		

Project Name:	Allied Waste/Wasatch Regional Landfill Phase 1A		
Site Location:	Tooele, UT	**GSE No.:**	**517149**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Darin Olson	435 888-4418	
General Contractor:	Allied Waste Industries		
GC Contact:	Darin Olson	435 888-4418	
Engineering Firm:	Hansen Allen & Luce		
Engineer Contact:	Kent Staheli	801 566-5599	
Products:	GSE HD 60 mil	995,400	sq. ft.
	GSE HD Textured 60 mil	187,200	sq. ft.
	GSE HyperNet	989,595	sq. ft.
	GSE Geotextile 8 oz	123,000	sq. ft.
	GSE Geotextile 16 oz	1,000	sq. ft.
Amount:	$934,644		
Date completed:	8/6/2005		

Project Name:	Onyx/Greentree Landfill 2005 Cap		
Site Location:	Kersey, PA	**GSE No.:**	**517201**
Application:	Sanitary LF Cap		
Owner:	**Onyx Waste Services**		
Owner Contact:	Bill Binnie	814 265-1744	
General Contractor:	Onyx Greentree Landfill		
GC Contact:	Bill Binnie	814 265-1744	
Engineering Firm:	Blazosky Associates, Inc.		
Engineer Contact:	Steven Harshbarger	724 733-2060	
Products:	GSE UltraFlex Textured 40 mil	866,250	sq. ft.
	GSE FabriNet 6 oz	723,840	sq. ft.
	GSE FabriNet HF 6 oz	136,300	sq. ft.
Amount:	$618,716		
Date completed:	10/9/2005		

Project Name:	Waste Management/ Fitchburg Landfill Section 3 Expansion		
Site Location:	Westminster, MA	**GSE No.:**	**512845**
Application:	Sanitary LF		

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Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	Waste Management		
GC Contact:	Bob Magnusson	603 929-5435	
Engineering Firm:	Brown & Caldwell		
Engineer Contact:	William Goodman	508 923-0879	
Products:	GSE HD Textured 60 mil	1,185,620	sq. ft.
	GSE HD 40 mil	39,150	sq. ft.
	Bentofix NWL	995,100	sq. ft.
	GSE FabriNet 8 oz	499,192	sq. ft.
	GSE Geotextile 24 oz	71,690	sq. ft.
Amount:	$920,358		
Date completed:	11/3/2004		

Project Name:	Waste Management/ GROWS Landfill Slope Cap		
Site Location:	Morrisville, PA	**GSE No.:**	**514392**
Application:	Sanitary LF Cap		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI GROWS Landfill		
GC Contact:	Ed Kucowski	215 428-3244	
Engineering Firm:	Earth Tech, Inc.		
Engineer Contact:	Keith McKeon	215 244-7109	
Products:	GSE HD Textured 60 mil	771,750	sq. ft.
	GSE FabriNet HF 8 oz	374,767	sq. ft.
	GSE Geotextile 16 oz	43,072	sq. ft.
Amount:	$875,450		
Date completed:	8/9/2004		

Project Name:	Waste Management/ Northwest Regional Landfill Phase 1 Module 9		
Site Location:	Surprise, AZ	**GSE No.:**	**514585**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI Northwest Regional Landfill		
GC Contact:	Glen Roycroft	623 584-6065	
Engineering Firm:	GeoSyntec Consultants		
Engineer Contact:	Christopher Hunt	925 943-3034	
Products:	GSE HD Textured 60 mil Single-Sided	783,900	sq. ft.
	GSE HyperNet	4,500	sq. ft.
Amount:	$693,776		
Date completed:	6/21/2004		

Project Name:	Waste Management/ Timberline Trail RDF Cap		
Site Location:	Weyerhaeuser, WI	**GSE No.:**	**514647**
Application:	Sanitary LF Cap		
Owner:	**Waste Management**		
Owner Contact:	Dan Leclaire	608 887-9031	
General Contractor:	WMI Timberline Trail RDF		
GC Contact:	Dan Leclaire	608 837-9031	
Engineering Firm:	CQM, Inc.		
Engineer Contact:	Pete Rammer	920 465-3911	
Products:	GSE UltraFlex Textured 40 mil	739,440	sq. ft.
	Bentofix NSL	734,056	sq. ft.
	GSE FabriNet 6 oz	736,021	sq. ft.
	GSE Geotextile 6 oz	10,044	sq. ft.

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Amount:	$860,837		
Date completed:	8/19/2004		

Project Name:	Waste Management/Kirby Canyon Landfill Cell 7 Phase 1		
Site Location:	San Jose, CA	**GSE No.:**	**514668**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Guy Petraborg		510.051
General Contractor:	WMI Kirby Canyon Landfill		
GC Contact:	Guy Petraborg		408 779-2206
Engineering Firm:	GeoSyntec Consultants		
Engineer Contact:	Hari Sharma		510 836-3034
Products:	GSE HD Textured 40 mil	472,500	sq. ft.
	GSE HD Textured 80 mil Single-Sided	590,400	sq. ft.
	GSE FabriNet HF 8 oz	369,170	sq. ft.
	GSE Geotextile 8 oz	34,000	sq. ft.
	GSE Geotextile 16 oz	3,500	sq. ft.
Amount:	$607,150		
Date completed:	12/3/2004		

Project Name:	Waste Management/West Hawaii Landfill Cell 7		
Site Location:	Waikoloa, HI	**GSE No.:**	**514670**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Mike Kahn		808 886-0940
General Contractor:	WMI West Hawaii Sanitary Landfill		
GC Contact:	Mike Kahn		808 886-0940
Engineering Firm:	A-Mehr, Inc.		
Engineer Contact:	Ali Mehr		714 633-5757
Products:	GSE White 60 mil	453,600	sq. ft.
	Bentofix NSL	409,200	sq. ft.
	GSE Geotextile 16 oz	72,000	sq. ft.
Amount:	$643,068		
Date completed:	7/20/2004		

Project Name:	Lancaster Landfill and Recycling Center Phase 1A		
Site Location:	Lancaster, CA	**GSE No.:**	**514672**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Rick Von Pein		510 613-0254
General Contractor:	WMI Lancaster Recycling & Disposal		
GC Contact:	John Workman		661 945-5944
Engineering Firm:	Bryan A. Stirrat & Associates		
Engineer Contact:	Janet Paul		909 860-7777
Products:	GSE HD Textured 60 mil	351,000	sq. ft.
	GSE HD Textured 60 mil Single-Sided	189,000	sq. ft.
	Bentofix NWL	530,077	sq. ft.
	GSE Geotextile 8 oz	359,940	sq. ft.
	GSE Geotextile 12 oz	39,500	sq. ft.
	GSE Geotextile16 oz	19,000	sq. ft.
Amount:	$733,345		
Date completed:	10/6/2004		

Project Name:	Waste Management/ Security RDF Cell 5 Phase V

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Site Location:	Cleveland, TX	**GSE No.:**	**514682**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Jeff Palutis	770 805-3363	
General Contractor:	WMI Security RDF		
GC Contact:	Mike Derdeyn	281 592-3543	
Engineering Firm:	Metroplex Core		
Engineer Contact:	Reid Matthews	281 440-5503	
Products:	GSE HD 60 mil	470,745	sq. ft.
	GSE HD Textured 60 mil	468,750	sq. ft.
	GSE HyperNet	468,750	sq. ft.
	GSE FabriNet 6 oz	490,333	sq. ft.
	GSE FabriNet HF 6 oz	222,633	sq. ft.
	GSE Geotextile 6 oz	128,750	sq. ft.
Amount:	$642,884		
Date completed:	7/30/2004		

Project Name:	Waste Management/Eagle Valley Landfill Cell 11B		
Site Location:	Orion, MI	**GSE No.:**	**514702**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 218-1702	
General Contractor:	WMI Eagle Valley Landfill		
GC Contact:	Rich Paajanen	248 391-0990	
Engineering Firm:	Earth Tech		
Engineer Contact:	Matthew Williams	734 779-2800	
Products:	GSE HD 60 mil	226,800	sq. ft.
	GSE HD Textured 60 mil	175,500	sq. ft.
	GSE UltraFlex Textured 60 mil	315,900	sq. ft.
	GSE HyperNet	193,905	sq. ft.
	Bentofix NSL	491,866	sq. ft.
	GSE FabriNets	88,582	sq. ft.
	GSE Geotextiles	390,301	sq. ft.
Amount:	$688,110		
Date completed:	10/1/2004		

Project Name:	Waste Management/Waters Landfill Cell D North		
Site Location:	Frederic, MI	**GSE No.:**	**514705**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 218-1702	
General Contractor:	WMI Waters Landfill		
GC Contact:	Debora Johnston	517 732-3553	
Engineering Firm:	Midwestern Consulting LLC		
Engineer Contact:	J. Chris Sullivan	734 995-0200	
Products:	GSE HD Textured 60 mil	630,113	sq. ft.
	Bentofix NSL	299,925	sq. ft.
	GSE FabriNet 6 oz	464,000	sq. ft.
	GSE Geotextile 10 oz	19,000	sq. ft.
Amount:	$813,252		
Date completed:	7/26/2004		

Project Name:	Waste Management/Chain of Rocks RDF Final Cover Top Slopes		
Site Location:	Granite City, IL	**GSE No.:**	**514712**
Application:	Sanitary LF Cap		
Owner:	**Waste Management**		

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Owner Contact:	Denny Dennison	618 271-6788
General Contractor:	WMI Chain of Rocks RDF	
GC Contact:	Denny Dennison	618 271-6788
Engineering Firm:	Sherrill Associates	
Engineer Contact:	Melissa Shulte	618 656-9251
Products:	GSE HD Textured 40 mil	2,133,225 sq. ft.
Amount:	$746,595	
Date completed:	9/24/2004	

Project Name:	Waste Management/ Pheasant Run Landfill Phase 2 Composite Liner	
Site Location:	Bristol, WI	**GSE No.: 514716**
Application:	Sanitary LF	
Owner:	**Waste Management**	
Owner Contact:	Casey Furlong	262 857-7956
General Contractor:	WMI Pheasant Run RDF	
GC Contact:	Casey Furlong	262 857-7956
Engineering Firm:	CQM, Inc.	
Engineer Contact:	Pete Rammer	920 465-3911
Products:	GSE HD Textured 60 mil	842,400 sq. ft.
	GSE FabriNet 6 oz	273,470 sq. ft.
	GSE Geotextile 12 oz	99,067 sq. ft.
Amount:	$605,389	
Date completed:	8/20/2004	

Project Name:	Waste Management/ Mountain View Reclamation Cap	
Site Location:	Greencastle, PA	**GSE No.: 514728**
Application:	Sanitary LF Cap	
Owner:	**Waste Management**	
Owner Contact:	Tony Eith	215 269-2143
General Contractor:	WMI Mountain View Reclamation	
GC Contact:	Bob Detz	717 593-4501
Engineering Firm:	Earth Tech	
Engineer Contact:	John Conturo	215 244-7108
Products:	GSE HD Textured 40 mil	614,250 sq. ft.
	GSE FabriNet 8 oz	712,733 sq. ft.
	GSE Geotexile 10 oz	71,000 sq. ft.
Amount:	$625,535	
Date completed:	7/26/2004	

Project Name:	Waste Management/ Mountain View Reclamation Cell 16B	
Site Location:	Greencastle, PA	**GSE No.: 514730**
Application:	Sanitary LF	
Owner:	**Waste Management**	
Owner Contact:	Tony Eith	215 269-2143
General Contractor:	WMI Mountain View Reclamation	
GC Contact:	Bob Detz	717 593-4501
Engineering Firm:	Earth Tech	
Engineer Contact:	John Conturo	215 244-7108
Products:	GSE HD Textured 60 mil	620,100 sq. ft.
	GSE FabriNet UF 8 oz	311,750 sq. ft.
	Bentofix NS	313,875 sq. ft.
	GSE Geotexile 6 oz	6,000 sq. ft.
	GSE Geotextile 16 oz	70,003 sq. ft.
Amount:	$709,184	
Date completed:	6/3/2004	

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Project Name:	Waste Management/Laurel Highlands Landfill Cell 4A		
Site Location:	Johnstown, PA	**GSE No.:**	**514735**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Laurel Highlands Landfill		
GC Contact:	Brad Minemyer	814 749-9065	
Engineering Firm:	Civil & Environmental Consultants, Inc.		
Engineer Contact:	Eric Chiado	724 327-5200	
Products:	GSE HD Textured 60 mil	643,050	sq. ft.
	GSE HyperNet	647,700	sq. ft.
	Bentofix NSL	321,884	sq. ft.
	GSE Geotextile 10 oz	76,111	sq. ft.
Amount:	$656,249		
Date completed:	11/22/2004		

Project Name:	Waste Management/ Southern Alleghenies Landfill Phase III Cell 2A		
Site Location:	Davidsville, PA	**GSE No.:**	**514737**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Southern Alleghenies Landfill		
GC Contact:	Darrell Klink	814 479-2537	
Engineering Firm:	Civil Design Solutions, Inc.		
Engineer Contact:	David Murray	412 299-2700	
Products:	GSE HD 60 mil	478,800	sq. ft.
	GSE HD Textured 60 mil	234,000	sq. ft.
	Bentofix NSL	330,686	sq. ft.
	GSE HyperNet HF	221,155	sq. ft.
	GSE HyperNet HS	220,320	sq. ft.
	GSE FabriNets	253,596	sq. ft.
	GSE Geotextile 10 oz	51,000	sq. ft.
Amount:	$660,686		
Date completed:	9/29/2004		

Project Name:	Waste Management/ Crossroads Landfill Phase 8B		
Site Location:	Norridgewock, ME	**GSE No.:**	**514750**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Disposal Services of Maine		
GC Contact:	Dave Jarvis	207 634-2714	
Engineering Firm:	GeoSyntec Consultants		
Engineer Contact:	Dave Bonnett	978 263-9588	
Products:	GSE HD Textured 60 mil	526,500	sq. ft.
	GSE HD 60 mil	141,375	sq. ft.
	Bentofix NSL	484,027	sq. ft.
	GSE FabriNet HS 8 oz	257,854	sq. ft.
	GSE FabriNet UF 8 oz	146,595	sq. ft.
Amount:	$774,575		
Date completed:	8/12/2004		

Project Name:	Waste Management/Mill Seat Landfill Stage IIIB		
Site Location:	Bergen, NY	**GSE No.:**	**514760**
Application:	Sanitary LF		

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Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Mill Seat Landfill		
GC Contact:	Jeff Richardson	585 494-3000	
Engineering Firm:	Earth Tech		
Engineer Contact:	Jim Doughtery	215 244-7100	
Products:	GSE HD Textured 60 mil	632,610	sq. ft.
	Bentofix NWL	241,357	sq. ft.
	GSE FabriNet 6 oz	690,345	sq. ft.
	GSE Geotextile 16 oz	37,963	sq. ft.
	GSE Geotextile 6 oz	2,000	sq. ft.
Amount:	$780,095		
Date completed:	10/13/2004		

Project Name:	Onyx/Orchard Hills Landfill Phase IV, V and Berm		
Site Location:	Davis Junction, IL	**GSE No.:**	**514762**
Application:	Sanitary LF		
Owner:	**Onyx Waste Services**		
Owner Contact:	Randy Frank	262 971-1391	
General Contractor:	Onyx Waste Services		
GC Contact:	Randy Frank	262 971-1391	
Engineering Firm:	RMT		
Engineer Contact:	Mark Torresani	608 831-4444	
Products:	GSE HD 60 mil	879,120	sq. ft.
	GSE HD Textured 60 mil	245,700	sq. ft.
	Bentofix NSL	5,784	sq. ft.
	GSE Geotextile 12 oz	182,738	sq. ft.
	GSE Geotextile 6 oz	119,000	sq. ft.
Amount:	$690,944		
Date completed:	11/24/2004		

Project Name:	Onyx/Greentree Cap		
Site Location:	Kersey, PA	**GSE No.:**	**514767**
Application:	Sanitary LF Cap		
Owner:	**Onyx Waste Services**		
Owner Contact:	Bill Binnie	814 265-1744	
General Contractor:	Onyx Waste Services		
GC Contact:	Bill Binnie	814 265-1744	
Engineering Firm:	Blazosky Associates, Inc.		
Engineer Contact:	Jim Echard	814 238-2060	
Products:	GSE UltraFlex Textured 40 mil	1,512,000	sq. ft.
	GSE FabriNet 6 oz	1,490,745	sq. ft.
	GSE Geotextile 6 oz	9,000	sq. ft.
Amount:	$899,319		
Date completed:	11/20/2004		

Project Name:	Waste Management/Hardy Road Landfill Final Cover		
Site Location:	Akron, OH	**GSE No.:**	**514853**
Application:	Sanitary LF Cap		
Owner:	**Waste Management**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Hardy Road Landfill		
GC Contact:	Scott Herman	330 928-8293	
Engineering Firm:	Civil & Environmental Consultants, Inc.		
Engineer Contact:	Carla Suszkowski	412 429-2324	
Products:	GSE UltraFlex Textured 40 mil	1,134,000	sq. ft.
	GSE FabriCap 6 oz	1,163,612	sq. ft.

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Amount:	$773,930		
Date completed:	8/12/2004		

Project Name:	Waste Management/Pine Tree Acres Landfill Cell 15		
Site Location:	Lenox, MI	**GSE No.:**	**514859**
Application:	Sanitary LF		
Owner:	**Waste Management**		
Owner Contact:	Steve Lackner	630 218-1702	
General Contractor:	WMI Pine Tree Acres Landfill		
GC Contact:	Rich Paajanen	810 749-9698	
Engineering Firm:	McNeely & Lincoln Associates, Inc.		
Engineer Contact:	Allen Visel	734 432-9777	
Products:	GSE HD 60 mil	592,200	sq. ft.
	GSE HD Textured 60 mil	163,800	sq. ft.
	GSE UltraFlex Textured 40 mil	346,500	sq. ft.
	Bentofix NSL	749,575	sq. ft.
	GSE FabriNet 8 oz	98,600	sq. ft.
	GSE FabriNet 6 oz	38,280	sq. ft.
	GSE Geotextiles	113,000	sq. ft.
Amount:	$714,845		
Date completed:	8/31/2004		

Project Name:	Allied Waste/Rockwood Landfill Cell 14		
Site Location:	Newport, MI	**GSE No.:**	**514912**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Christina Pearse-Bossnick	734 397-2790	
General Contractor:	Allied Waste Industries		
GC Contact:	Christina Pearse-Bossnick	734 397-2790	
Engineering Firm:	Midwestern Consulting LLC		
Engineer Contact:	Chris Sullivan	734 995-0200	
Products:	GSE HD Textured 60 mil	889,200	sq. ft.
	GSE FabriNet UF 6 oz	782,090	sq. ft.
	Bentofix NS	444,075	sq. ft.
	TP275-88 Geocomposite	108,646	sq. ft.
Amount:	$749,196		
Date completed:	10/15/2004		

Project Name:	Allied Waste/Coffin Butte Landfill Cell 3B(b)		
Site Location:	Corvallis, OR	**GSE No.:**	**514944**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Art Mains	800 275-5641	
General Contractor:	Allied Waste Industries		
GC Contact:	Art Mains	800 275-5641	
Engineering Firm:	Thiel Engineering		
Engineer Contact:	Rick Thiel	530 692-9114	
Products:	GSE HD Textured 60 mil	1,087,425	sq. ft.
	GSE HD Textured 40 mil	456,750	sq. ft.
	GSE Conductive Textured 80 mil Single-Sided	79,200	sq. ft.
Amount:	$650,716		
Date completed:	11/13/2004		

Project Name:	Allied Waste/ECDC Environmental Landfill		
Site Location:	East Carbon, UT	**GSE No.:**	**514947**

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Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Darin Olson	435 888-4418	
General Contractor:	Allied Waste Industries		
GC Contact:	Darin Olson	435 888-4418	
Engineering Firm:	Hansen, Allen & Luce, Inc.		
Engineer Contact:	Kent Staheli	801 566-5599	
Products:	GSE HD 60 mil	907,200	sq. ft.
	GSE HD Textured 60 mil	152,100	sq. ft.
	GSE HyperNet	468,165	sq. ft.
	GSE HyperNet HF	480,955	sq. ft.
	GSE Geotextile 8 oz	111,495	sq. ft.
	GSE Geotextile 16 oz	12,500	sq. ft.
Amount:	$764,161		
Date completed:	7/30/2004		

Project Name:	Allied Waste/Sunshine Canyon Landfill Phase IV-B Part 1		
Site Location:	Sylmar, CA	**GSE No.:**	**514957**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Frank Kiesler	818 833-6508	
General Contractor:	Allied Waste Industries		
GC Contact:	Frank Kiesler	818 833-6508	
Engineering Firm:	A-Mehr, Inc.		
Engineer Contact:	Ali Mehr	949 206-0157	
Products:	GSE HD Textured 80 mil	748,756	sq. ft.
	Bentofix NSL	571,377	sq. ft.
	GSE Geotextile 16 oz	105,990	sq. ft.
Amount:	$829,987		
Date completed:	10/8/2004		

Project Name:	Cactus Landfill Cell 1A		
Site Location:	Pinal County, AZ	**GSE No.:**	**515086**
Application:	Sanitary LF		
Owner:	**Capitol Environmental Resource, Inc.**		
Owner Contact:	Shawn McCash	480 734-2620	
General Contractor:	CS&W Contracting, Inc.		
GC Contact:	Robert Myers	602 266-7000	
Engineering Firm:	EMCON/OWT, Inc.		
Engineer Contact:	Donald Hullings	520 792-2800	
Products:	GSE White Textured 60 mil	444,600	sq. ft.
	GSE White Textured 60 mil Single-Sided	170,100	sq. ft.
	GSE FabriNet 10 oz	449,051	sq. ft.
	GSE Geotextile 10 oz	30,264	sq. ft.
Amount:	$617,166		
Date completed:	7/6/2004		

Project Name:	Seneca Landfill Cell 7		
Site Location:	Evans City, PA	**GSE No.:**	**515641**
Application:	Sanitary LF		
Owner:	**Seneca Landfill, Inc.**		
Owner Contact:	Ed Vogel	724 625-1511	
General Contractor:	Seneca Landfill, Inc.		
GC Contact:	Ed Vogel	724 625-1511	
Engineering Firm:	Youchak & Youchak, Inc.		
Engineer Contact:	Dan Tolmer	412 323-8840	

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Products:	GSE HD Textured 60 mil	631,800	sq. ft.
	GSE HD 60 mil	37,800	sq. ft.
	GSE FabriNet 6/16oz	317,550	sq. ft.
	GSE FabriNet 6/10 oz	319,000	sq. ft.
	Bentofix NWL	634,725	sq. ft.
	GSE HyperNet	13,500	sq. ft.
	GSE Geotextile 16 oz	319,500	sq. ft.
Amount:	$779,023		
Date completed:	11/24/2004		

Project Name:	Staten Island Transfer Station at Freshkill Landfill		
Site Location:	Staten Island, NY	**GSE No.:**	**508444**
Application:	Sanitary LF		
Owner:	**New York City Dept of Sanitation**		
Owner Contact:	Bernard Weinberger	212 837-8057	
General Contractor:	Tully Construction Co.		
GC Contact:	Tom Olesczuk	718 446-7000	
Engineering Firm:	HDR Engineering, Inc.		
Engineer Contact:	D. Harkins		
Products:	GSE HD 60 mil	69,615	sq. ft.
Amount:	$658,750		
Date completed:	10/3/2003		

Project Name:	Allied Waste/ BFI Sunshine Canyon Landfill Phase IV-A		
Site Location:	Sylmar, CA	**GSE No.:**	**509763**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Curt Fuji	925 458-9800	
General Contractor:	Allied BFI Sunshine Canyon Landfill		
GC Contact:	Sam Rojas	818 833-6500	
Engineering Firm:	A-Mehr, Inc.		
Engineer Contact:	Ali Mehrazarin	714 633-5757	
Products:	GSE HD Textured 80 mil	817,650	sq. ft.
	GSE HD 40 mil	39,150	sq. ft.
	Bentofix NSL	475,760	sq. ft.
	GSE Geotextile 16 oz	125,465	sq. ft.
Amount:	$645,940		
Date completed:	5/5/2003		

Project Name:	Waste Mgt/GROWS Landfill Final Cover		
Site Location:	Morrisville, PA	**GSE No.:**	**509992**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI GROWS Landfill		
GC Contact:	Ed Kucowski	215 428-3244	
Engineering Firm:	Earth Tech, Inc.		
Engineer Contact:	Keith McKeon	215 244-7109	
Products:	GSE HD Textured 40 mil	853,300	sq. ft.
	GSE FabriNet	713,700	sq. ft.
	GSE Geotextile 10 oz	20,610	sq. ft.
	Geotextile	651,360	sq. ft.
Amount:	$986,650		
Date completed:	11/25/2003		

Project Name: Waste Mgt/ Pheasant Run 2003 Composite Cover

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Site Location:	Whitelaw, WI	**GSE No.:**	**510047**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Luci Altieri	630 218-1821	
General Contractor:	WMI Pheasant Run Landfill		
GC Contact:	Casey Furlong	414 529-6180	
Engineering Firm:	CQM		
Engineer Contact:	Terry McDonald	920 465-3911	
Products:	GSE HD Textured 60 mil	732,320	sq. ft.
	GSE HyperNet	675,000	sq. ft.
	GSE FabriNet	100,050	sq. ft.
	Bentofix NSL	364,890	sq. ft.
	GSE Geotextile 16 oz	84,000	sq. ft.
	GSE Geotextile 6 oz	35,000	sq. ft.
Amount:	$623,600		
Date completed:	9/25/2003		

Project Name:	Onyx/Arbor Hills Landfill Cell 5B		
Site Location:	Northville, MI	**GSE No.:**	**510286**
Application:	Sanitary LF		
Owner:	**Onyx Waste Services**		
Owner Contact:	Jay Warzinski	262 971-1390	
General Contractor:	Onyx Waste Services		
GC Contact:	Jay Warzinski	262 971-1390	
Engineering Firm:	Midwestern Consulting		
Engineer Contact:	Barbara Coughlin	248 620-2203	
Products:	GSE UltraFlex Textured 60 mil	829,800	sq. ft.
	GSE UltraFlex Textured 40 mil	422,600	sq. ft.
	Bentofix NS	850,950	sq. ft.
	GSE FabriNet	409,480	sq. ft.
Amount:	$989,055		
Date completed:	6/28/2003		

Project Name:	Waste Management/Shade Landfill Cell 1		
Site Location:	Cairnbrook, PA	**GSE No.:**	**510937**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Rick Smitsky	412 893-4962	
General Contractor:	WMI Shade Landfill		
GC Contact:	Brian Stewart	814 754-4587	
Engineering Firm:	Cumberland Geotechnical		
Engineer Contact:	Jaff Barnes	724 327-5200	
Products:	GSE HD 60 mil	1,083,600	sq. ft.
	GSE HD Textured 60 mil	58,500	sq. ft.
	GSE HyperNet	1,017,000	sq. ft.
Amount:	$707,720		
Date completed:	7/21/2003		

Project Name:	Waste Mgt/Columbia Ridge Landfill Module 9A		
Site Location:	Arlington, OR	**GSE No.:**	**511473**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI Columbia Ridge Landfill & Recycling Center		
GC Contact:	Chris Haynes	541 454-3201	
Engineering Firm:	Earth Tech, Inc.		
Engineer Contact:	Andy Querio	630 574-2006	
Products:	GSE HD Textured 60 mil	948,290	sq. ft.

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	GSE HD 40 mil	39,150	sq. ft.
	GSE Geotextile 4 oz	98,500	sq. ft.
	GSE Geotextile 16 oz	119,000	sq. ft.
Amount:	$712,260		
Date completed:	5/29/2003		

Project Name:	Mostoller Landfill Phase 3b/3c		
Site Location:	Somerset, PA	**GSE No.:**	**511536**
Application:	Sanitary LF		
Owner:	**North East Waste Services Company**		
Owner Contact:	Barry Clark	814 444-0112	
General Contractor:	North East Waste Services Company		
GC Contact:	Barry Clark	814 444-0112	
Engineering Firm:	CME Engineering		
Engineer Contact:	Jeff Barnes	814 443-3344	
Products:	GSE HD Textured 60 mil	483,690	sq. ft.
	GSE FabriNet HS	113,675	sq. ft.
	GSE FabriNet Single-Sided	62,640	sq. ft.
	Bentofix NSL	166,700	sq. ft.
	GSE HyperNet	94,500	sq. ft.
	GSE Geotextile 16 oz	23,500	sq. ft.
Amount:	$751,550		
Date completed:	10/8/2003		

Project Name:	Hopewell Closure Cap		
Site Location:	Newburg, PA	**GSE No.:**	**512366**
Application:	Sanitary LF Cap		
Owner:	**North East Waste Services Company**		
Owner Contact:	Bill Neidigh	717 423-5917	
General Contractor:	North East Waste Services Company		
GC Contact:	Bill Neidigh	717 423-5917	
Engineering Firm:	Martin & Martin, Inc.		
Engineer Contact:	Richard Bodner	717 264-6759	
Products:	GSE UltraFlex Textured 40 mil	772,430	sq. ft.
	GSE FabriNet	672,800	sq. ft.
	GSE Geotextile 16 oz	73,500	sq. ft.
Amount:	$609,675		
Date completed:	7/29/2003		

Project Name:	Hopewell Landfill Cell 4		
Site Location:	Newburg, PA	**GSE No.:**	**512367**
Application:	Sanitary LF		
Owner:	**North East Waste Services Company**		
Owner Contact:	Bill Neidigh	717 423-5917	
General Contractor:	North East Waste Services Company		
GC Contact:	Bill Neidigh	717 423-5917	
Engineering Firm:	Martin & Martin, Inc.		
Engineer Contact:	Richard Bodner	717 264-6759	
Products:	GSE HD Textured 60 mil	732,320	sq. ft.
	GSE HyperNet	675,000	sq. ft.
	GSE FabriNet	100,050	sq. ft.
	Bentofix NSL	364,890	sq. ft.
	GSE Geotextile 6 oz	35,000	sq. ft.
	GSE Geotextile 16 oz	84,000	sq. ft.
Amount:	$751,500		
Date completed:	9/30/2003		

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Project Name:	Waste Mgt/CWM of the Northwest Landfill L14 Cell 1		
Site Location:	Arlington, OR	**GSE No.:**	**512442**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Rick Von Pein	510 613-0254	
General Contractor:	WMI CWM of the Northwest Landfill		
GC Contact:	Chris Haynes	541 454-3201	
Engineering Firm:	Earth Tech, Inc.		
Engineer Contact:	Amy Querio	630 574-2006	
Products:	GSE White Textured 60 mil	862,200	sq. ft.
	GSE FabriNet HF	793,300	sq. ft.
	GSE Geotextile 16 oz	1,500	sq. ft.
Amount:	$654,615		
Date completed:	8/19/2003		

Project Name:	Waste Mgt/Charles City County Landfill Phase 4 Cell 1		
Site Location:	Charles City, VA	**GSE No.:**	**512568**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Rick Smitsky	412 893-4962	
General Contractor:	WMI Charles City Landfill		
GC Contact:	Jim Stemborg	804 966-7146	
Engineering Firm:	GeoSyntec Consultants		
Engineer Contact:	John Beech	404 705-9500	
Products:	GSE HD 60 mil	970,200	sq. ft.
	GSE HyperNet	530,880	sq. ft.
	Bentofix NSE	469,650	sq. ft.
	GSE FabriNet Single-Sided	62,640	sq. ft.
Amount:	$607,160		
Date completed:	6/3/2003		

Project Name:	Allied Waste/Timberlands Landfill Cell 6		
Site Location:	Brewton, AL	**GSE No.:**	**512632**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Brian Martz	205 929-3118	
General Contractor:	Allied Waste Industries		
GC Contact:	Brian Martz	205 929-3118	
Engineering Firm:	Golder Associates		
Engineer Contact:	Claudia Moeller	770 492-8191	
Products:	GSE HD Textured 60 mil	666,900	sq. ft.
	Bentofix NWLE	662,625	sq. ft.
	GSE FabriNet HF	659,315	sq. ft.
	GSE Geotextile 8 oz	4,500	sq. ft.
Amount:	$752,250		
Date completed:	5/8/2003		

Project Name:	Allied Waste/Brickyard Landfill Cell		
Site Location:	Danville, IL	**GSE No.:**	**512683**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Terry Bent	217 787-6079	
General Contractor:	Allied Brickyard Landfill		
GC Contact:		217 443-3128	
Engineering Firm:	Feezor Engineering, Inc.		
Engineer Contact:	Dan Feezor	217 753-3988	

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Products:	GSE HD 60 mil	151,200	sq. ft.
	GSE HD Textured 60 mil	35,100	sq. ft.
	GSE Geotextile 4 oz	20,000	sq. ft.
	GSE Geotextile 8 oz	2,000	sq. ft.
Amount:	$671,990		
Date completed:	8/6/2003		

Project Name:	Allied Waste/Big River Landfill Area 5C Part 3		
Site Location:	Leland, MS	**GSE No.:**	**512705**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Kirby Thompson	225 686-0122	
General Contractor:	Allied Waste Industries		
GC Contact:	Kirby Thompson	225 686-0122	
Engineering Firm:	Eco-Systems, Inc.		
Engineer Contact:	Jeff Allen	601 936-4440	
Products:	GSE HD 60 mil	239,400	sq. ft.
	GSE HD Textured 60 mil	23,400	sq. ft.
	GSE Geotextile 8 oz	4,000	sq. ft.
Amount:	$89,500		
Date completed:	8/30/2003		

Project Name:	Allied Waste/ECDC Environmental Super Cell 1A North		
Site Location:	East Carbon, UT	**GSE No.:**	**512709**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Greg Czerniski	480 596-9596	
General Contractor:	Allied Waste Industries		
GC Contact:	Darin Olsen	435 888-4418	
Engineering Firm:	Hansen Allen & Luce		
Engineer Contact:	Kent Staheli	801 566-5599	
Products:	GSE HD 60 mil	844,200	sq. ft.
	GSE HD Textured 60 mil	409,500	sq. ft.
	GSE HyperNet	427,200	sq. ft.
	GSE HyperNet HF	423,625	sq. ft.
	GSE Geotextile 8 oz	102,000	sq. ft.
	GSE Geotextile 16 oz	40,000	sq. ft.
Amount:	$726,570		
Date completed:	6/16/2003		

Project Name:	Waste Management/ Westside Landfill Cell		
Site Location:	Three Rivers, MI	**GSE No.:**	**512735**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Luci Altieri	630 218-1821	
General Contractor:	WMI Westside Landfill		
GC Contact:	Fred Sawyers	616 273-1770	
Engineering Firm:	Lambert Engineering		
Engineer Contact:	Greg Lambert	616 443-1876	
Products:	GSE HD Textured 60 mil	524,780	sq. ft.
	GSE HD 60 mil	680,400	sq. ft.
	GSE FabriNet Single-Sided	688,750	sq. ft.
	GSE FabriNet	480,240	sq. ft.
	Bentofix NSL	1,162,590	sq. ft.
	GSE Geotextile 6 oz	5,625	sq. ft.
	GSE Geotextile 8 oz	26,740	sq. ft.
Amount:	$948,850		

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Date completed:	9/30/2003		

Project Name:	Waste Management/Glen's Landfill Cell 4 Phase 1		
Site Location:	Maple City, MI	**GSE No.:**	**512745**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Luci Altieri	630 218-1821	
General Contractor:	WMI Glen's Landfill		
GC Contact:	Debora Johnston	231 228-5196	
Engineering Firm:	Earth Tech, Inc.		
Engineer Contact:	Matt Williams	734 779-2800	
Products:	GSE HD Textured 60 mil	405,720	sq. ft.
	GSE HD 60 mil	352,800	sq. ft.
	Bentofix NSL	720,750	sq. ft.
	GSE FabriNet	403,535	sq. ft.
	GSE HyperNet HF	360,000	sq. ft.
	GSE Geotextile 8 oz	49,000	sq. ft.
Amount:	$796,625		
Date completed:	7/19/2003		

Project Name:	Waste Management/Turnkey Landfill Phase 8A		
Site Location:	Rochester, NH	**GSE No.:**	**512752**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI of New Hampshire		
GC Contact:	Anne Reichert	603 330-2140	
Engineering Firm:	Sanborn Head & Associates, Inc.		
Engineer Contact:	James Chabot	603 229-1900	
Products:	GSE HD Textured 60 mil	1,205,890	sq. ft.
	GSE FabriNet	1,100,550	sq. ft.
	Bentofix NS	230,175	sq. ft.
Amount:	$903,250		
Date completed:	12/16/2003		

Project Name:	Waste Management/Grand Central Landfill 2003 Cap		
Site Location:	Pen Argyl, PA	**GSE No.:**	**512827**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Grand Central Sanitary Landfill		
GC Contact:	Bruce Fahs	610 863-1315	
Engineering Firm:	EarthRes Group		
Engineer Contact:	David Horvath	215 766-1211	
Products:	GSE UltraFlex Textured 40 mil	724,500	sq. ft.
	GSE FabriNet	493,000	sq. ft.
	GSE Geotextile 8 oz	40,000	sq. ft.
	GSE Geotextile 12 oz	52,370	sq. ft.
Amount:	$615,430		
Date completed:	12/12/2003		

Project Name:	Waste Mgt/Mountain View Reclamation Closure Cells 11-14		
Site Location:	Greencastle, PA	**GSE No.:**	**512831**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	

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General Contractor:	WMI Mountain View Reclamation		
GC Contact:	Gary Von Stetina	717 597-5666	
Engineering Firm:	In House		
Engineer Contact:	Gary Von Stetina	717 597-5666	
Products:	GSE HD Textured 40 mil	945,900	sq. ft.
	GSE FabriNet HS	863,910	sq. ft.
	GSE Geotextile 10 oz	96,000	sq. ft.
Amount:	$735,750		
Date completed:	12/9/2003		

Project Name:	Waste Management/ Monroeville Landfill Cell 6		
Site Location:	Monroeville, PA	**GSE No.:**	**512835**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Monroeville Landfill		
GC Contact:	Rick Smitsky	412 824-0678	
Engineering Firm:	Civil Design Solutions, Inc.		
Engineer Contact:	Dave Murray	412 299-2700	
Products:	GSE HD 60 mil	642,600	sq. ft.
	GSE HD Textured 60 mil	281,570	sq. ft.
	GSE HyperNet	61,500	sq. ft.
	GSE FabriNet	277,820	sq. ft.
	GSE Geotextile 10 oz	73,500	sq. ft.
Amount:	$872,870		
Date completed:	9/24/2003		

Project Name:	Waste Mgt/Southern Alleghenies Landfill Phase III Area Cell 1A		
Site Location:	Davidsville, PA	**GSE No.:**	**512837**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Southern Alleghenies Landfill		
GC Contact:	Brian Stewart	814 479-2537	
Engineering Firm:	Civil Design Solutions, Inc.		
Engineer Contact:	David Murray	412 299-2700	
Products:	GSE HD 60 mil	264,600	sq. ft.
	GSE FabriNet UF	375,280	sq. ft.
	GSE FabriNet HS	302,470	sq. ft.
	GSE HyperNet HS	253,530	sq. ft.
	Bentofix NSL	427,800	sq. ft.
	GSE Geotextile 10 oz	29,000	sq. ft.
Amount:	$894,015		
Date completed:	11/10/2003		

Project Name:	Waste Mgt/Chicopee Stage 2 Base Liner		
Site Location:	Chicopee, MA	**GSE No.:**	**512843**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	Waste Management, Inc.		
GC Contact:	Bob Magnusson	603 929-3494	
Engineering Firm:	Golder Associates		
Engineer Contact:	Richard Wesenberg	603 668-0880	
Products:	GSE HD Textured 60 mil	516,810	sq. ft.
	GSE HD 40 mil	19,575	sq. ft.
	GSE FabriNet HF	500,830	sq. ft.

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	Bentofix NWL	504,525	sq. ft.
Amount:	$687,200		
Date completed:	11/17/2003		

Project Name:	Waste Mgt/Lake View Valley Landfill Phase 3A		
Site Location:	Erie, PA	**GSE No.:**	**513014**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Tony Eith	215 269-2143	
General Contractor:	WMI Lake View Landfill		
GC Contact:	Keith Doverspike	814 824-7808	
Engineering Firm:	Earth Tech, Inc.		
Engineer Contact:	John Conturo	215 244-7100	
Products:	GSE HD Textured 60 mil	821,450	sq. ft.
	GSE FabriNet	379,900	sq. ft.
	GSE Geotextile 16 oz	92,000	sq. ft.
Amount:	$684,050		
Date completed:	7/7/2003		

Project Name:	Waste Management/ Akron Regional Landfill Cap		
Site Location:	Akron, OH	**GSE No.:**	**509089**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Kurt Shaner	412 893-4948	
General Contractor:	WMI Akron Regional Landfill		
GC Contact:	Rolando Benlo	330 351-1018	
Engineering Firm:	Civil & Environmental Consultants, Inc.		
Engineer Contact:	Rick Buaffalini	412 429-2324	
Products:	VFP Textured 40 mil	694,480	sq. ft.
	Geocomposite	894,480	sq. ft.
	Bentofix NS	894,480	sq. ft.
Amount:	$690,915		
Date completed:	1/15/2002		

Project Name:	Cove Sanitation Landfill Cell 1		
Site Location:	Bad Axe, MI	**GSE No.:**	**509063**
Application:	Sanitary LF		
Owner:	**Cove Sanitation**		
Owner Contact:	Fred Hambleton	517 658-2464	
General Contractor:	Genoak Construction		
GC Contact:	Robert Bammert	248 634-0428	
Engineering Firm:	Rowe Engineering, Inc.		
Engineer Contact:	Dan Booth	810 341-7500	
Products:	HDPE 60 mil	218,214	sq. ft.
	HDPE Textured 60 mil	164,011	sq. ft.
	Geonet	218,214	sq. ft.
	Geocomposite	164,011	sq. ft.
	GCL	362,225	sq. ft.
	Geotextile	218,214	sq. ft.
Amount:	$646,875		
Date completed:	1/15/2002		

Project Name:	Allied Waste/ Conestoga Landfill Cell 12		
Site Location:	Morgantown, PA	**GSE No.:**	**507679**
Application:	Sanitary LF Cap		
Owner:	**Allied Waste Industries**		

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Owner Contact:	Al Roman	610 286-7876
General Contractor:	Allied Waste Industries	
GC Contact:	Al Roman	610 286-7876
Engineering Firm:	Blazosky Associates, Inc.	
Engineer Contact:	Mike Rudy	601 935-7701
Products:	GSE HD Textured 60 mil	1,111,500 sq. ft.
	Geotextile	236,500 sq. ft.
Amount:	$984,075	
Date completed:	1/19/2002	

Project Name:	Seneca Landfill Cell 5/6	
Site Location:	Evans City, PA	**GSE No.: 509177**
Application:	Sanitary LF	
Owner:	**Seneca Landfill**	
Owner Contact:	Ed Vogel	724 625-1511
General Contractor:	Seneca Landfill	
GC Contact:	Ed Vogel	724 625-1511
Engineering Firm:	Youchak & Youchak	
Engineer Contact:	Derek Medved	412 323-8840
Products:	GSE HD Textured 60 mil	712,000 sq. ft.
	GSE HD 60 mil	23,175 sq. ft.
	GSE FabriNet	712,000 sq. ft.
Amount:	$625,450	
Date completed:	11/30/2002	

Project Name:	J.H. Campbell Ash Disposal Landfill Cell 3	
Site Location:	West Olive, MI	**GSE No.: 509378**
Application:	Sanitary LF	
Owner:	**Consumers Energy Co.**	
Owner Contact:	D.M. Corson	517 788-0550
General Contractor:	Consumers Energy Co.	
GC Contact:	Ken Chou	616 994-6946
Engineering Firm:	STS Consultants, Ltd	
Engineer Contact:		616 940-3077
Products:	GSE HD 60 mil	1,436,400 sq. ft.
	GSE HD Textured 60 mil	281,750 sq. ft.
	GSE FabriNet	256,800 sq. ft.
	GSE HyperNet	1,651,500 sq. ft.
	Bentofix NSL	107,333 sq. ft.
	Geotextile	94,000 sq. ft.
Amount:	$980,000	
Date completed:	6/29/2002	

Project Name:	Allied Waste/ Charlotte Motor Speedway Landfill V Cell 2L	
Site Location:	Harrisburg, NC	**GSE No.: 509440**
Application:	Sanitary LF	
Owner:	**Allied Waste Industries**	
Owner Contact:	Brian Card	803 547-3184
General Contractor:	Allied Waste Industries	
GC Contact:	Rich Nolan	803 547-3184
Engineering Firm:	ESP Associates	
Engineer Contact:		704 504-1015
Products:	GSE HD Textured 60 mil	619,560 sq. ft.
	GSE FabriNet	593,050 sq. ft.
	Bentofix EC	332,475 sq. ft.
	Bentofix NWL	160,425 sq. ft.
Amount:	$642,135	
Date completed:	5/11/2002	

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Project Name:	Waste Management/ Butterfield Station Landfill		
Site Location:	Mobile, AZ	**GSE No.:**	**509565**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Jack Kolopanis	602 256-0630	
General Contractor:	Waste Management, Inc.		
GC Contact:	Jack Kolopanis	602 256-0630	
Products:	GSE HD 60 mil	668,314	sq. ft.
	GSE HD 30 mil	668,314	sq. ft.
	Bentofix NW	668,314	sq. ft.
Amount:	$825,775		
Date completed:	2/21/2002		

Project Name:	Waste Management/ Columbia Ridge Landfill Module 9		
Site Location:	Arlington, OR	**GSE No.:**	**509662**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Roger North	503 242-9493	
General Contractor:	WMI Columbia Ridge Landfill		
GC Contact:	Sam Jiries	541 454-2630	
Engineering Firm:	Earth Tech		
Engineer Contact:	Anthony Quero	630 574-2006	
Products:	GSE HD Textured 60 mil	1,088,100	sq. ft.
	Geotextile	231,150	sq. ft.
Amount:	$740,290		
Date completed:	7/19/2002		

Project Name:	Allied Waste/ Sunshine Canyon Landfill Phase IIC		
Site Location:	Sylmar, CA	**GSE No.:**	**509757**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Curt Fuji	925 458-9800	
General Contractor:	Allied Sunshine Canyon Landfill		
GC Contact:	Sam Rojas	818 833-6508	
Engineering Firm:	GeoSyntec Consultants		
Engineer Contact:	Jeff Dombrowski	714 969-0800	
Products:	GSE HD 30 mil	453,600	sq. ft.
	GSE HD Textured 60 mil Single-Sided	548,100	sq. ft.
	Bentofix NSL	561,426	sq. ft.
	Geotextile	77,000	sq. ft.
Amount:	$805,790		
Date completed:	7/16/2002		

Project Name:	Waste Management/ Chicopee Landfill Phase 6 Stage 2A		
Site Location:	Chicopee, MA	**GSE No.:**	**509854**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Bob Magnusson	603 929-3494	
General Contractor:	Waste Management, Inc.		
GC Contact:	Bob Magnusson	603 929-3494	
Engineering Firm:	Golder & Associates		
Engineer Contact:	Rich Wesenberg	603 668-0880	
Products:	GSE HD Textured 60 mil	830,700	sq. ft.
	GSE FabriNet HF	711,037	sq. ft.

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	Bentofix DN	304,500	sq. ft.
	Bentofix ST	533,250	sq. ft.
Amount:	$883,225		
Date completed:	7/9/2002		

Project Name:	Waste Management/ Mill Seat Landfill Stage IIIA		
Site Location:	Bergen, NY	**GSE No.:**	**509876**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Jeff Richardson	585 494-3000	
General Contractor:	WMI Mill Seat Landfill		
GC Contact:	Jeff Richardson	585 494-3000	
Engineering Firm:	Earth Tech		
Engineer Contact:	Paul Whitty	215 244-7100	
Products:	GSE HD Textured 60 mil	1,183,349	sq. ft.
	GSE FabriNet	1,166,913	sq. ft.
	Bentofix NWL	562,649	sq. ft.
	Geotextile	8,500	sq. ft.
Amount:	$779,700		
Date completed:	10/11/2002		

Project Name:	Waste Management/ Taunton Sanitary Landfill Cells 3 & 4 Expansion		
Site Location:	Taunton, MA	**GSE No.:**	**509982**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Peter Richer	606 929-3434	
General Contractor:	WMI Taunton Landfill		
GC Contact:	Peter Richer	606 929-3434	
Engineering Firm:	Brown & Caldwell		
Engineer Contact:	Phil Jagoda	508 923-0879	
Products:	GSE HD Textured 60 mil	620,100	sq. ft.
	GSE FabriNet	656,169	sq. ft.
	Bentofix NWL	629,982	sq. ft.
Amount:	$781,425		
Date completed:	11/25/2002		

Project Name:	Waste Management/ High Acres Landfill Cell 6/7 Overliner		
Site Location:	Fairport, NY	**GSE No.:**	**509988**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:			
General Contractor:	WMI High Acres Landfill		
GC Contact:	Jeff Kocian	716 223-6132	
Engineering Firm:	Blasland, Bouck & Lee, Inc.		
Engineer Contact:	Todd Farmeni	585 223-2074	
Products:	GSE HD Textured 60 mil	915,400	sq. ft.
	GSE HD 60 mil	478,800	sq. ft.
	GSE HyperNet	238,500	sq. ft.
	GSE FabriNet	442,888	sq. ft.
	Bentofix NWL	230,000	sq. ft.
	Geotextile	45,135	sq. ft.
Amount:	$813,375		
Date completed:	10/8/2002		

Project Name:	Waste Management/ Hardy Road Landfill Cap

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Site Location:	Akron, OH	**GSE No.:**	**509999**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Greg Meyer	937 318-6325	
General Contractor:	WMI Akron Regional Landfill		
GC Contact:	Scott Herman	330 928-8293	
Engineering Firm:	Civil & Environmental Consultants		
Engineer Contact:	Carla Suszkowski	412 429-2324	
Products:	GSE UltraFlex Textured 40 mil	1,071,000	sq. ft.
	GSE FabriNet	1,076,466	sq. ft.
Amount:	$664,200		
Date completed:	11/7/2002		

Project Name:	Waste Management/ Shade Landfill Cell 1A		
Site Location:	Cairnbrook, PA	**GSE No.:**	**510008**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Rick Smitsky	412 893-4962	
General Contractor:	WMI Shade Landfill		
GC Contact:	Brian Stewart	814 754-4587	
Engineering Firm:	Cumberland Geotechnical		
Engineer Contact:	Jeff Barnes	724 327-5200	
Products:	GSE HD 60 mil	1,083,600	sq. ft.
	GSE HD Textured 60 mil	58,500	sq. ft.
	GSE HyperNet	1,017,000	sq. ft.
Amount:	$680,900		
Date completed:	9/27/2002		

Project Name:	Waste Management/ King George Landfill Cells 8B & 15		
Site Location:	King George, VA	**GSE No.:**	**510021**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Rick Smitsky	412 893-4962	
General Contractor:	WMI King George Landfill		
GC Contact:	Jim Stenborg	703 709-7651	
Engineering Firm:	Golder & Associates		
Engineer Contact:		281 931-8674	
Products:	GSE HD Textured 60 mil	865,800	sq. ft.
	GSE HD Textured 40 mil	440,325	sq. ft.
	GSE HD 20 mil	75,150	sq. ft.
	GSE FabriNet	440,177	sq. ft.
	Bentofix NSE	660,300	sq. ft.
Amount:	$955,250		
Date completed:	10/1/2002		

Project Name:	Waste Management/ Venice Park Landfill Cell 2		
Site Location:	Lennon, MI	**GSE No.:**	**510067**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Luci Altieri	630 218-1821	
General Contractor:	WMI Venice Park Landfill		
GC Contact:	Lori Winters	810 621-9080	
Engineering Firm:	Golder & Associates		
Engineer Contact:	Shannon Mann	517 482-2262	
Products:	GSE HD 60 mil	291,690	sq. ft.
	GSE UltraFlex Textured 40 mil	47,250	sq. ft.
	GSE FabriNet	324,887	sq. ft.

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	GSE FabriNet Single-Sided	275,500	sq. ft.
	Bentofix NS	623,100	sq. ft.
Amount:	$645,350		
Date completed:	10/2/2002		

Project Name:	Mostoller Landfill Pad 3A		
Site Location:	Somerset, PA	**GSE No.:**	**510488**
Application:	Sanitary LF		
Owner:	**Mostoller Landfill**		
Owner Contact:	Barry Clark	814 444-0120	
General Contractor:	Mostoller Landfill		
GC Contact:	Barry Clark	814 444-0120	
Engineering Firm:	Blazosky Associates, Inc.		
Engineer Contact:	Jim Echard	814 238-2060	
Products:	GSE HD Textured 60 mil	647,028	sq. ft.
	GSE HyperFrictionFlex 60 mil	448,983	sq. ft.
	GSE FabriNet	255,824	sq. ft.
	GSE FabriNet Single-Sided	320,160	sq. ft.
	GSE HyperNet	306,000	sq. ft.
	Geotextile	80,000	sq. ft.
	Bentofix NSL	527,618	sq. ft.
Amount:	$975,675		
Date completed:	11/13/2002		

Project Name:	Allied Waste/ Woolworth Road Landfill Cell 10		
Site Location:	Keithville, LA	**GSE No.:**	**504699**
Application:	Sanitary LF		
Owner:	**Allied Waste Industies**		
Owner Contact:	Paul Marks	318 925-2262	
General Contractor:	Browning Ferris Industries Waste of North America,Inc.		
GC Contact:	Paul Marks	318 925-2262	
Engineering Firm:	URS		
Products:	GSE HD 60 mil	623,700	sq. ft.
	GSE GundSeal 40 mil	569,000	sq. ft.
	GSE FabriNet Single-Sided 6 oz	620,300	sq. ft.
Amount:	$682,590		
Date completed:	9/1/2000		

Project Name:	Allied Waste/ Sunshine Canyon Landfill Phase III Extension		
Site Location:	Sylmar, CA	**GSE No.:**	**504816**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	John Mays	818 833-6508	
General Contractor:	Allied Waste Sunshine Canyon Landfill		
GC Contact:	John Mays	818 833-6508	
Engineering Firm:	Geosyntec Consultants		
Engineer Contact:	Jeff Dubrowski	714 969-0800	
Products:	GSE HD Textured Single-Sided 60 mil	396,900	sq. ft.
	GSE HD Textured 60 mil	165,263	sq. ft.
	GSE HD 30 mil	406,350	sq. ft.
	GSE HD 40 mil	19,320	sq. ft.
	GSE HyperNet	432,600	sq. ft.
	Bentomat ST	472,500	sq. ft.
	Geotextile	86,500	sq. ft.
Amount:	$644,391		
Date completed:	10/1/2000		

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Project Name:	Waste Management/ Cedar Ridge Cap		
Site Location:	East Jordan, MI	**GSE No.:**	**510636**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Luci Altieri	630 218-1821	
General Contractor:	WMI Cedar Ridge RDF		
GC Contact:	Debbie Johnston	248 596-3500	
Engineering Firm:	Earth Tech		
Engineer Contact:	May	734 779-2813	
Products:	GSE UltraFlex Textured 40 mil	1,131,300	sq. ft.
	GSE FabriNet	1,067,824	sq. ft.
	Bentofix NSL	564,975	sq. ft.
	Geotextile	1,616,223	sq. ft.
Amount:	$856,265		
Date completed:	10/22/2002		

Project Name:	Waste Management/ East Liverpool Final Cap		
Site Location:	Cincinnati, OH	**GSE No.:**	**511068**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Greg Meyer	937 318-6325	
General Contractor:	WMI East Liverpool Landfill		
GC Contact:	Mohammed Ali	330 866-3265	
Engineering Firm:	Earth Tech		
Engineer Contact:	Morgan Subbarayan	734 779-2816	
Products:	GSE UltraFlex Textured 40 mil	630,000	sq. ft.
	GSE FabriCap	631,272	sq. ft.
	Bentofix NS	602,175	sq. ft.
Amount:	$626,225		
Date completed:	9/7/2002		

Project Name:	Mead Westvaco Phase 1 Landfill		
Site Location:	Escanaba, MI	**GSE No.:**	**511153**
Application:	Sanitary LF		
Owner:	**Mead Westvaco Corporation**		
Owner Contact:	David DeVet	906 233-3370	
General Contractor:	Bacco Construction		
GC Contact:	Bruce Nygard	960 774-2616	
Engineering Firm:	STS Consultants, Ltd		
Engineer Contact:	Steven Shimek	920 468-1978	
Products:	GSE HD 60 mil	390,600	sq. ft.
	GSE HD Textured 60 mil	193,234	sq. ft.
	GSE FabriNet	791,670	sq. ft.
	GSE HyperNet	45,000	sq. ft.
	Bentofix NSL	399,900	sq. ft.
Amount:	$647,575		
Date completed:	11/30/2002		

Project Name:	Onyx/Arbor Hills Landfill Cell 5B		
Site Location:	Northville, MI	**GSE No.:**	**510285**
Application:	Sanitary LF		
Owner:	**Superior Services**		
Owner Contact:	Jay Warzinski	262 971-1390	
General Contractor:	Superior Services		
GC Contact:	Jay Warzinski	262 971-1390	

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Engineering Firm:	Midwestern Consulting		
Engineer Contact:	Barbara Coughlin	248 620-2203	
Products:	GSE UltraFlex Textured 40 mil	1,260,000	sq. ft.
	GSE UltraFlex Textured 60 mil	414,000	sq. ft.
	GSE HD Textured 60 mil	292,500	sq. ft.
	GSE FabriNet	400,200	sq. ft.
	Bentofix NS	558,000	sq. ft.
	Geotextile	27,500	sq. ft.
Amount:	$923,525		
Date completed:	9/22/2002		

Project Name:	Lanchester Landfill Cells 3C & 4		
Site Location:	Honey Brook, PA	**GSE No.:**	**502410**
Application:	Sanitary LF		
Owner:	**Chester County Solid Waste Authority**		
Owner Contact:			
General Contractor:	Pavex, Inc.		
GC Contact:	Brent Gallager	717 761-1502	
Engineering Firm:	Geosyntec Consultants		
Engineer Contact:	Jim Lyon		
Products:	GSE HD Textured 40 mil	110,250	sq. ft.
	GSE HD Textured 60 mil	1,614,600	sq. ft.
	GSE FabriNet	863,650	sq. ft.
	GSE FabriCap	863,650	sq. ft.
	GSE HyperNet	29,400	sq. ft.
Amount:	$630,130		
Date completed:	5/4/2001		

Project Name:	Waste Management/Chicopee Landfill Phase 6		
Site Location:	Chicopee, MA	**GSE No.:**	**504886**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Bob Mangusson	603 929-1935	
General Contractor:	Waste Management, Inc.		
GC Contact:	Bob Magnusson	603 929-1935	
Engineering Firm:	Maquire Group		
Products:	GSE HD Textured 60 mil	852,050	sq. ft.
	GSE FabriNet Single-Sided	401,280	sq. ft.
	GSE FabriNet	292,880	sq. ft.
Amount:	$616,650		
Date completed:	7/7/2001		

Project Name:	Southport Road Landfill Closure		
Site Location:	Kissimmee, FL	**GSE No.:**	**507003**
Application:	Sanitary LF Cap		
Owner:	**Osceola County Board of County Commissioners**		
Owner Contact:	Rey Palma	407 343-3125	
General Contractor:	C.J. Langenfelder & Son, Inc.		
GC Contact:	Mike Tiller	321 631-2687	
Engineering Firm:	HDR Engineering		
Engineer Contact:	Terry Tiedeman		
Products:	GSE UltraFlex Textured 40 mil	866,250	sq. ft.
	GSE CF315-66 Triplaner	875,425	sq. ft.
Amount:	$714,300		
Date completed:	9/20/2001		

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Project Name:	Allied Waste/Conestoga Landfill Cell 11		
Site Location:	Morgantown, PA	**GSE No.:**	**507328**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Al Roman	610 286-7876	
General Contractor:	Allied Waste Industries		
GC Contact:	Al Roman	610 286-7876	
Engineering Firm:	Blazosky Associates, Inc.		
Engineer Contact:	Mike Rudy		
Products:	GSE HD Textured 60 mil	1,240,200	sq. ft.
	GSE HyperFlex 60 mil	67,680	sq. ft.
	GSE FabriNet	241,500	sq. ft.
	Geotextile	269,000	sq. ft.
Amount:	$894,850		
Date completed:	6/26/2001		

Project Name:	Allied Waste/Sunshine Canyon Phase IIIB		
Site Location:	Sylmar, CA	**GSE No.:**	**507364**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Curt Fujii	925 458-9800	
General Contractor:	Allied Waste Sunshine Canyon		
GC Contact:	Sam Rojas	818 833-6508	
Engineering Firm:	Geosyntec Consultants		
Engineer Contact:	Jeff Dombrowski		
Products:	GSE HD 30 mil	407,000	sq. ft.
	GSE HD Textured 60 mil	152,100	sq. ft.
	GSE HD Textured 60 mil Single-Sided	585,900	sq. ft.
	Geotextile	99,500	sq. ft.
	GSE FabriNet	8,400	sq. ft.
Amount:	$823,900		
Date completed:	11/26/2001		

Project Name:	Waste Management/Alliance 2001 Cap		
Site Location:	Taylor, PA	**GSE No.:**	**507701**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Glenn Kempa	570 562-1600	
General Contractor:	Waste Management, Inc.		
GC Contact:	Glenn Kempa	570 562-1600	
Engineering Firm:	Martin & Martin		
Engineer Contact:	Rick Bodner		
Products:	GSE UltraFlex Textured 40 mil	866,250	sq. ft.
	GSE FabriNet	907,350	sq. ft.
	Geotextile	97,000	sq. ft.
Amount:	$681,420		
Date completed:	8/3/2001		

Project Name:	Mostoller Landfill		
Site Location:	Somerset, PA	**GSE No.:**	**507756**
Application:	Sanitary LF		
Owner:	**Mostoller Landfill, Inc.**		
Owner Contact:	Barry Clark	814 444-0120	
General Contractor:	Mostoller Landfill, Inc.		
GC Contact:	Barry Clark	814 444-0120	
Engineering Firm:	Crouse Consultants		

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Engineer Contact:	Jeff Evers		
Products:	GSE HD Textured 60 mil	1,056,500	sq. ft.
	GSE HyperNet	155,400	sq. ft.
	GSE FabriNet	383,925	sq. ft.
	GSE FabriNet Single-Sided	164,225	sq. ft.
	Claymax 200R	229,500	sq. ft.
	Geotextile	64,900	sq. ft.
Amount:	$716,875		
Date completed:	10/12/2001		

Project Name:	Norcal B & J Landfill Cell 5.1		
Site Location:	Vacaville, CA	**GSE No.:**	**507815**
Application:	Sanitary LF		
Owner:	**Norcal Waste**		
Owner Contact:	Tim Daleiden	707 678-5692	
General Contractor:	R.J. Gordon Construction, Inc.		
GC Contact:	John Johnson	925 680-8660	
Engineering Firm:	Golder Associates		
Engineer Contact:	Ken Haskell		
Products:	GSE HD Textured 60 mil Single-Sided	612,150	sq. ft.
	GSE FabriNet HF	137,200	sq. ft.
	Geotextile	64,500	sq. ft.
Amount:	$623,000		
Date completed:	7/2/2001		

Project Name:	Commonwealth Landfill Phase IV and Phase 1 Cap		
Site Location:	Hegins, PA	**GSE No.:**	**507977**
Application:	Sanitary LF		
Owner:	**Commonwealth Environmental Systems**		
Owner Contact:	David Leung	570 695-3590	
General Contractor:	Commonwealth Environmental Systems		
GC Contact:	David Leung	570 695-3590	
Engineering Firm:	CECO Associates		
Engineer Contact:	Al Maganotta		
Products:	GSE HD Textured 40 mil	739,550	sq. ft.
	GSE HyperFlex 60 mil	856,850	sq. ft.
	GSE HD Textured 60 mil	573,300	sq. ft.
	GSE FabriNet	691,900	sq. ft.
	GSE FabriCap	851,225	sq. ft.
Amount:	$913,000		
Date completed:	11/15/2001		

Project Name:	Lanchester Landfill Area B Cap		
Site Location:	Narvon, PA	**GSE No.:**	**502006**
Application:	Sanitary LF Cap		
Owner:	**Lanchester Landfill**		
General Contractor:	Pavex Inc.		
GC Contact:	Brent Gallagher	717 761-1502	
Engineering Firm:	Geosyntec Consultants		
Engineer Contact:	Eric Steinhauser	410 381-4333	
Products:	GSE HD Textured 40 mil	1,855,300	sq. ft.
	GSE FabriCap	1,814,150	sq. ft.
Amount:	$630,130		
Date completed:	7/1/2000		

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Project Name:	Glades Cut-Off Road Landfill Cell 3A		
Site Location:	Fort Pierce, FL	**GSE No.:**	**504212**
Application:	Sanitary LF		
Owner:	**St. Lucie County Solid Waste**		
Owner Contact:	Leo Gordeiro	561 462-6987	
General Contractor:	Sheltra & Son Construction Co., Inc.		
GC Contact:	Vince Gorham	561 597-3180	
Engineering Firm:	Camp Dresser & McKee Eng.		
Engineer Contact:	Eric Grotke	407 689-3336	
Products:	GSE HyperFlex 60 mil	1,263,360	sq. ft.
	GSE HyperNet	1,889,000	sq. ft.
	Claymax 200R	491,775	sq. ft.
	Bentomat ST	154,725	sq. ft.
	Geotextile 8 oz	70,500	sq. ft.
Amount:	$889,000		
Date completed:	8/1/2000		

Project Name:	Waste Management/ Alliance Landfill 2000 Closure		
Site Location:	Taylor, PA	**GSE No.:**	**504949**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Glenn Kempa	570 562-1600	
General Contractor:	Waste Management, Inc.		
GC Contact:	Glenn Kempa	570 562-1600	
Engineering Firm:	Martin & Martin		
Engineer Contact:	Rick Bodner	717 264-6759	
Products:	GSE UltraFlex Textured 40 mil	902,950	sq. ft.
	GSE HD 40 mil	14,625	sq. ft.
	GSE FabriCap 7.3 oz	896,500	sq. ft.
Amount:	$658,796		
Date completed:	9/1/2000		

Project Name:	Waste Management/ Saginaw Valley Closure		
Site Location:	Saginaw, MI	**GSE No.:**	**504982**
Application:	Sanitary LF Cap		
Owner:	**Waste Management, Inc.**		
Owner Contact:	John Prusko	810 621-9080	
General Contractor:	Waste Management, Inc.		
GC Contact:	John Prusko	810 621-9080	
Engineering Firm:	Golder Associates Ltd.		
Engineer Contact:	Domenic F. Mattiazzi	705 524-6861	
Products:	GSE HD Textured 40 mil	2,558,200	sq. ft.
	Bentomat ST	2,265,750	sq. ft.
Amount:	$958,189		
Date completed:	10/31/2000		

Project Name:	Waste Management/ Westside Landfill Cell 6		
Site Location:	Three Rivers, MI	**GSE No.:**	**504984**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Fred Sawyers	616 688-5777	
General Contractor:	Waste Management Inc		
GC Contact:	Fred Sawyer	616 688-5777	
Engineering Firm:	Earth Tech		
Engineer Contact:	Te-Yang Soong	734 779-2813	
Products:	GSE HyperFlex 60 mil	1,015,200	sq. ft.
	GSE HD Textured 60 mil	187,200	sq. ft.
	GSE HyperNet	364,000	sq. ft.

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	Geotextile	66,500	sq. ft.
Amount:	$709,567		
Date completed:	6/1/2000		

Project Name:	Dow/Salzburg Landfill Cells 20-22		
Site Location:	Midland, MI	**GSE No.:**	**505056**
Application:	Sanitary LF		
Owner:	**Dow Chemical USA**		
Owner Contact:	Bob Reiss	517 859-4353	
General Contractor:	Dow Chemical Company		
GC Contact:	Kurt Dietrich	517 636-0676	
Products:	GSE White Textured 60 mil	386,100	sq. ft.
	GSE White Textured 80 mil	354,420	sq. ft.
	GSE TP275-08	321,901	sq. ft.
	GSE TP275-88	274,968	sq. ft.
	Geotextile 8 oz	14,500	sq. ft.
Amount:	$788,842		
Date completed:	9/1/2000		

Project Name:	Roseburg Landfill Phase II		
Site Location:	Roseburg, OR	**GSE No.:**	**500182**
Application:	Sanitary LF		
Owner:	**Douglas County**		
Owner Contact:	Chuck Cates	541 440-4255	
General Contractor:	Wilder Construction Co.		
GC Contact:	Abe Moffat	503 255-1444	
Engineering Firm:	Shannon & Wilson		
Engineer Contact:	Cathy Robertson	206 632-8020	
Products:	GSE White Textured 60 mil	1,883,250	sq. ft.
	GSE FabriNet 6 oz	139,500	sq. ft.
	GSE FabriNet Single-Sided 6 oz	435,100	sq. ft.
Amount:	$816,258		
Date completed:	6/1/1999		

Project Name:	Allied/ Taylor County Landfill		
Site Location:	Mauk, GA	**GSE No.:**	**500453**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:	Brian Card	912 862-2504	
General Contractor:	Allied Waste/ Taylor County Landfill		
GC Contact:	Wes Mahaney	912 862-2504	
Engineering Firm:	Hodges, Harbin, Newberry, Inc.		
Products:	GSE HyperFrictionFlex 60 mil	921,112	sq. ft.
	Bentoliner	949,500	sq. ft.
Amount:	$641,908		
Date completed:	5/1/1999		

Project Name:	Waste Management/ Pine Bluff Landfill Phase II		
Site Location:	Ball Ground, GA	**GSE No.:**	**500476**
Application:	Sanitary LF		
Owner:	**Waste Management, Inc.**		
Owner Contact:	Dave Stewart	770 479-2936	
General Contractor:	Waste Management, Inc.		
GC Contact:	Ray Chewning	404 898-9243	
Engineering Firm:	J. Jones & Goulding		
Engineer Contact:	Ernie Heins	770 455-8555	

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Products:	GSE White Textured 60 mil	809,550	sq. ft.
	GSE White 60 mil	85,050	sq. ft.
	GSE FabriNet 10 oz	735,560	sq. ft.
Amount:	$650,072		
Date completed:	6/1/1999		

Project Name:	Rhode Island Resource Recovery Phase IV Area 1 & 2 Closures		
Site Location:	Johnston, RI	**GSE No.:**	**500869**
Application:	Sanitary LF Cap		
Owner:	**Rhode Island Resource Recovery Corporation**		
Owner Contact:	Robert Murray	401 942-1430	
General Contractor:	DiGregorio Corporation		
GC Contact:	Frank Maroni	401 232-5550	
Engineering Firm:	GZA GeoEnvironmental		
Engineer Contact:	Russ Morgan	401 421-4140	
Products:	GSE HyperFlex 60 mil	1,125,885	sq. ft.
	GSE HyperFlex 80 mil	1,333,640	sq. ft.
	Claymax200R	1,050,378	sq. ft.
	Geotextile	19,500	sq. ft.
Amount:	$875,000		
Date completed:	7/1/1999		

Project Name:	Wicomico County/ Newland Park Landfill Closure		
Site Location:	Salisbury, MD	**GSE No.:**	**500917**
Application:	Sanitary LF Cap		
Owner:	**Wicomico County**		
Owner Contact:	Everett Baker	410 548-4935	
General Contractor:	George & Lynch		
GC Contact:	Joe Moretto	302 734-5865	
Engineering Firm:	GeoSyntec Consultants		
Products:	GSE HyperFrictionFlex 60 mil	142,364	sq. ft.
	GSE HD Textured 40 mil	1,432,936	sq. ft.
	GSE FabriNet	1,399,874	sq. ft.
	Bentomat ST	101,250	sq. ft.
Amount:	$849,715		
Date completed:	11/1/1999		

Project Name:	Washington County Resh Road Landfill Cell 2		
Site Location:	Hagerstown, MD	**GSE No.:**	**500920**
Application:	Sanitary LF		
Owner:	**Washington County**		
Owner Contact:	Robert G. Davenport	301 791-3101	
General Contractor:	Charles Brake		
GC Contact:	Larry Miller	717 369-3411	
Engineering Firm:	KCI		
Engineer Contact:	Jim Krawczyk	410 316-7874	
Products:	GSE HD Textured 60 mil	175,000	sq. ft.
	GSE HD 60 mil	173,880	sq. ft.
	GSE UltraFlex 40 mil	160,875	sq. ft.
	GSE UltraFlex Textured 40 mil	173,250	sq. ft.
	Bentomat ST	119,250	sq. ft.
	Claymax200R	152,875	sq. ft.
	GSE TP 275-88	501,160	sq. ft.
Amount:	$745,880		
Date completed:	11/1/1999		

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Project Name:	Palm City Landfill		
Site Location:	Palm City, FL	**GSE No.:**	**501676**
Application:	Sanitary LF		
Owner:	**Martin County**		
Owner Contact:		561 288-5509	
General Contractor:	Southeast Environmental		
GC Contact:	Earl Holmes	912 247-7330	
Engineering Firm:	CDM		
Engineer Contact:	Alex Mackled	561 689-3336	
Products:	GSE HyperFlex 60 mil	1,285,900	sq. ft.
	GSE HyperNet	1,696,400	sq. ft.
Amount:	$851,470		
Date completed:	7/1/1999		

Project Name:	Brookhaven Landfill Cell 5 Phases 6, 7, 8		
Site Location:	Brookhaven, NY	**GSE No.:**	**502404**
Application:	Sanitary LF		
Owner:	**Town of Brookhaven**		
Owner Contact:	Jack Oberholzer		
General Contractor:	Asplundh Construction Corp.		
GC Contact:	George J. Stolz	516 205-9340	
Engineering Firm:	Emcon		
Products:	GSE White Textured 60 mil	1,218,600	sq. ft.
	GSE FabriNet 8 oz	589,000	sq. ft.
	Bentoliner	470,250	sq. ft.
	Claymax	6,225	sq. ft.
Amount:	$909,429		
Date completed:	9/1/1999		

Project Name:	River Birch Landfill Phase 4 Cells 7-12		
Site Location:	Avondale, LA	**GSE No.:**	**502465**
Application:	Sanitary LF		
Owner:	**River Birch Incorporated**		
Owner Contact:	Jeff Claunch	504 364-1140	
General Contractor:	Envirocon - Baton Rouge, LA		
GC Contact:		225 291-1222	
Engineering Firm:	Mader-Miers Engineering, Inc.		
Products:	GSE HD 60 mil	594,100	sq. ft.
	GSE HD 40 mil	493,350	sq. ft.
	GSE FabriNet 6 oz	965,700	sq. ft.
	Triplaner	44,700	sq. ft.
	Claymax200R	871,500	sq. ft.
Amount:	$606,866		
Date completed:	11/1/1999		

Project Name:	Allied Waste/ Roxana Landfill Modules 2A, 2B, 3A, 3B		
Site Location:	Roxana, IL	**GSE No.:**	**502909**
Application:	Sanitary LF		
Owner:	**Allied Waste Industries**		
Owner Contact:		618 656-6912	
General Contractor:	Allied Waste		
GC Contact:		618 656-6912	
Engineering Firm:	Hurst - Rosche Engineers, Inc.		
Engineer Contact:		217 532-3953	
Products:	GSE White 60 mil	245400	sq. ft.
	GSE White Textured 60 mil	444,600	sq. ft.

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	GSE GundSeal Textured 40 mil	407,000	sq. ft.
	GSE HD Textured 40 mil	63,000	sq. ft.
Amount:	$645,255		
Date completed:	8/1/1999		

Project Name:	Browning Ferris Industries/ Davis Junction Cap		
Site Location:	Davis Junction, IL	**GSE No.:**	**503577**
Application:	Sanitary LF Cap		
Owner:	**Browning Ferris Industries**		
Owner Contact:	Kevin Shaw	815 874-9000	
General Contractor:	Browning Ferris Industries		
GC Contact:	Kevin Shaw	815 874-9000	
Engineering Firm:	STS Consultants, Ltd		
Engineer Contact:	Tony Maxson	847 279-2500	
Products:	GSE UltraFlex 40 mil	1,638,000	sq. ft.
	GSE HyperNet CP	1,668,000	sq. ft.
Amount:	$689,050		
Date completed:	11/1/1999		

x:/estimating/estimate/master reference list/landfills and caps.doc. 3/2007

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NORTH AMERICAN MANUFACTURING CAPABILITIES

GSE Lining Technology, Inc. with its corporate headquarters located in Houston, Texas, has manufacturing facilities located throughout North America. The manufacturing facilities are located in Houston, Texas; Kingstree, South Carolina; Spearfish, South Dakota; and Barrie, Ontario, Canada. They are each equipped to provide the highest quality product with industry leading technology and maximum output to service customers' needs:

Houston, Texas: Multiple HDPE/LLDPE geomembrane sheet production lines that offer a wide range of products of smooth, textures, colors, thicknesses, and widths. In addition, HDPE geonet/geocomposite production lines are available for many net or composite variations needed for drainage.

Kingstree, South Carolina: HDPE geonet/geocomposite production line that offers the full range of drainage products. In addition, a nonwoven fabric production line that can produce 3 oz. to 32 oz. geotextile material for both environmental and civil markets.

Spearfish, South Dakota: Geosynthetic clay lining (GCL) production lines capable of a full range of geomembrane supported GCLs and/or fabric encased GCLs.

Barrie, Ontario, Canada: GCL production line capable of a full range of fabric encased GCLs.

At these facilities, GSE offers manufacturing capacity of over 1 billion square feet of saleable product per year.

~500,000,000 sf of Geomembrane sheet of all types
~180,000,000 sf of Geonet/ Geocomposite of all types
~450,000,000 sf of Nonwoven fabrics
~200,000,000 sf of GCLs of all types

All facilities operate the workforce on shifts. Each shift is fully staffed with Supervisor, Unit Operators, Quality Control and Maintenance personnel under the supervision of the Production Manager.

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SAMPLE COPY

PRO RATA LIMITED MATERIAL WARRANTY
FOR GSE LINING TECHNOLOGY, INC.
Geomembrane Products
(U.S.A.)

Date:		Warranty No.:	
Purchaser Name:		Project No.:	
Address:		Effective Date:	
City, State:		Project Name:	
Product Type/Description:	GSE Geomembrane	Project Address:	

GSE Lining Technology, Inc. ("GSE") warrants each GSE product described above to be free from material manufacturing defects (as described by the contract's material specifications) and to be able to withstand normal weathering for a period of **five (5) years** from the date of sale. This limited warranty does not include damages or defects in the GSE product resulting from acts of God, casualty or catastrophe, including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" does not include, among other things, the exposure of GSE's product to harmful chemicals, abuse by machinery, equipment or people; improper site preparation or placement of cover materials; excessive pressures or stresses from any source. This warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson-Moss Warranty Act.

Should defects or premature loss of use within the scope of this warranty occur, GSE will, at its option, repair or replace the GSE product on a pro rata basis at the current price in such manner as to charge the Purchaser only for that portion of the warranted life which has elapsed since the purchase of the product. GSE shall have the right to inspect and determine the cause of the alleged defect in the product and to take appropriate steps to repair or replace the product if a defect exists that is covered under this warranty.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail or courier, to GSE Lining Technology Co., 19103 Gundle Road, Houston, TX 77073, with the words "Warranty Claim" clearly marked on the face of the envelope, within ten (10) days of Purchaser becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have rights under this warranty. GSE shall not be obligated to perform any inspection or obligated to perform any repair or replacement under this warranty until the area is made available free from all obstructions, water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this warranty, Purchaser shall reimburse GSE for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the product as GSE determines to have violated the warranty provided herein. GSE shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to: damages for loss of production, lost profits, personal injury or property damage. GSE shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser to GSE's product, unless GSE specifically authorized, in writing, said repairs, replacements, modifications or alterations in advance. GSE liability under this warranty shall in no event exceed the replacement cost of the product sold to the Purchaser for the particular installation in which it failed.

GSE neither assumes nor authorizes any person other than an officer of GSE to assume for it any other or additional liability in connection with the GSE product made on the basis of the Limited Warranty. **GSE MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN HEREIN AND HEREBY DISCLAIMS ALL WARRANTIES, INCLUDING BOTH EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, AND BY ACCEPTING DELIVERY OF THE PRODUCT, PURCHASER WAIVES ALL OTHER POSSIBLE WARRANTIES. GSE's WARRANTY BECOMES AN OBLIGATION OF GSE TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT.**

This warranty is extended to the Purchaser and is non-transferable and non-assignable, i.e. there are no third-party beneficiaries to this warranty.

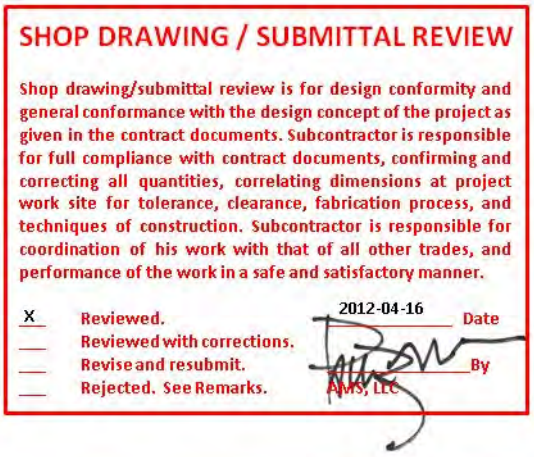
Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

HUT-APD-SUB-003-02-GSE-liner-QC-data

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-003-02	2012-04-16	Paul Zinsious AMS	502-640-2918



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CHESAPEAKE CONTAINMENT SYSTEMS, INC.
352 Earls Road Middle River, MD 21220
410-335-5886 phone 443-303-1682 fax

SUBMITTAL

Date: April 4, 2012

COVER SHEET

Project: Hutsonville Ash Pond

General Contractor: **Charah, Inc**
12601 Plantside Drive
Louisville, KY 40299

Spec Section: 02800 HDPE Geomembrane Liner
Submittal Ref: 40 Mil HDPE Geomembrane Liner- Manufacturers Quality Control Certification

Inclusions:

1) Roll Allocation List
2) Roll Test Data (3 pages)
3) Formosa Plastics Certificate of Analysis (12C1076)
4) Formosa Plastics Certificate of Analysis (12C1080)
5) Formosa Plastics Certificate of Analysis (12C1081)

REVIEWER NOTES

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GSE Roll Allocation

Order SO-066934
Customer Chesapeake Containment Systems, Inc.
Project Name Ameren Hutsonville Ash Pond D

Roll#	Resin Lot	Product Code	Mfg Date	Length
108162776	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162777	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162778	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162779	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162780	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162781	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162782	12C1081	HDT-040GE-BBB-B-W0	3/29/2012	700
108162783	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162784	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162785	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162786	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162787	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162788	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162789	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162790	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162791	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162792	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162793	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162794	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162801	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162802	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162803	12C1081	HDT-040GE-BBB-B-W0	3/30/2012	700
108162804	12C1081	HDT-040GE-BBB-B-W0	3/31/2012	700
108162805	12C1081	HDT-040GE-BBB-B-W0	3/31/2012	700
108162806	12C1081	HDT-040GE-BBB-B-W0	3/31/2012	700
108162807	12C1081	HDT-040GE-BBB-B-W0	3/31/2012	700
108162808	12C1081	HDT-040GE-BBB-B-W0	3/31/2012	700
108162809	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162812	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162813	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162814	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162815	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162816	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162817	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162818	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162819	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162820	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162821	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162822	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162823	12C1080	HDT-040GE-BBB-B-W0	3/31/2012	700
108162824	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162825	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700

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108162827	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162828	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162829	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162830	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162831	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162832	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162833	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162834	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162835	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162836	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162837	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162838	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162839	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162840	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162841	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162842	12C1080	HDT-040GE-BBB-B-W0	4/1/2012	700
108162855	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162856	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162857	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162858	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162859	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162860	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162861	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162862	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162863	12C1076	HDT-040GE-BBB-B-W0	4/2/2012	700
108162864	12C1076	HDT-040GE-BBB-B-W0	4/3/2012	700
108162865	12C1076	HDT-040GE-BBB-B-W0	4/3/2012	700
108162866	12C1076	HDT-040GE-BBB-B-W0	4/3/2012	700
108162867	12C1076	HDT-040GE-BBB-B-W0	4/3/2012	700
108162868	12C1076	HDT-040GE-BBB-B-W0	4/3/2012	700

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ROLL TEST DATA REPORT

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Report Date: Apr/3/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1–Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162776	39	36	104	104	17	16	127	95	483	311	38	35	103	0.944	2.37	10	21	21
108162777	39	36	104	104	17	16	127	95	483	311	38	35	103	0.944	2.33	10	21	21
108162778	39	36	103	106	17	16	143	110	573	473	38	37	110	0.944	2.33	10	21	21
108162779	39	34	103	106	17	16	143	110	573	473	38	37	110	0.944	2.33	10	22	19
108162780	38	35	104	112	17	16	142	107	560	356	39	37	110	0.944	2.34	10	22	19
108162781	38	35	104	112	17	16	142	107	560	356	39	37	110	0.944	2.34	10	21	19
108162782	39	35	104	112	17	16	142	107	560	356	39	37	110	0.944	2.34	10	21	19
108162783	38	35	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	22	20
108162784	39	34	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	22	20
108162785	39	35	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	21	20
108162786	39	35	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	21	20
108162787	39	35	101	104	17	16	130	104	516	437	36	36	106	0.944	2.51	10	21	20
108162788	38	35	101	104	17	16	130	104	516	437	36	36	106	0.944	2.51	10	21	20
108162789	39	34	101	104	17	16	130	104	516	437	36	36	106	0.944	2.51	10	21	20
108162790	39	37	113	118	17	16	141	118	521	404	39	39	107	0.944	2.40	10	21	20
108162791	39	36	113	118	17	16	141	118	521	404	39	39	107	0.944	2.40	10	21	21
108162792	38	37	113	118	17	16	141	118	521	404	39	39	107	0.944	2.40	10	21	21
108162793	39	37	111	117	17	17	144	131	534	544	40	37	110	0.944	2.53	9	21	21
108162794	39	36	111	117	17	17	144	131	534	544	40	37	110	0.944	2.53	9	21	21
108162801	39	34	106	113	17	16	132	107	455	324	38	36	111	0.944	2.36	10	21	20
108162802	38	35	105	111	17	17	138	113	524	422	39	36	106	0.944	2.39	10	21	20
108162803	39	35	105	111	17	17	138	113	524	422	39	36	106	0.944	2.39	10	21	20
108162804	39	35	105	111	17	17	138	113	524	422	39	36	106	0.944	2.39	10	21	20
108162805	39	35	106	109	17	16	142	103	533	388	38	35	114	0.944	2.45	10	21	20
108162806	39	34	106	109	17	16	142	103	533	388	38	35	114	0.944	2.45	10	21	19
108162807	38	35	106	109	17	16	142	103	533	388	38	35	114	0.944	2.45	10	21	19
108162808	39	35	111	122	17	17	148	113	543	392	39	39	110	0.946	2.24	10	23	22
108162809	38	35	111	122	17	17	148	113	543	392	39	39	110	0.946	2.24	10	20	19
108162812	40	35	116	120	16	16	151	111	547	315	40	39	111	0.946	2.49	10	22	20
108162813	39	34	116	120	16	16	151	111	547	315	40	39	111	0.946	2.49	10	22	20
108162814	39	34	117	124	17	16	140	105	511	300	43	39	108	0.946	2.34	10	21	21
108162815	39	35	117	124	17	16	140	105	511	300	43	39	108	0.946	2.34	10	21	21
108162816	39	35	117	124	17	16	140	105	511	300	43	39	108	0.946	2.34	10	21	22
108162817	39	34	121	123	16	16	135	105	472	267	41	40	110	0.946	2.46	10	21	22

GSE Lining Technology, LLC.

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ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/3/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1–Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162818	39	36	121	123	16	16	135	105	472	267	41	40	110	0.946	2.46	10	21	21
108162819	39	34	121	123	16	16	135	105	472	267	41	40	110	0.946	2.46	10	21	21
108162820	40	36	112	118	16	16	139	101	492	279	40	43	112	0.946	2.45	10	23	22
108162821	39	35	112	118	16	16	139	101	492	279	40	43	112	0.946	2.45	10	23	22
108162822	40	36	112	118	16	16	139	101	492	279	40	43	112	0.946	2.45	10	23	21
108162823	40	36	107	112	16	16	124	105	393	400	41	39	107	0.946	2.35	10	23	21
108162824	40	36	107	112	16	16	124	105	393	400	41	39	107	0.946	2.35	10	22	21
108162825	39	35	107	112	16	16	124	105	393	400	41	39	107	0.946	2.35	10	22	21
108162827	39	34	105	111	17	16	115	100	363	246	38	36	106	0.945	2.41	10	24	24
108162828	39	34	105	111	17	16	115	100	363	246	38	36	106	0.945	2.41	10	24	23
108162829	39	35	105	111	17	16	115	100	363	246	38	36	106	0.945	2.41	10	24	23
108162830	39	35	116	120	17	16	128	88	449	175	40	38	108	0.945	2.38	10	22	21
108162831	39	35	116	120	17	16	128	88	449	175	40	38	108	0.945	2.38	10	22	21
108162832	39	35	116	120	17	16	128	88	449	175	40	38	108	0.945	2.38	10	23	22
108162833	39	35	124	127	16	16	132	102	394	255	42	41	110	0.946	2.37	10	23	22
108162834	38	35	124	127	16	16	132	102	394	255	42	41	110	0.946	2.37	10	23	22
108162835	38	35	124	127	16	16	132	102	394	255	42	41	110	0.946	2.37	10	23	22
108162836	39	36	117	123	16	16	130	99	416	275	41	38	107	0.945	2.44	10	22	22
108162837	38	35	117	123	16	16	130	99	416	275	41	38	107	0.945	2.44	10	22	22
108162838	38	35	117	123	16	16	130	99	416	275	41	38	107	0.945	2.44	10	22	21
108162839	38	35	111	119	16	16	126	96	444	201	42	39	107	0.945	2.38	10	22	21
108162840	38	34	111	119	16	16	126	96	444	201	42	39	107	0.945	2.38	10	22	21
108162841	39	35	111	119	16	16	126	96	444	201	42	39	107	0.945	2.38	10	22	21
108162842	39	34	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	23	24
108162855	38	35	110	110	17	15	107	94	211	202	41	38	112	0.945	2.34	10	25	27
108162856	38	34	116	122	17	16	147	115	493	339	43	41	111	0.945	2.48	10	26	27
108162857	39	35	116	122	17	16	147	115	493	339	43	41	111	0.945	2.48	10	23	27
108162858	40	37	116	122	17	16	147	115	493	339	43	41	111	0.945	2.48	10	21	22
108162859	39	36	110	115	17	16	129	93	414	256	40	38	107	0.945	2.39	10	21	21
108162860	40	37	110	115	17	16	129	93	414	256	40	38	107	0.945	2.39	10	21	21
108162861	38	34	110	115	17	16	129	93	414	256	40	38	107	0.945	2.39	10	22	21
108162862	39	36	117	118	16	16	138	98	470	292	40	37	106	0.945	2.28	10	22	21
108162863	38	35	117	118	16	16	138	98	470	292	40	37	106	0.945	2.28	10	23	21
108162864	38	34	117	118	16	16	138	98	470	292	40	37	106	0.945	2.28	10	23	21

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/3/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1−Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162865	39	34	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	21	21
108162866	38	34	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	21	21
108162867	39	35	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	22	21
108162868	39	35	121	130	17	16	135	101	461	210	43	40	112	0.945	2.30	10	22	21

Laboratory Manager

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Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS

201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978

PHONE:(888)FPCUSA3

Certificate of Analysis

CUSTOMER:GSE LINING TECHNOLOGY, IN
UP TRACK 14732 WESTFIELD

HOUSTON TX 77070

PRODUCT :HL3812
RAILCAR FPAX940150

S/O NO : SEM1A83
CUSTOMER PO : 03-067904
DATE SHIPPED: 3/12/12
LOT NO : 12C1076
WEIGHT (LB) : 192,250.00
CUSTID:FT03112 SPIDM4

TEST ITEM	REFERENCE METHOD	TEST VALUE
HLMI, g/10 min.	ASTM D1238	12.1
Density, g/cm3	ASTM D1505	.9389

Linda Kao

QC SUPERVISOR: LINDA KAO

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Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS

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PO BOX 700
POINT COMFORT TX 77978

PHONE:(888)FPCUSA3

Certificate of Analysis

CUSTOMER:GSE LINING TECHNOLOGY, IN
UP TRACK 14732 WESTFIELD

HOUSTON TX 77070

PRODUCT :HL3812
RAILCAR FPAX200181

S/O NO : SEM1A79
CUSTOMER PO : 03-067904
DATE SHIPPED: 3/12/12
LOT NO : 12C1080
WEIGHT (LB) : 196,450.00
CUSTID:FT03112 SPIDM4

TEST ITEM	REFERENCE METHOD	TEST VALUE
HLMI, g/10 min.	ASTM D1238	13.4
Density, g/cm3	ASTM D1505	.9388

Linda Kao

QC SUPERVISOR: LINDA KAO

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FORMOSA PLASTICS CORPORATION, TEXAS

201 FORMOSA DRIVE
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POINT COMFORT TX 77978

PHONE:(888)FPCUSA3

Certificate of Analysis

CUSTOMER:GSE LINING TECHNOLOGY, IN
UP TRACK 14732 WESTFIELD

HOUSTON TX 77070

PRODUCT :HL3812
RAILCAR FPAX980327

S/O NO : SEM1A82
CUSTOMER PO : 03-067904
DATE SHIPPED: 3/12/12
LOT NO : 12C1081
WEIGHT (LB) : 192,500.00
CUSTID:FT03112 SPIDM4

TEST ITEM	REFERENCE METHOD	TEST VALUE
HLMI, g/10 min.	ASTM D1238	12.3
Density, g/cm3	ASTM D1505	.9384

Linda Kao

QC SUPERVISOR: LINDA KAO

April 16, 2012

Mail To:

Rick Pershall
Geotechnology, Inc.
11816 Lackland Road, Suite 150
St. Louis, MO 63146

email: r_pershall@geotechnology.com

Bill To:

<= Same

Dear Mr. Pershall:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Hutsonsville Power Station Ash Pond D Closure**
TRI Job Reference Number:	E2366-36-03
Material(s) Tested:	12, GSE 40 mil Textured HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D 5994) Tensile (ASTM D 6693) Puncture Strength (ASTM D 4833) Tear Resistance (ASTM D 1004)

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

MPatel

Mansukh Patel
Sr. Laboratory Coordinator
Geosynthetic Services Division
www.GeosyntheticTesting.com

cc: Sam R. Allen, Vice President and Division Manager

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162776
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	46	43	41	42	41	39	41	39	46	44	**42**	3
											39	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	106	121	113	111	102						**111**	7
TD Yield Strength (ppi)	116	115	118	107	112						**114**	4
MD Break Strength (ppi)	118	148	133	144	137						**136**	12
TD Break Strength (ppi)	101	91	94	99	101						**97**	4
MD Yield Elongation (%)	16	16	16	16	16						**16**	0
TD Yield Elongation (%)	17	17	17	16	16						**17**	1
MD Break Elongation (%)	413	496	479	519	545						**490**	50
TD Break Elongation (%)	165	81	246	370	366						**246**	126
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	96	97	101	101	104						**100**	4
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	37	37	38	39	40	35	39	39	37	37	**38**	2
TD Tear Strength (lbs)	34	38	36	35	39	33	38	38	35	37	**36**	2

MD Machine Direction TD Transverse Direction

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162782
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	39	40	41	45	44	39	42	48	44	41	**42**	3
											39	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	108	125	119	129	123						**121**	8
TD Yield Strength (ppi)	123	123	129	123	120						**124**	3
MD Break Strength (ppi)	144	156	145	173	137						**151**	14
TD Break Strength (ppi)	91	108	100	101	99						**100**	6
MD Yield Elongation (%)	14	16	16	15	13						**15**	1
TD Yield Elongation (%)	12	16	16	14	14						**14**	2
MD Break Elongation (%)	535	531	513	591	451						**524**	50
TD Break Elongation (%)	68	310	296	65	86						**165**	126
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	115	113	112	106	107						**111**	4
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	41	39	41	42	41	45	39	41	37	39	**41**	2
TD Tear Strength (lbs)	39	40	36	40	38	35	40	37	41	39	**39**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162788
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	41	44	42	41	42	41	40	39	39	40	**41**	2
											39	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	102	118	113	118	107						**112**	7
TD Yield Strength (ppi)	116	119	118	113	110						**115**	4
MD Break Strength (ppi)	126	146	138	148	133						**138**	9
TD Break Strength (ppi)	130	101	110	91	87						**104**	17
MD Yield Elongation (%)	17	17	14	14	14						**15**	2
TD Yield Elongation (%)	22	15	19	17	21						**19**	3
MD Break Elongation (%)	496	500	453	485	454						**478**	23
TD Break Elongation (%)	531	336	314	218	158						**311**	143
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	101	106	100	106	105						**104**	3
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	42	37	37	44	44	39	41	38	39	38	**40**	3
TD Tear Strength (lbs)	40	37	37	38	38	37	37	39	35	36	**37**	1

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162794
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	45	48	44	46	42	44	43	45	42	45	**44**	2
											42	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	112	109	117	118	114						**114**	4
TD Yield Strength (ppi)	121	118	121	125	122						**121**	3
MD Break Strength (ppi)	132	130	156	130	138						**137**	11
TD Break Strength (ppi)	98	90	102	124	99						**103**	13
MD Yield Elongation (%)	19	16	15	15	19						**17**	2
TD Yield Elongation (%)	17	15	14	16	15						**15**	1
MD Break Elongation (%)	438	438	538	420	500						**467**	50
TD Break Elongation (%)	386	364	329	440	108						**325**	128
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	108	106	110	108	111						**109**	2
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	40	39	42	38	42	40	39	38	40	38	**40**	2
TD Tear Strength (lbs)	35	39	38	39	38	36	38	38	40	39	**38**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162806
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	44	45	47	50	42	43	45	43	40	40	**44**	3
											40	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	131	127	117	122	117						**123**	6
TD Yield Strength (ppi)	111	124	116	129	128						**122**	8
MD Break Strength (ppi)	126	97	101	107	154						**117**	23
TD Break Strength (ppi)	118	121	96	100	92						**105**	13
MD Yield Elongation (%)	18	17	17	17	17						**17**	0
TD Yield Elongation (%)	14	12	12	14	14						**13**	1
MD Break Elongation (%)	456	78	163	248	553						**299**	200
TD Break Elongation (%)	518	456	414	58	61						**301**	224
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	101	99	105	107	108						**104**	4
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	37	37	41	39	40	36	42	37	39	35	**38**	2
TD Tear Strength (lbs)	41	40	37	39	41	39	39	41	40	40	**40**	1

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162814
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	47	43	47	44	44	37	46	40	41	43	**43**	3
											37	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	115	119	119	115	126						**119**	4
TD Yield Strength (ppi)	120	117	123	128	131						**124**	6
MD Break Strength (ppi)	143	136	137	139	112						**133**	12
TD Break Strength (ppi)	110	91	97	108	107						**103**	8
MD Yield Elongation (%)	19	16	16	15	17						**17**	2
TD Yield Elongation (%)	15	13	14	13	14						**14**	1
MD Break Elongation (%)	519	454	469	504	190						**427**	135
TD Break Elongation (%)	425	99	261	304	158						**249**	128
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	101	105	110	102	106						**105**	3
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	40	39	39	41	38	38	42	39	40	38	**39**	1
TD Tear Strength (lbs)	39	39	37	37	41	36	40	37	36	39	**38**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162820
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	38	42	46	45	45	43	37	41	42	43	**42**	3
											37	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	105	126	122	126	122						**120**	9
TD Yield Strength (ppi)	114	128	123	133	130						**126**	7
MD Break Strength (ppi)	114	117	147	62	124						**113**	31
TD Break Strength (ppi)	93	101	95	110	100						**100**	7
MD Yield Elongation (%)	15	14	16	14	17						**15**	1
TD Yield Elongation (%)	12	12	17	14	11						**13**	2
MD Break Elongation (%)	396	233	506	95	420						**330**	165
TD Break Elongation (%)	144	58	80	250	296						**166**	105
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	106	99	103	105	107						**104**	3
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	43	43	42	42	42	39	37	44	42	40	**41**	2
TD Tear Strength (lbs)	36	35	38	40	39	40	39	39	41	39	**39**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162827
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	42	39	41	42	39	46	45	42	37	40	**41** **37**	3 << min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	121	120	126	136	117						**124**	7
TD Yield Strength (ppi)	128	125	126	135	130						**129**	4
MD Break Strength (ppi)	126	130	139	122	106						**125**	12
TD Break Strength (ppi)	103	101	9*6	109	112						**106**	5
MD Yield Elongation (%)	15	15	15	15	15						**15**	0
TD Yield Elongation (%)	16	13	15	17	13						**15**	2
MD Break Elongation (%)	399	451	434	200	341						**365**	101
TD Break Elongation (%)	188	98	106	190	190						**154**	48
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	104	105	101	97	107						**103**	4
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	42	41	36	40	43	41	38	41	40	38	**40**	2
TD Tear Strength (lbs)	37	36	38	38	43	35	37	35	35	34	**37**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162833
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	42	44	43	41	45	40	42	48	40	41	**43**	3
											40	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	121	130	134	122	117						**125**	7
TD Yield Strength (ppi)	124	123	126	129	128						**126**	3
MD Break Strength (ppi)	128	115	160	141	121						**133**	18
TD Break Strength (ppi)	99	81	116	89	101						**97**	13
MD Yield Elongation (%)	13	16	16	14	15						**15**	1
TD Yield Elongation (%)	23	13	16	15	15						**16**	4
MD Break Elongation (%)	349	240	504	459	421						**395**	103
TD Break Elongation (%)	140	110	454	83	126						**183**	153
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	116	103	94	115	103						**106**	9
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	40	44	39	40	45	42	39	37	37	39	**40**	3
TD Tear Strength (lbs)	42	39	39	42	44	39	43	41	43	41	**41**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162839
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	42	45	41	42	40	39	36	44	39	41	**41**	3
											36	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	115	126	129	122	129						**124**	6
TD Yield Strength (ppi)	128	129	122	121	120						**124**	4
MD Break Strength (ppi)	103	121	141	123	113						**120**	14
TD Break Strength (ppi)	95	97	100	105	85						**96**	7
MD Yield Elongation (%)	16	16	16	12	16						**15**	2
TD Yield Elongation (%)	18	14	16	20	22						**18**	3
MD Break Elongation (%)	335	399	463	343	230						**354**	86
TD Break Elongation (%)	89	341	135	311	91						**194**	123
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	104	98	101	97	107						**101**	4
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	44	41	37	42	39	39	42	43	38	43	**41**	2
TD Tear Strength (lbs)	38	42	40	43	41	40	39	43	38	36	**40**	2

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162857
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	43	46	41	44	42	48	44	41	36	40	**43**	3
											36	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	118	129	132	127	122						**126**	6
TD Yield Strength (ppi)	126	125	128	121	122						**124**	3
MD Break Strength (ppi)	143	151	153	145	114						**141**	16
TD Break Strength (ppi)	103	99	98	101	99						**100**	2
MD Yield Elongation (%)	16	16	16	16	16						**16**	0
TD Yield Elongation (%)	22	17	15	19	19						**18**	3
MD Break Elongation (%)	529	511	510	473	243						**453**	119
TD Break Elongation (%)	354	156	109	446	178						**249**	144
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	123	114	119	113	107						**115**	6
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	45	40	43	41	44	42	40	45	38	38	**42**	3
TD Tear Strength (lbs)	36	37	37	37	38	38	41	39	39	37	**38**	1

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Geotechnology, Inc.
Project: Ameren Hutsonsville Power Station Ash Pond D Closure

Material: GSE 40 mil Textured HDPE Geomembrane
Sample Identification: 108162863
TRI Log #: E2366-36-03

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5994)												
Thickness (mils)	44	44	39	43	43	41	42	44	41	43	**42**	2
											39	<< min
Tensile Properties (ASTM D 6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	103	116	120	120	113						**114**	7
TD Yield Strength (ppi)	126	117	122	113	124						**120**	5
MD Break Strength (ppi)	128	114	110	154	106						**122**	20
TD Break Strength (ppi)	91	121	90	123	91						**103**	17
MD Yield Elongation (%)	15	15	15	15	13						**15**	1
TD Yield Elongation (%)	20	16	16	16	19						**17**	2
MD Break Elongation (%)	453	404	326	516	109						**362**	157
TD Break Elongation (%)	208	500	114	454	196						**294**	171
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	106	102	109	96	104						**103**	5
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	41	41	42	42	43	46	43	42	41	42	**42**	1
TD Tear Strength (lbs)	39	37	40	38	39	38	36	39	38	37	**38**	1

MD Machine Direction TD Transverse Direction

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GSE ENVIRONMENTAL

Shipping Order – Packing List – Original – Not Negotiable

GSE Lining Technology, LLC. Houston, TX

Number BL-0061991

Received at **Houston, TX** from GSE Lining Technology, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to the rates and contract agreed to in writing by GSE Lining Technology, LLC and Carrier. GSE Lining Technology, LLC s obligation to pay freight charges for the shipment is conditioned on (1) the existence of a separate written contract with the carrier transporting the freight and (2) the carrier s name appearing on this Bill of Lading, and other carriers must look solely to a party other than GSE Lining Technology, LLC for payment.

Ship to: CCS/Ameren Hutsonville Ash Pond D
15142 East 1900th Avenue
Randy Porter 502-554-5230
Hutsonville, IL 62433

Roll Certifications Included

Ship date: Apr/28/2012
Branch plant: 1500
Sales order: SO-066934

Shipping instructions: 24 hr and 1 hr PRECALL REQUIRED. all trucks subject to inspection. No weapons, drugs, alchohol, pets, riders, etc. PPE equipment – Hardhat, safety glasses, High Vis Vest, sleeved shirt, long pants, steel toe boots.

Line no.	Shipped quantity	Product code	UM	Kind of Package, Description of Articles, Special Marks and Exceptions		Weight
	189,000	HDT-040GE-BBB-B-W0	SF	GSE HD 2S Textured 040 mil GM13 22.5' W		
1				108162783	GSE HD 2S Textured 040 mil GM13 22.5' W	3,690.00
2				108162784	GSE HD 2S Textured 040 mil GM13 22.5' W	3,710.00
3				108162792	GSE HD 2S Textured 040 mil GM13 22.5' W	3,690.00
4				108162794	GSE HD 2S Textured 040 mil GM13 22.5' W	3,720.00
5				108162801	GSE HD 2S Textured 040 mil GM13 22.5' W	3,710.00
6				108162802	GSE HD 2S Textured 040 mil GM13 22.5' W	3,690.00
7				108162803	GSE HD 2S Textured 040 mil GM13 22.5' W	3,670.00
8				108162805	GSE HD 2S Textured 040 mil GM13 22.5' W	3,655.00
9				108162806	GSE HD 2S Textured 040 mil GM13 22.5' W	3,645.00
10				108162809	GSE HD 2S Textured 040 mil GM13 22.5' W	3,640.00
11				108162835	GSE HD 2S Textured 040 mil GM13 22.5' W	3,605.00
12				108162842	GSE HD 2S Textured 040 mil GM13 22.5' W	3,595.00
	1	FREIGHTSHT001	EA		DOM. SHIPPING CHARGE	
13					DOM. SHIPPING CHARGE	0.00

Total quantity: 189,001 **Total weight:** 44,020.00

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer PO number
12-039

If this shipment is to be delivered to consignee, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed

X _____

PRO Number
RR041380

Seal numbers

Truckers P.O. #
PO2000

Driver requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier name: Landstar

Carrier signature: _____

Date: _____

GSE Lining Technology, LLC.

GSE ENVIRONMENTAL™

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/28/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	BL-0061991

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162783	38	35	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	22	20
108162784	39	34	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	22	20
108162792	38	37	113	118	17	16	141	118	521	404	39	39	107	0.944	2.40	10	21	21
108162794	39	36	111	117	17	17	144	131	534	544	40	37	110	0.944	2.53	9	21	21
108162801	39	34	106	113	17	16	132	107	455	324	38	36	111	0.944	2.36	10	21	20
108162802	38	35	105	111	17	17	138	113	524	422	39	36	106	0.944	2.39	10	21	20
108162803	39	35	105	111	17	17	138	113	524	422	39	36	106	0.944	2.39	10	21	20
108162805	39	35	106	109	17	16	142	103	533	388	38	35	114	0.944	2.45	10	21	20
108162806	39	34	106	109	17	16	142	103	533	388	38	35	114	0.944	2.45	10	21	19
108162809	38	35	111	122	17	17	148	113	543	392	39	39	110	0.946	2.24	10	20	19
108162835	38	35	124	127	16	16	132	102	394	255	42	41	110	0.946	2.37	10	23	22
108162842	39	34	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	23	24

Laboratory Manager

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GSE ENVIRONMENTAL

Shipping Order – Packing List – Original – Not Negotiable

GSE Lining Technology, LLC. Houston, TX

Number BL–0061981

Received at **Houston, TX** from GSE Lining Technology, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to the rates and contract agreed to in writing by GSE Lining Technology, LLC and Carrier. GSE Lining Technology, LLC s obligation to pay freight charges for the shipment is conditioned on (1) the existence of a separate written contract with the carrier transporting the freight and (2) the carrier s name appearing on this Bill of Lading, and other carriers must look solely to a party other than GSE Lining Technology, LLC for payment.

Ship to: **CCS/Ameren Hutsonville Ash Pond D**
15142 East 1900th Avenue
Randy Porter 502–554–5230
Hutsonville, IL 62433

Ship date: Apr/27/2012
Branch plant: 1500
Sales order: SO–066934

Shipping instructions: **24 hr and 1 hr PRECALL REQUIRED. all trucks subject to inspection. No weapons, drugs, alchohol, pets, riders, etc. PPE equipment – Hardhat, safety glasses, High Vis Vest, sleeved shirt, long pants, steel toe boots.**

Line no.	Shipped quantity	Product code	UM	Kind of Package, Description of Articles, Special Marks and Exceptions		Weight
	189,000	HDT–040GE–BBB–B–W0	SF	GSE HD 2S Textured 040 mil GM13 22.5' W		
1				108162804	GSE HD 2S Textured 040 mil GM13 22.5' W	3,650.00
2				108162807	GSE HD 2S Textured 040 mil GM13 22.5' W	3,650.00
3				108162813	GSE HD 2S Textured 040 mil GM13 22.5' W	3,635.00
4				108162815	GSE HD 2S Textured 040 mil GM13 22.5' W	3,665.00
5				108162818	GSE HD 2S Textured 040 mil GM13 22.5' W	3,625.00
6				108162819	GSE HD 2S Textured 040 mil GM13 22.5' W	3,625.00
7				108162829	GSE HD 2S Textured 040 mil GM13 22.5' W	3,585.00
8				108162830	GSE HD 2S Textured 040 mil GM13 22.5' W	3,585.00
9				108162831	GSE HD 2S Textured 040 mil GM13 22.5' W	3,590.00
10				108162832	GSE HD 2S Textured 040 mil GM13 22.5' W	3,590.00
11				108162833	GSE HD 2S Textured 040 mil GM13 22.5' W	3,615.00
12				108162839	GSE HD 2S Textured 040 mil GM13 22.5' W	3,600.00
	1	FREIGHTSHT001	EA		DOM. SHIPPING CHARGE	
13					DOM. SHIPPING CHARGE	0.00

Total quantity: **189,001** **Total weight:** **43,415.00**

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer PO number
12–039

If this shipment is to be delivered to consignee, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed

X _____

PRO Number
RR041382

Seal numbers

Truckers P.O. #
PO2100

Driver requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230–6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier name: **JH Rose Logistics, LLC**

Carrier signature: _____

Date: _____

GSE Lining Technology, LLC.

GSE ENVIRONMENTAL

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/27/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	BL-0061981

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162804	39	35	105	111	17	17	138	113	524	422	39	36	106	0.944	2.39	10	21	20
108162807	38	35	106	109	17	16	142	103	533	388	38	35	114	0.944	2.45	10	21	19
108162813	39	34	116	120	16	16	151	111	547	315	40	39	111	0.946	2.49	10	22	20
108162815	39	35	117	124	17	16	140	105	511	300	43	39	108	0.946	2.34	10	21	21
108162818	39	36	121	123	16	16	135	105	472	267	41	40	110	0.946	2.46	10	21	21
108162819	39	34	121	123	16	16	135	105	472	267	41	40	110	0.946	2.46	10	21	21
108162829	39	35	105	111	17	16	115	100	363	246	38	36	106	0.945	2.41	10	24	23
108162830	39	35	116	120	17	16	128	88	449	175	40	38	108	0.945	2.38	10	22	21
108162831	39	35	116	120	17	16	128	88	449	175	40	38	108	0.945	2.38	10	22	21
108162832	39	35	116	120	17	16	128	88	449	175	40	38	108	0.945	2.38	10	23	22
108162833	39	35	124	127	16	16	132	102	394	255	42	41	110	0.946	2.37	10	23	22
108162839	38	35	111	119	16	16	126	96	444	201	42	39	107	0.945	2.38	10	22	21

Laboratory Manager

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GSE ENVIRONMENTAL™

Shipping Order – Packing List – Original – Not Negotiable

GSE Lining Technology, LLC. Houston, TX

Number BL-0061960

Received at **Houston, TX** from GSE Lining Technology, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to the rates and contract agreed to in writing by GSE Lining Technology, LLC and Carrier. GSE Lining Technology, LLC s obligation to pay freight charges for the shipment is conditioned on (1) the existence of a separate written contract with the carrier transporting the freight and (2) the carrier s name appearing on this Bill of Lading, and other carriers must look solely to a party other than GSE Lining Technology, LLC for payment.

Ship to: CCS/Ameren Hutsonville Ash Pond D
15142 East 1900th Avenue
Randy Porter 502-554-5230
Hutsonville, IL 62433

Roll Certifications Included

Ship date: Apr/27/2012
Branch plant: 1500
Sales order: SO-066934

Shipping instructions: 24 hr and 1 hr PRECALL REQUIRED. all trucks subject to inspection. No weapons, drugs, alchohol, pets, riders, etc. PPE equipment – Hardhat, safety glasses, High Vis Vest, sleeved shirt, long pants, steel toe boots.

Line no.	Shipped quantity	Product code	UM	Kind of Package, Description of Articles, Special Marks and Exceptions		Weight
	189,000	HDT-040GE-BBB-B-W0	SF	GSE HD 2S Textured 040 mil GM13 22.5' W		
1				108162776	GSE HD 2S Textured 040 mil GM13 22.5' W	3,575.00
2				108162777	GSE HD 2S Textured 040 mil GM13 22.5' W	3,600.00
3				108162778	GSE HD 2S Textured 040 mil GM13 22.5' W	3,650.00
4				108162779	GSE HD 2S Textured 040 mil GM13 22.5' W	3,660.00
5				108162785	GSE HD 2S Textured 040 mil GM13 22.5' W	3,720.00
6				108162787	GSE HD 2S Textured 040 mil GM13 22.5' W	3,725.00
7				108162789	GSE HD 2S Textured 040 mil GM13 22.5' W	3,715.00
8				108162791	GSE HD 2S Textured 040 mil GM13 22.5' W	3,700.00
9				108162793	GSE HD 2S Textured 040 mil GM13 22.5' W	3,690.00
10				108162808	GSE HD 2S Textured 040 mil GM13 22.5' W	3,640.00
11				108162812	GSE HD 2S Textured 040 mil GM13 22.5' W	3,660.00
12				108162814	GSE HD 2S Textured 040 mil GM13 22.5' W	3,650.00
	1	FREIGHTSHT001	EA		DOM. SHIPPING CHARGE	
13					DOM. SHIPPING CHARGE	0.00

Total quantity: 189,001 **Total weight:** 43,985.00

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer PO number
12-039

If this shipment is to be delivered to consignee, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed

X _____

PRO Number
RR041384

Seal numbers

Truckers P.O. #
PO2000

Driver requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier name: Access America Transport

Carrier signature: _____

Date: _____

GSE Lining Technology, LLC.

GSE ENVIRONMENTAL™

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/27/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	BL-0061960

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1–Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162776	39	36	104	104	17	16	127	95	483	311	38	35	103	0.944	2.37	10	21	21
108162777	39	36	104	104	17	16	127	95	483	311	38	35	103	0.944	2.33	10	21	21
108162778	39	36	103	106	17	16	143	110	573	473	38	37	110	0.944	2.33	10	21	21
108162779	39	34	103	106	17	16	143	110	573	473	38	37	110	0.944	2.33	10	22	19
108162785	39	35	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	21	20
108162787	39	35	101	104	17	16	130	104	516	437	36	36	106	0.944	2.51	10	21	20
108162789	39	34	101	104	17	16	130	104	516	437	36	36	106	0.944	2.51	10	21	20
108162791	39	36	113	118	17	16	141	118	521	404	39	39	107	0.944	2.40	10	21	21
108162793	39	37	111	117	17	17	144	131	534	544	40	37	110	0.944	2.53	9	21	21
108162808	39	35	111	122	17	17	148	113	543	392	39	39	110	0.946	2.24	10	23	22
108162812	40	35	116	120	16	16	151	111	547	315	40	39	111	0.946	2.49	10	22	20
108162814	39	34	117	124	17	16	140	105	511	300	43	39	108	0.946	2.34	10	21	21

Laboratory Manager

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Shipping Order – Packing List – Original – Not Negotiable

GSE ENVIRONMENTAL

GSE Lining Technology, LLC. Houston, TX

Number BL-0061993

Received at **Houston, TX** from GSE Lining Technology, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to the rates and contract agreed to in writing by GSE Lining Technology, LLC and Carrier. GSE Lining Technology, LLC s obligation to pay freight charges for the shipment is conditioned on (1) the existence of a separate written contract with the carrier transporting the freight and (2) the carrier s name appearing on this Bill of Lading, and other carriers must look solely to a party other than GSE Lining Technology, LLC for payment.

Ship to: **CCS/Ameren Hutsonville Ash Pond D**
15142 East 1900th Avenue
Randy Porter 502-554-5230
Hutsonville, IL 62433

Roll Certifications Included

Ship date: Apr/28/2012
Branch plant: 1500
Sales order: SO-066934

Shipping instructions: **24 hr and 1 hr PRECALL REQUIRED. all trucks subject to inspection. No weapons, drugs, alchohol, pets, riders, etc. PPE equipment – Hardhat, safety glasses, High Vis Vest, sleeved shirt, long pants, steel toe boots.**

Line no.	Shipped quantity	Product code	UM	Kind of Package, Description of Articles, Special Marks and Exceptions		Weight
	189,000	HDT-040GE-BBB-B-W0	SF	GSE HD 2S Textured 040 mil GM13 22.5' W		
1				108162780	GSE HD 2S Textured 040 mil GM13 22.5' W	3,675.00
2				108162786	GSE HD 2S Textured 040 mil GM13 22.5' W	3,715.00
3				108162827	GSE HD 2S Textured 040 mil GM13 22.5' W	3,595.00
4				108162841	GSE HD 2S Textured 040 mil GM13 22.5' W	3,600.00
5				108162855	GSE HD 2S Textured 040 mil GM13 22.5' W	3,605.00
6				108162856	GSE HD 2S Textured 040 mil GM13 22.5' W	3,605.00
7				108162857	GSE HD 2S Textured 040 mil GM13 22.5' W	3,620.00
8				108162858	GSE HD 2S Textured 040 mil GM13 22.5' W	3,705.00
9				108162864	GSE HD 2S Textured 040 mil GM13 22.5' W	3,665.00
10				108162866	GSE HD 2S Textured 040 mil GM13 22.5' W	3,665.00
11				108162867	GSE HD 2S Textured 040 mil GM13 22.5' W	3,670.00
12				108162868	GSE HD 2S Textured 040 mil GM13 22.5' W	3,695.00
	1	FREIGHTSHT001	EA		DOM. SHIPPING CHARGE	
13					DOM. SHIPPING CHARGE	0.00

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer PO number
12-039

If this shipment is to be delivered to consignee, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed

X _____

PRO Number
RR041383

Seal numbers

Truckers P.O. #
PO2100

Total quantity: **189,001** **Total weight:** **43,815.00**

Driver requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier name: **JH Rose Logistics, LLC**

Carrier signature: _____

Date: _____

GSE Lining Technology, LLC.

GSE ENVIRONMENTAL

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/28/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	BL-0061993

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162780	38	35	104	112	17	16	142	107	560	356	39	37	110	0.944	2.34	10	22	19
108162786	39	35	104	113	17	16	138	120	513	477	40	36	106	0.944	2.36	10	21	20
108162827	39	34	105	111	17	16	115	100	363	246	38	36	106	0.945	2.41	10	24	24
108162841	39	35	111	119	16	16	126	96	444	201	42	39	107	0.945	2.38	10	22	21
108162855	38	35	110	110	17	15	107	94	211	202	41	38	112	0.945	2.34	10	25	27
108162856	38	34	116	122	17	16	147	115	493	339	43	41	111	0.945	2.48	10	26	27
108162857	39	35	116	122	17	16	147	115	493	339	43	41	111	0.945	2.48	10	23	27
108162858	40	37	116	122	17	16	147	115	493	339	43	41	111	0.945	2.48	10	21	22
108162864	38	34	117	118	16	16	138	98	470	292	40	37	106	0.945	2.28	10	23	21
108162866	38	34	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	21	21
108162867	39	35	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	22	21
108162868	39	35	121	130	17	16	135	101	461	210	43	40	112	0.945	2.30	10	22	21

Laboratory Manager

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Shipping Order – Packing List – Original – Not Negotiable

GSE ENVIRONMENTAL

GSE Lining Technology, LLC. Houston, TX

Number BL-0061992

Received at **Houston, TX** from GSE Lining Technology, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to the rates and contract agreed to in writing by GSE Lining Technology, LLC and Carrier. GSE Lining Technology, LLC s obligation to pay freight charges for the shipment is conditioned on (1) the existence of a separate written contract with the carrier transporting the freight and (2) the carrier s name appearing on this Bill of Lading, and other carriers must look solely to a party other than GSE Lining Technology, LLC for payment.

Ship to: CCS/Ameren Hutsonville Ash Pond D
15142 East 1900th Avenue
Randy Porter 502-554-5230
Hutsonville, IL 62433

Roll Certifications Included

Ship date: Apr/28/2012
Branch plant: 1500
Sales order: SO-066934

Shipping instructions: **24 hr and 1 hr PRECALL REQUIRED. all trucks subject to inspection. No weapons, drugs, alchohol, pets, riders, etc. PPE equipment – Hardhat, safety glasses, High Vis Vest, sleeved shirt, long pants, steel toe boots.**

Line no.	Shipped quantity	Product code	UM	Kind of Package, Description of Articles, Special Marks and Exceptions		Weight
	189,000	HDT-040GE-BBB-B-W0	SF	GSE HD 2S Textured 040 mil GM13 22.5' W		
1				108162781	GSE HD 2S Textured 040 mil GM13 22.5' W	3,685.00
2				108162782	GSE HD 2S Textured 040 mil GM13 22.5' W	3,700.00
3				108162788	GSE HD 2S Textured 040 mil GM13 22.5' W	3,720.00
4				108162790	GSE HD 2S Textured 040 mil GM13 22.5' W	3,675.00
5				108162821	GSE HD 2S Textured 040 mil GM13 22.5' W	3,610.00
6				108162836	GSE HD 2S Textured 040 mil GM13 22.5' W	3,640.00
7				108162859	GSE HD 2S Textured 040 mil GM13 22.5' W	3,710.00
8				108162860	GSE HD 2S Textured 040 mil GM13 22.5' W	3,720.00
9				108162861	GSE HD 2S Textured 040 mil GM13 22.5' W	3,700.00
10				108162862	GSE HD 2S Textured 040 mil GM13 22.5' W	3,670.00
11				108162863	GSE HD 2S Textured 040 mil GM13 22.5' W	3,660.00
12				108162865	GSE HD 2S Textured 040 mil GM13 22.5' W	3,670.00
	1	FREIGHTSHT001	EA		DOM. SHIPPING CHARGE	
13					DOM. SHIPPING CHARGE	0.00

Total quantity: 189,001 **Total weight:** 44,160.00

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer PO number
12-039

If this shipment is to be delivered to consignee, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed

X _____

PRO Number
RR041381

Seal numbers

Truckers P.O. #
PO2000

Driver requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier name: JH Rose Logistics, LLC

Carrier signature: _____

Date: _____

GSE Lining Technology, LLC.

GSE ENVIRONMENTAL

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/28/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	BL-0061992

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162781	38	35	104	112	17	16	142	107	560	356	39	37	110	0.944	2.34	10	21	19
108162782	39	35	104	112	17	16	142	107	560	356	39	37	110	0.944	2.34	10	21	19
108162788	38	35	101	104	17	16	130	104	516	437	36	36	106	0.944	2.51	10	21	20
108162790	39	37	113	118	17	16	141	118	521	404	39	39	107	0.944	2.40	10	21	20
108162821	39	35	112	118	16	16	139	101	492	279	40	43	112	0.946	2.45	10	23	22
108162836	39	36	117	123	16	16	130	99	416	275	41	38	107	0.945	2.44	10	22	22
108162859	39	36	110	115	17	16	129	93	414	256	40	38	107	0.945	2.39	10	21	21
108162860	40	37	110	115	17	16	129	93	414	256	40	38	107	0.945	2.39	10	21	21
108162861	38	34	110	115	17	16	129	93	414	256	40	38	107	0.945	2.39	10	22	21
108162862	39	36	117	118	16	16	138	98	470	292	40	37	106	0.945	2.28	10	22	21
108162863	38	35	117	118	16	16	138	98	470	292	40	37	106	0.945	2.28	10	23	21
108162865	39	34	113	120	16	16	120	109	312	313	37	41	109	0.945	2.22	10	21	21

Laboratory Manager

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GSE ENVIRONMENTAL

Shipping Order – Packing List – Original – Not Negotiable

GSE Lining Technology, LLC. Houston, TX

Number BL–0061976

Received at **Houston, TX** from GSE Lining Technology, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to the rates and contract agreed to in writing by GSE Lining Technology, LLC and Carrier. GSE Lining Technology, LLC s obligation to pay freight charges for the shipment is conditioned on (1) the existence of a separate written contract with the carrier transporting the freight and (2) the carrier s name appearing on this Bill of Lading, and other carriers must look solely to a party other than GSE Lining Technology, LLC for payment.

Ship to: CCS/Ameren Hutsonville Ash Pond D
15142 East 1900th Avenue
Randy Porter 502–554–5230
Hutsonville, IL 62433

Roll Certifications Included

Ship date: Apr/27/2012
Branch plant: 1500
Sales order: SO–066934

Shipping instructions: 24 hr and 1 hr PRECALL REQUIRED. all trucks subject to inspection. No weapons, drugs, alchohol, pets, riders, etc. PPE equipment – Hardhat, safety glasses, High Vis Vest, sleeved shirt, long pants, steel toe boots.

Line no.	Shipped quantity	Product code	UM	Kind of Package, Description of Articles, Special Marks and Exceptions		Weight
	189,000	HDT–040GE–BBB–B–W0	SF	GSE HD 2S Textured 040 mil GM13 22.5' W		
1				108162816	GSE HD 2S Textured 040 mil GM13 22.5' W	3,670.00
2				108162817	GSE HD 2S Textured 040 mil GM13 22.5' W	3,630.00
3				108162820	GSE HD 2S Textured 040 mil GM13 22.5' W	3,615.00
4				108162822	GSE HD 2S Textured 040 mil GM13 22.5' W	3,640.00
5				108162823	GSE HD 2S Textured 040 mil GM13 22.5' W	3,690.00
6				108162824	GSE HD 2S Textured 040 mil GM13 22.5' W	3,575.00
7				108162825	GSE HD 2S Textured 040 mil GM13 22.5' W	3,590.00
8				108162828	GSE HD 2S Textured 040 mil GM13 22.5' W	3,580.00
9				108162834	GSE HD 2S Textured 040 mil GM13 22.5' W	3,615.00
10				108162837	GSE HD 2S Textured 040 mil GM13 22.5' W	3,625.00
11				108162838	GSE HD 2S Textured 040 mil GM13 22.5' W	3,620.00
12				108162840	GSE HD 2S Textured 040 mil GM13 22.5' W	3,605.00
	1	FREIGHTSHT001	EA		DOM. SHIPPING CHARGE	
13					DOM. SHIPPING CHARGE	0.00

Total quantity: 189,001 **Total weight:** 43,455.00

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer PO number
12–039

If this shipment is to be delivered to consignee, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed

X _____

PRO Number
RR041379

Seal numbers

Truckers P.O. #
PO2200

Driver requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230–6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier name: C. H. Robinson International,

Carrier signature: _____

Date: _____

GSE Lining Technology, LLC.

GSE ENVIRONMENTAL™

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Apr/27/2012

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-066934	Chesapeake Containment Systems, Inc.	Hutsonville IL US	HDT-040GE-BBB-B-W0	BL-0061976

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height GRI GM12 (mils) Side A	Asperity Height GRI GM12 (mils) Side B
108162816	39	35	117	124	17	16	140	105	511	300	43	39	108	0.946	2.34	10	21	22
108162817	39	34	121	123	16	16	135	105	472	267	41	40	110	0.946	2.46	10	21	22
108162820	40	36	112	118	16	16	139	101	492	279	40	43	112	0.946	2.45	10	23	22
108162822	40	36	112	118	16	16	139	101	492	279	40	43	112	0.946	2.45	10	23	21
108162823	40	36	107	112	16	16	124	105	393	400	41	39	107	0.946	2.35	10	23	21
108162824	40	36	107	112	16	16	124	105	393	400	41	39	107	0.946	2.35	10	22	21
108162825	39	35	107	112	16	16	124	105	393	400	41	39	107	0.946	2.35	10	22	21
108162828	39	34	105	111	17	16	115	100	363	246	38	36	106	0.945	2.41	10	24	23
108162834	38	35	124	127	16	16	132	102	394	255	42	41	110	0.946	2.37	10	23	22
108162837	38	35	117	123	16	16	130	99	416	275	41	38	107	0.945	2.44	10	22	22
108162838	38	35	117	123	16	16	130	99	416	275	41	38	107	0.945	2.44	10	22	21
108162840	38	34	111	119	16	16	126	96	444	201	42	39	107	0.945	2.38	10	22	21

Laboratory Manager

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Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

HUT-APD-SUB-030-02 Geomembrane-liner-close-out [REVISED]

02800-1.4.A.6 Material Warranty and Liner Installation Warranty

02800-1.4.C.1 Manufacturer Warranty

02800-1.4.C.2 Geomembrane Installation Warranty

02800-1.4.C.9 Installation Record Drawing

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-030-02	2012-08-10	Paul Zinsious AMS	502-640-2918

SHOP DRAWING / SUBMITTAL REVIEW

Shop drawing/submittal review is for design conformity and general conformance with the design concept of the project as given in the contract documents. Subcontractor is responsible for full compliance with contract documents, confirming and correcting all quantities, correlating dimensions at project work site for tolerance, clearance, fabrication process, and techniques of construction. Subcontractor is responsible for coordination of his work with that of all other trades, and performance of the work in a safe and satisfactory manner.

X Reviewed. 2012-08-10 Date
___ Reviewed with corrections.
___ Revise and resubmit. By
___ Rejected. See Remarks. AWS, LLC

Paul H. Zinsious, PMP

From: Ryan Clark <rclark@ccsliners.com>
Sent: Thursday, August 09, 2012 3:12 PM
To: Saindon, Anna
Cc: Paul H. Zinsious, PMP
Subject: RE: Questions regarding the Hutsonville geomembrane CQA report
Attachments: hutsonville closeout package rev 080912.pdf

Categories: Purple Category

Please see attached and comments below in red.

Thanks

Ryan P. Clark
Chesapeake containment Systems, Inc
352 Earls Road
Middle River, MD 21220
Ph: 410-335-5886
Fax: 443-303-1682
Cell: 410-913-3390
Web: www.ccsliners.com

From: Saindon, Anna [mailto:A_Saindon@geotechnology.com]
Sent: Thursday, August 09, 2012 8:45 AM
To: Ryan Clark
Cc: pzinsious@ashmanagementservices.com
Subject: Questions regarding the Hutsonville geomembrane CQA report

Good morning,

We noticed a few inconsistencies about the Ameren Hutsonville CQA report. Please review the following:

Record Layout Drawing:

- DS-7 should be labeled DS-7A and 7B- Drawing revised to show A and B
- DS-19 should be labeled DS-19A and 19B- Drawing revised to show A and B
- DS-31 is not labeled- Revised to show DS location
- DS-45 is shown on P64/P65 but forms show it at P70/P71- Drawing and repair log showed correct location for DS-45, revised destruct log to actual location
- DS-71 is labeled P90/P95 in the table and P95/P96 on layout- Drawing and repair log showed correct location for DS-71, revised destruct log to show actual location
- DS-84 should be labeled DS-84A1- Revised on drawing

Seaming and Non Destructive Test Log have some entries that do not have all the air pressure test data but says pass. For example, on 6/4/12 Seam 30/64. If these are fails that were repaired with a cap repair, please note as a fail/repair. Changed dashes on seaming log to actual repair number that capped seams.

Thank you for your assistance,

Anna Saindon, PE, RG
Senior Engineer

GEOTECHNOLOGY, INC.
11816 Lackland Road, Suite 150
St. Louis, MO 63146
(314) 997-7440 phone
(314) 997-2067 fax
www.geotechnology.com

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CHESAPEAKE
CONTAINMENT SYSTEMS, INC.

Hutsonville Ash Pond Closure

Closeout Submittals

(Rev: 8-9-2012)

1. Compliance Letter

2. Material Warranty

3. Installation Warranty (1 year)

4. SUBGRADE ACCEPTANCE

5. QC Documentation

6. Tensiometer Cert

7. Installation Record Drawing

8. Job Photos

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE
CONTAINMENT SYSTEMS, INC.

July 25, 2012

Ash Management Services
12601 Plantside Drive
Louisville Kentucky

Project: Hutsonville Ash Pond Closure- Ameren

Attn: Paul Zinsious

Chesapeake Containment Systems is pleased to present the attached record documentation for the Ameren Hutsonville Ash Pond Closure project.

We certify that the enclosed information is a compilation of our documentation for the project and that the installation was performed in accordance with the project specifications.

We further certify that all subgrade surface (surface quality only) was accepted by Chesapeake Containment Systems, Inc. prior to installation of Geosynthetics.

Included in this package are record copies of our field Quality Control, Installation records, and tensiometer certifications

If you should require any additional information please do not hesitate to contact our office.

Thank you

Chesapeake Containment Systems, Inc

Ryan P. Clark

352 Earls Road, Middle River, MD 21220 | 410.335.5886 Phone | 1.888.50.LINER (54637) Toll-Free | 443.303.1682 eFax | www.ccsliners.com

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GSE ENVIRONMENTAL™

PRO RATA LIMITED MATERIAL WARRANTY
FOR GSE LINING TECHNOLOGY, LLC
(U.S.A.)

Date:	7/30/12	Warranty No.:	**66934**
Purchaser Name:	Ameren Energy Resources	Project No.:	66934
Address:	1500 Eastport Plaza Drive	Effective Date:	7/1/12
City, State:	Collinsville, IL 62234	Project Name:	Ameren Hutsonville Ash Pond
Product Type/Description:	**GSE Geomembrane Products**	Project Address:	Hutsonville, IL

GSE Lining Technology, LLC ("GSE") warrants each GSE product described above to be free from material manufacturing defects (as described by the contract's material specifications) and to be able to withstand normal weathering for a period of **five (5) years** from the date of sale. This limited warranty does not include damages or defects in the GSE product resulting from acts of God, casualty or catastrophe, including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" does not include, among other things, the exposure of GSE's product to harmful chemicals, abuse by machinery, equipment or people; improper site preparation or placement of cover materials; excessive pressures or stresses from any source. This warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson-Moss Warranty Act.

Should defects or premature loss of use within the scope of this warranty occur, GSE will, at its option, repair or replace the GSE product on a pro rata basis at the current price in such manner as to charge the Purchaser only for that portion of the warranted life which has elapsed since the purchase of the product. GSE shall have the right to inspect and determine the cause of the alleged defect in the product and to take appropriate steps to repair or replace the product if a defect exists that is covered under this warranty.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail or courier, to GSE Lining Technology, LLC, 19103 Gundle Road, Houston, TX 77073, with the words "Warranty Claim" clearly marked on the face of the envelope, within ten (10) days of Purchaser becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have rights under this warranty. GSE shall not be obligated to perform any inspection or obligated to perform any repair or replacement under this warranty until the area is made available free from all obstructions, water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this warranty, Purchaser shall reimburse GSE for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the product as GSE determines to have violated the warranty provided herein. GSE shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to: damages for loss of production, lost profits, personal injury or property damage. GSE shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser to GSE's product, unless GSE specifically authorized, in writing, said repairs, replacements, modifications or alterations in advance. GSE liability under this warranty shall in no event exceed the replacement cost of the product sold to the Purchaser for the particular installation in which it failed.

GSE neither assumes nor authorizes any person other than an officer of GSE to assume for it any other or additional liability in connection with the GSE product made on the basis of the Limited Warranty. **GSE MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN HEREIN AND HEREBY DISCLAIMS ALL WARRANTIES, INCLUDING BOTH EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, AND BY ACCEPTING DELIVERY OF THE PRODUCT, PURCHASER WAIVES ALL OTHER POSSIBLE WARRANTIES. GSE's WARRANTY BECOMES AN OBLIGATION OF GSE TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT.**

This warranty is extended to the Purchaser and is non-transferable and non-assignable, i.e. there are no third-party beneficiaries to this warranty.

PWGeomembrane5 R01/15/10

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.
LIMITED WORKMANSHIP WARRANTY

Warranty No. I12-011-01
Project No: I12-011
Effective Date: 7-1-12

PURCHASER: Ameren Corporation Hutsonville Plant

ADDRESS: 15142 East 1900th Ave

CITY, STATE, ZIP: Crawford County, IL 62433

PROJECT NAME: Hutsonville Ash Pond Closure

DESCRIPTION: 40 mil textured HDPE

ADDRESS: 15142 East 1900th Ave

CITY, STATE, ZIP: Crawford County, IL 62433

CHESAPEAKE CONTAINMENT SYSTEMS, INC. (CCSI) warrants each CCSI LINER SYSTEM installed by CCSI to be free from defects in workmanship. This "Workmanship Warranty" shall be in effect from the date the installation of the Liner System is completed and accepted by the Owner for a period of ONE YEAR of normal use in approved applications.

This Limited Warranty does not include damages or defects in the CCSI Liner System resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" as used herein does not include, among other things, the exposure of CCSI Liner System to harmful chemicals, abuse of CCSI Liner System by machinery, equipment or people, excessive pressures or stress from any source, subsurface or overburdened soil conditions, and total or differential soil settlements and the effect these may have on the liner system.

Should defects or premature loss of use within the scope of the above Limited Workmanship Warranty occur, CCSI will, at its option, repair or replace the CCSI Liner System on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. CCSI will have the right to inspect and determine the cause of any alleged defect in the CCSI Liner System and to take appropriate steps to repair or replace the CCSI Liner System if a defect exists and is within the term of this Limited Warranty.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail, to the President of CCSI within thirty (30) days after the alleged defect is noticed. Should the required notice not be given, the defect and all warranties shall be deemed to have been waived by the Purchaser, and Purchaser shall have no right of recovery against CCSI. In the event repairs and/or replacements are to be effected, said repairs and/or replacements shall not become due until the area subject to repair and/or replacement of CCSI Liner System is available to CCSI in a clean, dry, unencumbered condition. This includes, but is not limited to, the area made available for repair and/or replacement of CCSI Liner System to be free from all water, dirt, sludge, residuals, and liquids of any kind.

CCSI's liability under this warranty shall in no event exceed the replacement cost of the material and installation sold to the Purchaser for the particular installation in which it failed. Further, under no circumstances shall CCSI be liable for any special, direct, indirect, or consequential damages arising from loss of production or any other losses including losses due to personal injuries and product liability owing to the failure of the material or installation and no allowance will be made for repairs, replacements, or alterations made by the Purchaser without the express written consent of CCSI.

CCSI neither assumes nor authorizes any person other than an officer of CCSI to assume for it any other or additional liability in connection with the CCSI Liner System made the basis of the Limited Warranty. The Limited Workmanship Warranty on the CCSI Liner System herein is given in lieu of all other possible material warranties, either express or implied, and by accepting delivery of the material Purchaser waives all other possible workmanship warranties, except those specifically given.

The parties expressly agree that the sale hereunder is for commercial or industrial use only.

CCSI's Limited Warranty is extended to the purchaser/owner and is non transferable and non-assignable.

Purchaser acknowledges by acceptance that the Limited Workmanship Warranty given herein is accepted in preference to any and all other possible workmanship warranties.

CCSI MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESS OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE

WARRANTY BECOMES EFFECTIVE UPON RECEIPT OF FINAL PAYMENT

I hereby state I have read and understood the above and foregoing Limited Warranty and agree to such by signing hereunder.

PURCHASER NAME:_____

SIGNATURE:_____

TITLE:_____

DATE:_____

Chesapeake Containment Systems, Inc.

Ryan Clark-Vice President

Sworn before me this 26 day of July, 2012.

Melissa Marie Cullin

expires 12/1/15

MELISSA MARIE CULLIN NOTARY PUBLIC BALTIMORE COUNTY, MD

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE
CONTAINMENT SYSTEMS, INC.

SUBGRADE SURFACE ACCEPTANCE

Project Name: Hutsonville Ash Pond Closure Customer: Charah, Inc.

Project Number: I12-011 Date: 7/26/2012

Location: Crawford County, IL Partial: _____ Final: X

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. Chesapeake Containment Systems, Inc. does not accept responsibility for weather damage, compaction, elevation or moisture content, subsurface conditions, nor for the surface condition maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the Owner or Earthwork Contractor.

For Chesapeake Containment Systems, Inc.

RYAN CLARK

For Contractor/Owner/Inspector:

Acceptance Number: Final Area Accepted: All Subgrade

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I12011
Project Name: Hutsonville Power Plan
Start Date: 5/30/2012
Project Location: Hutsonville,IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	58
Shear:	80	Shear:	80

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
1	5/30/2012	10:10	55F	M40	AO	860	600	95	68				133	130				Pass	BF	SS
								78	85											
2	5/30/2012	10:40	55F	M14	PV	850	500	94	97				130	131				Pass	BF	SS
								80	80											
3	5/30/2012	10:59	55F	M16	LS	860	600	103	80				132	129				Pass	BF	SS
								81	82											
4	5/30/2012	10:57	55F	M16	LS	860	600	97	95				138	130				Pass	BF	TT
								80	68											
5	5/30/2012	1:02	70F	M40	AO	860	600	87	92				119	127				Pass	BF	SS
								98	83											
6	5/30/2012	1:20	70F	M14	PV	850	550	89	83				127	129				Pass	BF	SS
								92	75											
7	5/30/2012	3:30	70F	M16	LS	860	600	99	83				128	128				Pass	BF	SS
								85	101											
8	5/31/2012	7:00	65F	M16	LS	860	600	106	87				142	150				Pass	BF	SS
								93	92											
9	5/31/2012	7:10	65F	M16	LS	860	600	86	86				137	138				Pass	BF	TT
								96	95											
10	5/31/2012	7:07	65F	M40	AO	860	600	99	90				144	142				Pass	BF	SS
								95	97											
11	5/31/2012	7:00	65F	M14	PV	850	500	86	106				143	143				Pass	BF	SS
								112	88											
12	5/31/2012	7:10	65F	M40	AO	860	600	89	93				130	132				Pass	BF	TT
								89	99											

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I12011
Project Name: Hutsonville Power Plan
Start Date: 5/30/2012
Project Location: Hutsonville,IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	58
Shear:	80	Shear:	80

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
13	6/1/2012	10:20	50F	MX2	PV	500	500	66	108				110	122				Pass	BF	TT
14	6/1/2012	1:37	55F	MX2	PV	500	500	90	85				122	125				Pass	BF	TT
15	6/2/2012	7:43	50F	M14	PV	830	530	100	96				146	147				Pass	BF	SS
								102	99											
16	6/2/2012	8:12	60F	M16	LS	860	600	81	89				142	140				Pass	BF	SS
								109	100											
17	6/2/2012	8:15	60F	M41	JF	860	600	91	93				143	146				Pass	BF	SS
								111	78											
18	6/2/2012	11:40	60F	M14	PV	850	500	111	78									Fail	BF	TT
19	6/2/2012	12:26	60F	M14	PV	850	500	98	111				131	103				Pass	BF	TT
								112	103											
20	6/4/2012	7:00	59F	M14	PV	830	500	87	86				143	143				Pass	BF	SS
								93	100											
21	6/4/2012	7:09	59F	M41	JF	860	560	89	79				139	142				Pass	BF	SS
								83	67											
22	6/4/2012	7:15	59F	M16	DG	860	600	99	98				150	143				Pass	BF	SS
								77	79											
23	6/4/2012	10:10	62F	M16	DG	860	580	87	74				139	133				Pass	BF	SS
								79	84											
24	6/4/2012	11:50	65F	M41	JF	860	560	74	103				131	136				Pass	BF	SS
								71	61											

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I12011
Project Name: Hutsonville Power Plan
Start Date: 5/30/2012
Project Location: Hutsonville,IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	58
Shear:	80	Shear:	80

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
25	6/4/2012	12:08	65F	M16	DG	860	580	73 89	73 78				142	145				Pass	BF	SS
26	6/4/2012	12:50	65F	M14	PV	830	550	101 81	102 86				134	137				Pass	BF	SS
27	6/4/2012	1:37	65F	M14	DG	800	600	101 80	100 84				128	136				Pass	BF	SS
28	6/4/2012	4:46	65F	M41	JF	860	450	107 106	97 86				132	131				Pass	BF	TT
29	6/5/2012	7:14	58F	M14	PV	850	580	101 79	82 78				142	143				Pass	BF	SS
30	6/5/2012	7:10	58F	M16	DG	860	550	87 88	74 88				145	145				Pass	BF	SS
31	6/5/2012	7:02	58F	M41	JF	860	560	93 102	109 96				141	139				Pass	BF	SS
32	6/5/2012	11:20	73F	M41	JF	800	580	75 77	80 82				116	115				Pass	BF	SS
33	6/5/2012	11:26	73F	M16	DG	800	600	63 76	79 75				114	119				Pass	BF	SS
34	6/5/2012	11:30	73F	M14	PV	800	600	96 86	77 67				119	121				Pass	BF	SS
35	6/6/2012	6:47	55F	M14	PV	830	550	101 86	91 96				144	148				Pass	BF	SS
36	6/6/2012	7:00	55F	M16	DG	860	550	92 94	75 90				148	138				Pass	BF	SS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I12011
Project Name: Hutsonville Power Plan
Start Date: 5/30/2012
Project Location: Hutsonville,IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	60	58
Shear:	80	80

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
37	6/6/2012	6:55	55F	M41	JF	860	560	106	76				145	136				Pass	BF	SS
								100	86											
38	6/6/2012	9:34	60F	M40	PV	830	530	77	73				122	113				Pass	BF	SS
								84	75											
39	6/6/2012	9:18	60F	M41	JF	860	430	85	73				101	106				Pass	BF	TT
								94	90											
40	6/6/2012	11:59	73F	M41	JF	860	560	98	62				99	100				Pass	BF	SS
								64	88											
41	6/6/2012	1:28	73F	M40	PV	830	500	100	83				99	88				Pass	BF	TT
								92	79											
42	6/6/2012	2:17	73F	MX2	AO	490	480	109	99				119	103				Pass	BF	TT
43	6/7/2012	6:58	53F	M40	PV	850	500	118	84				158	151						SS
								93	92											
44	6/7/2012	7:00	53F	M16	DG	860	550	90	60				152	138						SS
								93	63											
45	6/7/2012	6:58	53F	M40	PV	850	500	96	90				146	124						TT
								94	85											
46	6/7/2012	7:22	53F	M41	JF	860	550	104	118				154	151						SS
								105	93											
47	6/7/2012	8:24	53F	M40	PV	830	500	89	93				142	144						ST
								91	101											
48	6/7/2012	12:58	85F	M40	PV	830	600	81	96				136	127						SS
								95	81											

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I12011
Project Name: Hutsonville Power Plan
Start Date: 5/30/2012
Project Location: Hutsonville,IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	58
Shear:	80	Shear:	80

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
49	6/7/2012	1:00	85F	M40	PV	830	600	90	98				97	117						TT
								93	85											
50	6/7/2012	1:38	85F	M41	JF	800	600	87	71				137	133						SS
								109	107											
51	6/7/2012	1:25	85F	M16	DG	800	600	88	102				145	104						SS
								120	85											
52	6/7/2012	1:47	85F	M16	DG	800	550	74	74				146	116						ST
								104	124											
53	6/7/2012	3:50	85F	MX2	AO	490	480	118	112				134	120						TT
54	6/8/2012	7:00	50F	MX2	AO	490	480	109	69				133	136						TT
55	6/8/2012	7:12	50F	MX18	PV	500	550	93	107				141	140						SS
56	6/8/2012	1:00	75F	MX2	AO	480	460	101	126				129	95						TT
57	6/8/2012	1:00	75F	MX18	PV	500	450	117	104				127	120						TT
58	6/9/2012	7:00		MX2	AO	480	460	104	129				134	122						TT
59	6/9/2012	7:10		MX18	PV	830	500	126	116				121	127						TT
60	6/9/2012	1:00		MX2	AO	420	460	101	91				132	130						TT

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I12011
Project Name: Hutsonville Power Plan
Start Date: 5/30/2012
Project Location: Hutsonville,IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	58
Shear:	80	Shear:	80

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
61	6/9/2012	1:10		MX18	PV	830	430	124	116				130	116						TT

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE
CONTAINMENT SYSTEMS, INC.

Panel Placement Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Project Start Date: 5/30/2012
Project Location: hutsonville,IL

Material HD TEXTURED
Thickness: 40

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
5/30/12	1	9:40	FLOOR	2839	15	50	750
5/30/12	2	9:50	FLOOR	2829	22	148	3256
5/30/12	3	10:10	FLOOR	2829	22	491	10802
5/30/12	4	10:15	FLOOR	2829	22	528	11616
5/30/12	5	11:00	FLOOR	2808	22	565	12430
5/30/12	6	11:15	FLOOR	2808	22	103	2266
5/30/12	7	11:34	FLOOR	2814	22	483	10626
5/30/12	8	1:03	FLOOR	2814	22	202	4444
5/30/12	9	1:20	FLOOR	2789	22	384	8448
5/30/12	10	1:50	FLOOR	2789	22	292	6424
5/30/12	11	1:55	FLOOR	2787	22	272	5984
5/30/12	12	2:18	FLOOR	2787	22	404	8888
5/30/12	13	2:34	FLOOR	2832	22	132	2904
5/30/12	14	2:45	FLOOR	2832	22	508	11176
5/30/12	15	3:20	FLOOR	2791	22	480	10560
5/30/12	16	3:40	FLOOR	2791	22	179	3938
5/30/12	17	3:30	FLOOR	2777	22	268	5896
5/30/12	18	3:45	FLOOR	2777	22	409	8998
5/30/12	19	4:35	FLOOR	2785	22	16	352
5/30/12	20	4:43	FLOOR	2785	22	397	8734
5/30/12	21	5:00	FLOOR	2758	22	340	7480
5/31/12	22	7:10	FLOOR	2793	22	128	2816
5/31/12	23	7:20	FLOOR	2793	22	367	8074
5/31/12	24	7:40	FLOOR	2793	22	189	4158
5/31/12	25	7:50	FLOOR	2830	22	120	2640
5/31/12	26	8:00	FLOOR	2830	22	281	6182
5/31/12	27	8:08	FLOOR	2830	22	255	5610
5/31/12	28	8:18	FLOOR	2779	22	232	5104
5/31/12	29	8:30	FLOOR	2779	22	209	4598
5/31/12	30	8:41	FLOOR	2779	22	188	4136

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Panel Placement Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Project Start Date: 5/30/2012
Project Location: hutsonville,IL

Material: HD TEXTURED
Thickness: 40

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
5/31/12	31	8:50	FLOOR	2778	22	172	3784
5/31/12	32	9:10	FLOOR	2778	22	157	3454
5/31/12	33	9:16	FLOOR	2778	22	144	3168
5/31/12	34	9:24	FLOOR	2778	22	131	2882
5/31/12	35	9:35	FLOOR	2778	22	49	1078
5/31/12	36	9:50	FLOOR	2812	22	69	1518
5/31/12	37	10:00	FLOOR	2812	22	106	2332
5/31/12	38	10:08	FLOOR	2812	22	94	2068
5/31/12	39	10:18	FLOOR	2812	22	82	1804
5/31/12	40	10:21	FLOOR	2812	22	62	1364
5/31/12	41	10:30	FLOOR	2812	22	57	1254
5/31/12	42	10:32	FLOOR	2812	22	45	990
5/31/12	43	10:35	FLOOR	2812	22	33	726
5/31/12	44	10:40	FLOOR	2812	22	20	440
5/31/12	45	10:52	FLOOR	2812	22	14	308
6/2/12	46	7:00	FLOOR	2807	22	694	15268
6/2/12	47	7:20	FLOOR	2833	22	695	15290
6/2/12	48	7:40	FLOOR	2813	22	695	15290
6/2/12	49	8:00	FLOOR	2813	22	697	15334
6/2/12	50	8:20	FLOOR	2819	22	698	15356
6/2/12	51	9:30	FLOOR	2816	22	696	15312
6/2/12	52	9:15	FLOOR	2776	22	696	15312
6/4/12	53	7:00	FLOOR	2804	22	692	15224
6/4/12	54	7:15	FLOOR	2835	22	694	15268
6/4/12	55	7:30	FLOOR	2803	22	694	15268
6/4/12	56	7:45	FLOOR	2806	22	695	15290
6/4/12	57	8:00	FLOOR	2794	22	695	15290
6/4/12	58	10:00	FLOOR	2792	22	695	15290
6/4/12	59	11:25	FLOOR	2842	22	694	15268
6/4/12	60	12:50	FLOOR	2784	22	693	15246

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Panel Placement Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Project Start Date: 5/30/2012
Project Location: hutsonville,IL

Material HD TEXTURED
Thickness: 40

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
6/4/12	61	1:00	FLOOR	2802	22	693	15246
6/4/12	62	1:54	FLOOR	2805	22	694	15268
6/4/12	63	2:26	FLOOR	2801	22	695	15290
6/4/12	64	3:02	FLOOR	2783	22	695	15290
6/4/12	65	3:22	FLOOR	2809	22	695	15290
6/4/12	66	3:45	FLOOR	2815	22	695	15290
6/5/12	67	7:40	FLOOR	2823	22	695	15290
6/5/12	68	8:00	FLOOR	2822	22	695	15290
6/5/12	69	8:25	FLOOR	2838	22	693	15246
6/5/12	70	8:39	FLOOR	2837	22	694	15268
6/5/12	71	9:35	FLOOR	2825	22	695	15290
6/5/12	72	9:50	FLOOR	2820	22	695	15290
6/5/12	73	10:15	FLOOR	2824	22	696	15312
6/5/12	74	10:30	FLOOR	2834	22	697	15334
6/5/12	75	10:54	FLOOR	2817	22	699	15378
6/5/12	76	1:31	FLOOR	2828	22	699	15378
6/5/12	77	1:51	FLOOR	2840	22	695	15290
6/5/12	78	2:00	FLOOR	2782	22	691	15202
6/6/12	79	7:00	FLOOR	2865	22	688	15136
6/6/12	80	7:30	FLOOR	2836	22	683	15026
6/6/12	81	8:00	FLOOR	2781	22	684	15048
6/6/12	82	8:10	FLOOR	2788	22	684	15048
6/6/12	83	8:24	FLOOR	2860	22	683	15026
6/6/12	84	8:40	FLOOR	2861	22	676	14872
6/6/12	85	8:50	FLOOR	2859	22	653	14366
6/6/12	86	9:00	FLOOR	2790	22	535	11770
6/6/12	87	11:04	FLOOR	2862	22	275	6050
6/6/12	88	11:40	FLOOR	2862	12	54	648
6/6/12	89	9:20	FLOOR	2832	22	10	220
6/6/12	90	9:30	FLOOR	2859	22	22	484

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Panel Placement Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Project Start Date: 5/30/2012
Project Location: hutsonville,IL

Material: HD TEXTURED
Thickness: 40

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
6/6/12	91	10:00	FLOOR	2790	22	33	726
6/7/12	92	6:47	FLOOR	2821	22	697	15334
6/7/12	93	7:00	FLOOR	2863	22	697	15334
6/7/12	94	7:20	FLOOR	2866	22	697	15334
6/7/12	95	10:50	FLOOR	2786	22	644	14168
6/7/12	96	10:32	FLOOR	2818	22	565	12430
6/7/12	97	11:40	FLOOR	2831	22	407	8954
6/7/12	98	1:33	FLOOR	2831	22	176	3872
6/7/12	99	11:50	FLOOR	2780	22	100	2200
6/7/12	100	11:55	FLOOR	2780	22	100	2200
6/7/12	101	1:40	FLOOR	2862	22	92	2024
6/7/12	102	1:42	FLOOR	2862	22	8	176
6/7/12	103	1:50	FLOOR	2831	10	40	400
6/7/12	104	1:59	FLOOR	2831	10	23	230
6/7/12	105	2:10	FLOOR	2831	10	15	150
							938234

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
5/30/12	1/2	10:40	AO	M40	860	600	S EOS	N EOS	100	30	29	12:54	12:59	LS	5/31/12	PASS
5/30/12	2/3	11:11	AO	M40	860	600	E EOS	N EOS	195	30	28	1:03	1:08	LS	5/31/12	PASS
5/30/12	3/4	11:00	PV	M14	850	500	S EOS	64' N S EOS	64	30	30	1:21	1:26	LS	5/31/12	PASS
5/30/12	3/4	11:00	PV	M14	850	500	64' N S EOS	N EOS	442	30	30	1:17	1:22	LS	5/31/12	PASS
5/30/12	4/5	11:20	LS	M16	860	600	S EOS	230' N S EOS	230	30	30	1:24	1:29	LS	5/31/12	PASS
5/30/12	4/5	11:20	LS	M16	860	600	230' N S EOS	270' N S EOS	40	30	30	1:40	1:45	LS	5/31/12	PASS
5/30/12	4/5	11:20	LS	M16	860	600	270' N S EOS	N EOS	279	30	30	1:41	1:46	LS	5/31/12	PASS
5/30/12	5/7	11:43	AO	M40	860	600	S EOS	N EOS	483	30	28	9:31	9:36	LS	6/1/12	PASS
5/30/12	5/6	12:40	AO	M40	860	600	S EOS	N EOS	98	30	30	9:40	9:45	LS	6/1/12	PASS
5/30/12	6/7	1:17	LS	M16	860	600	W EOS	E EOS	22	30	30	9:35	9:40	LS	6/1/12	PASS
5/30/12	8/9	1:30	LS	M16	860	600	W EOS	E EOS	22	30	30	9:57	10:02	LS	6/1/12	PASS
5/30/12	7/9	1:35	PV	M14	850	550	S EOS	N EOS	384	30	30	9:53	9:58	LS	6/1/12	PASS
5/30/12	7/8	2:25	PV	M14	850	550	S EOS	N EOS	98	30	30	9:45	9:50	LS	6/1/12	PASS
5/30/12	6/8	2:35	PV	M14	850	550	S EOS	N EOS	108	30	30	9:49	9:54	LS	6/1/12	PASS
5/30/12	9/11	2:13	LS	M16	860	600	S EOS	N EOS	272	30	30	10:03	10:08	LS	6/1/12	PASS
5/30/12	9/10	2:41	LS	M16	860	600	S EOS	N EOS	113	30	30	10:01	10:06	LS	6/1/12	PASS
5/30/12	8/10	2:56	LS	M16	860	600	S EOS	N EOS	198	30	30	9:51	9:56	LS	6/1/12	PASS
5/30/12	10/11	2:01	LS	M16	860	600	W EOS	E EOS	22	30	30	10:09	10:14	LS	6/1/12	PASS
5/30/12	10/12	2:25	AO	M40	860	600	N EOS	S EOS	277	30	30	10:15	10:20	LS	6/1/12	PASS
5/30/12	11/12	2:58	AO	M40	860	600	N EOS	S EOS	140	30	30	10:22	10:27	LS	6/1/12	PASS
5/30/12	11/13	3:15	AO	M40	860	600	N EOS	S EOS	131	30	30	10:38	10:43	LS	6/1/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured

Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
5/30/12	12/14	3:10	PV	M14	850	550	N EOS	S EOS	391	30	30	10:26	10:31	LS	6/1/12	PASS
5/30/12	13/14	3:55	PV	M14	850	550	N EOS	S EOS	133	30	30	10:34	10:39	LS	6/1/12	PASS
5/30/12	12/13	3:40	LS	M16	860	600	W EOS	E EOS	22	30	30	10:40	10:45	LS	6/1/12	PASS
5/30/12	14/15	3:52	AO	M40	860	600	N EOS	S EOS	493	30	30	10:47	10:52	LS	6/1/12	PASS
5/30/12	16/17	3:46	LS	M16	860	600	E EOS	W EOS	22	30	29	11:40	11:45	LS	6/1/12	PASS
5/30/12	15/16	4:05	LS	M16	860	600	N EOS	S EOS	200	30	30	11:41	11:46	LS	6/1/12	PASS
5/30/12	15/17	4:32	LS	M16	860	600	N EOS	S EOS	267	30	30	10:55	11:00	LS	6/1/12	PASS
5/30/12	16/18	4:25	PV	M14	850	550	N EOS	S EOS	171	30	30	11:50	11:55	LS	6/1/12	PASS
5/30/12	17/18	4:45	PV	M14	850	550	N EOS	180' S N EOS	180	30	30	11:25	11:30	LS	6/1/12	PASS
5/30/12	17/18	4:45	PV	M14	850	550	180' S N EOS	S EOS	73	30	30	11:03	11:08	LS	6/1/12	PASS
5/30/12	17/19	5:15	PV	M14	850	550	N EOS	S EOS	16	30	30	11:01	11:06	LS	6/1/12	PASS
5/30/12	18/19	5:05	LS	M16	860	600	W EOS	E EOS	22	30	30	11:08	11:13	LS	6/1/12	PASS
5/30/12	18/20	5:08	AO	M40	860	600	N EOS	290' S N EOS	290	30	30	11:28	11:33	LS	6/1/12	PASS
5/30/12	18/20	5:08	AO	M40	860	600	290' S N EOS	S EOS	104	30	30	11:22	11:27	LS	6/1/12	PASS
5/30/12	19/20	5:54	AO	M40	860	600	N EOS	S EOS	16	30	30	11:15	11:20	LS	6/1/12	PASS
5/30/12	20/21	5:35	LS	M16	860	600	N EOS	240' SN EOS	240	30	30	11:58	12:03	LS	6/1/12	PASS
5/30/12	20/21	5:35	LS	M16	860	600	240' SN EOS	S EOS	15	30	30	12:00	12:05	LS	6/1/12	PASS
5/31/12	20/22	7:40	LS	M16	860	600	N EOS	85' S N EOS	85	30	30	12:10	12:15	LS	6/1/12	PASS
5/31/12	20/22	7:40	LS	M16	860	600	85' S N EOS	S EOS	43	30	29	1:09	1:14	LS	6/1/12	PASS
5/31/12	21/22	7:20	LS	M16	860	600	W EOS	E EOS	22	30	30	12:05	12:10	LS	6/1/12	PASS
5/31/12	21/23	7:20	AO	M40	860	600	N EOS	S EOS	224	30	30	12:08	12:13	LS	6/1/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
5/31/12	22/23	7:59	AO	M40	860	600	N EOS	S EOS	127	30	29	1:08	1:13	LS	6/1/12	PASS
5/31/12	23/24	7:45	PV	M14	850	600	N EOS	S EOS	203	30	30	1:18	1:23	LS	6/1/12	PASS
5/31/12	23/25	8:15	PV	M14	850	600	N EOS	S EOS	120	30	30	1:18	1:23	LS	6/1/12	PASS
5/31/12	24/25	8:05	LS	M16	860	600	W EOS	E EOS	22	30	30	1:56	2:01	LS	6/1/12	PASS
5/31/12	24/26	8:10	LS	M16	860	600	N EOS	S EOS	175	30	30	1:22	1:27	LS	6/1/12	PASS
5/31/12	25/26	9:31	LS	M16	860	600	N EOS	S EOS	120	30	30	1:20	1:25	LS	6/1/12	PASS
5/31/12	26/27	8:24	AO	M40	860	600	N EOS	S EOS	267	30	30	1:32	1:37	LS	6/1/12	PASS
5/31/12	27/28	8:34	PV	M14	850	600	N EOS	S EOS	243	30	29	1:15	1:20	LS	6/1/12	PASS
5/31/12	28/29	9:03	LS	M16	860	600	N EOS	S EOS	221	30	30	2:03	2:08	LS	6/1/12	PASS
5/31/12	29/30	9:06	AO	M40	860	600	N EOS	S EOS	197	30	30	2:09	2:14	LS	6/1/12	PASS
5/31/12	30/31	9:17	PV	M40	850	600	N EOS	S EOS	179	30	30	2:15	2:20	LS	6/1/12	PASS
5/31/12	31/32	9:38	LS	M16	860	600	N EOS	95 S N EOS	95	30	30	2:20	2:25	LS	6/1/12	PASS
5/31/12	31/32	9:38	LS	M16	860	600	95 S N EOS	S EOS	69	30	30	2:25	2:30	LS	6/1/12	PASS
5/31/12	32/33	9:39	AO	M40	860	600	N EOS	S EOS	150	30	30	2:30	2:35	LS	6/1/12	PASS
5/31/12	33/34	9:50	PV	M14	850	600	N EOS	S EOS	137	30	30	2:35	2:40	LS	6/1/12	PASS
5/31/12	34/35	10:10	LS	M16	860	600	N EOS	S EOS	55	30	29	3:01	3:06	LS	6/1/12	PASS
5/31/12	34/36	10:17	LS	M16	860	600	N EOS	S EOS	69	30	30	2:40	2:45	LS	6/1/12	PASS
5/31/12	35/36	10:05	AO	M40	860	600	W EOS	E EOS	22	30	29	2:55	1:38	LS	6/1/12	PASS
5/31/12	35/37	10:12	AO	M40	860	600	N EOS	S EOS	43	30	30	3:06	3:11	LS	6/1/12	PASS
5/31/12	36/37	10:20	AO	M40	860	600	N EOS	S EOS	69	30	30	2:49	2:54	LS	6/1/12	PASS
5/31/12	37/38	10:20	PV	M14	850	600	N EOS	S EOS	100	30	30	2:13	2:18	LS	6/1/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
5/31/12	38/39	10:40	LS	M16	860	600	N EOS	S EOS	88	30	30	3:19	3:24	LS	6/1/12	PASS
5/31/12	39/40	10:40	AO	M40	860	600	N EOS	S EOS	76	30	30	3:35	3:40	LS	6/1/12	PASS
5/31/12	40/41	10:40	PV	M14	850	600	N EOS	S EOS	62	30	30	3:40	3:45	LS	6/1/12	PASS
5/31/12	41/42	10:52	AO	M40	860	600	N EOS	S EOS	51	30	30	3:51	3:56	LS	6/1/12	PASS
5/31/12	42/43	10:55	PV	M14	850	600	N EOS	S EOS	39	30	30	3:56	4:01	LS	6/1/12	PASS
5/31/12	43/44	11:07	PV	M14	850	600	N EOS	S EOS	26	30	30	4:01	4:06	LS	6/1/12	PASS
5/31/12	44/45	11:00	AO	M40	860	600	N EOS	S EOS	14	30	30	4:11	4:16	LS	6/1/12	PASS
6/2/12	46/47	8:10	PV	M14	850	530	S EOS	208' N S EOS	208	30	30	2:58	3:03	DG	6/2/12	PASS
6/2/12	46/47	8:10	PV	M14	850	530	208' N S EOS	N EOS	486	30	30	1:56	2:01	DG	6/2/12	PASS
6/2/12	47/48	8:30	LS	M16	860	600	S EOS	N EOS	696	30	30	2:02	2:07	DG	6/2/12	PASS
6/2/12	48/49	8:30	JF	M41	860	560	S EOS	N EOS	695	30	30	2:26	2:31	DG	6/2/12	PASS
6/2/12	49/50	10:20	LS	M16	860	600	S EOS	20' N S EOS	20	30	30	3:50	3:55	DG	6/2/12	PASS
6/2/12	49/50	10:20	LS	M16	860	600	20' N S EOS	120' N S EOS	100	30	30	3:25	3:30	DG	6/2/12	PASS
6/2/12	49/50	10:20	LS	M16	860	600	120' N S EOS	235' N S EOS	15	30	30	3:19	3:24	DG	6/2/12	PASS
6/2/12	49/50	10:20	LS	M16	860	600	235' N S EOS	335' N S ES	200	30	28	3:13	3:18	DG	6/2/12	PASS
6/2/12	49/50	10:20	LS	M16	860	600	335' N S ES	N EOS	365	30	30	2:50	2:55	DG	6/2/12	PASS
6/2/12	50/51	10:00	M14	PV	830	530	S EOS	N EOS	696	30	29	2:36	2:41	DG	6/2/12	PASS
6/2/12	51/52	10:35	M41	JF	860	600	S EOS	300' N S ES	300	30	30	3:30	3:49	DG	6/2/12	PASS
6/2/12	51/52	10:35	M41	JF	860	600	300' N S ES	N EOS	396	30	30	2:45	2:50	DG	6/2/12	PASS
6/2/12	4/52	1:18	M14	PV	850	500	E EOS	W EOS	22	30	30	5:11	5:16	DG	6/8/12	PASS
6/2/12	5/51	1:20	M14	PV	850	500	E EOS	W EOS	22	30	30	5:07	5:12	DG	6/8/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/2/12	7/50	1:24	M14	PV	850	500	E EOS	W EOS	22	30	30	5:06	5:11	DG	6/8/12	PASS
6/2/12	9/49	1:26	M14	PV	850	500	E EOS	W EOS	22	30	30	5:02	5:07	DG	6/8/12	PASS
6/2/12	11/48	1:31	M14	PV	850	500	E EOS	W EOS	22	30	29	5:00	5:05	DG	6/8/12	PASS
6/2/12	13/47	1:35	M14	PV	850	500	E EOS	W EOS	22	30	30	4:57	5:02	DG	6/8/12	PASS
6/2/12	14/46	1:38	M14	PV	850	500	E EOS	W EOS	22	30	30	4:55	5:00	DG	6/8/12	PASS
6/4/12	46/53	7:46	M14	PV	830	860	S EOS	N EOS	691	30	30	5:30	5:35	DG	6/7/12	PASS
6/4/12	53/54	8:00	DG	M16	860	580	S EOS	492' N S EOS	492	30	30	6:30	6:35	DG	6/8/12	PASS
6/4/12	53/54	8:00	DG	M16	860	580	492' N S EOS	560' N S EOS	68	30	30	6:25	6:30	DG	6/8/12	PASS
6/4/12	53/54	8:00	DG	M16	860	580	560' N S EOS	610' N S EOS	50	30	30	5:40	5:45	DG	6/7/12	PASS
6/4/12	53/54	8:00	DG	M16	860	580	610' N S EOS	N EOS	83	30	30	5:25	5:30	DG	6/7/12	PASS
6/4/12	54/55	8:15	JF	M41	860	560	S EOS	167' N S EOS	167	30	29	7:06	7:11	DG	6/8/12	PASS
6/4/12	54/55	8:15	JF	M41	860	560	167' N S EOS	N EOS	527	30	30	6:32	6:37	DG	6/8/12	PASS
6/4/12	55/56	9:16	PV	M14	830	530	N EOS	325' S N EOS	325	30	30	7:00	7:05	DG	6/8/12	PASS
6/4/12	55/56	9:16	PV	M14	830	530	325' S N EOS	500' S N EOS	175	30	30	6:43	6:48	DG	6/8/12	PASS
6/4/12	55/56	9:16	PV	M14	830	530	500' S N EOS	S EOS	193	30	30	7:12	7:17	DG	6/8/12	PASS
6/4/12	56/57	9:10	JF	M41	860	560	N EOS	15' S N EOS	15	30	30	7:10	7:15	DG	6/8/12	PASS
6/4/12	56/57	9:10	JF	M41	860	560	15' S N EOS	30' S N EOS	15	30	30	7:15	7:20	DG	6/8/12	PASS
6/4/12	56/57	9:10	JF	M41	860	560	30' S N EOS	580' S N EOS	550	30	30	7:21	7:26	DG	6/8/12	PASS
6/4/12	56/57	9:10	JF	M41	860	560	580' S N EOS	S EOS	116	30	30	8:42	8:47	DG	6/8/12	PASS
6/4/12	57/58	10:42	DG	M16	860	580	N EOS	S EOS	695	30	30	7:24	7:29	DG	6/8/12	PASS
6/4/12	58/59	11:25	PV	M14	830	530	S EOS	430' N S EOS	430	30	30	7:46	7:51	DG	6/8/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured

Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/4/12	58/59	11:25	PV	M14	830	530	430' N S EOS	570' N S EOS	140	30	30	7:40	7:45	DG	6/8/12	PASS
6/4/12	58/59	11:25	PV	M14	830	530	570' N S EOS	640 N S EOS	70	30	30	7:35	7:40	DG	6/8/12	PASS
6/4/12	58/59	11:25	PV	M14	830	530	570' N S EOS	N EOS	55	30	30	7:30	7:35	DG	6/8/12	PASS
6/4/12	59/60	12:54	DG	M16	860	580	S EOS	450' N S EOS	450	30	30	7:48	7:53	DG	6/8/12	PASS
6/4/12	59/60	12:54	DG	M16	860	580	450' N S EOS	N EOS	243	30	30	8:27	8:32	DG	6/8/12	PASS
6/4/12	60/61	1:26	JF	M41	860	560	S EOS	N EOS	692	30	30	8:00	8:05	DG	6/8/12	PASS
6/4/12	61/62	2:00	PV	M14	800	600	S EOS	390' N S EOS	390	30	30	7:53	7:58	DG	6/8/12	PASS
6/4/12	61/62	2:00	PV	M14	800	600	390' N S EOS	N EOS	303	30	30	8:07	8:12	DG	6/8/12	PASS
6/4/12	62/63	2:35	DG	M16	860	580	N EOS	S EOS	695	30	30	8:06	8:11	DG	6/8/12	PASS
6/4/12	63/64	3:07	JF	M41	860	560	S EOS	N EOS	694	30	30	8:08	8:13	DG	6/8/12	PASS
6/4/12	64/65	3:30	PV	M14	800	600	S EOS	N EOS	695	30	30	8:23	8:28	DG	6/8/12	PASS
6/4/12	65/66	4:08	DG	M16	860	580	S EOS	320' N S EOS	320	30	30	10:16	10:21	DG	6/8/12	PASS
6/4/12	65/66	4:08	DG	M16	860	580	320' N S EOS	490' N S EOS	170	30	30	9:40	9:45	DG	6/8/12	PASS
6/4/12	65/66	4:08	DG	M16	860	580	490' N S EOS	545' N S EOS	55	30	28	10:00	10:05	DG	6/8/12	PASS
6/4/12	65/66	4:08	DG	M16	860	580	545' N S EOS	N EOS	150	30	30	8:15	8:20	DG	6/8/12	PASS
6/4/12	15/53	5:09	JF	M41	860	450	W EOS	E EOS	22	30	30	4:51	4:56	DG	6/8/12	PASS
6/4/12	17/54	5:12	JF	M41	860	450	W EOS	E EOS	22	30	29	4:49	4:54	DG	6/8/12	PASS
6/4/12	19/55	5:15	JF	M41	860	450	W EOS	E EOS	22	30	29	4:46	4:51	DG	6/8/12	PASS
6/4/12	20/56	5:18	JF	M41	860	450	W EOS	E EOS	22	30	30	4:40	4:45	DG	6/8/12	PASS
6/4/12	22/57	5:22	JF	M41	860	450	W EOS	E EOS	22	30	30	4:43	4:48	DG	6/8/12	PASS
6/4/12	23/58	5:26	JF	M41	860	450	W EOS	E EOS	22	30	30	4:34	4:39	DG	6/8/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/4/12	25/59	2:29	JF	M41	860	450	W EOS	E EOS	22	30	28	4:30	4:35	DG	6/8/12	PASS
6/4/12	26/60	5:33	JF	M41	860	450	W EOS	E EOS	22	30	30	4:28	4:33	DG	6/8/12	PASS
6/4/12	27/61	5:36	JF	M41	860	450	W EOS	E EOS	22	30	30	4:25	4:30	DG	6/8/12	PASS
6/4/12	28/62	5:41	JF	M41	860	450	W EOS	E EOS	22	30	30	4:23	4:28	DG	6/8/12	PASS
6/4/12	29/63	5:45	JF	M41	860	450	W EOS	E EOS	22	30	30	4:19	4:24	DG	6/8/12	PASS
6/4/12	30/64	5:45	JF	M41	860	450	W EOS	E EOS	22	CAPPED BY R232						
6/4/12	31/65	5:51	JF	M41	860	450	W EOS	E EOS	22	30	30	4:17	4:22	DG	6/8/12	PASS
6/4/12	32/66	5:54	JF	M41	860	450	W EOS	E EOS	22	30	30	4:16	4:21	DG	6/8/12	PASS
6/5/12	66/67	8:02	JF	M41	860	560	S EOS	520' N S EOS	520	30	30	8:51	8:56	DG	6/8/12	PASS
6/5/12	66/67	8:02	JF	M41	860	560	520' N S EOS	N EOS	175	30	30	8:38	8:43	DG	6/8/12	PASS
6/5/12	67/68	8:07	PV	M14	830	530	S EOS	96' N S EOS	96	30	29	10:16	10:21	DG	6/8/12	PASS
6/5/12	67/68	8:07	PV	M14	830	530	96' N S EOS	N EOS	598	30	30	8:58	9:03	DG	6/8/12	PASS
6/5/12	68/69	8:22	DG	M16	860	550	S EOS	N EOS	693	30	28	9:05	9:10	DG	6/8/12	PASS
6/5/12	69/70	9:55	JF	M41	860	560	S EOS	515' N S EOS	515	30	30	9:29	9:34	DG	6/8/12	PASS
6/5/12	69/70	9:55	JF	M41	860	560	515' N S EOS	N EOS	178	30	30	9:12	9:17	DG	6/8/12	PASS
6/5/12	70/71	9:53	PV	M14	800	530	S EOS	N EOS	695	30	30	10:28	10:33	DG	6/8/12	PASS
6/5/12	71/72	9:58	DG	M16	860	550	S EOS	N EOS	695	30	30	10:30	10:35	DG	6/8/12	PASS
6/5/12	72/73	12:12	JF	M41	800	580	S EOS	N EOS	696	30	30	10:37	10:42	DG	6/8/12	PASS
6/5/12	73/74	12:35	PV	M14	800	600	S EOS	650' N S EOS	650	30	30	10:57	11:02	DG	6/8/12	PASS
6/5/12	-	12:35	PV	M14	800	600	650' N S EOS	N EOS	46	30	30	10:48	10:53	DG	6/8/12	PASS
6/5/12	74/75	12:34	DG	M16	800	600	S EOS	N EOS	698	30	29	10:45	10:50	DG	6/8/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured

Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/5/12	75/76	2:15	DG	M16	800	600	S EOS	N EOS	700	30	30	10:54	10:59	DG	6/8/12	PASS
6/5/12	76/77	2:12	PV	M14	800	600	S EOS	N EOS	699	30	30	11:16	11:21	DG	6/8/12	PASS
6/5/12	77/78	2:23	JF	M41	800	580	S EOS	266' N S EOS	266	30	29	11:25	11:30	DG	6/8/12	PASS
6/5/12	77/78	2:23	JF	M41	800	580	266' N S EOS	N EOS	425	30	30	11:08	11:13	DG	6/8/12	PASS
6/5/12	33/67	3:00	PV	M40	830	500	W EOS	E EOS	22	30	30	4:10	4:15	DG	6/8/12	PASS
6/5/12	34/68	3:03	PV	M40	830	500	W EOS	E EOS	22	30	30	4:05	4:10	DG	6/8/12	PASS
6/5/12	36/69	3:05	PV	M40	830	500	W EOS	E EOS	22	30	30	4:03	4:08	DG	6/8/12	PASS
6/5/12	37/70	3:07	PV	M40	830	500	W EOS	E EOS	22	30	30	4:00	4:05	DG	6/8/12	PASS
6/5/12	38/71	3:11	PV	M40	830	500	W EOS	E EOS	22	30	28	3:54	3:59	DG	6/8/12	PASS
6/5/12	39/72	3:14	PV	M40	830	500	W EOS	E EOS	11	30	30	3:49	3:54	DG	6/8/12	PASS
6/5/12	39/72	3:14	PV	M40	830	500	W EOS	E EOS	11	CAPPED BY R234						
6/5/12	40/73	3:45	PV	M40	830	500	W EOS	E EOS	22	30	30	3:39	3:44	DG	6/8/12	PASS
6/5/12	41/74	3:48	PV	M40	830	500	W EOS	E EOS	22	30	28	3:34	3:39	DG	6/8/12	PASS
6/5/12	42/75	9:08	PV	M40	830	500	W EOS	E EOS	22	30	30	3:22	3:27	DG	6/8/12	PASS
6/5/12	43/76	4:34	PV	M40	830	500	W EOS	E EOS	22	30	30	3:12	3:17	DG	6/8/12	PASS
6/5/12	44/77	4:36	PV	M40	830	500	W EOS	E EOS	22	30	30	3:10	3:15	DG	6/8/12	PASS
6/5/12	45/78	4:37	PV	M40	830	500	W EOS	E EOS	22	30	30	3:07	3:12	DG	6/8/12	PASS
6/6/12	78/79	7:00	PV	M14	830	530	S EOS	N EOS	693	30	30	11:14	11:19	DG	6/8/12	PASS
6/5/12	79/80	7:20	DG	M16	860	550	S EOS	90' N S EOS	90	30	30	11:38	11:43	DG	6/8/12	PASS
6/6/12	79/80	7:20	DG	M16	860	550	90' N S EOS	N EOS	592	30	30	11:30	11:35	DG	6/8/12	PASS
6/5/12	80/81	7:33	JF	M41	860	560	S EOS	N EOS	684	30	30	11:36	11:41	DG	6/8/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/6/12	81/82	8:43	PV	M14	860	560	S EOS	150' N S EOS	150	30	30	11:50	11:55	DG	6/8/12	PASS
6/5/12	81/82	8:43	PV	M40	870	530	150' N S EOS	N EOS	534	30	30	1:37	1:42	DG	6/8/12	PASS
6/6/12	82/83	9:06	DG	M16	860	550	S EOS	N EOS	684	30	30	11:48	11:53	DG	6/8/12	PASS
6/5/12	84/89	10:07	JF	M41	860	560	S EOS	N EOS	8	30	30	1:11	1:16	DG	6/8/12	PASS
6/6/12	83/84	10:08	JF	M41	860	560	S EOS	N EOS	682	30	28	1:19	1:24	DG	6/8/12	PASS
6/5/12	84/85	11:06	DG	M16	860	550	S EOS	120' N S EOS	120	30	30	1:40	1:45	DG	6/8/12	PASS
6/5/12	84/85	11:06	DG	M16	860	550	120' N S EOS	425' N S EOS	305	30	30	1:44	1:49	DG	6/8/12	PASS
6/5/12	84/85	11:06	DG	M16	860	550	425' N S EOS	N EOS	245	30	30	2:41	2:46	DG	6/8/12	PASS
6/6/12	85/86	11:06	PV	M40	830	530	S EOS	575' N S E	575	30	30	1:50	1:55	DG	6/8/12	PASS
6/6/12	85/86	11:06	PV	M40	830	530	575' N S E	N EOS	61	30	30	2:51	2:56	DG	6/8/12	PASS
6/6/12	86/87	1:38	JF	M41	860	560	S EOS	N EOS	325	30	30	1:56	2:01	DG	6/8/12	PASS
6/6/12	87/88	11:43	JF	M41	860	560	W EOS	E EOS	12	30	CAPPED BY R152					
6/6/12	86/88	2:15	JF	M41	860	560	S EOS	25' N S EOS	25	30	30	2:20	2:25	DG	6/8/12	PASS
6/6/12	86/88	2:15	JF	M41	860	560	25' N S EOS	N EOS	84	30	30	2:32	2:37	DG	6/8/12	PASS
6/6/12	83/89	9:30	JF	M41	860	430	E EOS	W EOS	22	30	30	6:30	6:35	DG	6/9/12	PASS
6/6/12	89/90	10:47	DG	M16	860	550	S EOS	N EOS	11	30	30	6:31	6:36	DG	6/9/12	PASS
6/6/12	83/90	10:49	DG	M16	860	550	S EOS	N EOS	14	30	30	6:36	6:41	DG	6/9/12	PASS
6/6/12	82/90	9:49	JF	M41	860	530	E EOS	W EOS	22	30	30	6:37	6:42	DG	6/9/12	PASS
6/6/12	90/91	11:03	DG	M16	860	530	N EOS	S EOS	22	30	30	6:49	6:54	DG	6/9/12	PASS
6/6/12	82/91	10:57	DG	M16	860	550	N EOS	S EOS	11	30	30	6:44	6:49	DG	6/9/12	PASS
6/6/12	81/91	9:35	JF	M41	860	430	E EOS	11' W E EOS	11	30	30	6:50	6:55	DG	6/9/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/6/12	81/91	9:35	JF	M41	860	430	11' W E EOS	W EOS	11	30	30	6:58	7:03	DG	6/9/12	PASS
6/7/12	92/93	8:36	JF	M41	860	550	E EOS	172' W E EOS	172	30	30	7:14	7:19	DG	6/9/12	PASS
6/7/12	92/93	8:36	JF	M41	860	550	172' W E EOS	W EOS	525	30	30	8:36	8:41	DG	6/9/12	PASS
6/7/12	93/94	8:33	DG	M16	860	550	E EOS	W EOS	697	30	30	7:20	7:25	DG	6/9/12	PASS
6/7/12	81/94	9:28	PV	M40	830	500	N EOS	14' S N EOS	14	30	30	7:08	7:13	DG	6/9/12	PASS
6/7/12	81/94	9:28	PV	M40	830	500	14' S N EOS	S EOS	8	30	30	7:04	7:09	DG	6/9/12	PASS
6/7/12	81/93	9:30	PV	M40	830	500	N EOS	S EOS	8	30	30	7:03	7:08	DG	6/9/12	PASS
6/7/12	91/93	9:32	PV	M40	830	500	N EOS	S EOS	14	30	30	6:52	6:57	DG	6/9/12	PASS
6/7/12	91/92	9:33	PV	M40	830	500	N EOS	S EOS	22	30	30	6:57	7:02	DG	6/9/12	PASS
6/7/12	80/94	9:46	PV	M40	830	500	E EOS	W EOS	22	30	30	7:16	7:21	DG	6/9/12	PASS
6/7/12	79/94	9:48	PV	M40	830	500	E EOS	W EOS	22	30	30	7:23	7:28	DG	6/9/12	PASS
6/7/12	78/94	9:51	PV	M40	830	500	E EOS	W EOS	22	30	30	7:32	7:37	DG	6/9/12	PASS
6/7/12	77/94	9:56	PV	M40	830	500	E EOS	W EOS	22	30	30	7:33	7:38	DG	6/9/12	PASS
6/7/12	76/94	9:57	PV	M40	830	500	E EOS	W EOS	22	30	30	7:37	7:42	DG	6/9/12	PASS
6/7/12	75/94	10:00	PV	M40	830	500	E EOS	W EOS	22	30	30	7:40	7:45	DG	6/9/12	PASS
6/7/12	74/94	10:03	PV	M40	830	500	E EOS	W EOS	22	30	30	7:43	7:48	DG	6/9/12	PASS
6/7/12	73/94	10:06	PV	M40	830	500	E EOS	W EOS	22	30	30	7:46	7:51	DG	6/9/12	PASS
6/7/12	72/94	10:09	PV	M40	830	500	E EOS	W EOS	22	30	30	7:48	7:53	DG	6/9/12	PASS
6/7/12	71/94	10:12	PV	M40	830	500	E EOS	W EOS	22	30	30	7:53	7:58	DG	6/9/12	PASS
6/7/12	70/94	10:14	PV	M40	830	500	E EOS	W EOS	22	30	30	7:55	8:00	DG	6/9/12	PASS
6/7/12	69/94	10:17	PV	M40	830	500	E EOS	W EOS	22	30	30	7:58	8:03	DG	6/9/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/7/12	68/94	10:20	PV	M40	830	500	E EOS	W EOS	22	30	30	8:00	8:05	DG	6/9/12	PASS
6/7/12	67/94	10:25	PV	M40	830	500	E EOS	W EOS	22	30	30	8:04	8:09	DG	6/9/12	PASS
6/7/12	66/94	10:26	PV	M40	830	500	E EOS	W EOS	22	30	30	8:09	8:14	DG	6/9/12	PASS
6/7/12	65/94	10:29	PV	M40	830	500	E EOS	W EOS	22	30	30	8:10	8:15	DG	6/9/12	PASS
6/7/12	64/94	10:32	PV	M40	830	500	E EOS	W EOS	22	30	30	8:11	8:16	DG	6/9/12	PASS
6/7/12	63/94	10:35	PV	M40	830	500	E EOS	W EOS	22	30	30	8:15	8:20	DG	6/9/12	PASS
6/7/12	62/94	10:38	PV	M40	830	500	E EOS	W EOS	22	30	30	8:30	8:35	DG	6/9/12	PASS
6/7/12	61/94	10:41	PV	M40	830	500	E EOS	W EOS	22	30	30	8:35	8:40	DG	6/9/12	PASS
6/7/12	60/94	10:44	PV	M40	830	500	E EOS	W EOS	22	30	30	8:37	8:42	DG	6/9/12	PASS
6/7/12	59/94	10:47	PV	M40	830	500	E EOS	W EOS	22	30	30	8:43	8:48	DG	6/9/12	PASS
6/7/12	58/94	10:50	PV	M40	830	500	E EOS	W EOS	22	30	30	8:50	8:55	DG	6/9/12	PASS
6/7/12	57/94	10:53	PV	M40	830	500	E EOS	W EOS	22	30	30	8:53	8:58	DG	6/9/12	PASS
6/7/12	56/94	10:56	PV	M40	830	500	E EOS	W EOS	22	30	30	8:59	9:04	DG	6/9/12	PASS
6/7/12	55/94	11:06	PV	M40	830	500	E EOS	11' W E EOS	11	30	30	9:04	9:09	DG	6/9/12	PASS
6/7/12	55/94	11:06	PV	M40	830	500	11' W E EOS	W EOS	11	30	30	9:10	9:15	DG	6/9/12	PASS
6/7/12	54/94	11:08	PV	M40	830	500	E EOS	W EOS	22	30	30	9:11	9:16	DG	6/9/12	PASS
6/7/12	53/94	11:10	PV	M40	830	500	E EOS	W EOS	22	30	30	9:15	9:20	DG	6/9/12	PASS
6/7/12	46/94	11:12	PV	M40	830	500	E EOS	W EOS	22	30	30	9:14	9:19	DG	6/9/12	PASS
6/7/12	47/94	11:15	PV	M40	830	500	E EOS	W EOS	22	30	30	9:25	9:30	DG	6/9/12	PASS
6/7/12	48/94	11:18	PV	M40	830	500	E EOS	W EOS	22	30	30	9:30	9:35	DG	6/9/12	PASS
6/7/12	49/94	11:21	PV	M40	830	500	E EOS	W EOS	13	30	30	9:34	9:39	DG	6/9/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/7/12	94/99	4:45	PV	M40	850	500	N EOS	S EOS	22	30	30	9:34	9:39	DG	6/9/12	PASS
6/7/12	93/100	4:51	PV	M40	850	500	N EOS	S EOS	22	30	30	9:49	9:54	DG	6/9/12	PASS
6/7/12	92/102	4:55	PV	M40	850	500	N EOS	S EOS	22	30	30	10:05	10:10	DG	6/9/12	PASS
6/7/12	99/96	4:22	DG	M16	800	550	N EOS	S EOS	22	30	30	10:30	10:35	DG	6/9/12	PASS
6/7/12	96/100	4:30	DG	M16	800	550	N EOS	10' S N EOS	10	30	30	10:47	10:52	DG	6/9/12	PASS
6/7/12	96/100	4:30	DG	M16	800	550	10' S N EOS	S EOS	12	30	30	10:52	10:57	DG	6/9/12	PASS
6/7/12	96/102	4:33	DG	M16	800	550	N EOS	S EOS	22	30	30	10:57	11:02	DG	6/9/12	PASS
6/7/12	52/95	2:50	PV	M40	830	600	S EOS	N EOS	693	30	30	5:43	5:48	DG	6/9/12	PASS
6/7/12	95/96	1:16	PV	M40	830	600	S EOS	50' N S EOS	50	30	30	10:40	10:45	DG	6/9/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date Started: 5/30/2012
Project Location: Hutsonsville,IL

Material: HD Textured
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test						Pass / Fail
										PSI		Time		Tech	Date	
										Start	Finish	Start	Finish			
6/7/12	95/96	1:16	PV	M40	830	600	50' N S EOS	215' N S EOS	165	30	30	10:35	10:40	DG	6/9/12	PASS
6/7/12	95/96	1:16	PV	M40	830	600	215' N S EOS	550' N S EOS	335	30	30	5:55	6:00	DG	6/9/12	PASS
6/7/12	95/96	1:16	PV	M40	830	600	550' N S EOS	N EOS	45	30	30	5:50	5:55	DG	6/9/12	PASS
6/7/12	96/97	2:05	JF	M41	800	600	S EOS	458 N S EOS	458	30	30	6:07	6:12	DG	6/9/12	PASS
6/7/12	96/97	2:05	JF	M41	800	600	458 N S EOS	N EOS	10	30	30	6:02	6:07	DG	6/9/12	PASS
6/7/12	97/98	4:07	DG	M16	800	550	S EOS	250' N S EOS	250	30	30	11:10	11:15	DG	6/9/12	PASS
6/7/12	97/98	4:07	DG	M16	800	550	250' N S EOS	N EOS	16	30	30	11:35	11:40	DG	6/9/12	PASS
6/7/12	97/103	2:38	DG	M16	800	550	S EOS	N EOS	80	30	30	11:40	11:45	DG	6/9/12	PASS
6/7/12	49/94	4:05	DG	M16	800	550	E EOS	W EOS	13	30	30	9:44	9:49	DG	6/9/12	PASS
6/7/12	50/99	4:07	DG	M16	800	550	E EOS	W EOS	22	30	30	10:10	10:15	DG	6/9/12	PASS
6/7/12	51/99	4:10	DG	M16	800	550	E EOS	W EOS	22	30	30	10:15	10:20	DG	6/9/12	PASS
6/7/12	52/99	4:13	DG	M16	800	550	E EOS	W EOS	22	30	30	10:20	10:25	DG	6/9/12	PASS
6/7/12	95/99	4:16	DG	M16	800	550	E EOS	W EOS	22	30	30	10:25	10:30	DG	6/9/12	PASS
6/7/12	99/100	3:33	JF	M41	860	600	E EOS	W EOS	100	30	30	10:54	10:59	DG	6/9/12	PASS
6/7/12	100/101	3:50	JF	M41	860	600	E EOS	W EOS	92	30	28	10:00	10:05	DG	6/9/12	PASS
6/7/12	100/102	4:00	JF	M41	860	600	E EOS	W EOS	8	CAPPED BY R255						
6/7/12	101/102	3:35	DG	M16	800	550	N EOS	S EOS	22	30	30	11:05	11:10	DG	6/9/12	PASS
6/7/12	98/105	3:02	DG	M16	860	600	S EOS	N EOS	30	30	30	11:15	11:20	DG	6/9/12	PASS
6/7/12	98/104	3:06	DG	M16	860	600	S EOS	N EOS	56	30	30	11:20	11:25	DG	6/9/12	PASS
6/7/12	104/105	2:58	DG	M16	860	600	E EOS	W EOS	12	30	30	11:25	11:30	DG	6/9/12	PASS
6/7/12	3/95	4:25	PV	M14	830	660	E EOS	W EOS	17	30	30	5:12	5:17	DG	6/9/12	PASS

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville,IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location Seam #	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test P/F	Vacuum Test Date	Vac Test Tech
1	AT	1/2 S AT	6/1/2012	12:00	P	2*6	MX2	PV	PASS	6/13/12	mg
2	MD	1/2 12' N S EOS	6/1/2012	12:12	P	2*10	MX2	PV	PASS	6/13/12	mg
3	LE	2/3 S AT	6/1/2012	11:13	P	2*20	MX2	PV	PASS	6/13/12	mg
4	AT	2/3 N AT	6/1/2012	1:52	P	2*6	MX2	PV	PASS	6/13/12	mg
5	AT	3/4 N AT	6/1/2012	2:00	P	2*6	MX2	PV	PASS	6/13/12	mg
6	MD	3/4 10' S N AT	6/1/2012	1:45	P	2*8	MX2	PV	PASS	6/13/12	mg
7	DS-1	3/4 420' N S EOS	6/1/2012	2:05	P	2*6	MX2	PV	PASS	6/13/12	mg
8	BO	3/4 64' N S EOS	6/1/2012	10:20	P	2*2	MX2	PV	PASS	6/13/12	mg
9	DS-2	4/5 220' N S EOS	6/6/2012	3:50	P	2*6	MX2	AO	PASS	6/13/12	mg
10	BO	4/5 230' N S EOS	6/1/2012	10:41	P	2*2	MX2	PV	PASS	6/13/12	mg
11	BO	4/5 270' N S EOS	6/1/2012	10:46	P	2*2	MX2	PV	PASS	6/13/12	mg
12	BO	4/5 N AT	6/1/2012	2:33	P	2*6	MX2	PV	PASS	6/13/12	mg
13	LE	5-6-8 N AT	6/6/2012	2:30	P	6*50	MX2	AO	PASS	6/13/12	mg
14	T	5-6-7	6/1/2012	2:12	P	2*6	MX2	PV	PASS	6/13/12	mg
15	DS-3/A/B	5/7 100' N S EOS	6/1/2012	4:00	P	2*25	MX2	AO	PASS	6/13/12	mg
16	T	7-8-9	6/1/2012	3:30	P	2*2	MX2	PV	PASS	6/13/12	mg
17	DS-4	7/8 80' N S EOS	6/1/2012	2:30	P	2*6	MX2	PV	PASS	6/13/12	mg
18	T	6-7-8	6/1/2012	2:18	P	2*2	MX2	PV	PASS	6/13/12	mg
19	T	8-9-10	6/1/2012	3:28	P	2*2	MX2	PV	PASS	6/13/12	mg
20	DS-5	9/10 10' N S EOS	6/1/2012	3:44	P	2*6	MX2	PV	PASS	6/13/12	mg
21	T	9-10-11	6/1/2012	3:40	P	2*2	MX2	PV	PASS	6/13/12	mg
22	MD	11/13 125' S N EOS	6/12/2012	9:00	P	2*25	MX2	AO	PASS	6/13/12	mg
23	DS-7	11-12-13	6/12/2012	9:05	P	2*8	MX2	AO	PASS	6/13/12	mg
24	T	11-12-13	6/6/2012	4:10	P	4*4	MX2	AO	PASS	6/13/12	mg
25	T	10-11-12	6/1/2012	3:35	P	2*2	MX2	PV	PASS	6/13/12	mg
26	DS-6	10/12 N AT	6/1/2012	3:08	P	2*8	MX2	PV	PASS	6/13/12	mg
27	DS-8	12/14 310' S N EOS	6/1/2012	4:21	P	2*6	MX2	PV	PASS	6/13/12	mg
28	T	12-13-14	6/6/2012	4:05	P	2*2	MX2	PV	PASS	6/13/12	mg
29	DS-9	14/15 470' S N EOS	6/1/2012	8:09	P	2*6	MX2	PV	PASS	6/13/12	mg
30	AT	14/15 N AT	6/1/2012	3:15	P	2*2	MX2	PV	PASS	6/13/12	mg
31	DS-10	15/16 150' S N EOS	6/1/2012	3:55	P	2*6	MX2	PV	PASS	6/13/12	mg
32	T	15-16-17	6/1/2012	4:11	P	2*2	MX2	PV	PASS	6/13/12	mg
33	T	17-18-19	6/1/2012	5:56	P	2*2	MX2	PV	PASS	6/13/12	mg
34	BT	17/18 180' S N EOS	6/1/2012	9:15	P	2*5	MX2	ao	PASS	6/13/12	mg
35	DS-11	17/18 150' S N EOS	6/1/2012	4:30	P	2*6	MX2	PV	PASS	6/13/12	mg
36	MD	17/18 150' S N EOS 11' W P17	6/1/2012	9:22	P	2*5	MX2	ao	PASS	6/13/12	mg
37	T	16-17-18	6/1/2012	4:00	P	2*6	MX2	PV	PASS	6/13/12	mg
38	BO	16/18 N AT	6/1/2012	3:25	P	2*2	MX2	PV	PASS	6/13/12	mg
39	BO	18/20 290' S N AT	6/1/2012	4:34	P	2*2	MX2	PV	PASS	6/13/12	mg
40	T	18-19-20	6/1/2012	5:49	P	2*2	MX2	PV	PASS	6/13/12	mg
41	BO	20/22 85' S N EOS	6/1/2012	5:44	P	2*2	MX2	PV	PASS	6/13/12	mg
42	DS-12 A AND B	20-21-22	6/1/2012	5:28	P	2*26	MX2	PV	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville,IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
43	MD	20/21 12' S N EOS 3' W P 20	6/6/2012	3:34	P	2*2	MX2	AO	PASS	6/13/12	mg
44	BO	20/21 N AT	6/6/2012	3:30	P	2*4	MX2	AO	PASS	6/13/12	mg
45	BO	21/23 220' S N EOS	6/1/2012	5:20	P	2*2	MX2	PV	PASS	6/13/12	mg
46	T	21-21-23	6/1/2012	5:15	P	2*2	MX2	PV	PASS	6/13/12	mg
47	DS13 A AND B	22/23 20' S N EOS	6/1/2012	5:37	P	2*25	MX2	PV	PASS	6/13/12	mg
48	T	23-24-25	6/7/2012	5:00	P	2*2	MX2	AO	PASS	6/13/12	mg
49	AT	23-24 N AT	6/7/2012	5:20	P	2*2	MX2	AO	PASS	6/13/12	mg
50	AT	24/26 N AT	6/8/2012	7:10	P	2*4	MX2	AO	PASS	6/13/12	mg
51	T	24-25-26	6/7/2012	5:05	P	2*2	MX2	AO	PASS	6/13/12	mg
52	DS-14 A AND B	26/27 150' S N EOS	6/7/2012	5:40	P	2*25	MX2	AO	PASS	6/13/12	mg
53	MD	51/52 300' N S EOS	6/8/2012	10:00	P	2*20	MX2	AO	PASS	6/13/12	mg
54	DS-25	50/51 590' N S EOS	6/8/2012	9:12	P	2*6	MX18	PV	PASS	6/13/12	mg
55	DS-24	50/51 100' N S EOS	6/8/2012	9:20	P	2*6	MX2	AO	PASS	6/13/12	mg
56	MD	49/50 25' N S EOS	6/8/2012	9:25	P	2*2	MX2	AO	PASS	6/13/12	mg
57	DS-15	27/28 100' S N EOS	6/7/2012	6:00	P	2*6	MX2	AO	PASS	6/13/12	mg
58	BO	28/29 N AT	6/8/2012	7:35	P	2*2	MX2	AO	PASS	6/13/12	mg
59	DS16	28/29 20' S N AT	6/8/2012	7:25	P	2*6	MX2	AO	PASS	6/13/12	mg
60	BO	29/30 N AT	6/8/2012	7:40	P	2*2	MX2	AO	PASS	6/13/12	mg
61	BO	31/32 95' S N AT	6/8/2012	7:50	P	2*2	MX2	AO	PASS	6/13/12	mg
62	BO	49/50 135' N S EOS	6/8/2012	9:30	P	2*2	MX2	AO	PASS	6/13/12	mg
63	MD	33/34 70' S N AT 11'W P 33	6/8/2012	7:45	P	2*2	MX2	AO	PASS	6/13/12	mg
64	T	34-35-36	6/8/2012	7:55	P	2*2	MX2	AO	PASS	6/13/12	mg
65	DS-17	35/36 15' S N AT	6/8/2012	8:05	P	2*6	MX2	AO	PASS	6/13/12	mg
66	T	35-36-37	6/8/2012	8:06	P	2*2	MX2	AO	PASS	6/13/12	mg
67	DS-18	37/38 27' S N AT	6/8/2012	8:15	P	2*2	MX2	AO	PASS	6/13/12	mg
68	DS-19	38/39 N AT	6/8/2012	8:00	P	2*28	MX2	AO	PASS	6/13/12	mg
69	DS-26	51/52 250' N S AT	6/8/2012	9:55	P	2*6	MX2	AO	PASS	6/13/12	mg
70	BO	49/50 125' N S EOS	6/8/2012	9:15	P	2*2	MX2	AO	PASS	6/13/12	mg
71	DS-23	49/50 250' N S EOS	6/8/2012	9:40	P	2*2	MX2	AO	PASS	6/13/12	mg
72	DS-22	48/49 440' N S EOS	6/8/2012	9:20	P	2*6	MX18	PV	PASS	6/13/12	mg
73	DS-21	47/48 450' N S EOS	6/8/2012	9:31	P	2*16	MX18	PV	PASS	6/13/12	mg
74	DS-20	46/47 300' N S EOS	6/8/2012	9:50	P	2*6	MX18	PV	PASS	6/13/12	mg
75	BO	46/47 208' N S EOS	6/12/2012	9:35	P	2*2	MX18	PV	PASS	6/13/12	mg
76	DS-39	46/53 400' N S E	6/8/2012	10:16	P	2*6	MX18	PV	PASS	6/13/12	mg
77	BO	53/54 610' N S EOS	6/8/2012	11:31	P	2*6	MX18	PV	PASS	6/13/12	mg
78	BO	53/54 560' N S EOS	6/8/2012	11:26	P	2*6	MX18	PV	PASS	6/13/12	mg
79	DS-52	53-54 498' N S EOS	6/8/2012	11:13	P	2*6	MX18	PV	PASS	6/13/12	mg
80	BT	53/54 492' N S EOS	6/8/2012	9:25	P	2*5	MX2	ao	PASS	6/13/12	mg
81	DS27	54/55 100 N S EOS	6/8/2012	11:17	P	2*6	MX2	AO	PASS	6/13/12	mg
82	BO	54/55 167' N S EOS	6/8/2012	11:12	P	2*2	MX2	AO	PASS	6/13/12	mg
83	DS-40	55/56 210' S N EOS	6/8/2012	11:10	P	2*6	MX18	PV	PASS	6/13/12	mg
84	BO	55/56 325' S N EOS	6/8/2012	10:25	P	2*2	MX18	PV	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: 112-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville,IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
85	BO	55/56 500' S N EOS	6/8/2012	11:05	P	2*2	MX2	AO	PASS	6/13/12	mg
86	BO	56/57 15' S N EOS	6/8/2012	1:19	P	2*2	MX18	PV	PASS	6/13/12	mg
87	BO	56/57 30 S N EOS	6/8/2012	11:47	P	2*2	MX18	PV	PASS	6/13/12	mg
88	MD	56/57 265' S N EOS	6/8/2012	2:14	P	2*2	MX18	PV	PASS	6/13/12	mg
89	DS-29	56/57 315' S N EOS	6/8/2012	10:33	P	2*6	MX18	PV	PASS	6/13/12	mg
90	BO	56/57 580' S N EOS	6/8/2012	11:25	P	2*6	MX2	AO	PASS	6/13/12	mg
91	DS-53	57/58 310' S N EOS	6/8/2012	10:40	P	2*6	MX18	PV	PASS	6/13/12	mg
92	BO	58/59 640' N S EOS	6/8/2012	1:25	P	2*6	MX18	PV	PASS	6/13/12	mg
93	BO	58/59 570' N S EOS	6/8/2012	1:47	P	2*6	MX18	PV	PASS	6/13/12	mg
94	DS-42	58/59 500' N S EOS	6/8/2012	1:56	P	2*6	MX18	PV	PASS	6/13/12	mg
95	BO	58/59 430' N S EOS	6/8/2012	2:03	P	2*6	MX18	PV	PASS	6/13/12	mg
96	DS-41	58/59 10' N S EOS	6/8/2012	11:40	P	2*6	MX2	AO	PASS	6/13/12	mg
97	DS-54	59/60 100' N S EOS	6/8/2012	11:50	P	2*2	MX2	AO	PASS	6/13/12	mg
98	BO	59/60 495' N S EOS	6/8/2012	1:57	P	2*2	MX18	PV	PASS	6/13/12	mg
99	DS-55	59/60 600' N S EOS	6/8/2012	1:32	P	2*6	MX18	PV	PASS	6/13/12	mg
100	DS-30	60/61 245' N S EOS	6/8/2012	1:40	P	2*6	MX2	AO	PASS	6/13/12	mg
101	DS-43	61/62 200' N S EOS	6/8/2012	1:50	P	2*6	MX2	AO	PASS	6/13/12	mg
102	BT	61/62 390' N S EOS	6/8/2012	9:35	P	2*5	MX2	ao	PASS	6/13/12	mg
103	DS-44	61/62 680' N S EOS	6/8/2012	3:57	P	2*6	MX18	PV	PASS	6/13/12	mg
104	DS-56	62/63 350' S N EOS	6/8/2012	3:13	P	2*6	MX18	PV	PASS	6/13/12	mg
105	DS-31	63/64 20' N S EOS	6/8/2012	2:10	P	2*6	MX2	AO	PASS	6/13/12	mg
106	DS-32	63/64 500' N S EOS	6/8/2012	2:24	P	2*6	MX18	PV	PASS	6/13/12	mg
107	DS-45	64/65 500' N S EOS	6/8/2012	2:43	P	2*6	MX18	PV	PASS	6/13/12	mg
108	DS-57	65/66 140' N S EOS	6/8/2012	2:00	P	2*6	MX2	AO	PASS	6/13/12	mg
109	BO	65/66 320' N S EOS	6/12/2012	9:45	P	2*5	MX2	ao	PASS	6/13/12	mg
110	BO	65/66 490' N S EOS	6/8/2012	5:18	P	2*25	MX18	PV	PASS	6/13/12	mg
111	BO	65/66 545 N S EOS	6/8/2012	9:03	P	2*22	MX18	PV	PASS	6/13/12	mg
112	DS-58	65/66 650' N S EOS	6/8/2012	3:44	P	2*6	MX18	PV	PASS	6/13/12	mg
113	BO	66/67 520' N S EOS	6/12/2012	10:00	P	2*5	MX2	ao	PASS	6/13/12	mg
114	DS-33	66/67 445' N S EOS	6/12/2012	10:15	P	2*5	MX2	ao	PASS	6/13/12	mg
115	BT	67/68 96' N S EOS	6/12/2012	10:23	P	2*5	MX2	ao	PASS	6/13/12	mg
116	DS-46	67/68 300' N S EOS	6/12/2012	10:32	P	2*5	MX2	ao	PASS	6/13/12	mg
117	DS-59	68/69 450' N S EOS	6/8/2012	5:48	P	2*6	MX18	PV	PASS	6/13/12	mg
118	DS-34	69/70 55' N S EOS	6/8/2012	2:30	P	2*6	MX2	AO	PASS	6/13/12	mg
119	MD	69/70 155' N S EOS	6/8/2012	2:34	P	2*2	MX2	AO	PASS	6/13/12	mg
120	BT	69/70 515' N S EOS	6/12/2012	10:47	P	2*5	MX2	ao	PASS	6/13/12	mg
121	DS-35	69/70 540' N S EOS	6/12/2012	10:52	P	2*5	MX2	ao	PASS	6/13/12	mg
122	DS-48	70/71 600' N S EOS	6/12/2012	11:00	P	2*5	MX2	ao	PASS	6/13/12	mg
123	DS-47	70/71 100' N S EOS	6/8/2012	2:20	P	2*6	MX2	AO	PASS	6/13/12	mg
124	DS-60	71/72 250 N S EOS	6/12/2012	11:05	P	2*5	MX2	ao	PASS	6/13/12	mg
125	DS-36	72/73 350' N S EOS	6/12/2012	11:10	P	2*5	MX2	ao	PASS	6/13/12	mg
126	BO	73/74 650' N S EOS	6/9/2012	7:00	P	2*6	MX18	PV	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville, IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
127	DS-49	73/74 400' N S EOS	6/12/2012	11:15	P	2*5	MX2	ao	PASS	6/13/12	mg
128	DS-61	74/75 50' N S EOS	6/8/2012	4:00	P	2*6	MX2	AO	PASS	6/13/12	mg
129	DS-62	74/75 560' N S EOS	6/9/2012	7:30	P	2*6	MX18	PV	PASS	6/13/12	mg
130	DS-63	75/76 350' N S EOS	6/12/2012	11:23	P	2*5	MX2	ao	PASS	6/13/12	mg
131	DS-51	76/77 10' N S EOS	6/8/2012	4:20	P	2*6	MX2	AO	PASS	6/13/12	mg
132	DS-50	76/77 200' N S EOS	6/8/2012	4:50	P	2*6	MX2	AO	PASS	6/13/12	mg
133	BT	77/78 260' N S EOS	6/12/2012	11:45	P	2*5	MX2	ao	PASS	6/13/12	mg
134	DS-37	77/78 125' N S EOS	6/8/2012	4:45	P	2*6	MX2	AO	PASS	6/13/12	mg
135	DS-38	77/78 25' N S EOS	6/8/2012	4:25	P	2*6	MX2	AO	PASS	6/13/12	mg
136	DS-64	78/79 500' N S EOS	6/9/2012	7:39	P	2*6	MX18	PV	PASS	6/13/12	mg
137	DS-74	79/80 650' N S EOS	6/9/2012	10:00	P	2*6	MX18	PV	PASS	6/13/12	mg
138	DS-73	79/80 150 N S EOS	6/8/2012	4:40	P	2*6	MX2	AO	PASS	6/13/12	mg
139	BO	79/80 90' N S EOS	6/8/2012	4:31	P	2*2	MX2	AO	PASS	6/13/12	mg
140	DS-81	80/1 500' N S EOS	6/9/2012	7:47	P	2*6	MX18	PV	PASS	6/13/12	mg
141	DS-65	81/82 300' N S EOS	6/9/2012	7:45	P	2*6	MX2	AO	PASS	6/13/12	mg
142	BO	81/82 150 N S EOS	6/9/2012	7:10	P	2*2	MX2	AO	PASS	6/13/12	mg
143	DS-75	82/83 400' N S EOS	6/9/2012	8:00	P	2*2	MX2	AO	PASS	6/13/12	mg
144	DS-82	83/84 300' N S EOS	6/9/2012	7:20	P	2*6	MX2	AO	PASS	6/13/12	mg
145	DS-76	84/85 100' N S EOS	6/8/2012	5:35	P	2*6	MX2	AO	PASS	6/13/12	mg
146	BO	84/85 120' N S EOS	6/8/2012	5:25	P	2*6	MX2	AO	PASS	6/13/12	mg
147	BO	84/85 425' N S EOS	6/9/2012	7:50	P	2*2	MX2	AO	PASS	6/13/12	mg
148	DS-67	85/86 600' N S EOS	6/9/2012	8:17	P	2*6	MX18	PV	PASS	6/13/12	mg
149	BO	85/86 575' N S EOS	6/9/2012	8:09	P	2*2	MX18	PV	PASS	6/13/12	mg
150	DS-66	85/86 100' N S EOS	6/8/2012	5:45	P	2*6	MX2	AO	PASS	6/13/12	mg
151	DS-83	86/87 120' N S EOS	6/9/2012	7:05	P	2*6	MX2	AO	PASS	6/13/12	mg
152	T	86-87-88	6/9/2012	9:00	P	2*12	MX2	AO	PASS	6/13/12	mg
153	MD	86/88 25' N S EOS	6/9/2012	8:05	P	2*30	MX2	AO	PASS	6/13/12	mg
154	LE	86/88 N AT	6/9/2012	9:00	P	2*30	MX18	PV	PASS	6/13/12	mg
155	DS EX1	86 W AT	6/9/2012	9:08	P	2*6	MX18	PV	PASS	6/13/12	mg
156	DS-77	84/85 600' N S EOS	6/9/2012	8:00	P	2*6	MX18	PV	PASS	6/13/12	mg
157	T	83-84-89	6/9/2012	11:00	P	2*6	MX2	AO	PASS	6/13/12	mg
158	T	83-89-90	6/9/2012	11:05	P	2*2	MX2	AO	PASS	6/13/12	mg
159	T	82-83-90	6/9/2012	11:10	P	2*6	MX2	AO	PASS	6/13/12	mg
160	T	82-90-91	6/9/2012	12:50	P	2*2	MX2	AO	PASS	6/13/12	mg
161	T	81-82-91	6/9/2012	1:00	P	2*6	MX3	AO	PASS	6/13/12	mg
162	BO	81/91 11' W E EOS	6/9/2012	1:10	P	2*6	MX4	AO	PASS	6/13/12	mg
163	T	91-92-93	6/9/2012	1:17	P	2*2	MX5	AO	PASS	6/13/12	mg
164	T	91-92-81	6/9/2012	1:15	P	2*2	MX6	AO	PASS	6/13/12	mg
165	T	81-93-94	6/9/2012	1:20	P	2*2	MX7	AO	PASS	6/13/12	mg
166	BO	81/94 14 S N EOS	6/9/2012	1:25	P	2*2	MX8	AO	PASS	6/13/12	mg
167	T	80-81-94	6/9/2012	1:30	P	2*2	MX9	AO	PASS	6/13/12	mg
168	MD	80/94 3'W 4' S P94	6/9/2012	1:38	P	4*4	MX10	AO	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville,IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
169	DS-84	92/93 145' W E EOS	6/9/2012	1:40	P	2*6	MX2	AO	PASS	6/13/12	mg
170	MD	92-93 385' W E EOS	6/9/2012	3:15	P	2*2	MX2	AO	PASS	6/13/12	mg
171	MD	92/93 410' W E EOS	6/9/2012	3:10	P	2*2	MX2	AO	PASS	6/13/12	mg
172	BO	92/93 425' W E EOS	6/9/2012	3:05	P	2*2	MX2	AO	PASS	6/13/12	mg
173	MD	92/93 475 W E EOS	6/11/2012	11:20	P	2*2	MX2	AO	PASS	6/13/12	mg
174	DS-85	92/93 650' W E EOS	6/11/2012	8:10	P	2*2	MX2	AO	PASS	6/13/12	mg
175	DS-78	93/94 400' W E EOS	6/9/2012	3:20	P	2*6	MX2	AO	PASS	6/13/12	mg
176	T	79-80-94	6/9/2012	1:35	P	2*6	MX2	AO	PASS	6/13/12	mg
177	T	78-79-94	6/9/2012	1:44	P	2*2	MX2	AO	PASS	6/13/12	mg
178	T	77-78-94	6/9/2012	1:45	P	2*2	MX2	AO	PASS	6/13/12	mg
179	T	76-77-94	6/9/2012	1:47	P	2*2	MX2	AO	PASS	6/13/12	mg
180	T	75-76-94	6/9/2012	1:50	P	2*2	MX2	AO	PASS	6/13/12	mg
181	T	74-75-94	6/9/2012	1:53	P	2*2	MX2	AO	PASS	6/13/12	mg
182	T	73-74-94	6/9/2012	1:55	P	2*2	MX2	AO	PASS	6/13/12	mg
183	T	72-73-94	6/9/2012	1:58	P	2*2	MX2	AO	PASS	6/13/12	mg
184	T	71-72-94	6/9/2012	2:05	P	2*2	MX2	AO	PASS	6/13/12	mg
185	DS-68	71/94 11' W E EOS	6/9/2012	2:10	P	2*2	MX2	AO	PASS	6/13/12	mg
186	T	70-71-94	6/9/2012	2:15	P	2*2	MX2	AO	PASS	6/13/12	mg
187	T	69-70-94	6/9/2012	2:17	P	2*2	MX2	AO	PASS	6/13/12	mg
188	T	68-69-94	6/9/2012	2:20	P	2*2	MX2	AO	PASS	6/13/12	mg
189	T	67-68-94	6/9/2012	2:25	P	2*2	MX2	AO	PASS	6/13/12	mg
190	T	66-67-94	6/9/2012	2:30	P	2*2	MX2	AO	PASS	6/13/12	mg
191	T	65-66-94	6/9/2012	2:35	P	2*2	MX2	AO	PASS	6/13/12	mg
192	MD	65/66 6' N S EOS 1E P66	6/9/2012	2:37	P	2*2	MX2	AO	PASS	6/13/12	mg
193	T	64-65-94	6/9/2012	2:41	P	2*2	MX2	AO	PASS	6/13/12	mg
194	T	63-64-94	6/9/2012	2:45	P	2*2	MX2	AO	PASS	6/13/12	mg
195	T	62-63-94	6/9/2012	2:50	P	2*2	MX2	AO	PASS	6/13/12	mg
196	T	61-62-94	6/9/2012	2:55	P	2*2	MX2	AO	PASS	6/13/12	mg
197	T	60-61-94	6/9/2012	3:00	P	2*2	MX2	AO	PASS	6/13/12	mg
198	T	59-60-94	6/9/2012	3:25	P	2*2	MX2	AO	PASS	6/13/12	mg
199	T	58-59-94	6/9/2012	3:40	P	2*2	MX2	AO	PASS	6/13/12	mg
200	T	57-58-94	6/11/2012	6:45	P	2*2	MX2	AO	PASS	6/13/12	mg
201	T	56-57-94	6/9/2012	6:50	P	2*2	MX2	AO	PASS	6/13/12	mg
202	T	55-56-94	6/11/2012	6:50	P	2*2	MX2	AO	PASS	6/13/12	mg
203	BO	55-94-11' W E EOS	6/11/2012	6:55	P	2*6	MX2	AO	PASS	6/13/12	mg
204	T	54-55-94	6/11/2012	7:00	P	2*7	MX2	AO	PASS	6/13/12	mg
205	T	53-54-94	6/11/2012	7:05	P	2*2	MX2	AO	PASS	6/13/12	mg
206	T	45-53-94	6/11/2012	7:10	P	2*22	MX2	AO	PASS	6/13/12	mg
207	T	46-47-94	6/11/2012	7:25	P	2*2	MX2	AO	PASS	6/13/12	mg
208	DS-72	47-48-94	6/11/2012	7:30	P	2*7	MX2	AO	PASS	6/13/12	mg
209	T	48-49-94	6/11/2012	7:35	P	2*7	MX2	AO	PASS	6/13/12	mg
210	T	49-94-99	6/11/2012	7:40	P	2*2	MX2	AO	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville,IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
211	T	93-94-99-100	6/11/2012	7:50	P	2*6	MX2	AO	PASS	6/13/12	mg
212	T	92-93-100-101	6/11/2012	8:05	P	2*2	MX2	AO	PASS	6/13/12	mg
213	T	49-50-99	6/11/2012	7:45	P	2*2	MX2	AO	PASS	6/13/12	mg
214	T	50-51-99	6/11/2012	8:20	P	2*2	MX2	AO	PASS	6/13/12	mg
215	DS-80	51/99 11' W E EOS	6/11/2012	8:40	P	2*2	MX2	AO	PASS	6/13/12	mg
216	T	51-52-99	6/11/2012	8:50	P	2*2	MX2	AO	PASS	6/13/12	mg
217	T	52-95-99	6/11/2012	9:00	P	2*2	MX2	AO	PASS	6/13/12	mg
218	LE	45/78 N AT	6/9/2012	10:12	P	2*2	MX2	AO	PASS	6/13/12	mg
219	T	44-45-78-77	6/9/2012	10:14	P	4*4	MX18	PV	PASS	6/13/12	mg
220	T	43-44-76-77	6/9/2012	10:20	P	4*4	MX18	PV	PASS	6/13/12	mg
221	T	42-43-75-76	6/9/2012	10:47	P	4*4	MX18	PV	PASS	6/13/12	mg
222	T	41-42-74-75	6/9/2012	10:56	P	4*4	MX18	PV	PASS	6/13/12	mg
223	T	40-41-73-74	6/9/2012	11:04	P	4*4	MX18	PV	PASS	6/13/12	mg
224	T	39-40-72-73	6/9/2012	12:50	P	4*11	MX18	PV	PASS	6/13/12	mg
225	T	38-39-71-72	6/9/2012	1:26	P	2*2	MX18	PV	PASS	6/13/12	mg
226	T	37-38-70-71	6/9/2012	1:31	P	2*2	MX18	PV	PASS	6/13/12	mg
227	T	36-37-69-70	6/9/2012	1:35	P	2*2	MX18	PV	PASS	6/13/12	mg
228	T	34-36-68-69	6/9/2012	1:43	P	2*6	MX18	PV	PASS	6/13/12	mg
229	T	33-34-67-68	6/9/2012	1:55	P	2*6	MX18	PV	PASS	6/13/12	mg
230	T	32-33-66-67	6/9/2012	2:04	P	2*6	MX18	PV	PASS	6/13/12	mg
231	T	31-32-65-66	6/9/2012	2:24	P	2*6	MX18	PV	PASS	6/13/12	mg
232	T	30-60	6/9/2012	2:26	P	2*23	MX18	PV	PASS	6/13/12	mg
233	T	28-29-62-63	6/11/2012	7:04	P	2*2	MX18	PV	PASS	6/13/12	mg
234	T	27-28-61-62	6/11/2012	7:09	P	2*2	MX18	DG	PASS	6/13/12	mg
235	T	26-27-60-61	6/11/2012	7:14	P	2*2	MX18	DG	PASS	6/13/12	mg
236	T	25-2659-60	6/11/2012	7:19	P	2*2	MX18	DG	PASS	6/13/12	mg
237	T	23-25-58-59	6/11/2012	7:29	P	2*2	MX18	DG	PASS	6/13/12	mg
238	T	22-23-57-58	6/11/2012	7:34	P	2*2	MX18	DG	PASS	6/13/12	mg
239	T	20-22-56-57	6/11/2012	7:39	P	2*2	MX18	DG	PASS	6/13/12	mg
240	T	19-20-55-56	6/11/2012	7:52	P	2*2	MX18	DG	PASS	6/13/12	mg
241	MD	55-56 6' S EOS	6/11/2012	7:54	P	2*2	MX18	DG	PASS	6/13/12	mg
242	T	17-19-54-55	6/11/2012	7:57	P	2*2	MX18	DG	PASS	6/13/12	mg
243	T	15-17-53-54	6/11/2012	8:00	P	2*2	MX18	DG	PASS	6/13/12	mg
244	T	14-15-46-53	6/11/2012	8:05	P	2*6	MX18	DG	PASS	6/13/12	mg
245	T	13-14-46-47	6/11/2012	8:10	P	2*2	MX18	DG	PASS	6/13/12	mg
246	T	11-13-47-48	6/11/2012	8:15	P	2*2	MX18	DG	PASS	6/13/12	mg
247	T	9-11-48-49	6/11/2012	8:25	P	2*2	MX18	DG	PASS	6/13/12	mg
248	T	7-9-49-50	6/11/2012	8:30	P	2*2	MX18	DG	PASS	6/13/12	mg
249	T	5-7-50-51	6/11/2012	8:35	P	2*2	MX18	DG	PASS	6/13/12	mg
250	T	4-5-51-53	6/11/2012	8:40	P	2*2	MX18	DG	PASS	6/13/12	mg
251	T	3-4-52-95	6/11/2012	8:55	P	2*2	MX18	DG	PASS	6/13/12	mg
252	BO	3/95 W AT	6/11/2012	9:00	P	2*2	MX18	DG	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: 112-011
Project Name: Hutsonville Power Plant
Date: 5/30/12
Project LocatDn: Hutsonville,IL

Material: HD TEXTURED
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
253	DS-70	52/95 600' N S EOS	6/11/2012	9:05	P	2*6	MX18	DG	PASS	6/13/12	mg
254	DS-69	52/95 120' N S EOS	6/11/2012	11:19	P	2*6	MX18	DG	PASS	6/13/12	mg
255	T	96-100-101-103	6/11/2012	9:50	P	2*10	MX2	AO	PASS	6/13/12	mg
256	BO	96/100 10' S N EOS	6/11/2012	9:20	P	2*6	MX2	AO	PASS	6/13/12	mg
257	T	96-99-100	6/11/2012	9:15	P	2*6	MX2	AO	PASS	6/13/12	mg
258	T	95-96-99	6/11/2012	9:10	P	2*2	MX2	AO	PASS	6/13/12	mg
259	BO	95/96 50' N S EOS	6/11/2012	11:27	P	2*2	MX18	DG	PASS	6/13/12	mg
260	BO	95/96 215' N S EOS	6/11/2012	10:34	P	2*2	MX18	DG	PASS	6/13/12	mg
261	DS-71	95/96 400' N S EOS	6/11/2012	10:07	P	2*2	MX18	DG	PASS	6/13/12	mg
262	BO	95/96 552 N S EOS	6/11/2012	9:20	P	2*6	MX18	DG	PASS	6/13/12	mg
263	BO	96/97 458' N S EOS	6/11/2012	10:15	P	2*2	MX18	DG	PASS	6/13/12	mg
264	DS-86	96/97 380' N S EOS	6/11/2012	10:26	P	2*6	MX18	DG	PASS	6/13/12	mg
265	DS-79	97/98 290' N S EOS	6/11/2012	11:09	P	2*6	MX18	DG	PASS	6/13/12	mg
266	BO	97/98 254' N S EOS	6/11/2012	10:50	P	2*2	MX18	DG	PASS	6/13/12	mg
267	T	97-98-103	6/11/2012	10:56	P	2*12	MX18	DG	PASS	6/13/12	mg
268	T	98-104-105	6/11/2012	11:34	P	2*2	MX18	DG	PASS	6/13/12	mg

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
1	3/4	6/1/12	M14	PV	850/500		125	90	90	94	101	133	126	141	132	135	PASS	BF	SS
							88	86	82	83	83								
2	4/5	6/1/12	M16	LS	860/600		93	85	95	62	93	124	102	94	123	115	FAIL	BF	SS
							95	106	84	78	96								
2A	4/5	6/6/12	M16	LS	860/600		71	96	91	87	97	139	133	139	128	129	PASS	BF	SS
							89	100	66	77	85								
2B	4/5	6/6/12	M16	LS	860/600		81	87	67	90	77	146	137	149	130	132	PASS	BF	SS
							88	86	90	84	64								
3	5/7	6/1/12	M40	AO	860/600		107	83									FAIL	BF	SS
3A	5/7	6/1/12	M40	AO	860/600		93	96	95	88	83	149	149	147	144	144	PASS	BF	SS
							95	95	97	92	79								
3B	5/7	6/1/12	M40	AO	860/600		93	96	92	86	83	148	150	147	150	143	PASS	BF	SS
							87	75	95	92	92								
4	7/8	6/1/12	M14	PV	850/550		91	81	96	87	92	142	126	132	126	140	PASS	BF	SS
							92	93	83	99	110								
5	9/10	6/1/12	M16	LS	860/600		117	98	95	95	93	137	134	140	139	139	PASS	BF	SS
							97	88	100	86	93								
6	10/12	6/1/2012	M40	AO	860/600		82	107	114	195	93	136	135	137	139	129	PASS	BF	SS
							116	98	94	97	94								
7	11/13	6/1/2012	M40	AO	860/600		80	84	99	90	102	137	139	115	136	141	FAIL	BF	SS
							103	73	89	78	87								

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
7A	11/13	6/6/2012	M40	AO	860/600		88	74	88	70	61	142	137	149	133	143	PASS	BF	SS
							82	81	89	75	75								
7B	11/13	6/6/2012	M40	AO	860/600		86	82	91	85	83	152	128	150	134	138	PASS	BF	SS
							87	75	75	90	84								
8	12/14	6/1/2012	M14	PV	850/550		91	98	93	92	103	141	137	136	133	132	PASS	BF	SS
							96	96	99	87	70								
9	14/15	6/1/2012	M40	AO	860/600		109	103	103	103	98	133	131	129	131	135	PASS	BF	SS
							96	106	81	99	93								
10	15/16	6/1/2012	M16	LS	860/600		95	93	92	89	94	134	126	127	113	131	PASS	BF	SS
							94	93	107	87	82								
11	17/18	6/1/2012	M14	PV	850/550		87	90	110	87	104	132	130	133	136	130	PASS	BF	SS
							91	103	101	94	78								
12	20/22	6/1/2012	M16	LS	860/600		89	88	86	91	83	139	129	137	135	135	FAIL	BF	SS
							90	100	82	95	88								
12A	20/22	6/6/2012	M16	LS	860/600		94	76	88	72	86	141	139	121	131	103	PASS	BF	SS
							91	67	80	87	80								
12B	20/22	6/6/2012	M16	LS	860/600		74	61	90	85	84	152	126	127	145	136	PASS	BF	SS
							73	67	77	68	76								
13	22/23	6/1/2012	M40	M40	860/600		90	84	100	101	76						FAIL	BF	SS
							78	99	94	89	94								
13 A	22/23	6/2/2012	M40	M40	860/600		94	102	99	97	106	135	137	142	143	133	PASS	BF	SS
							96	92	103	76	83								

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
13 B	22/23	6/2/2012	M40	M40	860/600		97	92	99	94	97	128	133	132	133	135	PASS	BF	SS
							93	100	86	71	85								
14	26/27	6/2/2012	M40	M40	860/600		79	71	79	82	72						FAIL	BF	SS
							97	92	107	101	93								
14A	26/27	6/2/2012	M40	M40	860/600		108	89	82	90	82	155	150	142	150	153	PASS	BF	SS
							68	96	68	62	93								
14B	26/27	6/2/2012	M40	M40	860/600		82	86	111	88	93	138	134	152	152	153	PASS	BF	SS
							101	100	89	96	96								
15	27/28	6/1/2012	M14	PV	850/600		86	87	93	106	90	136	134	131	135	139	PASS	BF	SS
							93	97	92	107	97								
16	28/29	6/1/2012	M16	LS	860/600		91	92	93	91	87	129	134	131	132	132	PASS	BF	SS
							93	84	86	84	83								
17	35/37	6/1/2012	M40	AO	860/600		102	100	99	87	98	137	132	138	126	138	PASS	BF	SS
							87	103	96	82	105								
18	37/38	6/1/2012	M14	PV	860/600		87	102	86	82	83	139	144	139	130	129	PASS	BF	SS
							99	85	99	103	94								
19	38/39	6/1/2012	M16	LS	860/600		80	88	75	88	85	141	139	139	138	143	FAIL	BF	SS
							81	74	74	85	87								
19A	38/39	6/6/2012	M16	LS	860/600		90	88	81	67	90	134	155	151	137	138	PASS	BF	SS
							97	85	89	82	86								
19B	38/39	6/6/2012	M16	LS	860/600		92	81	95	87	86	158	144	157	141	147	PASS	BF	SS
							97	75	87	93	75								

Electronic Filing: Received, Clerk's Office 09/28/2020

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
							Peel (ppi) IN / OUT					Shear (ppi)							
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
20	46/47	6/2/2012	M14	PV	830/530		111	82	107	96	90	136	138	143	147	142	PASS	BF	SS
							81	77	86	75	104								
21	47/48	6/2/2012	M16	LS	860/600		85	90	66	76	86	142	143	141	142	139	PASS	BF	SS
							96	100	91	84	105								
22	48/49	6/2/2012	M14	JF	860/600		79	104	98	88	100	140	136	140	136	131	PASS	BF	SS
							90	80	92	105	83								
23	49/50	6/2/2012	M16	LS	860/600		78	74	72	80	79	134	135	133	136	138	PASS	BF	SS
							82	92	89	89	86								
24	50/51	6/2/2012	M14	PV	830/530		99	99	111	93	97	138	136	138	136	143	PASS	BF	SS
							94	95	96	93	95								
25	50/51	6/2/2012	M14	PV	830/530		102	102	92	89	88	138	132	143	138	144	PASS	BF	SS
							91	114	106	110	107								
26	51/52	6/2/2012	M41	JF	860/600		85	112	96	60	102	146	134	148	146	137	PASS	BF	SS
							86	60	86	75	82								
27	54/55	6/9/2012	M41	JF	860/560		85	112	96	66	102	146	134	148	146	137	PASS	BF	SS
							86	60	86	75	58								
28	55/56	6/9/2012	M41	JF	860/560		82	87	75	82	84	131	140	135	135	136	PASS	BF	SS
							88	89	90	84	82								
29	56/57	6/9/2012	M41	JF	860/560		86	90	107	94	66	142	142	149	141	142	PASS	BF	SS
							77	69	89	74	82								

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
							Peel (ppi) IN / OUT					Shear (ppi)							
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
30	60/61	6/9/2012	M41	JF	860/560		71	94	76	72	86	144	133	142	128	133	PASS	BF	SS
							94	66	98	62	65								
31	63/64	6/9/2012	M41	JF	860/560		114	110	119	81	117	147	146	142	133	134	PASS	BF	SS
							83	83	91	107	81								
32	63/64	6/9/2012	M41	JF	860/560		88	67	71	69	85	147	135	147	130	135	PASS	BF	SS
							105	95	100	95	65								
33	66/67	6/9/2012	M41	JF	860/560		99	67	89	83	66	146	141	157	135	136	PASS	BF	SS
							104	72	93	84	73								
34	69/70	6/9/2012	M41	JF	860/560		77	89	107	113	99	143	134	145	130	135	PASS	BF	SS
							111	73	73	69	67								
35	69/70	6/9/2012	M41	JF	860/560		90	109	110	72	89	145	128	144	135	135	PASS	BF	SS
							101	87	108	102	85								
36	72/73	6/9/2012	M41	JF	800/580		96	80	92	94	90	144	123	142	132	135	PASS	BF	SS
							84	73	93	90	89								
37	77/78	6/9/2012	M41	JF	800/580		110	89	114	115	114	144	132	136	124	135	PASS	BF	SS
							97	86	97	87	93								
38	77/78	6/9/2012	M41	JF	800/580		108	91	94	83	89	139	100	138	112	126	PASS	BF	SS
							99	65	105	87	97								

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
							Peel (ppi) IN / OUT					Shear (ppi)							
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
39	46/53	6/9/2012	M14	PV	830/530		87	88	101	83	85	146	131	143	133	132	PASS	BF	SS
							90	83	84	107	67								
40	55/56	6/9/2012	M14	PV	830/530		81	90	90	70	89	136	122	138	126	124	PASS	BF	SS
							97	94	98	91	91								
41	58/59	6/9/2012	M14	PV	830/530		110	107	111	102	72	145	134	145	133	138	PASS	BF	SS
							80	79	84	90	101								
42	58/59	6/9/2012	M14	PV	830/530		94	81	81	85	85	143	135	143	131	134	PASS	BF	SS
							80	84	88	84	77								
43	61/62	6/9/2012	M14	PV	800/600		92	93	102	89	82	145	135	143	138	131	PASS	BF	SS
							111	102	88	92	64								
44	61/62	6/9/2012	M14	PV	800/600		92	83	86	71	100	139	127	140	128	134	PASS	BF	SS
							116	89	97	86	88								
45	64/65	6/9/2012	M14	PV	800/530		91	79	96	69	96	138	127	139	132	132	PASS	BF	SS
							97	107	99	82	68								
46	67/68	6/9/2012	M14	PV	830/530		102	88	103	90	72	142	132	143	136	131	PASS	BF	SS
							99	96	102	84	106								
47	70/71	6/9/2012	M14	PV	800/530		107	104	98	96	72	149	132	145	142	139	PASS	BF	SS
							98	96	113	116	89								
48	70/71	6/9/2012	M14	PV	800/530		95	78	92	66	83	142	132	144	125	133	PASS	BF	SS
							101	103	84	61	78								
49	73/74	6/9/2012	M14	PV	800/600		88	97	112	68	77	151	142	150	138	135	PASS	BF	SS
							81	92	92	67	79								

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
50	76/77	6/9/2012	M14	PV	800/600		105	107	104	82	65	149	138	147	137	125	PASS	BF	SS
							87	66	100	89	63								
51	76/77	6/9/2012	M14	PV	800/600		109	94	114	88	100	142	115	144	132	136	PASS	BF	SS
							90	74	97	81	72								
52	53/54	6/9/2012	M16	DG	860/580		90	76	87	91	86	142	136	144	135	129	PASS	BF	SS
							82	71	98	68	72								
53	57/58	6/9/2012	M16	DG	860/580		94	62	85	81	88	140	134	138	124	126	PASS	BF	SS
							100	84	65	84	87								
54	59/60	6/9/2012	M16	DG	860/580		94	87	92	85	86	142	136	134	135	134	PASS	BF	SS
							101	97	103	77	91								
55	59/60	6/9/2012	M16	DG	860/580		99	82	88	90	80	149	133	150	133	132	PASS	BF	SS
							96	78	88	75	65								
56	62/63	6/9/2012	M16	DG	860/580		95	81	99	71	81	138	128	139	118	127	PASS	BF	SS
							98	83	99	93	72								
57	65/66	6/9/2012	M16	DG	860/580		87	73	84	62	78	140	132	141	133	132	PASS	BF	SS
							80	91	88	60	84								
58	65/66	6/9/2012	M16	DG	860/580		113	98	101	83	81	139	132	138	128	130	PASS	BF	SS
							86	72	101	74	76								
59	68/69	6/9/2012	M16	DG	860/550		92	89	99	93	88	153	134	147	138	135	PASS	BF	SS
							99	84	102	96	100								
60	71/72	6/9/2012	M16	DG	860/550		109	92	113	107	107	141	132	142	131	132	PASS	BF	SS
							82	77	95	86	82								

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
61	74/75	6/9/2012	M16	DG	800/600		104	93	116	86	93	144	135	144	129	134	PASS	BF	SS
							85	93	85	94	83								
62	74/75	6/11/2012	M16	DG	860/580		82	72	100	60	63	146	138	144	132	138	PASS	BF	SS
							104	70	88	70	68								
63	75/76	6/11/2012	M16	DG	860/580		84	78	75	75	74	149	145	149	143	141	PASS	BF	SS
							87	78	94	85	72								
64	78/79	6/11/2012	M14	PV	800/530		92	79	88	65	85	145	136	148	148	143	PASS	BF	SS
							88	53	84	83	80								
65	81/82	6/11/2012	M14	PV	800/530		80	71	84	68	76	146	134	145	138	135	PASS	BF	SS
							98	68	91	76	81								
66	85/86	6/11/2012	M14	PV	800/530		84	88	91	96	95	145	136	148	137	136	PASS	BF	SS
							101	90	85	81	82								
67	85/86	6/11/2012	M14	PV	800/530		93	78	94	95	92	140	130	145	141	138	PASS	BF	SS
							74	70	89	86	87								
68	71/94	6/11/2012	M14	PV	800/530		78	77	73	62	83	133	127	136	119	125	PASS	BF	TS
							88	63	95	83	84								
69	52/95	6/11/2012	M14	PV	800/530		108	76	82	91	68	141	130	142	128	128	PASS	BF	SS
							82	91	119	92	70								
70	52/95	6/11/2012	M14	PV	800/530		78	68	102	78	94	144	141	144	140	129	PASS	BF	SS
							102	101	69	102	74								
71	95/96	6/11/2012	M14	PV	800/530		87	68	114	68	87	146	136	146	139	141	PASS	BF	
							106	101	95	89	69								

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
72	48/94	6/11/2012	M14	PV	800/530		110	93	92	108	95	129	141	143	132	132	PASS	BF	ST
							106	93	101	108	63								
73	79/80	6/11/2012	M16	DG	860/580		88	103	123	98	84	153	141	149	147	141	PASS	BF	SS
							94	83	90	78	96								
74	79/80	6/11/2012	M16	DG	860/580		97	79	104	106	73	132	143	154	147	146	PASS	BF	SS
							84	65	95	73	68								
75	82/83	6/11/2012	M16	DG	860/580		94	89	101	77	68	150	140	149	138	141	PASS	BF	SS
							73	68	97	80	78								
76	84/85	6/11/2012	M16	DG	860/580		78	68	79	73	68	151	144	151	139	146	PASS	BF	SS
							83	63	82	82	72								
77	84/85	6/11/2012	M16	DG	860/580		108	98	77	66	73	150	142	150	138	144	PASS	BF	SS
							79	65	162	99	61								
78	93/94	6/11/2012	M16	DG	860/580		83	75	88	72	87	151	141	154	138	138	PASS	BF	SS
							101	91	91	89	63								
79	97/98	6/11/2012	M16	DG	860/580		62	82	87	67	87	138	131	139	131	128	PASS	BF	SS
							87	81	90	76	81								
80	99/51	6/11/2012	M16	DG	860/580		101	89	93	96	87	138	125	138	132	117	PASS	BF	ST
							95	92	93	94	95								
81	80/81	6/11/2012	M41	JF	860/560		85	72	71	69	73	143	133	141	131	133	PASS	BF	SS
							100	68	77	89	63								
82	83/84	6/11/2012	M41	JF	860/560		93	92	77	96	74	150	134	147	137	142	PASS	BF	SS
							86	94	106	78	72								

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CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I12-011
Project Name: Hutsonville Power Plant
Start Date: 5/30/2012
Project Location: Hutsonville, IL

Material: HD TEXTURED

40 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	60	Peel:	
Shear:	80	Shear:	

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
							Peel (ppi) IN / OUT					Shear (ppi)							
			Machine	Operator	Temp/ Speed °F/fpm	Temp/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
83	86/87	6/11/2012	M41	JF	860/560		100	78	87	81	76	145	130	139	138	135	PASS	BF	SS
							103	87	109	75	94								
84	92/93	6/11/2012	M41	JF	860/560		90	109	110	72	89	149	133	150	133	132	F	BF	SS
							104	93	116	86	93								
85	92/93	6/11/2012	M41	JF	860/560		97	85	89	82	86	140	136	140	136	131	PASS	BF	SS
							74	70	89	86	87								
86	97/98	6/11/2012	M16	DG	860/580		87	73	84	62	78	141	139	121	131	103	PASS	BF	TT
							80	71	84	68	76								
84A	92/93	6/11/2012	M41	JF	860/560		88	53	84	83	80						F	BF	TT
							90	74	97	81	72								
84A1	92/93	6/13/2012	M41	JF	860/560		91	81	96	87	92	145	134	145	133	138	PASS	BF	SS
							73	68	79	78	68								

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Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Chesapeake Containment Systems

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 233476

Calibration Apparatus:
Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 3908233476
Channel No: N/A

Dead Weight:

W1	2
W2	152
W3	302

Reference Cell:

R1	2
R2	152
R3	302

Indicator reading with no load: 0

Offset: 2.338462 Scale: 4.348708

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Excitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

BF

Date: 04/23/12

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Customer Name: **Chesapeake Containment Systems**

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 209325

Calibration Apparatus:
Reference load cell (S/N 204781)

A/D Module Model No: T-029
A/D Module Serial No: 3205209325
Channel No: N/A

Dead Weight:		Reference Cell:	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offset: **2.432781** Scale: **3.603864**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: BF Date: 04/23/12

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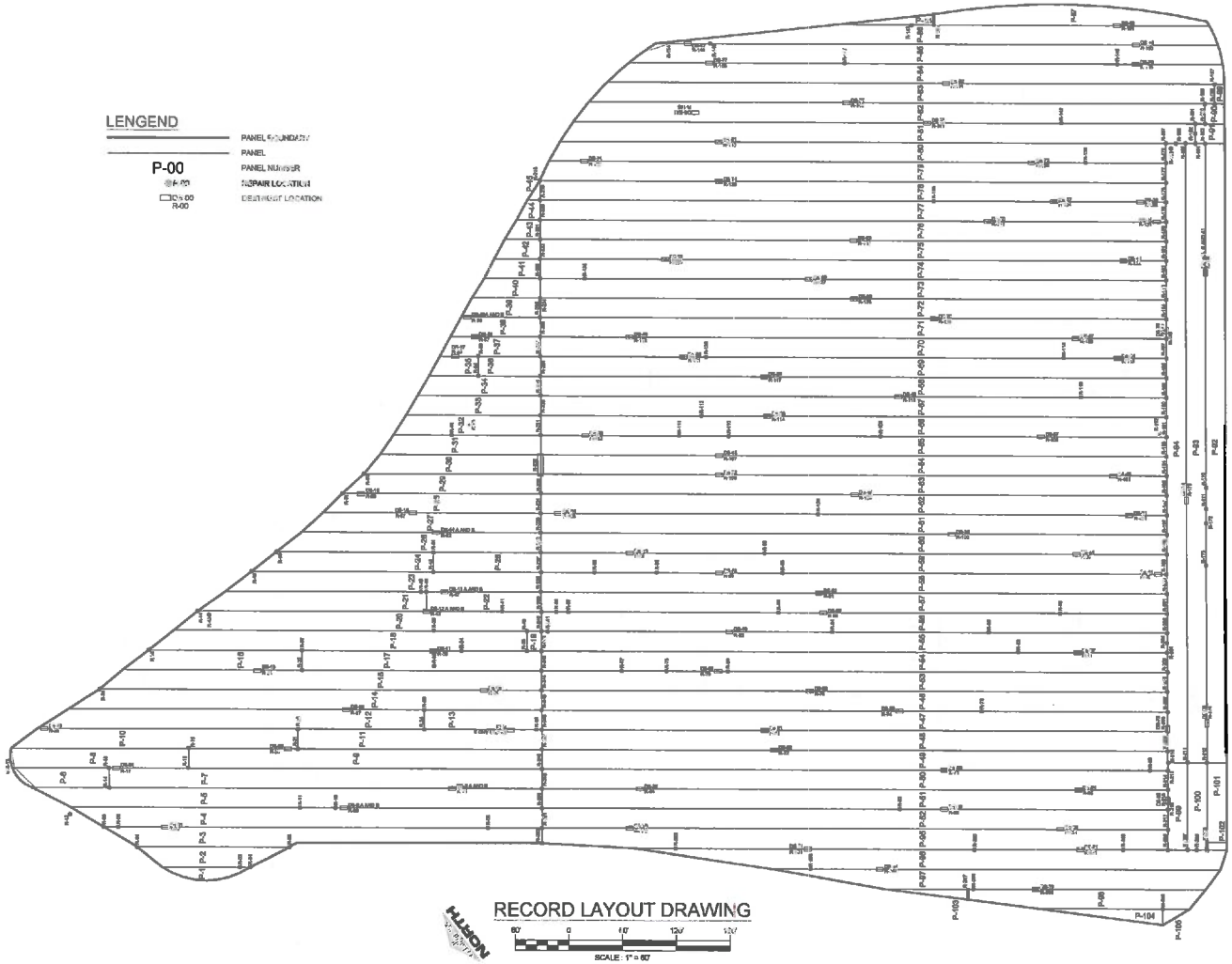

NOTE
RECORD LAYOUT DRAWING IS FOR GENERAL ORIENTATION ONLY. INFORMATION DOCUMENTED AND SUBMITTED AS FINAL RECORD COPY OF INSTALLATION. THIS IS NOT A SURVEYED DRAWING.

CHESAPEAKE CONTAINMENT SYSTEMS, INC.
352 Earls Road
Middle River, MD 21220
1.888.50.LINER(54637)
office: 410.335.5886
fax: 443.303.1652
www.csliners.com

RECORD LAYOUT DRAWING (CAP) PLAN

HUTSONVILLE
CLOSURE OF ASH POND 'D'
HUTSONVILLE, ILLINOIS

SCALE: 1" = 60'	DATE: 08/09/2012
DRAWING NUMBER: I12-011	SHEET NUMBER: 01 OF 01

R-01


06/01/2012


06/05/2012


06/01/2012


06/01/2012


06/01/2012


06/05/2012

Electronic Filing: Received, Clerk's Office 09/28/2020

Date: 2012-06-05

Mail To:
Anna Saindon
Geotechnology, Inc
11816 Lackland Rd
St. Louis , MO , 63146

Bill To:

Geotechnology, Inc
J019896.01

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8395**
Material(s) Tested:	(24) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

http://www.geosyntheticstesting.com
9063 Bee Caves Road / Austin, Tx. 78733 / 512.263.2101 / fax: 512.263.2558

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	82	113	110	119	118	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	97	100	92	96	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	133	130	132	130	129	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	91	97	91	85	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	101	96	101	97	86	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	117	122	120	122	**120**
Shear Elongation @ Break (%)	>50	46	>50	>50	>50	

The testing is based upon accepted industry practices as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claims as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

http://www.geosyntheticstesting.com
9063 Bee Caves Road / Austin, Tx. 78733 / 512.263.2101 / fax: 512.263.2558

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	98	124	92	108	95	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	99	98	92	92	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	131	135	130	134	132	**132**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	93	94	97	95	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	86	86	104	88	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	134	128	135	129	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	109	93	106	93	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	104	100	107	99	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	133	130	137	138	129	**133**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	102	101	99	94	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	101	104	89	98	94	**97**
Peel Incursion (%)	<5	<5	85	<5	<5	
Peel Locus Of Failure Code	SE	SE	AD-BRK	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	134	130	128	127	133	**130**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	105	112	111	112	115	**111**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	94	91	93	99	95	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	131	131	126	127	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	91	103	107	99	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	104	93	94	97	**97**
Peel Incursion (%)	<5	<5	<5	15	<5	
Peel Locus Of Failure Code	SE	SE	SE	AD-BRK	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	132	128	122	124	122	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	93	97	105	96	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	104	110	98	109	109	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	127	124	123	122	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-11 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	107	106	119	102	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	104	96	105	96	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	122	125	126	124	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	77	96	90	97	79	**88**
Peel Incursion (%)	50	<5	90	<5	100	
Peel Locus Of Failure Code	AD-BRK	SE	AD-BRK	SE	AD	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	NON-FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	82	79	91	87	**85**
Peel Incursion (%)	50	<5	25	<5	30	
Peel Locus Of Failure Code	AD-BRK	SE	AD-BRK	SE	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	124	131	131	127	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-13A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	108	102	92	91	82	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	104	99	107	101	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	131	131	130	130	136	**132**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-13B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	98	99	95	98	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	103	102	97	97	96	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	137	137	131	132	**132**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-15 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	107	107	102	109	106	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	99	107	98	93	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	118	130	126	136	132	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-16 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	90	89	90	90	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	101	92	93	90	91	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	132	126	133	130	**130**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-17 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	80	94	95	93	83	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	107	102	96	105	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	114	123	125	132	130	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Project: Hutsonville Power Station - Ash Pond D Closure

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TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-18 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	112	107	108	106	104	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	98	108	87	102	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	129	124	123	123	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-19 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	88	92	83	98	90	**90**
Peel Incursion (%)	<5	30	10	20	<5	
Peel Locus Of Failure Code	SE	AD-BRK	AD-BRK	AD-BRK	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	94	88	114	96	**97**
Peel Incursion (%)	30	<5	<5	<5	<5	
Peel Locus Of Failure Code	AD-BRK	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	117	127	133	127	125	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-20 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	96	105	83	87	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	107	108	102	105	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	130	137	137	139	136	**136**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-21 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	103	104	85	84	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	90	121	117	94	89	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	138	136	142	136	**136**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-22 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	93	95	96	100	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	110	101	106	104	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	130	131	133	129	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-23 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	87	87	82	94	90	**88**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	89	93	98	89	**93**
Peel Incursion (%)	<5	<5	<5	5	10	
Peel Locus Of Failure Code	SE	SE	SE	AD-BRK	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	140	132	131	131	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8395

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-24 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	113	114	117	113	111	**114**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	111	105	109	110	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	129	137	140	137	138	**136**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-25 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	90	97	96	95	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	108	109	108	113	109	**109**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	137	139	131	127	**132**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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http://www.geosyntheticstesting.com
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Electronic Filing: Received, Clerk's Office 09/28/2020

Date: 2012-06-06

Mail To:
Anna Saindon
Geotechnology, Inc
11816 Lackland Rd
St. Louis , MO , 63146

Bill To:

Geotechnology, Inc
J019896.01

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8407**
Material(s) Tested:	(5) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8407

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	96	96	91	93	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	100	106	98	97	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	126	126	128	129	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-3B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	105	102	102	106	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	106	101	93	101	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	130	134	130	132	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8407

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-14A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	105	95	109	104	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	101	97	83	91	89	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	135	136	136	139	140	**137**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-14B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	98	109	95	98	94	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	81	85	88	89	**86**
Peel Incursion (%)	<5	<5	<5	10	10	
Peel Locus Of Failure Code	SE	SE	SE	AD-BRK	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	136	135	133	133	135	**134**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8407

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-26 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	89	93	94	92	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	98	99	106	106	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	122	118	121	123	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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J019896.01

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

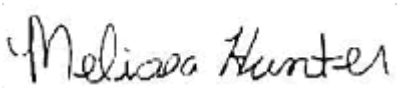
Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8417**
Material(s) Tested:	(6) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,



Melissa Hunter
Project Manager
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8417

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-7A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	98	92	99	94	95	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	94	93	100	100	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	142	138	137	143	140	**140**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-7B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	97	92	93	95	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	99	102	102	102	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	137	144	140	138	139	**140**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8417

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-12A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	94	98	95	102	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	96	89	93	96	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	136	137	139	145	138	**139**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-12B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	101	94	93	91	94	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	85	89	96	87	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	141	139	133	133	135	**136**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8417

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-19A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	103	93	103	101	103	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	94	97	101	98	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	140	141	140	147	141	**142**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-19B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	96	97	97	100	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	105	101	101	104	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	145	144	143	149	150	**146**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2012-06-09

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Anna Saindon
Geotechnology, Inc
11816 Lackland Rd
St. Louis , MO , 63146

Bill To:

Geotechnology, Inc
J019896.01

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8440**
Material(s) Tested:	(2) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8440

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS2A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	91	96	91	94	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	95	99	93	99	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	114	115	121	125	112	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	90	90	83	93	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	81	97	89	77	90	**87**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	125	125	125	128	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2012-06-12

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Project # : J019896.01

e-mail:a_saindon@geotechnology.com

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Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8458**
Material(s) Tested:	(60) Heat Fusion Weld Seam(s) (2) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
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NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-27 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	91	88	83	90	**88**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	115	111	103	110	109	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	126	125	132	131	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-29 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	94	101	93	99	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	97	92	111	112	114	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	133	126	127	128	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-30 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	80	82	80	81	79	**80**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	107	115	107	107	105	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	124	126	122	125	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-31 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	97	95	99	96	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	103	104	115	110	114	**109**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	125	125	125	130	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Client: Geotechnology, Inc

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-32 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	85	84	86	87	89	**86**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	105	103	104	97	106	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	125	129	128	126	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-33 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	99	85	101	101	**96**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	107	111	100	104	110	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	134	125	125	131	127	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-34 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	84	83	84	85	77	**83**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	106	97	102	98	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	82	100	127	131	124	**113**
Shear Elongation @ Break (%)	16	22	>50	>50	28	
Sample ID: DT-35 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	100	105	100	96	99	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	103	96	105	104	93	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	126	127	132	132	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-36 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	115	111	124	114	115	**116**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	103	95	95	101	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	124	125	129	129	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-37 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	109	117	106	106	104	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	97	100	100	105	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	121	120	119	123	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-38 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	107	106	103	116	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	97	105	95	112	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	121	122	127	122	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-39 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	95	117	114	111	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	103	104	106	105	102	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	126	126	132	127	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-40 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	101	111	114	107	104	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	113	106	111	106	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	118	118	120	118	**119**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-41 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	101	96	99	98	100	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	109	114	106	113	107	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	126	125	124	125	125	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-42 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	100	100	101	105	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	104	107	103	97	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	126	126	129	125	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-43 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	103	100	97	97	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	108	108	107	102	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	127	122	127	118	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-44 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	101	99	93	95	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	98	98	99	96	92	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	126	120	118	122	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-45 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	106	105	104	99	96	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	107	112	106	107	105	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	127	126	126	128	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-46 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	95	96	101	99	85	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	104	103	102	105	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	126	124	125	123	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-47 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	111	114	111	110	110	**111**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	95	92	91	102	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	121	125	119	121	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-48 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	108	98	109	102	94	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	92	92	90	91	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	122	125	119	123	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-49 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	109	104	107	112	109	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	100	90	97	92	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	129	128	130	134	129	**130**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Project: Hutsonville Power Station - Ash Pond D Closure

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-50 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	110	107	91	105	104	**103**
Peel Incursion (%)	<5	25	45	<5	<5	
Peel Locus Of Failure Code	SE	AD-BRK	AD-BRK	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	93	85	101	99	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	132	130	127	128	129	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-51 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	104	102	106	86	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	107	92	88	94	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	126	122	125	124	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-52 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	79	91	94	93	87	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	78	74	98	98	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	126	126	125	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-53 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	92	88	94	88	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	86	96	81	79	**86**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	117	118	118	119	118	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-54 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	99	104	103	103	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	85	92	97	92	92	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	125	125	124	123	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-55 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	96	88	91	97	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	113	107	93	116	96	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	126	128	128	125	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-56 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	94	90	98	92	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	96	93	97	92	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	117	118	118	118	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-57 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	93	97	93	90	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	89	91	104	102	99	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	123	124	122	123	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-58 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	94	95	107	97	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	86	101	77	88	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	121	122	121	123	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-59 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	104	96	103	96	99	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	99	109	100	105	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	129	127	129	127	126	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-60 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	95	91	92	89	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	109	106	106	86	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	127	127	126	126	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-61 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	82	89	88	92	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	85	82	83	78	78	**81**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	126	125	124	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-62 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	88	88	83	87	**87**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	96	98	102	90	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	125	124	124	124	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-63 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	85	85	83	88	83	**85**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	91	91	96	92	96	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	128	128	130	127	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-64 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	99	93	97	91	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	116	107	106	112	110	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	126	127	128	128	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-65 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	101	110	99	96	87	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	83	108	96	96	94	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	123	126	128	123	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-66 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	90	101	101	103	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	113	110	111	95	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	126	128	126	119	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-67 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	98	102	104	102	96	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	104	94	87	89	101	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	116	115	117	118	116	**116**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-68 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	109	89	110	78	85	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	99	98	103	93	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	114	118	115	115	112	**115**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-69 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	112	111	112	107	106	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	96	84	95	96	93	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	116	117	118	118	118	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-70 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	83	99	89	92	105	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	74	77	80	85	101	**83**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	117	117	117	117	117	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-71 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	109	111	109	99	112	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	100	97	97	96	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	126	119	124	99	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-72 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	114	109	106	110	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	105	107	105	93	96	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	117	119	114	119	109	**116**
Shear Elongation @ Break (%)	>50	>50	>50	>50	48	
Sample ID: DT-73 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	97	98	97	87	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	90	106	96	88	91	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	132	133	131	131	133	**132**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-74 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	105	108	106	90	110	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	99	94	94	92	93	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	128	131	126	131	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-75 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	92	92	90	94	**91**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	97	99	98	104	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	129	128	130	130	129	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-76 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	107	98	94	93	101	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	109	96	99	97	109	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	129	129	131	130	130	**130**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-77 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	86	86	85	87	**87**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	108	102	103	110	**106**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	132	128	129	126	126	**128**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-78 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	99	97	89	95	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	110	107	109	104	103	**107**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	133	129	129	128	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-79 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	84	88	89	82	102	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	106	98	90	85	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	119	119	120	119	122	**120**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-80 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	112	96	109	102	105	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	93	73	93	98	92	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	120	115	126	121	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-81 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	96	93	98	90	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	88	91	90	91	87	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	125	123	123	119	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-82 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	108	103	110	109	88	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	107	97	94	96	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	125	126	126	128	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-83 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	97	98	105	75	93	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	104	86	100	105	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	122	123	121	123	122	**122**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-84A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	96	93	93	96	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	100	96	96	94	97	**97**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	125	127	127	128	129	**127**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-84B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	105	102	105	105	**103**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	102	92	99	97	101	**98**
Peel Incursion (%)	<5	50	<5	<5	<5	
Peel Locus Of Failure Code	SE	AD-BRK	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	125	123	123	126	**124**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Material: 40mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-85 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	102	104	101	102	97	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	102	107	99	99	**100**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	124	129	124	124	127	**126**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-86 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	107	117	113	121	118	**115**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	90	110	102	101	101	**101**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	124	123	124	123	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

The testing is based upon accepted industry practices as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claims as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: Geotechnology, Inc
Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 8458

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-28 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	101	94	94	102	99	**98**
Peel Incursion (%)	<5%	<5%	<5%	<5%	<5%	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	115	114	120	116	120	**117**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-87 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	107	113	116	108	107	**110**
Peel Incursion (%)	<5%	<5%	<5%	<5%	<5%	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	125	127	123	127	**125**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

The testing is based upon accepted industry practices as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claims as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2012-06-14

Mail To:
Anna Saindon
Geotechnology, Inc
11816 Lackland Rd
St. Louis , MO , 63146

Bill To:

Geotechnology, Inc
Project # : J019896.01

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8486**
Material(s) Tested:	(7) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8486

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-34A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	107	96	95	104	90	**98**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	92	96	94	97	94	**95**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	127	129	132	131	129	**130**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-34B1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	110	78	102	79	98	**93**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	106	99	89	59	90	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	131	132	129	132	132	**131**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8486

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-50A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	99	109	100	101	101	**102**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	111	99	100	92	91	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	128	129	129	129	130	**129**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-50B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	97	79	84	93	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	90	93	78	101	82	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	120	119	116	117	120	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8486

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-72A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	105	114	98	107	98	**104**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	89	93	89	102	96	**94**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	121	121	118	118	113	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-72B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	83	94	90	80	97	**89**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	111	97	108	98	109	**105**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	115	122	124	122	**121**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8486

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-84B1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	87	79	105	104	110	**97**
Peel Incursion (%)	90	30	<5	90	<5	
Peel Locus Of Failure Code	AD-BRK	AD-BRK	SE	AD-BRK	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	91	88	103	102	**96**
Peel Incursion (%)	<5	<5	25	<5	<5	
Peel Locus Of Failure Code	SE	SE	AD-BRK	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	134	135	135	135	130	**134**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2012-06-15

Mail To:
Anna Saindon
Geotechnology, Inc
11816 Lackland Rd
St. Louis , MO , 63146

Bill To:

Geotechnology, Inc
Project # : J019896.01

e-mail:a_saindon@geotechnology.com

Dear Ms. Saindon,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Hutsonville Power Station - Ash Pond D Closure**
TRI Job Reference Number:	**8500**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Geotechnology, Inc

Project: Hutsonville Power Station - Ash Pond D Closure

Material: 40mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 8500

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-84B2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	94	98	85	94	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	95	104	107	99	90	**99**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	133	137	137	132	131	**134**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

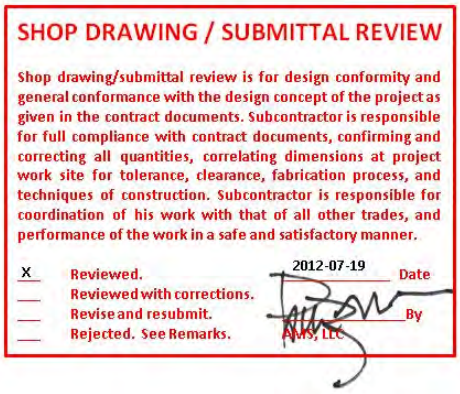
Hutsonville APD Closure

HUT-APD-SUB-023-02 Let-down Chute Geotextile

02373-1.4.A Product Data – Geotextile Fabric Properties…

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-023-02	2012-07-19	Paul Zinsious AMS	502-640-2918



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GEOTEX® BY PROPEX

Product Data
GEOTEX® 861

GEOTEX® 861 is a polypropylene, staple fiber, needlepunched nonwoven geotextile produced by Propex, and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. The fibers are needled to form a stable network that retains dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils.

GEOTEX 861 conforms to the property values listed below[1]. Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP). This product is NTPEP approved for AASHTO standards.

PROPERTY	TEST METHOD	MARV[2] ENGLISH	MARV[2] METRIC
ORIGIN OF MATERIALS			
% U.S. Manufactured Inputs		100%	100%
% U.S. Manufactured		100%	100%
PHYSICAL			
Mass/ Unit Area	ASTM D-5261	8.0 oz/yd^2	271 g/m^2
Thickness	ASTM D-5199	90 mils	2.3 mm
MECHANICAL			
Tensile Strength (Grab)	ASTM D-4632	220 lbs	979 N
Elongation	ASTM D-4632	50%	50%
CBR Puncture	ASTM D-6241	575 lbs	2559 N
Trapezoidal Tear	ASTM D-4533	95 lbs	423 N
ENDURANCE			
UV Resistance % Retained at 500 hrs	ASTM D-4355	70%	70%
HYDRAULIC			
Apparent Opening Size (AOS)[3]	ASTM D-4751	80 US Std. Sieve	0.180 mm
Permittivity	ASTM D-4491	1.5 sec^{-1}	1.5 sec^{-1}
Permeability	ASTM D-4491	0.38 cm/sec	0.38 cm/sec
Water Flow Rate	ASTM D-4491	110 gpm/ft^2	4482 l/min/m^2
ROLL SIZES		15 ft x 300 ft	4.57 m x 91.5 m

NOTES:
1. The property values listed above are effective 04/2011 and are subject to change without notice.
2. Values shown are in weaker principal direction. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.
3. Maximum average roll value.

GEOTEXTILE SYSTEMS BY PROPEX

ENGINEERING EARTH
www.geotextile.com

Propex Operating Company, LLC · 6025 Lee Highway, Suite 425 · PO Box 22788 · Chattanooga, TN 37422

ph 423 899 0444 · ph 800 621 1273 · fax 423 899 7619

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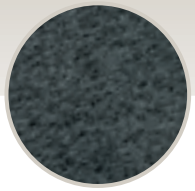
GEOTEX® NONWOVEN GEOTEXTILES



Made from the highest quality polypropylene fibers, our Geotex® nonwoven geotextiles are needlepunched to form a strong fabric that retains its dimensional stability, adding years to the life of any roadway, railroad, landfill or civil/environmental engineering project. Used in subsurface drainage, separation, stabilization, erosion control and cushioning applications, our geotextiles are resistant to ultraviolet (UV) degradation and to biological and chemical environments normally found in soils.

FEATURES & BENEFITS

- Mass per unit areas range from 3 to 17 oz/yd² (100 to 575 g/m²) to guarantee an available product for every application (heavier products may be available by special order)
- Superior chemical resistance in even the most aggressive environmental applications
- Staple fibers needlepunched together to form a sturdy fabric capable of withstanding construction installation stresses
- Contains additives for maximum UV resistance
- Produced at some of the largest, state-of-the-art production facilities to assure uniform product quality

Outperforms and is more cost effective than conventional methods, including:

- **Thicker aggregate layers**
- **Undercutting and removal**
- **Chemical stabilization**
- **Graded, granulated filters**

GEOTEX® NONWOVEN GEOTEXTILES PRODUCT FAMILY TABLE

CIVIL	ENVIRONMENTAL
GEOTEX® 311	GEOTEX® 651
GEOTEX 351	GEOTEX 861
GEOTEX 401	GEOTEX 1071
GEOTEX 451	GEOTEX 1291
GEOTEX 501	GEOTEX 1701
GEOTEX 601	
GEOTEX 701	
GEOTEX 801	
GEOTEX 1001	
GEOTEX 1071	
GEOTEX 1201	
GEOTEX 1601	

You can plan and implement road designs that will lower the cost and extend the life of your pavement—and our Roadways And Civil Engineering (R.A.C.E.) software can help. Download it today at geotextile.com.



Geotex® nonwoven geotextiles can be deployed directly on a soft, saturated subgrade.



Wrapping a subsurface drainage system with a Geotex® nonwoven geotextile will improve roadway life.



Robust Geotex® nonwovens stabilize subgrades and prevent the fouling of ballast beneath railway track.



Geotex® heavyweight nonwoven geotextiles allow the construction of landfill drainage layers without fear of liner damage.

PROPEX® | THE ADVANTAGE CREATORS.™

GEOSYNTHETICS

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GEOTEX® NONWOVEN GEOTEXTILES

APPLICATION RECOMMENDATIONS FOR GEOTEX® NONWOVEN GEOTEXTILES

	APPLICATION	ORGANIZATION/REFERENCE #	CATEGORY	GEOTEX® STYLE
CIVIL	PERMANENT EROSION CONTROL	AASHTO M288-05/FHWA FP-03	CLASS 1/TYPE IV (A-C) CLASS 2/TYPE IV (D-F)	GEOTEX® 801 GEOTEX 601
CIVIL	DRAINAGE	AASHTO M288-05/FHWA FP-03	CLASS 2/TYPE I (A-C) CLASS 3/TYPE I (D-F)	GEOTEX 601 GEOTEX 401
CIVIL	ROADWAY SEPARATION	AASHTO M288-05/FHWA FP-03	CLASS 1/TYPE II (A) CLASS 2/TYPE II (B) CLASS 3/TYPE II (C)	GEOTEX 801 GEOTEX 601 GEOTEX 401
CIVIL	ROADWAY STABILIZATION	AASHTO M288-05/FHWA FP-03	CLASS 1/TYPE III (A) CLASS 2/TYPE III (B)	GEOTEX 801 GEOTEX 601
CIVIL	RAILROAD STABILIZATION	AREMA/CH. 1, PART 10	REGULAR HEAVY EXTRA HEAVY	GEOTEX 1201 GEOTEX 1601 GEOTEX 1701
ENVIRONMENTAL	GEOMEMBRANE LINER PROTECTION	–	–	GEOTEX 861-1701
ENVIRONMENTAL	GAS VENTING	–	–	GEOTEX 861-1701
ENVIRONMENTAL	LANDFILL LEACHATE COLLECTION	EPA/GRI REPORT NO. 15	–	GEOTEX 651 GEOTEX 861
ENVIRONMENTAL	LANDFILL DRAINAGE SYSTEMS	–	–	GEOTEX 651

NOTES:
- AASHTO: American Association of State Highway Transportation Officials
- GRI: Geosynthetics Research Institute
- AREMA: American Railway Engineering and Maintenance Association
- EPA: Environmental Protection Agency

GEOTEX® NONWOVEN CIVIL GEOTEXTILES PROPERTY TABLE[1] ENGLISH & METRIC UNITS

	PROPERTY	TEST METHOD	VALUE[3]	UNIT	311	351	401	451	501	601	701	801	1001	1071	1201	1601
MECHANICAL	GRAB TENSILE STRENGTH	ASTM D-4632	MARV	lb N	80 356	95 423	115 512	120 534	140 623	160 712	180 801	205 912	250 1112	270 1202	300 1335	380 1691
MECHANICAL	GRAB ELONGATION	ASTM D-4632	MARV	%	50	50	50	50	50	50	50	50	50	50	50	50
MECHANICAL	PUNCTURE STRENGTH	ASTM D-4833	MARV	lb N	50 222	55 245	65 289	65 289	85 378	85 378	100 445	110 490	150 668	160 712	175 779	240 1068
MECHANICAL	CBR PUNCTURE	ASTM D-6241	MARV	lb N	210 934	260 1157	310 1379	335 1490	360 1601	410 1824	460 2046	525 2335	625 2780	725 3225	825 3670	1025 4559
MECHANICAL	MULLEN BURST	ASTM D-3786	MARV	psi kPa	150 1034	185 1275	210 1448	230 1586	280 1930	280 1930	330 2275	350 2413	460 3171	520 3585	580 3999	750 5170
MECHANICAL	TRAPEZOIDAL TEAR	ASTM D-4533	MARV	lb N	30 134	40 178	50 222	50 222	60 267	60 267	75 334	80 356	100 445	105 467	115 512	150 668
HYDRAULIC	APPARENT OPENING SIZE (AOS)	ASTM D-4751	MaxARV	US Sieve mm	50 0.300	50 0.300	70 0.212	70 0.212	70 0.212	70 0.212	70 0.212	80 0.180	100 0.150	100 0.150	100 0.150	100 0.150
HYDRAULIC	PERMITTIVITY	ASTM D-4491	MARV	sec^{-1}	2.0	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.2	1.2	1.0	0.7
HYDRAULIC	WATER FLOW RATE	ASTM D-4491	MARV	gpm/ft^2 $l/min/m^2$	150 6112	150 6112	140 5704	120 4889	115 4686	110 4480	110 4480	110 4480	85 3463	85 3463	75 3056	50 2037
ENDURANCE	UV RESISTANCE	ASTM D-4355	MARV	% Retained @ 500 hours	70	70	70	70	70	70	70	70	70	70	70	70
PACKAGING	ROLL WIDTH	MEASURED	TYPICAL	ft m	12.5 3.81	15 4.57	12.5 3.81	15 4.57	12.5 3.81	15 4.57	12.5 3.81	15 4.57	15 4.57	12.5 3.81	15 4.57	12.5 3.81	15 4.57	15 4.57	12.5 3.81	15 4.57	15 4.57	15 4.57	15 4.57	15 4.57	15 4.57
PACKAGING	ROLL LENGTH	MEASURED	TYPICAL	ft m	360 109.8	360 109.8	360 109.8	360 109.8	360 109.8	360 109.8	360 109.8	360 109.8	360 109.8	360 109.8	300 91.5	360 109.8	300 91.5	360 109.8	300 91.5	300 91.5	300 91.5	300 91.5	300 91.5	300 91.5
PACKAGING	ROLL WEIGHT	CALCULATED	TYPICAL	lb kg	122 55	143 65	141 64	168 76	156 71	187 85	165 75	191 87	211 96	210 95	213 97	242 110	245 111	264 120	264 120	325 147	372 169	405 184	545 247
PACKAGING	ROLL AREA	MEASURED	TYPICAL	yd^2 m^2	500 418	600 502	500 418	600 502	500 418	600 502	500 418	600 502	600 502	500 418	500 418	500 418	500 418	500 418	500 418	500 418	500 418	500 418	500 418	500 418

NOTES: 1. The property values listed are effective 06/2009 and are subject to change without notice. 2. Values reported in weaker principal direction. 3. All values listed are Minimum Average Roll Values (MARV) unless otherwise noted, calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will exceed the value reported. Maximum Average Roll Values (MaxARV) represents typical plus two standard deviations. 4. Underlined styles meet and/or exceed the American Association of State Highway Transportation Officials (AASHTO) M288-05 specifications.

GEOTEX® NONWOVEN ENVIRONMENTAL GEOTEXTILES PROPERTY TABLE[1]

ENGLISH & METRIC UNITS

	PROPERTY	TEST METHOD	VALUE[3]	UNIT	651	861	1071	1291	1701
MECHANICAL	GRAB TENSILE STRENGTH	ASTM D-4632	MARV	lb N	170 756	220 979	270 1202	320 1424	390 1736
	GRAB ELONGATION	ASTM D-4632	MARV	%	50	50	50	50	50
	PUNCTURE STRENGTH	ASTM D-4833	MARV	lb N	110 490	135 601	160 712	210 934	250 1112
	CBR PUNCTURE	ASTM D-6241	MARV	lb N	435 1935	575 2558	725 3225	925 4115	1125 5004
	MULLEN BURST	ASTM D-3786	MARV	psi kPa	330 2275	420 2895	520 3585	620 4274	800 5515
	TRAPEZOIDAL TEAR	ASTM D-4533	MARV	lb N	70 312	95 423	105 467	125 556	155 690
HYDRAULIC	APPARENT OPENING SIZE (AOS)	ASTM D-4751	MaxARV	US Sieve mm	70 0.212	80 0.180	100 0.150	100 0.150	100 0.150
	PERMITTIVITY	ASTM D-4491	MARV	sec^{-1}	1.5	1.5	1.2	0.8	0.7
	PERMEABILITY	ASTM D-4491	MARV	cm/sec	0.24	0.38	0.30	0.29	0.27
	WATER FLOW RATE	ASTM D-4491	MARV	gpm/ft^2 $l/min/m^2$	110 4480	110 4480	85 3463	60 2445	50 2037
PHYSICAL	MASS PER UNIT AREA	ASTM D-5261	MARV	oz/yd^2 g/m^2	6.0 203	8.0 271	10.0 339	12.0 407	16.0 542
	THICKNESS	ASTM D-5199	MARV	mils mm	80 2.0	90 2.3	105 2.7	115 2.9	165 4.2
ENDURANCE	UV RESISTANCE	ASTM D-4355	MARV	% Retained @ 500 hours	70	70	70	70	70
PACKAGING	ROLL WIDTH	MEASURED	TYPICAL	ft m	15 4.57	15 4.57	15 4.57	15 4.57	15 4.57
	ROLL LENGTH	MEASURED	TYPICAL	ft m	300 91.5	300 91.5	300 91.5	300 91.5	300 91.5
	ROLL WEIGHT	CALCULATED	TYPICAL	lb kg	235 107	291 132	372 169	434 197	577 262
	ROLL AREA	MEASURED	TYPICAL	yd^2 m^2	500 418	500 418	500 418	500 418	500 418

NOTES: 1. The property values listed are effective 06/2009 and are subject to change without notice. 2. Values reported in weaker principal direction. 3. All values listed are Minimum Average Roll Values (MARV) unless otherwise noted, calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will exceed the value reported. Maximum Average Roll Values (MaxARV) represents typical plus two standard deviations.

KEY PROPERTIES OF GEOTEX® NONWOVEN GEOTEXTILES

- Mass Per Unit Area: Relevant in the design of geomembrane liner protection, this value often "qualifies" a nonwoven geotextile.
- Puncture Strength: Especially during construction, the geotextile must withstand pressures applied from surrounding aggregate.
- Apparent Opening Size: A measurement of the opening sizes of the geotextile, this property is used when selecting the correct filter.
- Permittivity: This value is a measure of the geotextile's ability to pass water. When multiplied by the thickness, you can determine the permeability of the geotextile.

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For downloadable documents like construction specifications, installation guidelines, case studies and other technical information, please visit our web site at **geotextile.com**. These documents are available in easy-to-use Microsoft® Word format.

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INSTALLATION GUIDELINES

SEPARATION/STABILIZATION GEOTEXTILE FABRICS

INTRODUCTION

Propex's Geotex® family of geotextiles can enhance the performance of paved and unpaved roadways, parking lots, airports, loading docks, and storage areas through separation/stabilization of the roadway structure. The geotextiles provide three important functions: separation/stabilization, drainage, and reinforcement. The fabric serves as a permeable separation/stabilization layer, preventing the aggregate and subgrade soils from intermixing while allowing the passage of water. The geotextile also enhances the structural properties of the subgrade and the roadway aggregate to minimize the cost of the road structure.

The successful use of geotextiles in these applications requires proper installation. The four basic steps of proper installation include:

- Subgrade preparation
- Geotextile placement
- Aggregate placement
- Aggregate compaction

Geotex stabilization geotextiles can be used in most weather and temperature conditions.

Adequate planning and preparation for each installation step will speed construction and ensure good performance.

These guidelines provide recommendations for installation of geotextiles in separation/stabilization applications.

The guidelines are intended to assist the contractor responsible for installation of the specified geotextile.

They are to be considered general guidelines, appropriate for common construction conditions. Specific site conditions, design requirements, or other variables may require modification to these guidelines.

Subgrade Preparation

Initially, the site should be cleared of tree stumps, large stones, and other sharp objects that could puncture the fabric. This step should be performed regardless of subgrade strength.

Roadway subgrade preparation typically involves removal of all vegetation, roots, and topsoil. Localized soft or otherwise unsuitable subgrade areas may be required to be excavated and backfilled with select material. In some very soft soil applications, it is beneficial to leave vegetation, roots, and topsoil in place to limit subgrade soil disturbance and loss of strength.

Geotextile Placement

Two people can easily place Geotex® separation/stabilization geotextiles. The fabric should be rolled out onto the subgrade beginning at a point that allows easy access for construction equipment yet is consistent with the layout plan. On very soft subgrades (CBR<I) the fabric layout and aggregate placement should begin on firm soil on the site perimeter, to establish an "anchor point." From there the fabric can be rolled onto softer sections. The geotextile should not be dragged across the subgrade. The geotextile is usually laid in the direction of construction traffic; however, specific project dimensions may alter this layout. Geotextile panels should be overlapped both side-to-side and end-to-end, in the direction of aggregate placement. The recommended overlap ranges from 1.5 to 3 feet, depending on subgrade strength. Overlap recommendations are provided in Table 1.

Table 1. Recommended Geotextile Overlaps

Subgrade CBR Value	Subgrade R-Value (California)	Subgrade Shear Strength (lb/in²)	Field Estimation of CBR	Recommended Minimum Overlap
< 0.5	_____	≤ 2	_____	Sewn seam required
> 0.5 to 1	_____	> 2 to 4.5	A person can easily walk on the site	3 ft.
> 1 to 2	> 0 to 10	> 4.5 to 8.5	A low ground pressure bulldozer can access the site without significant rutting	2.5 ft.
> 2	> 10	> 8.5	A D4 bulldozer can access the site without significant rutting	1.5 ft.

Alternatively, adjacent fabric edges can be sewn together rather than overlapped. Sewn seams must be used when the geotextile provides significant tensile reinforcement. This is the case, for example, when the subgrade is very soft (CBR<0.5). Sewn seam strength and fabric orientation are important design parameters. In these critical applications, adjacent panels must be placed and sewn in accordance with the specifications provided by the design engineer. Field sewing is performed using a portable sewing machine and typically requires three or four laborers. Presewn panels can be supplied from the factory. Propex Engineering Bulletin No. 611, “Geotextile Sewn Seams,” provides detailed information on both field-sewn and factory-sewn seams.

Soil, rocks, or pins can be used to hold fabric edges and overlaps down until aggregate is placed. On curves, the geotextile may be folded or cut to conform to the curve, as shown in Figure 1. The fold or overlap should be in the direction of construction and can be held in place as described above.

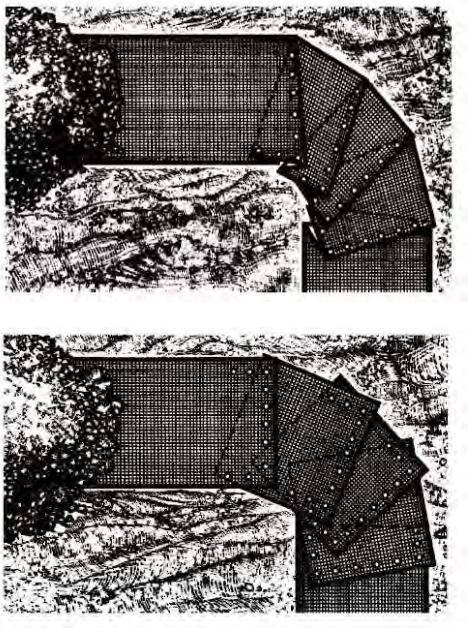

Figure 1 - Top, forming a curve using folds. Bottom, forming a curve using cut pieces.

Aggregate Placement

Aggregate is placed and spread on the fabric using conventional construction practices and equipment. Soil, rocks, or pins should be used to anchor the leading edge of the fabric to prevent it from lifting during placement of the first aggregate lift. The aggregate is typically back-dumped onto the geotextile, as the truck should not drive directly on the fabric. The aggregate is then spread over the geotextile. A tracked bulldozer is best used for this operation. Low ground pressure models are recommended for work on soft subgrades.

Lift thickness should not be less than 6 inches. The first lift should be as thick as necessary to limit rutting to less than 4 inches. During spreading, the bulldozer should blade into the load and slightly upward to prevent stressing the fabric. This procedure should be followed for each load until the fabric is completely covered. The dozer operator can determine which areas may need additional aggregate for good stability by observing aggregate layer rutting.

On very soft subgrades, care should be taken during aggregate placement to ensure that the fabric is not moved out of position nor the subgrade overstressed. Over some very soft soil conditions, "mud waves" may appear during or subsequent to aggregate placement. Mud waves result from overstressing the subgrade during fill placement, causing the subsurface soil to move away and up from the loaded area. They are normally not a problem if they do not heave above the surface of the aggregate base. If severe mud waves are anticipated, a Propex representative can provide information on construction procedures to minimize their adverse effects.

Sudden stops or turns by equipment operating over the geotextile should be avoided. Under typical conditions, vehicles should not be allowed to drive directly on the geotextile. If space constraints make this impractical, the possible damage from direct vehicle contact should be evaluated on a test section of the geotextile. If the fabric is damaged such that it cannot fulfill project requirements, a more damage-resistant geotextile should be specified. If the fabric is damaged during installation, the damaged section should be exposed and a patch of fabric placed over it. The patch should be large enough to overlap onto undamaged areas as recommended in Table 1. The aggregate is then replaced and compacted.

Aggregate Compaction

The aggregate must be compacted as required by the project specifications. The aggregate should be initially compacted by "walking" the tracked bulldozer back and forth over the aggregate while waiting for the next aggregate load. Construction traffic will then compact the aggregate until reasonable stability is obtained. Final compaction is achieved by rolling the area with a vibratory compactor, first without vibration for several passes and then with full vibration. Any weak areas found during final compaction usually indicate inadequate aggregate thickness in those locations. Do not grade ruts down; simply fill with additional aggregate and compact to the specified density. This also applies to any future rut maintenance that might be required.

Construction Monitoring

It is important that the construction conditions and process be monitored. If the actual subgrade has lower strength than that assumed for design, the structural section design thicknesses must be re-evaluated. Observation of rutting of the aggregate layer, for example, can pinpoint weak subgrade areas, allowing design adjustments to be made on site if necessary. One advantage of an unpaved road is the ability to identify and resurface weak areas to avoid overdesigning the entire road. Aggregate base placed for a new pavement may also be monitored for weak areas and corrected before the pavement layer(s) is placed.

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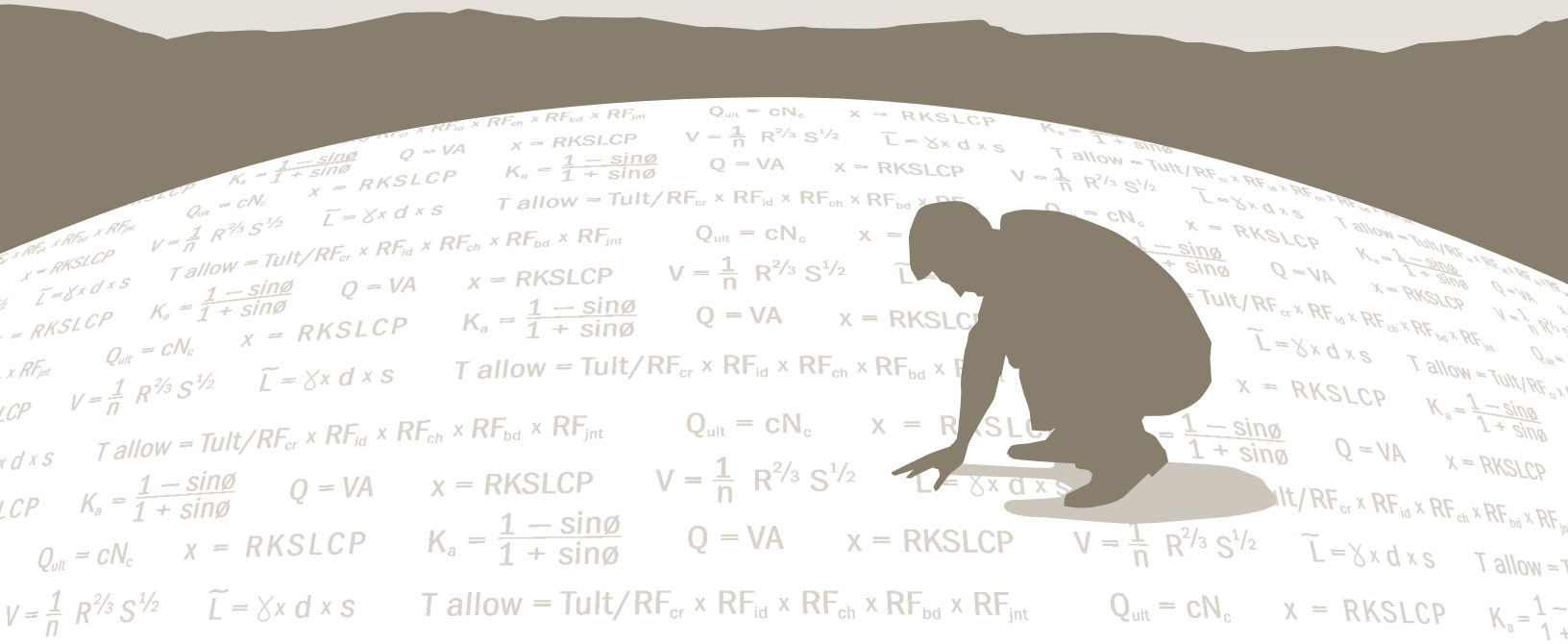
GEOTEXTILE SOLUTIONS

PERFORMANCE GROUNDED IN TECHNOLOGY



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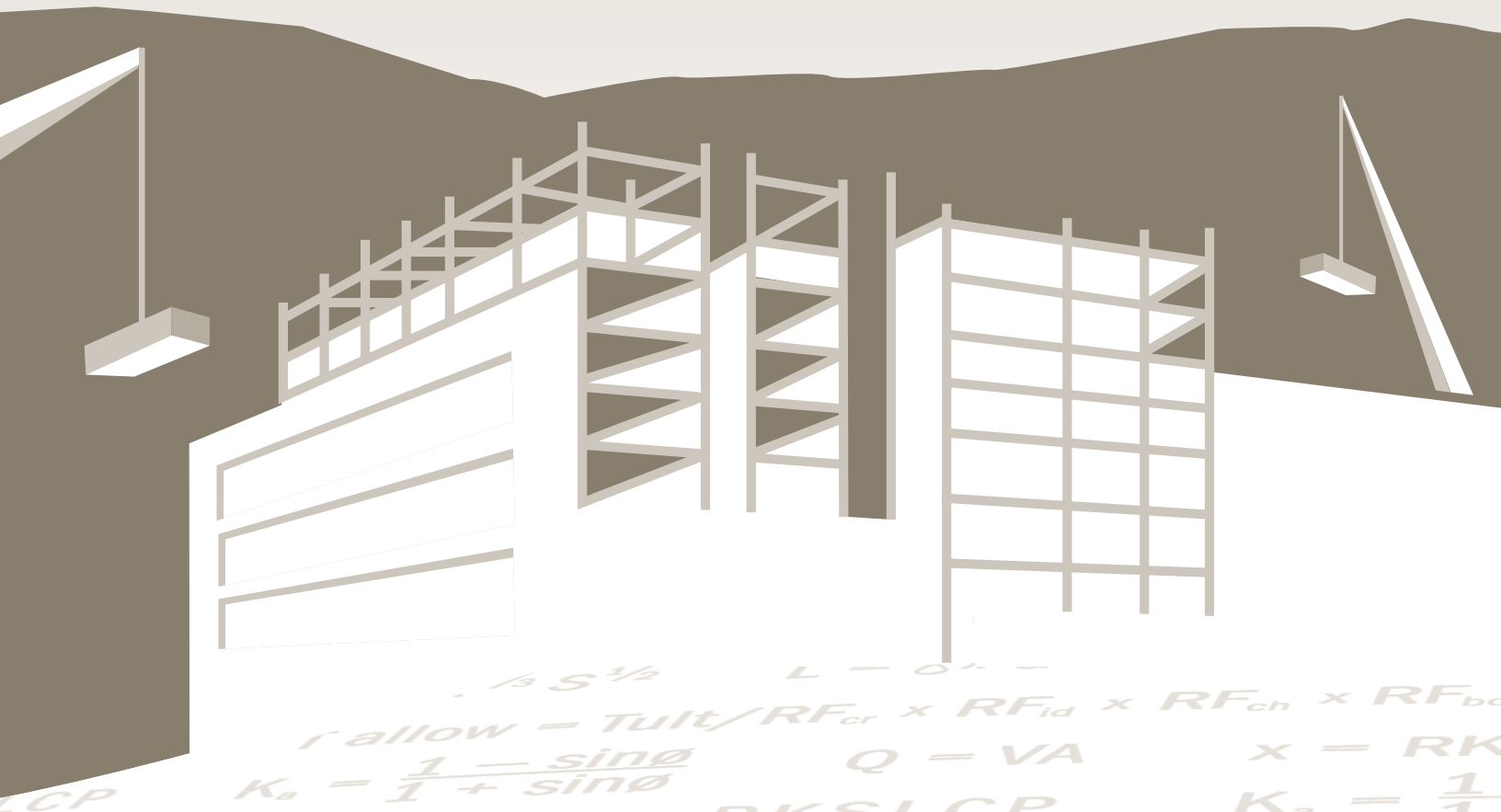
OUR PASSION FOR CREATING GEOSTABILIZATION SOLUTIONS BEGAN DECADES AGO



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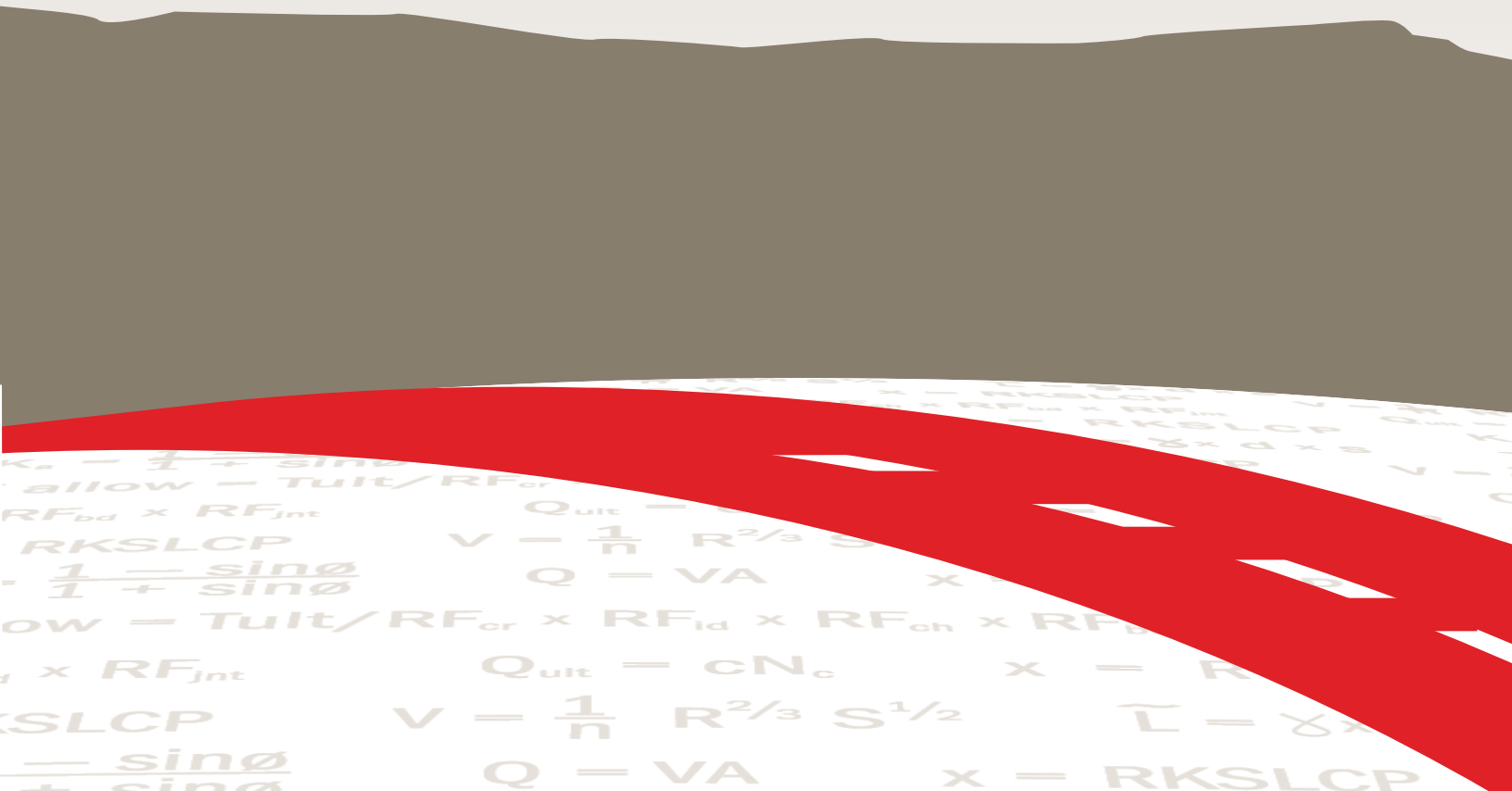
Starting with just a few nonwoven geotextiles, we quickly perfected and expanded a scientific approach to soil stabilization challenges that helped build an industry as much as our company. A proven solution for a variety of civil and environmental engineering challenges, geotextiles are used to improve performance and reduce costs of subsurface drains, roadways, railroads, embankments, landfills and more.

As the largest geotextile manufacturer in the world, we have designed a wide variety of geotextiles created to deliver superior performance under even the most demanding construction conditions. We also work in partnership with universities, public agencies and private consultants across the U.S. to investigate improvements in civil engineering designs and approaches, and we've developed the industry standards that have made geotextiles such a critical engineering tool. So when you choose a Propex geotextile, you are not just choosing one of the industry's highest performing products, you're choosing the technical knowledge, experience and support that backs it up. Propex—creating the advantages that make you more successful.



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INNOVATIONS

- Pioneered paving fabrics and the geosynthetic interlayer technology that have improved over one billion square yards of pavement
- As a leader in geotextile production and research, Propex has developed industry standards that have made geotextiles a vital and widely used engineering tool
- Introduced Roadways and Civil Engineering (R.A.C.E.) software for the design of economical new flexible pavements or unpaved roads and for pavement rehabilitation strategies



PERFORMANCE

- Well-documented performance case studies on every product we provide, including over 35 years of performance testing for paving fabrics and a 30-year performance study on woven geotextiles
- Propex has developed the industry's widest range of geostabilization solutions for virtually any construction project
- Strict manufacturing specifications, quality control monitoring and laboratory testing ensure our products consistently meet or exceed the most demanding construction specifications

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AVAILABILITY

- Vast global network of distributors and representatives assures local product availability
- Utilizing the latest software in forecasting demand, we always have product where and when you need it: distributors have ready access to our full line of geotextiles and keep locally popular products in inventory for quick pickup or delivery to your job site



COST EFFICIENCY

- Our geotextiles are much less costly to install than traditional geostabilization practices such as lime, soil cement or thicker layers of aggregate and pavement
- In unpaved roads, our products reduce the required aggregate by about one-third, and in paved roads, they reduce the structural section while maintaining the full section indefinitely
- Our products can be handled and installed easily

PEOPLE

- Staff includes dedicated engineering professionals with advanced degrees who can provide you with technical expertise, research and specification information
- Maintain industry leadership in trade associations and professional societies





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GEOTEX® GEOTEXTILES

THE FABRIC OF TODAY'S SITE DEVELOPMENT, TRANSPORTATION AND WASTE CONTAINMENT INDUSTRIES.

Propex has been a leading manufacturer of geotextiles for decades with billions of square yards of nonwoven and woven geotextiles installed around the world. From geotextiles for the construction and closure of solid waste landfills to the separation, stabilization and reinforcement of roads, our geotextiles are renowned for their ability to reduce construction and life-cycle costs in a wide range of applications. In fact, Propex has the widest selection of woven and nonwoven geotextiles available, including products that are used for:

GEOTEX® GEOTEXTILES AT A GLANCE

- Dimensionally stable woven and nonwoven solutions for everything from soil stabilization and filtration to roadway and landfill applications
- Resistant to ultraviolet (UV) degradation and to biological and chemical environments normally found in soil
- Outperforms and are more cost-effective than conventional soil methods

- Subsurface drainage
- Roadway separation/ stabilization
- Railroad stabilization
- Embankment reinforcement
- Earth-retaining structures
- Silt fences
- Lagoon closures
- Geomembrane liner protection
- Landfill gas collection
- Landfill drainage systems

1958 — First woven filtration geotextile produced using equipment later purchased

1968 — Began manufacturing nonwoven Petromat® paving products

1982 — Began manufacturing woven stabilization geotextiles

1995 — Began manufacturing high-strength woven geotextiles

2006 — Propex Fabrics Inc. acquires SI® Geosolutions making Propex the world's largest geotextile producer

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GEOTEX® GEOTEXTILES ▸



SUBSURFACE DRAINAGE ▸

During wet weather, water can penetrate a pavement surface into the road base course below. Foundation soils can also retain water that migrates up to the road's base course, causing the pavement to lose its strength, rut, heave in freezing weather and crack at the surface. While aggregate French drains help drain water away, they can become clogged with small soil particles. Nonwoven geotextiles are cost-effective, easily installed filter/separators that keep aggregate or geosynthetic drainage systems clog-free to ensure long-term performance.



ROADWAY SEPARATION/STABILIZATION ▸

As anyone who has dug up and repaired a failed road knows, loss of roadbase support due to subgrade soil contamination is the leading cause of failure. This contamination can happen quickly over soft or wet soils, but still develops even over competent subgrades. Once some of the original road structural section is lost to contamination, the road progressively fails, due to inadequate support for the traffic loading. When placed at the subgrade/roadbase interface, Propex geotextiles provide four functions to enhance roadway performance: separation, stabilization, reinforcement and drainage. These functions help maintain the integrity and strength of the pavement foundation, which ensures long-term performance of any pavement and reduces the required aggregate section to lower project cost.



RAILROAD STABILIZATION ▸

Maintaining track geometry is critical for efficient railroad operation. When subgrade pumps into the overlying ballast, it can destroy the track support system and create an uneven track bed. Nonwoven geotextiles prevent aggregate and ballast from punching into the subgrade and intermixing, reducing maintenance costs and ensuring long-term durability and drainability. High-strength woven geotextiles can reinforce railroad embankments over weak subgrade soils.



EMBANKMENT REINFORCEMENT ▸

During construction of roadways over organic deposits and highly compressible soils, construction equipment often can't travel across the soil without sinking. The soil needs to be strengthened and consolidated. Woven geotextiles provide long-term reinforcement for embankments constructed over soft soil, and can be installed easily. The added reinforcement allows construction equipment to travel across the soft soil, increasing overall site safety and reducing excavation costs.

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GEOTEX® GEOTEXTILES ▸



EARTH-RETAINING STRUCTURES ▸

Mechanically Stabilized Earth (MSE) retaining structures built with soil reinforcement fabrics are economical alternatives for designers looking to open up new land for development. Segmental Retaining Walls (SRWs), for example, are the most economical permanent retaining wall system available for fill slope construction. Reinforced steepened slopes using cost-effective high-strength geotextiles between soil lifts reinforce the slope surface and prevent deep-seated failure. In almost every case, earth-retaining structure solutions provide advantages over conventional concrete retaining structures, including:

- Increased land for development
- Installed cost savings of as much as 50% when compared to traditional concrete structures
- Quick and easy installation with reduced labor and equipment costs
- Improved aesthetics and reduced slope failures



SILT FENCES ▸

When attached to wood or metal posts and properly trenched, silt fence fabrics contain overland flow and filter suspended soil particles from water. This not only allows the water to drain efficiently, it also prevents environmental damage to areas next to construction sites. Plus, as sediment accumulates, the fabric's high tensile strength, UV resistance and low maintenance features ensure continued performance throughout the entire life span of the project.



LAGOON CLOSURES ▸

Woven geotextiles make it safe for the rapid deployment of soil caps over industrial sludge lagoons, allowing water to pass vertically during construction and soil separation—an application where geogrids alone can't perform adequately.

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GEOMEMBRANE LINER PROTECTION

When High-Density Polyethylene (HDPE) and other liners are installed during EPA Subtitle D-mandated solid waste landfill construction, they are susceptible to puncture and gouging during and after construction. This type of damage can weaken and possibly rupture the liner if it stretches due to unexpected tension. Heavyweight nonwoven geotextiles can cushion and protect geomembranes from damage by sharp objects. These fabrics enhance puncture, impact and abrasion resistance, allowing landfill system construction and operation without fear of damaging critical liners.

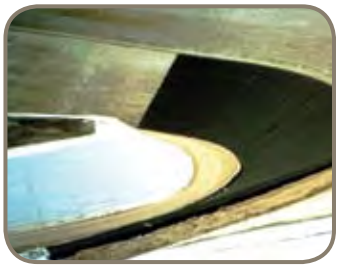


LANDFILL GAS COLLECTION

Maintaining a conduit for gases to escape from landfills can be challenging. Heavyweight nonwoven geotextiles help collect and transport gases that can build up beneath the flexible geomembranes used in the closure of solid waste facilities.

Overall, these geotextiles:

- Allow gas to travel through the porous geotextile laterally across the top of the landfill until it reaches a vent
- Help prevent gas pressure build-up that could explode the liner system
- Are used in the construction of drainage geonet composites for use on more active sites



LANDFILL DRAINAGE SYSTEMS

When placed in close contact with geonet or drainage stone, medium-weight nonwoven geotextiles can filter soil and waste while allowing water and leachate to pass. In new landfill cell construction, workers install a series of liquid or leachate collection pipes or stone filters along the bottom surface. These initial collection areas transport the leachate into one primary collection pipe, which transfers the liquid to a centralized treatment center. To ensure proper leachate collection, medium-weight nonwoven and woven monofilament geotextiles line the initial collection areas.

Specifically, these fabrics:

- Allow the liquid to pass through the initial collection areas
- Prevent clogging of the collection pipe and drainage stone
- Ensure a maintenance-free collection system
- Are used in the construction of drainage geonet composites

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PAVING PRODUCTS

One of the biggest contributors to roadway deterioration is the softening of subgrade soil that occurs when water infiltrates the base through cracks and pores in the pavement surface. A pavement with a base that is saturated as little as 10% of the time has just 50% of the life of a pavement protected from water infiltration. While typical road maintenance overlays or surface treatments provide only short-term relief, they do not address the real problem: moisture in the roadbase and crack-inducing stresses from the underlying pavement.

Our specialty paving fabrics and repair membranes are specifically engineered to reduce water infiltration and reflective cracking, thereby saving on costly repaving cycles. They have been proven to extend the life of highways, city streets, parking lots, and airport runways and taxiways. These versatile products are used in new asphalt concrete pavements, beneath overlays of rigid and flexible pavements and beneath chip-seal surface treatments.



PETROMAT® PAVING FABRIC

Petromat is the oldest and most widely used fabric interlayer system. This nonwoven fabric is field-saturated with an asphalt cement tack coat to become a continuous moisture barrier and a stress-absorbing interlayer in new or rehabilitated pavements. Petromat typically doubles asphalt concrete overlay life and can more than double the life of a chip-seal surface treatment. When Petromat is included, thicker overlays may also be reduced by as much as 1.5 inches in thickness without losing performance. The installed Petromat system typically costs less than 0.5 inches of asphalt concrete pavement.



PETROTAC® STRIP MEMBRANE

Petrotac is a unique “peel and stick” waterproofing membrane for effective repair of pavement cracks, joints or potholes and for sealing bridge decks. This product is a composite of Petromat nonwoven fabric coated with a rubberized asphalt adhesive mastic. The adhesive mastic easily bonds to the existing pavement surface, allowing for quick, uncomplicated product installation. A unique asphalt top coating ensures an excellent bond with the pavement overlay.

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HELP WHEN YOU NEED IT

ONE MORE PROPEX ADVANTAGE

With over 10 locations and more than 2,500 people worldwide, Propex has the resources to help you execute a plan that works. Not only do we have a complete line of products and educational programs for geotextiles, we have the expertise and tools to walk you through the process.

Online. A good place to start is the Propex web site—geotextile.com. There you'll find information about all our geotextile products as well as a complete library of downloadable technical support materials.



Roadway design and rehabilitation software. For help designing the newest, most economical flexible pavements or unpaved surfaces, order our Roadways and Civil Engineering (R.A.C.E.) software. Created to help you plan pavement rehabilitation strategies that will lower the cost and extend the life of your pavement repairs. To order, visit our web site at geotextile.com.

Contact us. Because we are committed to technical support during every phase of your project, Propex has on staff registered, professional engineers to aid you in your civil engineering design, geotextile selection and preparation of specifications. For help and more information, call Propex at **800-621-1273** or visit **geotextile.com**.

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GEOSYNTHETICS

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6025 Lee Highway, Suite 425
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AMS
Ash Management Services

Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

HUT-APD-SUB-023-03 Let-down Chute Geotextile

02373-1.4.B Samples [delivered to the site]

02373-1.4.C Roll Inventory [and material certification by manufacturer]

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-023-03	2012-08-02	Paul Zinsious AMS	502-640-2918

SHOP DRAWING / SUBMITTAL REVIEW

Shop drawing/submittal review is for design conformity and general conformance with the design concept of the project as given in the contract documents. Subcontractor is responsible for full compliance with contract documents, confirming and correcting all quantities, correlating dimensions at project work site for tolerance, clearance, fabrication process, and techniques of construction. Subcontractor is responsible for coordination of his work with that of all other trades, and performance of the work in a safe and satisfactory manner.

X Reviewed.
__ Reviewed with corrections.
__ Revise and resubmit.
__ Rejected. See Remarks.

2012-08-02 Date

By

AMEREN SERVICES
DRAWING REVIEW

☒ No Comments. Submit final drawings. Supplier may proceed.
☐ Comments noted. Make noted changes. Submit final drawings. Supplier may proceed.
☐ Unacceptable. Revise and resubmit.
☐ Review not required.
☐ _____

Review of this drawing does not relieve Supplier from responsibility for errors, correctness of details or compliance with Contract or Purchase Order requirements.

By M Wagstaff Date 8/16/12

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GEOTEX® BY PROPEX

Certificate of Compliance

August 1, 2012

Erosion Resources & Supply
BOL: 80509000 PO: 1510
GEOTEX® 861 is a polypropylene, staple fiber, needlepunched nonwoven geotextile produced by Propex, and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. The fibers are needled to form a stable network that retains dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils.

GEOTEX 861 conforms to the property values listed below[1]. Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP).

			MARV[2]
PROPERTY	TEST METHOD	ENGLISH	METRIC
ORIGIN OF MATERIALS			
% U.S. Manufactured Inputs		100%	100%
% U.S. Manufactured		100%	100%
PHYSICAL			
Mass/ Unit Area	ASTM D-5261	8.0 oz/yd^2	271 g/m^2
Thickness	ASTM D-5199	90 mils	2.3 mm
MECHANICAL			
Tensile Strength (Grab)	ASTM D-4632	220 lbs	979 N
Elongation	ASTM D-4632	50%	50%
Puncture	ASTM D-4833	135 lbs	601 N
CBR Puncture	ASTM D-6241	575 lbs	2559 N
Mullen Burst	ASTM D-3786	420 psi	2895 kPa
Trapezoidal Tear	ASTM D-4533	95 lbs	423 N
ENDURANCE			
UV Resistance % Retained at 500 hrs	ASTM D-4355	70%	70%
HYDRAULIC			
Apparent Opening Size (AOS)[3]	ASTM D-4751	80 US Std. Sieve	0.180 mm
Permittivity	ASTM D-4491	1.5 sec^{-1}	1.5 sec^{-1}
Permeability	ASTM D-4491	0.38 cm/sec	0.38 cm/sec
Water Flow Rate	ASTM D-4491	110 gpm/ft^2	4482 l/min/m^2
ROLL SIZES		15 ft x 300 ft	4.57 m x 91.5 m

Richard G Bledsoe
Quality Manager

NOTES:
1. The property values listed above are effective 04/2011 and are subject to change without notice.
2. Values shown are in weaker principal direction. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.
3. Maximum average roll value.

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ENGINEERING EARTH
www.geotextile.com

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ph 423 899 0444 · ph 800 621 1273 · fax 423 899 7619

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Propex

BOL: 80509000

Cust PO: 1520

Certificate of Analysis

MV: 1004499 861 15ftx300ft blk GEOTEX

R. Gene Bledsoe
Quality Manager

HU#/Rolls		AOS (mm)	CBR	Mass/Unit Area	MD Elong @ Break	MD Tensile @ Break	MD Trap Tear	Mullen Burst	Permeability	Permittivity	Puncture
Shipped	units	mm	lb	oz/yd2	%	lb	lb	psi	cm/s	1/sec	lb
	ASTM Test	D-4751	D-6241	D-5261	D-4632	D-4632	D-4533	D-3786	D-4491	D-4491	D-4833
2022355105	2258331	0.180	787.76	9.27	69	231.75	99.77	473	0.546	1.640	156.41
2022355188	2258331	0.180	864.11	9.57	70	272.79	122.39	487	0.516	1.904	166.73
2022355382	2258331	0.180	782.80	9.33	67	268.97	112.01	499	0.563	1.995	154.70
2022355388	2258331	0.180	782.80	9.33	67	268.97	112.01	499	0.563	1.995	154.70

1. Data listed above was determined in accordance with standard test methods, frequencies and procedures defined internally by plant and product type
2. Rolls tested on this shipment are identified with an asterisk(*)
3. HU# is handling unit and is terminology for roll number and "production order" equates to lot number.
Our enterprise resource planning system generates sequential handling unit and production order designations independent of the manufacturing facility producing the product.
Therefore, handling unit numbers may not be in sequential order within a production order.

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Propex

Certificate of Analysis

BOL: 80509000

Cust PO: 1520

MV: 1004499 861 15ftx300ft blk GEOTEX

R. Gene Bledsoe
Quality Manager

HU#/Rolls Shipped	units	Thickness	Water Flow Rate	XMD Elong @ Break	XMD Tensile @ Break	XMD Trap Tear
		mil	gpm/sf	%	lb	lb
	ASTM Test	D-5199	D-4491	D-4632	D-4632	D-4533
2022355105	2258331	135	121.15	78	298.06	117.24
2022355188	2258331	141	140.58	78	329.85	149.40
2022355382	2258331	124	147.38	85	325.18	132.21
2022355388	2258331	124	147.38	85	325.18	132.21

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Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

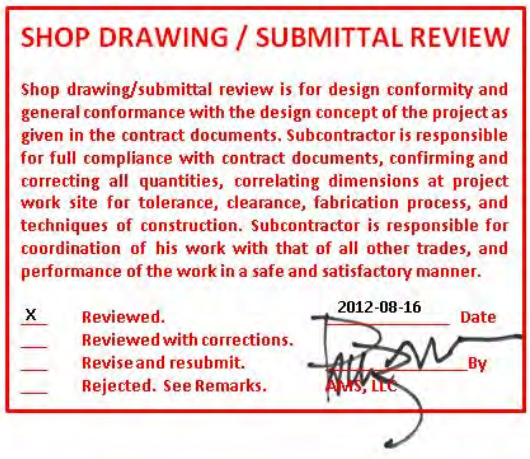
HUT-APD-SUB-023-05 Let-down Chute Geotextile [add roll info]

02373-1.4.A Product Data – Geotextile Fabric Properties…

Additional rolls were ordered for the project.

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-023-05	2012-08-16	Paul Zinsious AMS	502-640-2918



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GEOTEX® BY PROPEX

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August 16, 2012

Erosion Resources & Supply
BOL: 80509534 PO: 1525
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GEOTEX 861 conforms to the property values listed below[1]. Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP).

			MARV[2]
PROPERTY	TEST METHOD	ENGLISH	METRIC
ORIGIN OF MATERIALS			
% U.S. Manufactured Inputs		100%	100%
% U.S. Manufactured		100%	100%
PHYSICAL			
Mass/ Unit Area	ASTM D-5261	8.0 oz/yd^2	271 g/m^2
Thickness	ASTM D-5199	90 mils	2.3 mm
MECHANICAL			
Tensile Strength (Grab)	ASTM D-4632	220 lbs	979 N
Elongation	ASTM D-4632	50%	50%
Puncture	ASTM D-4833	135 lbs	601 N
CBR Puncture	ASTM D-6241	575 lbs	2559 N
Mullen Burst	ASTM D-3786	420 psi	2895 kPa
Trapezoidal Tear	ASTM D-4533	95 lbs	423 N
ENDURANCE			
UV Resistance % Retained at 500 hrs	ASTM D-4355	70%	70%
HYDRAULIC			
Apparent Opening Size (AOS)[3]	ASTM D-4751	80 US Std. Sieve	0.180 mm
Permittivity	ASTM D-4491	1.5 sec^{-1}	1.5 sec^{-1}
Permeability	ASTM D-4491	0.38 cm/sec	0.38 cm/sec
Water Flow Rate	ASTM D-4491	110 gpm/ft^2	4482 l/min/m^2
ROLL SIZES		15 ft x 300 ft	4.57 m x 91.5 m

Richard G Bledsoe
Quality Manager

NOTES:
1. The property values listed above are effective 04/2011 and are subject to change without notice.
2. Values shown are in weaker principal direction. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.
3. Maximum average roll value.

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BOL: 80509534

Cust PO: 1525

Certificate of Analysis

MV: 1004499 861 15ftx300ft blk GEOTEX

R. Gene Bledsoe
Quality Manager

HU#/Rolls Shipped	units	AOS (mm)	CBR	Mass/Unit Area	MD Elong @ Break	MD Tensile @ Break	MD Trap Tear	Mullen Burst	Permeability	Permittivity	Puncture
		mm	lb	oz/yd2	%	lb	lb	psi	cm/s	1/sec	lb
	ASTM Test	D-4751	D-6241	D-5261	D-4632	D-4632	D-4533	D-3786	D-4491	D-4491	D-4833
2022355242	2258331	0.180	779.60	9.61	72	252.31	100.22	487	0.711	2.162	170.27
2022355243	2258331	0.180	779.60	9.61	72	252.31	100.22	487	0.711	2.162	170.27
2022355247	2258331	0.180	779.60	9.61	72	252.31	100.22	487	0.711	2.162	170.27
2022355249	2258331	0.180	779.60	9.61	72	252.31	100.22	487	0.711	2.162	170.27
2022355252	2258331	0.180	779.60	9.27	73	278.06	98.63	479	0.711	2.162	143.49
2022355256	2258331	0.180	779.60	9.27	73	278.06	98.63	479	0.711	2.162	143.49
2022355260	2258331	0.180	779.60	9.27	73	278.06	98.63	479	0.711	2.162	143.49
2022355262	2258331	0.180	779.60	9.27	73	278.06	98.63	479	0.711	2.162	143.49
2022355264	2258331	0.180	779.60	9.27	73	278.06	98.63	479	0.711	2.162	143.49

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BOL: 80509534

Cust PO: 1525

Certificate of Analysis

MV: 1004499 861 15ftx300ft blk GEOTEX

R. Gene Bledsoe
Quality Manager

HU#/Rolls Shipped	units	Thickness	Water Flow Rate	XMD Elong @ Break	XMD Tensile @ Break	XMD Trap Tear
		mil	gpm/sf	%	lb	lb
	ASTM Test	D-5199	D-4491	D-4632	D-4632	D-4533
2022355242	2258331	139	159.68	79	315.63	127.47
2022355243	2258331	139	159.68	79	315.63	127.47
2022355247	2258331	139	159.68	79	315.63	127.47
2022355249	2258331	139	159.68	79	315.63	127.47
2022355252	2258331	139	159.68	84	350.16	136.00
2022355256	2258331	139	159.68	84	350.16	136.00
2022355260	2258331	139	159.68	84	350.16	136.00
2022355262	2258331	139	159.68	84	350.16	136.00
2022355264	2258331	139	159.68	84	350.16	136.00

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12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

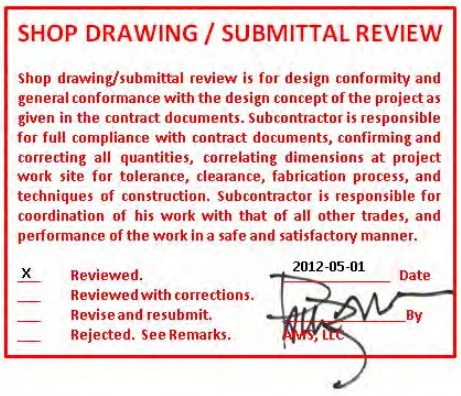
HUT-APD-SUB-010-01-Bentonite [digital-final]

[Original hard copy submission date at Progress Meeting on 05-01]

02245-1.4.A Product Data – Bentonite Properties
02245-1.4.B Method of Delivery…
02245-3.4.A Prequalification Testing of Bentonite

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-010-01	2012-05-01	Paul Zinsious AMS	502-640-2918



Paul H. Zinsious, PMP

From: Paul H. Zinsious, PMP
Sent: Thursday, May 10, 2012 12:31 PM
To: 'Wagstaff, Michael J'
Cc: j_cravens@geotechnology.com; Anna Saindon (a_saindon@geotechnology.com); Jimmy Boone [AMS]; Randy Porter [AMS]; John Denham [AMS]
Subject: RE: Hutsonville Contractor Submittal - Vent Cap] review
Attachments: SK-HUT-APD-020-R0.pdf

Good morning Mike:
Thank you for the time on the phone yesterday discussing the Bentonite VES-01. We submit the following comments referencing the "Terms of Substitution" in Hanson Professional Service, Inc. [HPS] review dated 2012-05-07:

01 GCL Seam realignment for parallel and perpendicular relative the actual in place panel layout [see sketch].
02 No issue.
03 The vendor recommends Bentonite facing down so if there ever was a tear in the geomembrane the Bentonite has an opportunity to swell and close the opening.
04 We submit additional overlap [on center 2 FT MIN] on GCL seams in lieu of sheets rolled under. We do not anticipate settlement of high magnitude.
05 No issue.
06 No issue. We will overlap GCL seams 1 FT MIN, and will use powdered Bentonite.

The GCL we are submitting is 30 MIL.

From: Wagstaff, Michael J [mailto:MWagstaff@ameren.com]
Sent: Monday, May 07, 2012 4:52 PM
To: Paul H. Zinsious, PMP
Cc: j_cravens@geotechnology.com; Anna Saindon (a_saindon@geotechnology.com)
Subject: FW: Hutsonville Contractor Submittal - Vent Cap

Paul,
Attached is Hanson's review of the value engineering proposal.
Please respond to the comments accordingly.
Thanks
Mike

Michael J. Wagstaff, P.E., PMP : : Consulting Engineer / Dam Safety, Civil & Structural Engineering :
: T 618.343.7790 : : C 618.406.3478
Ameren Energy Resources : : 1500 Eastport Plaza Drive : : Collinsville, IL 62234

From: Steve Bishoff [mailto:SBishoff@hanson-inc.com]
Sent: Monday, May 07, 2012 3:35 PM
To: Wagstaff, Michael J

Cc: Dan Whalen; Kevin Kreipe
Subject: RE: Hutsonville Contractor Submittal - Vent Cap

Mike –
Attached is the approval with comments on the GCL. It's 6 mg, so please let me know that you got it.
Thanks –
Steve

From: Wagstaff, Michael J [mailto:MWagstaff@ameren.com]
Sent: Monday, May 07, 2012 2:03 PM
To: Steve Bishoff
Subject: RE: Hutsonville Contractor Submittal - Vent Cap

Thanks Steve.

Can you forward the submittal review of the pelletized bentonite vs. GCL as well?

Thanks – Mike

Michael J. Wagstaff, P.E., PMP : : Consulting Engineer / Dam Safety, Civil & Structural Engineering : : T 618.343.7790 : : C 618.406.3478
Ameren Energy Resources : : 1500 Eastport Plaza Drive : : Collinsville, IL 62234

From: Steve Bishoff [mailto:SBishoff@hanson-inc.com]
Sent: Monday, May 07, 2012 1:31 PM
To: Wagstaff, Michael J
Cc: Kevin Kreipe; Dan Whalen
Subject: Hutsonville Contractor Submittal - Vent Cap

Mike –
Here is the approved cap vent submittal.
Steve

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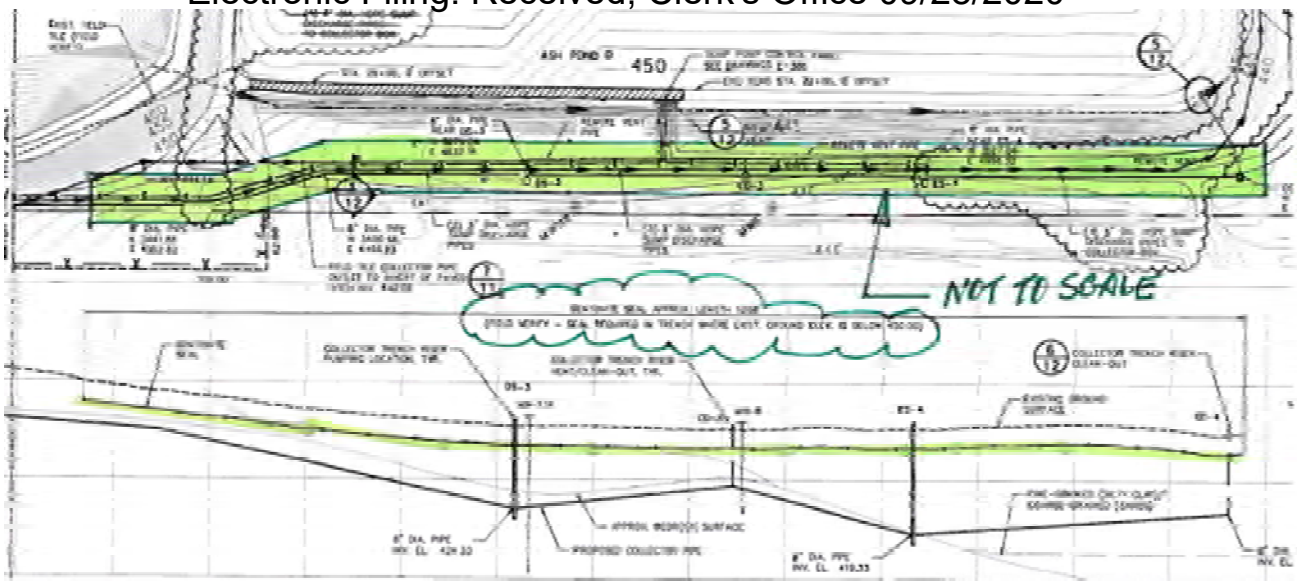

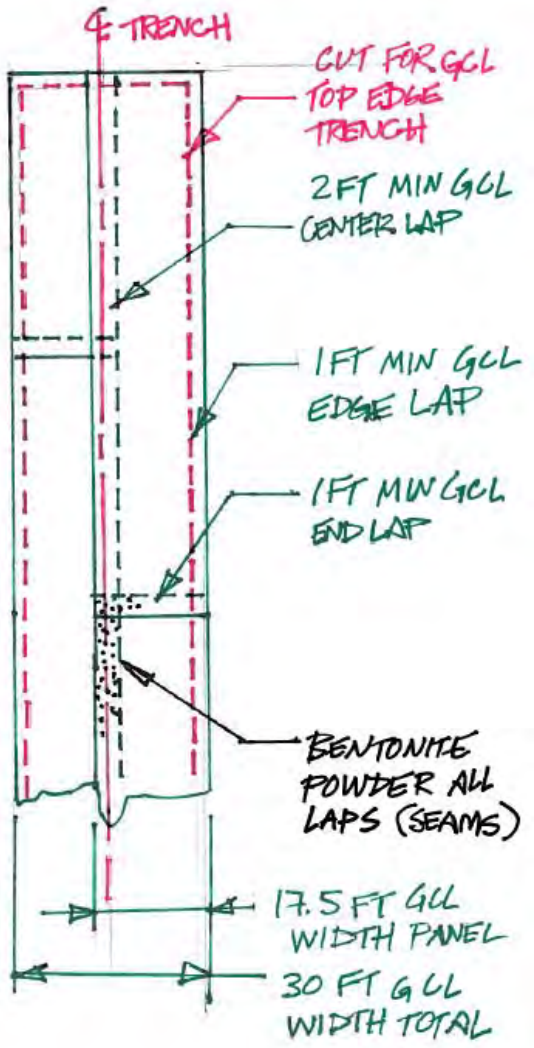

00	10-May-12	Release for AMS review	Hutsonville Power Station 15142 East 1900 Avenue Hutsonville, Illinois 62433	AMS Ash Management Services	Perforated Collector Pipe Trench Cross Section GCL Option - Panels **SK-HUT-APD-19-R1**

Paul H. Zinsious, PMP

From: Wagstaff, Michael J <MWagstaff@ameren.com>
Sent: Monday, May 07, 2012 4:52 PM
To: Paul H. Zinsious, PMP
Cc: j_cravens@geotechnology.com; Anna Saindon (a_saindon@geotechnology.com)
Subject: FW: Hutsonville Contractor Submittal - Vent Cap
Attachments: HUT-APD-SUB-001-05-Bentonite-Seal.pdf

Paul,
Attached is Hanson's review of the value engineering proposal.
Please respond to the comments accordingly.
Thanks
Mike

Michael J. Wagstaff, P.E., PMP : : Consulting Engineer / Dam Safety, Civil & Structural Engineering :
: T 618.343.7790 : : C 618.406.3478
Ameren Energy Resources : : 1500 Eastport Plaza Drive : : Collinsville, IL 62234

From: Steve Bishoff [mailto:SBishoff@hanson-inc.com]
Sent: Monday, May 07, 2012 3:35 PM
To: Wagstaff, Michael J
Cc: Dan Whalen; Kevin Kreipe
Subject: RE: Hutsonville Contractor Submittal - Vent Cap

Mike –
Attached is the approval with comments on the GCL. It's 6 mg, so please let me know that you got it.
Thanks –
Steve

From: Wagstaff, Michael J [mailto:MWagstaff@ameren.com]
Sent: Monday, May 07, 2012 2:03 PM
To: Steve Bishoff
Subject: RE: Hutsonville Contractor Submittal - Vent Cap

Thanks Steve.

Can you forward the submittal review of the pelletized bentonite vs. GCL as well?

Thanks – Mike

Michael J. Wagstaff, P.E., PMP : : Consulting Engineer / Dam Safety, Civil & Structural Engineering :
: T 618.343.7790 : : C 618.406.3478
Ameren Energy Resources : : 1500 Eastport Plaza Drive : : Collinsville, IL 62234

From: Steve Bishoff [mailto:SBishoff@hanson-inc.com]
Sent: Monday, May 07, 2012 1:31 PM
To: Wagstaff, Michael J
Cc: Kevin Kreipe; Dan Whalen
Subject: Hutsonville Contractor Submittal - Vent Cap

Mike –
Here is the approved cap vent submittal.
Steve

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HANSON

REVIEW OF SUBMITTAL

Project Name: Ameren Ash Pond Closure

Owner: Ameren

Project Location: Hutsonville, IL

Hanson Project Number: 10E0035

Date Received: 04-26-12

Work Discipline: Civil

Architect/Engineer: Hanson

Construction Mgr./Gen. Contr: AMS

Submitting Contractor: AMS

Vendor: GSE

Hanson Submittal No. : C-05

Specification Section: 2245 - Bentonite

Reviewed By: K. Kreipe

Date Reviewed: 05-07-12

REVIEW BY HANSON PROFESSIONAL SERVICES INC (HANSON)
Hanson's review of submittals is solely for their general conformance with Hanson's design intent and general conformance with information given in the construction documents. Hanson shall not be responsible for any aspects of a submittal that affect or are affected by means, methods, techniques, sequences and operations of construction, or safety precautions and programs incidental thereto, all of which are the contractor's responsibility. The contractor will be responsible for lengths, dimensions, elevations, quantities and coordination of the work with other trades. The contractor shall be responsible to review submittals and approve them in these respects. **Based on such review, actions (as defined below) are noted for each item submitted.**

Action	Action Comment	Action Definition
1	No Exceptions Taken	Fabrication, manufacture, or construction may proceed on the basis that the submittal is in conformance with the design concept and the contract documents.
2	Furnish As Corrected	Fabrication, manufacture, or construction may proceed after making the noted corrections to satisfy compliance with the design concept and/or the contract documents.
3	Revise and Resubmit	No fabrication, manufacture, or construction may proceed. Resubmit for review after requested revisions are made.
4	Submit Specified Item	No fabrication, manufacture, or construction may proceed. Submit specified item to Hanson for review.
5	Rejected - See Remarks	No fabrication, manufacture, or construction may occur for reasons stated in "Remarks."

Item ID	Item Description	Action	Comments/Remarks
01	Bentonite Trench Seal	2	See Attached

END OF COMMENTS

Copy to: File	Signed: 5-7-12

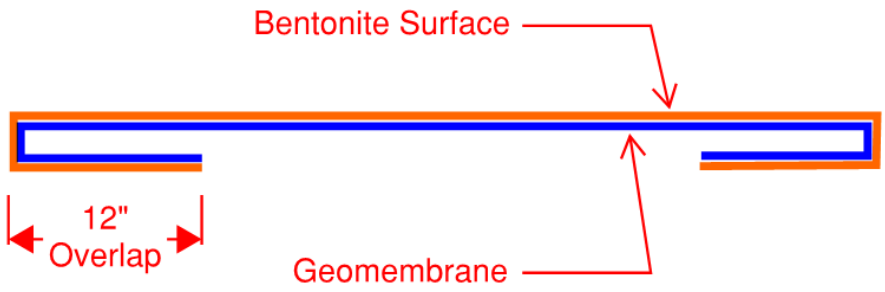
Value Engineering Submittal VES-01 - Bentonite-Seal

May 7, 2012

We approve the use of a geomembrane backed GCL (Gundseal) if the following criteria is met. A standard GCL is not suitable for this application.

Terms of this substitution are as follows:

1. Panels must be installed so that there is no seam perpendicular to the axis of the trench. (Any settlement will pull along the seam rather than pull the seam apart)
2. Backfill placed below the GCL must be mounded slightly above installation grade. (Settlement will eventually cause the GCL to lay flat)
3. Installation shall be such that the orientation of the GCL shall have the bentonite facing up and the geomembrane facing down.
4. Bentonite sheets shall be rolled under itself at the sides of the trench for a distance of one foot. (see sketch below)
5. Backfilled subgrade shall be smooth drum rolled prior to the installation of the GCL. CQA officer is required to inspect and sign-off on smooth surface per CQA plan.
6. Seams perpendicular to the axis of the trench shall be overlapped 6". Powdered Bentonite is required along seams (similar to CGL installation).



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Tuesday, May 01, 2012

Mr. Michael J. Wagstaff, PE, PMP
Consulting Engineer - Dam Safety Structural Engineering
Ameren Energy Resources
1500 Eastport Plaza Drive
Collinsville, Illinois 62234
CL 618-406-3478
EM mwagstaff@ameren.com

RE: Hutsonville Ash Pond D Closure
Ameren PO No. 567523 R2 - AMS-Charah No. 4115-06-6120
Value Engineering Submittal VES-01 – Bentonite cap option

Dear Mike:

We are offering for Ameren's consideration this Value Engineering Submittal [VES] to replace the specified Bentonite cap for the Perforate Collector Pipe [PCP] trench with a Geosynthetic Clay Liner [GCL] alternate. Use of this material in lieu of the 6 IN thick loose Bentonite cap we believe can provide the same level of permeability, decrease the installation time, provide a better quality of constructability for the sequencing of trench and utility, and realize a credit to Ameren. We submit the following for your review and comment:

Supporting documents attached:

1. GSE Fabric Encased Geosynthetic Clay Liners [Application Sheet]
2. GSE Bentoliner NWL Geosynthetic Clay Liner [Product Data Sheet]
3. GSE Geomembrane Supported Geosynthetic Clay Liners [Application Sheet]
4. GSE Gundseal Geosynthetic Clay Liner – Textured HDPE [Product Data Sheet]
5. AMS SK-HUT-APD-19-R1 "Perforated Collector Pipe – Trench Cross Section – GCL Option"

Benefits of the GCL:

1. GSE indicates the GCL has ability to provide the same level of permeability, for less profile.
2. Material is rolled out onto the trench back fill, saving time over using bulk Bentonite which has to be spread across the trench. This will shorten the overall duration of the PCP schedule.
3. The GCL will provide a more uniform installation thickness, thus ensuring continuous coverage.
4. Installation of the material does not require being wetted down before initial back fill. Since the trench area is not being wetted down, the area will be much cleaner and safer to access.
5. Once backfilled, the trench can be accessed immediately for installation of the utilities [pipe and conduit]. Whereas the loose Bentonite after being wetted and back filled, may require some set time before access for utility installation.
6. No impact to schedule in terms of delivery or installation.

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Mr. Michael J. Wagstaff, PE, PMP
Consulting Engineer - Dam Safety Structural Engineering
Ameren Energy Resources

RE: Hutsonville Ash Pond D Closure
Ameren PO No. 567523 R2 - AMS-Charah No. 4115-06-6120
Value Engineering Submittal VES-01 – Bentonite cap option

Credit calculations for using the GCL:

The construction documents require the Bentonite cap in the areas of the PCP where grade elevation is below 450 FT, for a length of about 1,203 FT. If the trench average width is approximately 28 FT wide, and we overlap the GCL 1 FT each side, we have a total width of 30 FT. Considering excavation each end of the PCP, we will use 1,250 FT for the total length. We then calculate the total area of GCL:

1,250 LF x 30 FT = 37,500 SF Adding 10% contingency = 37,500 x 1.10 = 41,250 SF

We are submitting two types of GCL for consideration, the NWL GCL, and the Gundseal which has a geomembrane layer. The approximate cost for each [including delivery and tax] per square foot we calculate:

NWL GCL	$ 0.43/SF x 41,250 SF = $ 17,737.50
Gundseal	$ 0.54/SF x 41,250 SF = $ 22,275.00

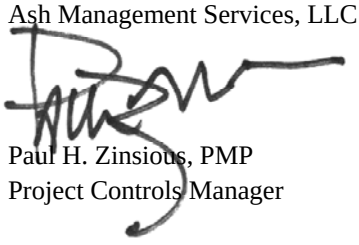
AMS has a budget line item cost for the Bentonite of $ 55,108.00. We propose a cost savings plan if this alternate is chosen to split the savings 50% between Ameren and AMS:

NWL GCL	$ 55,108 - $ 17,737.50 = $ 37,370.50	Split 50% = $ 18,685.25
Gundseal	$ 55,108 - $ 22,275.00 = $ 32,833.00	Split 50% = $ 16,416.50

We will use union labor rates per the original contract and in accordance working under the National Maintenance Agreement [NMA]. All workers will be Ameren CBT and AMS safety trained, with adherence to Ameren “Rules-to-live-by”. Work will be performed during standard work hours, without consideration for overtime.

Please advise if this alternate is acceptable to Ameren, and if Ameren would like to pursue further investigation. Feel free to call with any questions.

Respectfully,
Ash Management Services, LLC



Paul H. Zinsious, PMP
Project Controls Manager

Cc: Mr. John Denham – Regional Operations Manager – AMS
Mr. Jimmy Boone – Regional Manager - AMS
File: HUT-APD-VES-01-R0-2012-04-30
Attachments: As noted above.

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The Pioneer Of Geosynthetics
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Application Sheet

Fabric Encased Geosynthetic Clay Liners

FABRIC ENCASED GEOSYNTHETIC CLAY LINERS (GCLS)

GSE BentoLiner GCL is produced by distributing a uniform layer of the sodium bentonite between two geotextiles. Fibers from the upper nonwoven geotextile are needlepunched through the layer of bentonite and incorporated into the lower geotextile (either a woven or a scrim nonwoven). This process results in a strong mechanical bond between the fabrics. A heat treating process is then used to modify and more permanently lock the needlepunched fibers into place.

The sodium bentonite clay utilized in GSE BentoLiner GCL is a naturally occurring clay mineral that swells as liquid enters between its clay platelets. When hydrated under confinement, the bentonite swells to form a low permeability clay layer with a hydraulic conductivity value of $5x10^{-9}$ cm/sec which is an equivalent hydraulic protection of several feet of compacted clay. Unique properties, including increased internal shear resistance and long term creep resistance, make GSE BentoLiner GCL ideal for a wide range of containment lining applications.



GSE BentoLiner GCL

NEEDLEPUNCHING MAKES A DIFFERENCE

By needlepunching fibers through the sodium bentonite clay layer, a completely uniform, reinforced GCL is produced with shear strength, creep resistance, and stability advantages important to any application.

HIGH SHEAR RESISTANCE

Needlepunching reinforces the otherwise weak layer of sodium bentonite clay. Unreinforced bentonite is susceptible to shear failure, even on gentle slopes. The GSE BentoLiner GCL needlepunching process consistently reinforces the bentonite layer with thousands of high tenacity fibers that resist and transfer the shearing stresses into the encapsulating geotextiles.

UNIFORM BENTONITE CONTENT

The uniform confinement provided by the fibers from the needlepunching process resist lateral migration of the bentonite clay within the GSE BentoLiner GCL in either the dry or hydrated state. As a result, a consistent bentonite content is preserved throughout the composite, in turn resulting in a consistent low permeability.

GREATER INSTALLATION DURABILITY

During installation, the needlepunched fibers hold the bentonite in place and prevent the GCL from separating. GSE BentoLiner GCL is more durable over a wider range of installation conditions, and, because it is needlepunched, it can greatly reduce the adverse effects of premature hydration during installation.



Soil cover operations over installed GSE BentoLiner GCL.

SUPERIOR GCL SLOPE PERFORMANCE

With GSE BentoLiner GCL, the clay component is no longer the limiting factor on side slopes. You can use GSE BentoLiner GCL to replace compacted clay layers on steep side slopes and be assured of low permeability without sacrificing slope stability. The inherent confining stress from the needlepunching also improves the hydraulic properties of GSE BentoLiner GCL under low confining stress applications.



Improved slope stability utilizing GSE BentoLiner GCL.

-Continued-

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Application Sheet

ASSURANCE QUALITY CONTROL

Because GSE BentoLiner GCL is factory manufactured liner products, the controlled environment of the production facility allows for greater control over critical performance characteristics. The intensive manufacturing quality control program ensures consistent hydraulic and physical properties through the latest ASTM testing procedures.

The thorough manufacturing quality control minimizes the expensive and time consuming on-site quality assurance testing required for compacted clay liners. GSE BentoLiner GCL provides consistent high quality performance.



GSE BentoLiner deployed in a composite bottom liner system.

MORE VERSATILE THAN COMPACTED CLAY

GSE BentoLiner GCL is part of an important trend towards the combined use of geosynthetics and clay materials in containment applications. In a typical composite liner system, GCL works synergistically with polyethylene and other geomembrane materials to maximize liner system efficiency.

INCREASED AIRSPACE AND LINER EFFICIENCY

In a composite landfill liner system, GSE BentoLiner GCL can in many cases completely replace or significantly reduce the required thickness of the compacted clay layer. This results in less excavation and re-compaction as well as increased containment volume. And, in a landfill, increased airspace means increased revenues.

CAPS AND CLOSURES

GSE BentoLiner GCL is ideally suited for use in landfill caps and closures. Used alone, or in conjunction with a geomembrane, GSE BentoLiner GCL is resistant to the deleterious effects of differential settlement and seasonal temperature fluctuations.



GSE BentoLiner deployed on a landfill closure.

EASY TO INSTALL

GSE BentoLiner GCL is the widest fabric encased GCL in the industry. The widest width, coupled with available custom lengths, makes GSE BentoLiner the most versatile GCL available.

Simple, cost-effective installation techniques make GSE BentoLiner GCL a practical alternative to a compacted clay liner for a wide range of applications.



Deployment of GSE BentoLiner GCL.

ENGINEERING SUPPORT

The GSE Engineering Support Staff is comprised of multidisciplinary product professionals to support you across a range of project requirements. This includes knowledge in geomembrane, geosynthetic clay liners, geonet, geocomposite, nonwoven geotextile and concrete protection products and application solutions. Rely on our technical staff to help you solve your project issues.

CUSTOM FABRICATION

The GSE Custom Fabrication Group builds products to your exact specifications. We have extensive experience in prefabricated polyethylene products and components. A few examples of our custom fabricated products are Aqua Tanks, Quick Containment, concrete protection liners, boots, sumps, pads, pipes, daily covers, temporary containment, containment boom and other products to fulfill your fabrication needs.

INSTALLER NETWORK

The GSE Installer Network leads the industry with the most experienced, large, and flexible crews available around the world to meet your installation requirements. Each installer is equipped with state-of-the-art welding and testing equipment to ensure a successful installation. Selecting a qualified installer with the right product knowledge is critical to your success. Let GSE connect you to the right installer to handle your installation project of any size from start to finish.

AP22 BentoLiner 8022311

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PRODUCT DATA SHEET

GSE BentoLiner NWL Geosynthetic Clay Liner

GSE BentoLiner "NWL" is a needle-punched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a nonwoven and a scrim-nonwoven geotextile for dimensional stability. The product is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

AT THE CORE:

This composite clay liner is composed of a uniform layer of granular sodium bentonite between a nonwoven and scrim-nonwoven textile for dimensional stability.

Product Specifications

Tested Property	Test Method	Frequency	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV(1)
Carrier Scrim Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV
Bentonite Property			
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property			
Bentonite, Mass/Unit Area(2)	ASTM D 5993	1/40,000 ft²	0.75 lb/ft² MARV
Tensile Strength(3)	ASTM D 6768	1/40,000 ft²	45 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632(4)	1/40,000 ft²	3.5 lb/in MARV 21 lb MARV
Hydraulic Conductivity(5)	ASTM D 5887	1/Week	5 x 10^{-11} m/sec max
Index Flux(5)	ASTM D 5887	1/Week	1 x 10^{-8} m³/m²/sec max
Internal Shear Strength(6)	ASTM D 6243	Periodically	500 psf Typical
TYPICAL ROLL DIMENSIONS			
Width x Length(7)	Typical	Every Roll	15.5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft²
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:

- (1)Minimum Average Roll Value.
- (2)Oven-dried measurement. Equates to 0.84 lb/ft when indexed to a 12% moisture content.
- (3)Tested in machine direction.
- (4)Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.
- (5)Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.
- (6)Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.
- (7)Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

DURABILITY RUNS DEEP

For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

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Application Sheet

Geomembrane Supported Geosynthetic Clay Liners

GEOMEMBRANE SUPPORTED GEOSYNTHETIC CLAY LINERS (GCLS)

The GSE GundSeal GCL product composite provides the highest swelling and sealing of bentonite clay with the chemical resistance and impermeability of a polyethylene geomembrane.

GSE GundSeal consists of high quality sodium bentonite adhered to a 15 mil to 80 mil smooth or texture HDPE geomembrane, making it a unique one product composite liner for containment applications. A spunbonded geotextile is adhered to the bentonite surface to protect the bentonite during installation.

Given the documented hydraulic sealing provided by GSE GundSeal, the ease of its installation, and cost savings made possible by the simplicity of installing a single product, GSE GundSeal provides an effective alternative to conventional geomembrane and compacted clay or fabric GCL liner installations.



GSE GundSeal geomembrane supported GCL.

APPLICATIONS

GSE GundSeal is generally used in one of two fundamental capacities: (1) In a bottom liner system to contain fluid, such as in landfills, surface impoundments, and secondary containment applications, and (2) In a cover system to keep fluid out, such as in landfill caps and remediation closure applications. In either capacity, there are two general installation configurations to consider:

1. Single composite mode. In this mode the bentonite side of the material is installed face down and the geomembrane side face up, to form a one-product composite (geomembrane-clay) liner. Normally, given the effectiveness of the overlap seams, the overlaps are not mechanically joined but are simply overlapped for self-sealing. Alternately, it is possible to weld the geomembrane seams together, either using standard geomembrane hot-wedge or extrusion welding procedures.



Installation of overlapped GSE GundSeal as a composite liner on a closure project.

2. Encapsulated mode. In this mode, a supplemental overlying geomembrane is installed against the bentonite side of GSE GundSeal forming a geomembrane-bentonite-geomembrane composite liner. In this case, GSE GundSeal is usually installed with the bentonite side facing up with a supplemental geomembrane installed over the GSE GundSeal bentonite surface. The advantages of the encapsulated mode are that it increases fluid containment capability and also improves slope stability by keeping the bentonite dry over most of the area where GSE GundSeal has been deployed.



Installation of GSE GundSeal with an overlying GSE White geomembrane, forming encapsulated GundSeal.

HYDRAULIC PERFORMANCE

When utilized as a one product composite liner, the hydraulic performance of GSE GundSeal is superior to conventional geomembrane/compacted clay lining systems, given its excellent intimate contact, minimal wrinkles, and self sealing overlapped seams.

When utilized in an encapsulated liner(geomembrane/clay/geomembrane), GSE GundSeal hydraulic performance results in 17,000 times less leakage when compared to conventional geomembrane /compacted clay composite liner systems.

-Continued-

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Application Sheet

Examples of hydraulic and leakage comparisons between GSE GundSeal and conventional composite liner systems for different composite liner applications can be found in the GSE GundSeal Design Manual.

OVERLAPPED SEAM INTEGRITY

Given the excellent lay flat properties of installed GSE GundSeal liner, resulting in minimal geomembrane wrinkles, proven hydraulic performance of the overlap seams, and regulatory acceptance, GSE GundSeal seams can simply be overlapped with confidence that the composite lining system integrity will be maintained. Overlapped GSE GundSeal vs. conventional composite liners with welded geomembrane seams derive hydraulic performance benefits as well as economic savings due to decreased installation costs.

BENTONITE PROTECTION BY THE HDPE GEOMEMBRANE BACKING

The geomembrane backing of GSE GundSeal includes a high quality GSE HDPE geomembrane ranging in thickness from 15 mil to 80 mil (0.4 mm to 2.0 mm), and can be smooth or textured surface, depending on project slope requirements. In addition to providing an impermeable and chemical resistant carrier for the bentonite, the geomembrane backing also provides effective long-term protection and durability of the bentonite against cation exchange, wet/dry cycles, differential settlement, and bentonite contact with liquids and soils that may decrease the swelling and sealing capability of the bentonite.

SHEAR STRENGTH

If the bentonite must be kept dry in order to maintain a higher factor of safety for stability, then the 'encapsulated GSE GundSeal liner system is used. When GSE GundSeal is deployed in the encapsulated mode with a separate overlying geomembrane (geomembrane/bentonite/geomembrane),the textured geomembranes protect the bentonite from hydration and provide long term stability for sloping applications. Hydration of the bentonite is limited to areas adjacent to geomembrane defects and overlapped GSE GundSeal seams, resulting in up to 90% of the bentonite remaining dry over the life of the project.

The encapsulated GSE GundSeal liner system has been used successfully on many critical sloping applications in Europe, Asia, and the U.S. The design approach includes using a prorated shear strength design methodology that is discussed in detail in the GSE GundSeal Design Manual.

EASE OF INSTALLATION

Another advantage of the GSE GundSeal GCL is that with its HDPE geomembrane backing, it is easy to install. GSE GundSeal GCL panels are the longest and widest GCL rolls available in the industry thus providing fewer seams, lower scrap factor, and decreased roll handling during installation. A spun-bonded geotextile is attached to the bentonite surface for protection during material installation. GundSeal material can be unrolled or pulled into position without dislodging the bentonite.



Geomembrane deployed over GSE GundSeal forming encapsulated bentonite for slope performance.

THE GSE GUNDSEAL GCL DESIGN MANUAL

For a free copy of the state-of-the-practice design manual for utilizing GCLs in composite lining (geomembrane-clay) applications, please give us a call.



ENGINEERING SUPPORT

The GSE Engineering Support Staff is comprised of multidisciplinary product professionals to support you across a range of project requirements. This includes knowledge in geomembrane, geosynthetic clay liners, geonet, geocomposite, nonwoven geotextile and concrete protection products and application solutions. Rely on our technical staff to help you solve your project issues.

AP21 GundSeal 8/22/2011

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PRODUCT DATA SHEET

GSE GundSeal Geosynthetic Clay Liner (Textured HDPE)

GSE GundSeal geosynthetic clay liner (GCL) is a composite liner system that consists of a high quality sodium bentonite adhered to a textured high density polyethylene (HDPE) geomembrane with a spunbonded geotextile to protect the bentonite during installation. This one product composite liner system combines the low permeability of an HDPE geomembrane with the self-seaming characteristics of bentonite clay. The intimate contact of the bentonite with the geomembrane provides the best leak protection in the industry.

AT THE CORE:

A composite liner system that combines the low permeability of an HDPE geomembrane with the self-seaming characteristics of bentonite clay to provide the best leak protection in the industry.

Product Specifications

Tested Property	Test Method	Frequency	Minimum Average Value				
Finished GCL Property			20 mil	30 mil	40 mil	60 mil	80 mil
Bentonite Coating[1], lb/ft²	ASTM D 5993	1/40,000 ft²	≥ 0.75				
Effective Hydraulic Conductivity, m/s	ASTM D 5887/E96	periodically	≤ 4 x 10-14				
Bentonite Moisture Content	ASTM D 2216	1/40,000 ft²	25% Typical				
GCL Tensile Strength[3], lb/in	ASTM D 6768	1/200,000 ft²	40	63	84	130	173
Geomembrane Property[2]							
Thickness, mil Lowest individual reading	ASTM D 5199	1/100,000 ft²	20 18	30 27	40 36	60 54	80 72
Density, g/cm³	ASTM D 1505	1/200,000 ft²	0.94	0.94	0.94	0.94	0.94
Tensile Properties Tensile Break Strength, lb/in Elongation at Break, %	 ASTM D 6693 ASTM D 6693	 1/200,000 ft² 1/200,000 ft²	 30 100	 45 100	 60 100	 90 100	 120 100
Puncture Resistance, lb	ASTM D 4833	1/200,000 ft²	30	45	60	75	120
Sodium Bentonite Property							
Hydraulic Flux: Bentonite, m³/m²/sec	ASTM D 5887	periodically	≤ 1 x 10-8				
Hydraulic Conductivity, m/s	ASTM D 5887	periodically	≤ 5 x 10-11				
Swell Index, ml/2 g	ASTM D 5890	1/60,000 lb	≥ 24				
Fluid Loss, ml	ASTM D 5891	1/60,000 lb	≥ 18				
TYPICAL ROLL DIMENSIONS							
Roll Width[4], ft			17.5	17.5	17.5	17.5	17.5
Roll Length[4], ft			180	180	170	170	150
Roll Area, ft²			3,150	3,150	2,975	2,975	2,625
Roll Weight, lb			3,900	4,100	4,300	4,600	4,400

NOTES:

- [1]0% moisture content.
- [2]See specific GSE HD geomembrane product data sheet for additional information.
- [3]4 in wide sample, 12 in/min. Values are representative of the geomembrane tensile yield strength.
- [4]Roll lengths and widths have a tolerance of ± 1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

DURABILITY RUNS DEEP

For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

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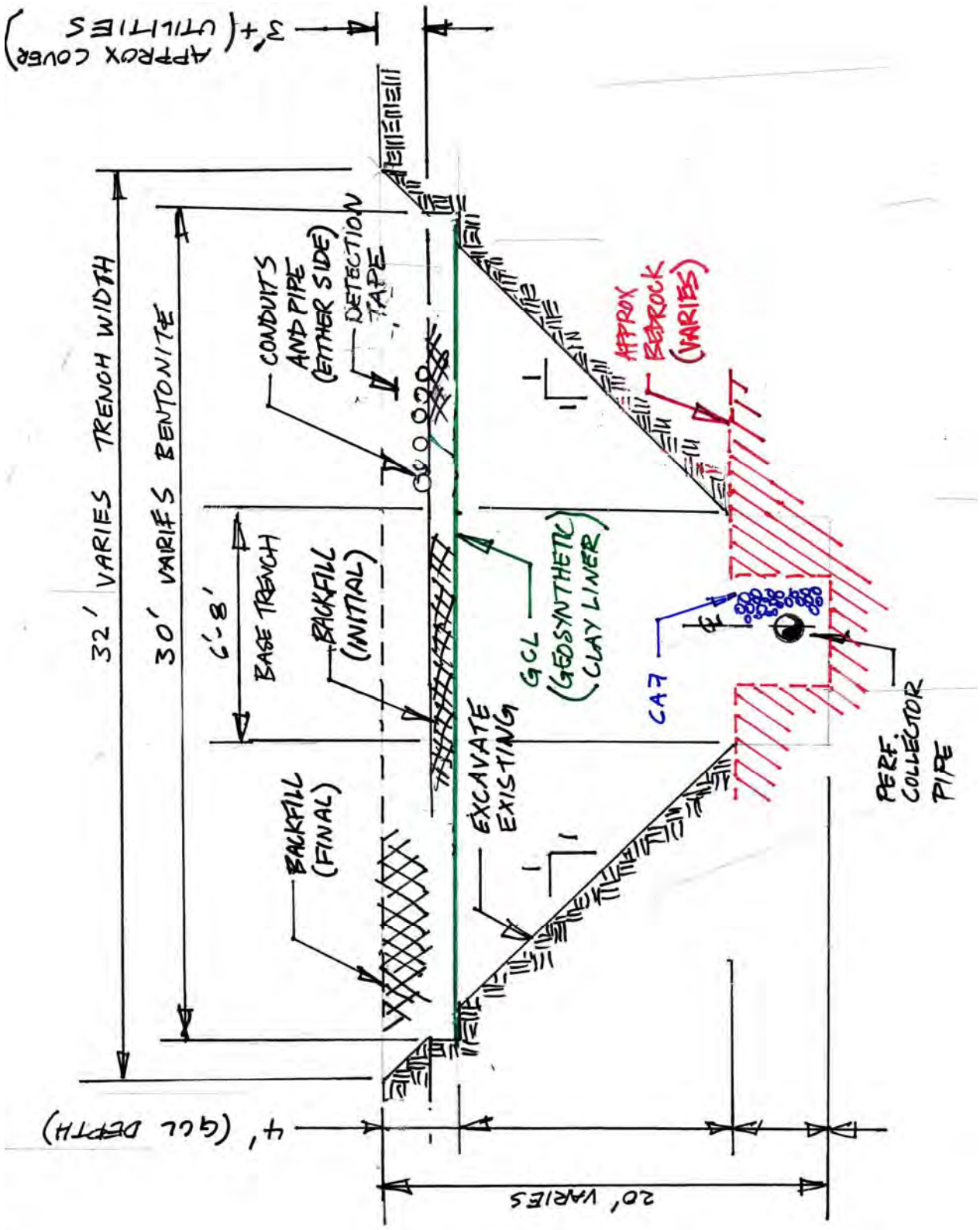

00 01	30-Apr-12 30-Apr-12	Release for AMS review Constructability	Hutsonville Power Station 15142 East 1900 Avenue Hutsonville, Illinois 62433	AMS Ash Management Services	Perforated Collector Pipe Trench Cross Section GCL Option **SK-HUT-APD-19-R1**

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Installation Quality Assurance Manual



GSE GundSeal

Geomembrane Supported Geosynthetic Clay Liner Products

GSE

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1.0 INTRODUCTION

This manual provides an overview of the GSE Installation Quality Assurance procedures consistent with industry accepted practices to ensure that the GSE GundSeal GCL products installed will best perform for its intended purpose. In addition, all installation work will be performed in strict accordance per the customer's specifications. Please read the procedures below completely before you begin. If you need further clarification, contact the GSE Installation Department for assistance or please refer to ASTM D 6102, Standard Guide for Installation of Geosynthetic Clay Liners and ASTM D 5888, Standard Guide for Storage and Handling of Geosynthetic Clay Liners. Remember safety first and use safe practices always on every project.

2.0 UNLOADING PROCEDURES

As with all lifting or unloading operations, appropriate equipment and experienced personnel should be employed along with proper safe handling methods. The party responsible for unloading the GSE GundSeal, should contact GSE prior to shipment, to determine the correct unloading methods and equipment, if different from the pre-approved and specified methods as described below.

Lifting GCL rolls can typically be accomplished with by using a 2.5 in - 3.0 in (63 mm - 75 mm) outside diameter (O.D.) steel pipe (preferably solid), with a wall thickness capable of providing sufficient beam strength to support the weight of the roll, which average less than 3,000 lb (1,364 kg) and the length is approximately 18 ft (5.5 m). This core pipe is inserted through the hollow center of the GCL cardboard core. Heavy-duty slings or chains, which are approximately 10 ft (3.1 m) long, each are attached to each end of the pipe, which are then fastened to a I-beam spreader bar or a GSE approved alternative. Care should be taken to ensure that lifting chains or straps do not rub, chafe, or otherwise damage the GCL. A crane, backhoe, front-end loader or another suitable piece of construction equipment can then lift the entire assembly.

An all-terrain, extendable boom forklift, such as a Lull or Caterpillar Telehandler, can be fitted with a special, solid steel "carpet pole" or stinger, typically 14.0 ft (4.3 m) in length having an outside diameter of no more then 3.38 in (8.6 mm). The carpet pole can be inserted into the hollow cardboard core of the GCL roll.

The roll should not be fully suspended until the pole extends through the entire length of the core tube or you run the risk that the core may break creating additional handling and unloading difficulties.

A properly structured and supported pole can be used to unload GCL rolls onsite. As an alternative, straps that are appropriately rated can be used as a GSE approved lifting method to unload GCL rolls. Lifting straps are supplied on every roll. Each GCL roll label contains roll weight information that should be consulted in determining appropriate lifting equipment and factors of safety.

The CQA inspector or owner's representative should verify that only appropriate handling equipment is utilized, i.e. equipment that does not pose any danger to personnel or undue risk of damage or deformation to the liner material.

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All roll numbers should be recorded during the unloading operations and compared to shipping papers to ensure receipt of only project compliant materials. Furthermore, rolls should be visually inspected for damage and suspect rolls marked, recorded, and set aside for further investigation by CQA personnel.

3.0 STORAGE

While stored GCL needs to be kept dry and away from potential flooding or high storm runoff. On the job site storage methods include; storing the rolls tarped on pallets; storing the rolls under roof in a clean, dry protected area; and storing the rolls on a flat, dry, stable surface suitably covered with protective waterproof tarps. Rolls can be stacked as long as it is done in a manner that prevents them from rolling, shifting, or spontaneously moving. Maximum roll height should be determined by CQA personnel, but never more than can be safely managed considering site conditions, equipment and personnel.

Stored rolls should be tarped and remain in their original, unopened plastic shipping sleeves to prevent damage and undue prehydration prior to installation. Any rolls that come in contact with water should be examined by CQA or an owner's representative prior to installation. Prehydrated or physically damaged rolls should be set aside for further examination to determine the plausibility of repair or need to replace.

4.0 SUBGRADE PREPARATION

The surface upon which the GSE GundSeal is installed should be smooth and free of wheel ruts, debris, roots, sticks, and sharp rocks larger than 1.0 inch. Site specific compaction requirements should be followed in accordance with the project plans and specifications. At a minimum, the site should be smooth rolled the level of compaction such that installation equipment or other construction vehicles traffic does not cause rutting greater than 1.0 in (25 mm).

In applications where the product is the sole barrier, subgrade surfaces consisting of gravel or granular soils may not be acceptable due to their large void content. For these applications, the subgrade shall contain no sharp objects greater than 0.75 in (18 mm). Immediately prior to deployment of the GCL, the subgrade shall be final compacted to fill in any remaining voids or desiccation cracks and to ensure that no sharp irregularities or abrupt elevation changes exist greater than 1.0 in (25 mm). The surfaces to be lined shall be maintained in this condition, free of standing water. The subgrade surface and preparation should be inspected and certified by a CQA inspector prior to GSE GundSeal placement.

Upon approval by the CQA inspector, it is the geosynthetic installer's responsibility to communicate to the engineer of any changes in the condition of the subgrade, that might render it out of compliance, with any of the requirements of the project specification or ASTM standard.

5.0 DEPLOYMENT FOR OVERLAPPED SEAMS

As rolls are selected for deployment, the labels should be removed and recorded by the installer, along with any other pertinent information. The rolls should only be transported from the storage area using approved lifting equipment as described in section 2.0 and the rolls should be deployed properly as outlined below.

IQA GS R01 21/09

A. *Installation Options*

GSE GundSeal can either be installed with the geomembrane side down, facing the subgrade, or

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with the bentonite side down, facing the subgrade. The installation procedures for these two methods are different given that additional care must be taken when installing the bentonite side down to prevent the bentonite from dislodging from the geomembrane backing.

Final decision on GSE GundSeal deployment should be left to the design or CQA engineer or an owner's representative.

Care should also be taken to keep unloading and installation equipment and vehicles from making excessive contact with the bentonite portion of the product during installation operations.

1. *Deployment Geomembrane Side Down*
   Methods of deployment range from manually pulling the GSE GundSeal from a suspended roll to securing the roll end and unrolling each panel as the equipment slowly moves backwards.

   Laborers should manually move the panels to their final and proper position paying strict adherence to required overlaps. Cutting the panels after placement is accomplished with a sharp hook blade utility knife or equivalent.

2. *Deployment Bentonite Side Down*
   The GSE GundSeal roll should be aligned next to the adjacent product sheet prior to unrolling. The installation equipment then begins unrolling the panel as the equipment moves in the direction of material deployment. For final material alignment, laborers should manually move the panels to the proper position with the required overlap distance. Care should be taken not to dislodge the sodium bentonite during installation.

B. *Seams*
Seaming between adjacent GSE GundSeal panels is accomplished by overlapping adjacent roll edges. The addition of supplemental granular bentonite into the seams is not required. When deployed geomembrane side up, longetudinal/lengthwise seams should be overlapped a minimum of 12.0 in (300 mm) unless engineering specifications indicate otherwise. Overlap of butt/widthwise seams should be a minimum of 12.0 in (300 mm), unless engineering specifications indicate otherwise. Overlap line markings can be printed on the longetudinal/lengthwise edges during the manufacturing process to facilitate added accuracy of the overlap distance.

When deployed geomembrane side down, overlapped longitudinal/lengthwise seams should be a minimum 6.0 in (150 mm), unless engineering specifications indicate otherwise. Overlapped butt/widthwise seams should be a minimum 12.0 in (300 mm), unless engineering specifications indicate otherwise.

IQA GS R0E 21/09

If the bentonite coating of the product becomes wet (> 30% moisture) allow the bentonite layer to air-dry before completing installation. [Note: GSE GundSeal bentonite coating will be dry for installation when desiccation marks show across the bentonite surface]. Alternately, the hydrated bentonite area can be patched with the same product material. For installations where shear strength is of concern, the hydrated area should be removed and patched with the equivalent material. If roll edges become

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hydrated, the overlap should be increased by the width of hydrated area to ensure a minimum 6.0 in (150 mm) of dry bentonite overlap.

6.0 DEPLOYMENT FOR WELDING GEOMEMBRANE SEAMS

The following procedures are guidelines for fusion welding and extrusion welding GSE GundSeal GCL geomembrane seams. These procedures are in addition to the standard GSE GundSeal installation procedures as discussed in sections 1.0 to 5.0 of this manual and in the GSE Installation Quality Assurance Manual for geomembrane products.

To facilitate welding panels together a 9.0 in (225 mm) wide protective tape is placed on both lengthwise edges during the manufacturing process. The tape is typically removed after winding rolls, thus providing bentonite free edges for welding prior to edge welding, the GSE GundSeal is installed in accordance with sections 1.0 to 5.0 of these guidelines.

A. *Seam Layout*

GSE GundSeal with bentonite free edges material should be deployed bentonite side down (geomembrane side up) in accordance with sections 1.0 to 5.0.

For fusion welded seams, a GSE GundSeal seam strip is deployed below the seam area with the bentonite facing up and centered under the overlap to be welded. Seam strips are typically GSE GundSeal with 15.0 mil (0.4 mm) HDPE geomembrane backing fabricated into 2.0 ft (600 mm) wide panels, effectively replaces the bentonite removed from the GSE GundSeal rolls during manuafacturer to facilitate welding. The typical length of each is 200 ft (61 m).

End of roll edges (widthwise) do not have bentonite free edges. Therefore, seams are made by overlapping panels a minimum of 6.0 in (150 mm) and extrusion welding a separate overlying geomembrane cap strip over the seam area. Alternately, the widthwise seams can be extrusion welded by scraping, or removing, a bentonite strip approximately 3.0 in (75 mm) wide and directly extrusion welding the two geomembranes together.

B. *Lengthwise Seaming Preparation & Fusion Welding*

Standard welding and support equipment should be used as outlined in the GSE Installation Quality Assurance Manual for geomembrane products.

1. After aligning the adjacent panels lengthwise, manually fold back the edges to inspect the bentonite free edge or remaining protective edge tape. The edges of the GSE GundSeal should be folded back far enough to allow the edges to lay flat with no undue stress applied to the geomembrane backing. The taped edges, the entire length of the seam, should be exposed.

2. Unroll the seam strip, bentonite side up. The seam strip should be installed directly below the two GSE GundSeal panels, centered directly under the final seam location, with the bentonite side of the seam strip facing upward. Seam strips should be overlapped a minimum of 6.0 in (150 mm) with the overlying bentonite coating of both base panel edges.

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3. Visually inspect the upper and lower exposed geomembrane surfaces. The surfaces must be clean and free of moisture, dust, dirt and any foreign materials.

4. Fold the roll edges back into the position to be welded. The overlap should lay flat and directly on top of the seam strip. Seams should be aligned with the fewest possible number of wrinkles and "fish mouths".

5. Trial seams should be made in accordance with standard GSE geomembrane seaming procedures prior to each welding period. Fusion welded and extrusion welded trial seams should be made with representative GSE GundSeal material and bentonite free geomembrane edges.

6. Fusion weld the seam using standard geomembrane seaming procedures as outlined in the GSE Installation Quality Assurance Manual for geomembrane products.

7. Non-destructive seam testing should be carried out on the complete length of the fusion weld using standard air pressure testing methods.

8. Destructive seam testing should be carried out as outlined in the GSE Installation Quality Assurance Manual for geomembrane products.

C. Widthwise Seam Preparation & Extrusion Welding

1. Widthwise seams, typically 17.5 ft (5.3 m) wide, should be overlapped a minimum of 6.0 in (150 mm).

2. Seams should be aligned with the fewest possible number of wrinkles and "fish mouths".

3. The seams should be welded by placement of a geomembrane cap strip over the seam and extrusion welding the cap strip to the geomembrane backings on both sides of the overlap. Alternately, the geomembrane backings of the GSE GundSeal panels can be extrusion welded together directly. This is accomplished by removing approximately 3.0 in (75 mm) of the bentonite coating from the outer edge of the upper geomembrane. Bentonite can be removed by "scraping" the geomembrane with a dull putty knife or equivalent that will not damage the geomembrane. The overlap should include a minimum 6.0 in (150 mm) of bentonite overlap that does not include the edge with scraped off bentonite.

4. Non-destructive seam testing should be carried out on the complete length of weld by standard vacuum testing procedures.

5. Destructive seam testing should be carried out as outlined in the GSE Installation Quality Assurance Manual for geomembrane products.

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D. Patching & Repairs For Welded GSE GundSeal

1. GSE GundSeal material should be inspected for cuts, tears or areas of bentonite loss.

2. The area to be repaired or patched must be free of contamination by foreign matter. Patches should be constructed of the same material as the damaged or affected area. Patches should have a minimum 6.0 in (150 mm) of bentonite overlap completely around the perimeter of the damaged area.

3. All patches should be secured to the underlying geomembrane backing material by extrusion welding the complete perimeter of the patch to base the GSE GundSeal liner as outlined in this section.

4. Non-destructive seam testing should be carried out on the complete length of weld by standard vacuum testing procedures.

7.0 ATTACHMENT DETAILS

GSE GundSeal attachments to structures, including concrete, steel and fiber glass, is accomplished by mechanically attaching the edge of the product liner to the structure by stainless steel batten strip. Alternately, for irregular shapes and PVC or HDPE pipe penetrations, GSE GundSeal is attached utilizing a supplemental fabricated HDPE geomembrane pipe boot.

The GSE GundSeal panel is deployed against concrete or steel structures with the bentonite side against the structure. As with geomembrane attachments, the leading edge of the GSE GundSeal liner is secured to the structure by a stainless steel batten strip around the perimeter of the structure. The liner should extend a minimum 6.0 in (150 mm) vertically upward on side walls.

Loose granular sodium bentonite or bentonite paste should be liberally applied at corners and areas where the bentonite may not be continuously in direct contact with the structure or subgrade.

GSE GundSeal should be attached to pipes and fiberglass with a separate HDPE pipe boot fabricated to fit snugly against the pipe or protrusion. The boot must lay flat against the adjacent installed GSE GundSeal panels.

GSE GundSeal should be deployed with the geomembrane side facing up adjacent to the pipe penetration. The end of the pipe boot sleeve should be attached to the pipe surface with a steel band fastened snugly around the perimeter of the pipe surface. Alternately, if the pipe is polyethylene, the end of the pipe boot sleeve can be extrusion welded to pipe surface. The pipe boot skirt should extend completely around the perimeter of the structure or penetration through the base of the liner and extend a minimum 1.0 ft (300 mm) over the adjacent geomembrane backing.

10A GS RDE 21/09

8.0 ANCHORING

GSE GundSeal is typically anchored in a trench around the perimeter of the lined area, which provides the required pullout resistance. In most cases, GCL can be anchored in the same trench as any adjacent

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geosynthetic liner components (if used). Dimensions and locations of the trench should be provided in the project drawings. Alternately, the material may be anchored by deploying additional run out of material, a minimum of 3.0 ft (1.0 m), past the slope crest and toe. Typically GCL should not be deployed in tension. The force holding the GCL in place should be provided by friction between the GCL and adjacent materials.

Steps should be taken to ensure that precipitation does not accumulate in the trench prior to backfilling. The GCL should only cover the front face and bottom of the anchor trench. The trench should be backfilled and properly compacted prior to placing cover soil on the slopes.

9.0 REPAIRS

Repair all damaged areas by placing a patch of the same material over the damaged area. Overlap of the patch around the damaged area should be a minimum 12.0 in (300 m) in all directions. For installations with the geomembrane side up, the patch may be secured to the installed GSE GundSeal geomembrane backing with duct tape or equivalent adhesive tape if desired.

10.0 INSPECTION

Prior to soil covering the panels, penetrations and any other details should be visually inspected to ensure full coverage and proper orientation. Once the installed GSE GundSeal material has been approved the next layer of geosynthetics or soil covering may be applied.

11.0 COVER MATERIAL

When placing cover material directly on top of the GSE GundSeal geomembrane backing, the soil should be pushed perpendicular to the product seams, where possible from the upper sheet to the lower sheet. Care should be taken to prevent soil from being lodged into and separating the product seams. A minimum of 1.0 ft (300 mm) of cover soil should be placed over the deployed liner with approximately 2.0 ft (600 mm) for high traffic areas to ensure adequate protection and prevent sodium bentonite free swell.

Cover soil should be free of all rocks greater than 0.75 in (18 mm) diameter, sharp or angular objects, sticks, roots or debris.

When the product is deployed with the bentonite side up (geomembrane against the subgrade), it is recommended to cover all exposed bentonite within the same day. This is typically accomplished by installing a geomembrane directly over the bentonite layer.

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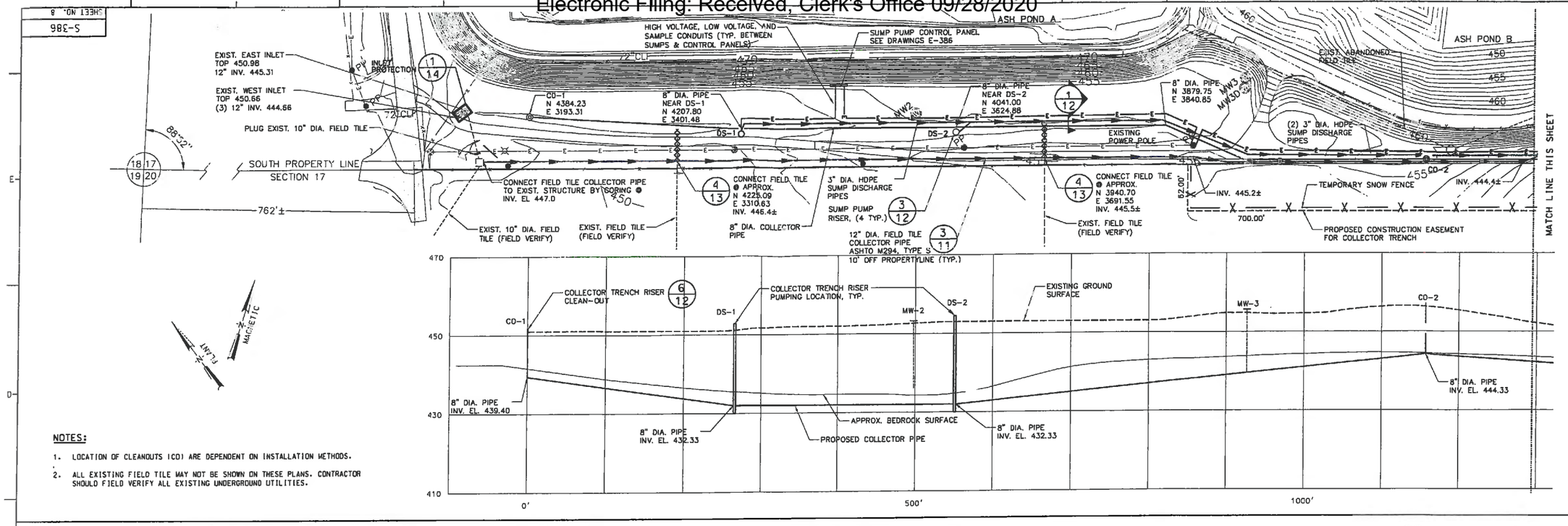
SHEET NO. 8

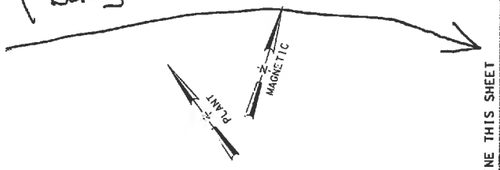


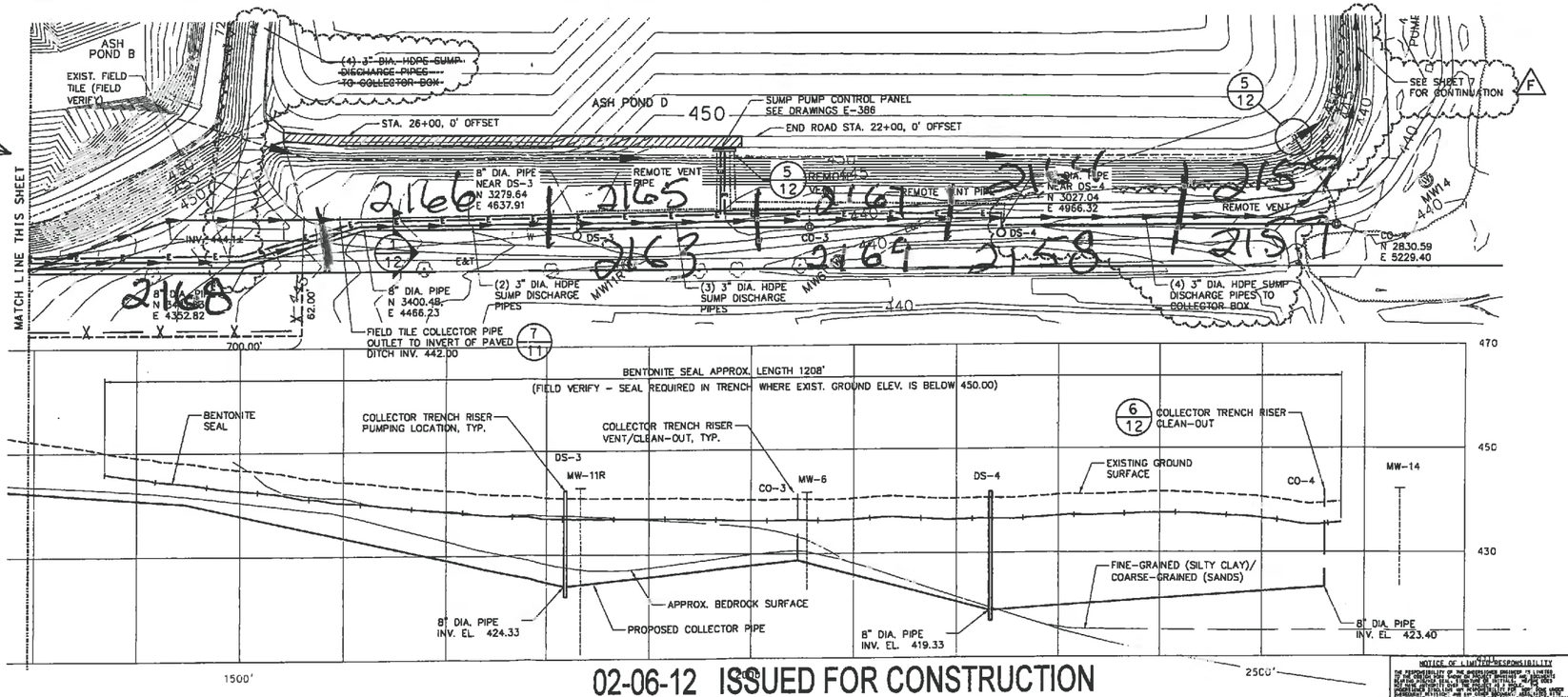
NOTES:

1. LOCATION OF CLEANOUTS (CO) ARE DEPENDENT ON INSTALLATION METHODS.
2. ALL EXISTING FIELD TILE MAY NOT BE SHOWN ON THESE PLANS. CONTRACTOR SHOULD FIELD VERIFY ALL EXISTING UNDERGROUND UTILITIES.

WEEK OF 7/30/12 - 8/3/12

GCL Locations (Badge Numbers)





RESPONSIBILITIES FOR EXISTING UTILITIES

THE LOCATION, SIZE AND/OR TYPE OF MATERIAL OF EXISTING UNDERGROUND OR OVERHEAD UTILITIES AS MAY BE INDICATED ON THESE CONSTRUCTION PLANS ARE NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. THE OWNER AND THE PROJECT ENGINEER HAVE NOT INDEPENDENTLY VERIFIED THIS INFORMATION AND DO NOT ASSUME ANY RESPONSIBILITY WHATSOEVER WITH RESPECT TO THE ACCURACY, SUFFICIENCY OR COMPLETENESS OF THE INFORMATION AND GIVE NO EXPRESSED OR IMPLIED GUARANTEE THAT ANY CONDITIONS INDICATED ARE REPRESENTATIVE OF ACTUAL CONDITIONS TO BE ENCOUNTERED.

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AND AGENCIES OF HIS CONSTRUCTION PLANS AND SHALL OBTAIN FROM EACH PARTY DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF ALL UTILITIES AND THE SCHEDULE OF ANY REMOVALS AND ADJUSTMENTS REQUIRED OF THE UTILITY. THE CONTRACTOR SHALL CONTACT J.U.L.I.E. (PHONE 800-892-0123) TO ASSIST IN COMPLETING THIS RESPONSIBILITY.

THE CONTRACTOR SHALL PROTECT ANY FACILITIES TO THE SATISFACTION OF THE UTILITY OR OWNING-AGENCY WITH THE COST OF ANY REQUIRED PROTECTION TO BE INCIDENTAL TO THE CONTRACT. IN THE EVENT A UTILITY LINE OR SERVICE IS UNEXPECTEDLY ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE UTILITY COMPANY OR AGENCY OF JURISDICTION. ANY SUCH UTILITIES DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO SERVICE AT ONCE.

PROTECTIVE FENCES, BERMS, AND BOLLARDS AT POWER POLES, TRANSMISSION TOWERS AND MONITORING WELLS SHALL BE CONSTRUCTED BY OTHERS BEFORE CONSTRUCTION IN THIS CONTRACT COMMENCES.

PROTECTION OF TRANSMISSION TOWERS, MONITORING WELLS & POWER POLES IS OF PARAMOUNT IMPORTANCE.
ANY DAMAGE TO TRANSMISSION TOWERS, WELLS OR POWER POLES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.

SCALES
VERT. 10 0 10 20
HORIZ. 50 0 50 100

02-06-12 ISSUED FOR CONSTRUCTION

NOTES

REFERENCE DRAWINGS: E-386 ELECTRICAL SHEET1

DRAWING RECORD								
REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING CHK'D	DRAFTING SUPV	LINES APPROVAL AMEREN	LINES APPROVAL OTHER	DESCRIPTION
A	06-24-11	-	-	-	-	-	-	DRFT SUBMITTAL - NOT FOR CONSTRUCTION
B	09-13-11	-	-	-	-	-	-	DRFT SUBMITTAL - NOT FOR CONSTRUCTION
C	07-13-11	-	-	SKB	DBK	-	-	ISSUED FOR DEVELOPMENT PURPOSES - NOT FOR CONSTRUCTION
D	09-13-11	-	-	SKB	SMG	-	-	DRFT SUBMITTAL - NOT FOR CONSTRUCTION
E	09-27-11	-	-	SKB	SMG	-	-	ISSUED FOR CONSTRUCTION
F	02-03-12	-	-	SKB	KNK	-	-	DRAFT CHANGES TO EXISTING SUMP DESIGN & ADD COLLECTOR BOX
G	02-06-12	-	-	SKB	KNK	-	-	ISSUED FOR CONSTRUCTION

STEVEN M. BISHOFF 062-040440 STATE OF ILLINOIS PROFESSIONAL ENGINEER

NOTICE OF LIMITED RESPONSIBILITY

SCALE -
LOC. NO. -
CLASS -

GROUNDWATER COLLECTION TRENCH PLAN & PROFILE
CONSTRUCTION PLANS FOR THE CLOSURE OF ASH POND D
SITE: HUTSONVILLE UNIT:-

Ameren

DRAWING NO. S-386 REV. G
SHEET NO. 8

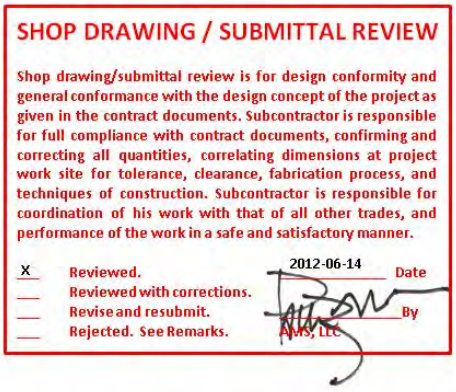
Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

HUT-APD-SUB-015-02-PCP - PVC pipe certification

02640-1.4.B Pipe Certifications from the Manufacturer

Submittal No.	Date	Contact	Phone no.
SUB-015-02	2012-06-1	Paul Zinsious AMS	502-640-2918



Electronic Filing: Received, Clerk's Office 09/28/2020

IMCO Utility Supply Co.

Municipal and Utility Supplies

To Whom This May Concern:

IMCO CERTIFIES THAT THE 8" NORTH AMERICAN C-900 DR-18 PVC PIPE SOLD TO B & T DRAINAGE ON THE HUTSONVILLE PROJECT MEETS THE FOLLOWING STANDARDS:

ASTM D1784
PIPE STANDARD AWWA C900-07
CERTIFICATIONS: ANSI/NSF STANDARD 61
UL STANDARD
DR18 + DR14: FM 1612

SINCERELY,

JASON COZADD
IMCO

Electronic Filing: Received, Clerk's Office 09/28/2020

North American Pipe Corporation™

AWWA C900-07: Municipal Water *Pipe*

North American Pipe's AWWA C900-07 PVC product line is manufactured to meet the needs of modern municipal water distribution systems. With top quality raw materials and modern processing technology North American Pipe's C900-07 pipe meets all industry standards in addition to our own rigorous quality control standards. North American Pipe's C900-07 pipe utilizes Reiber style gaskets throughout the entire product offering. North American Pipe produces a full range of CIOD pipe in DR-14, DR-18, and DR-25 classifications. Whether specifying or installing our pipe you can be assured that North American Pipe will provide the pipe "Right, On Time, All the Time".



Short Form Specification
AWWA C900-07 Municipal Water Pipe

Pipe Standard:	AWWA C900-07
Pipe Compound:	ASTM D1784 Cell Class 12454
Gasket:	ASTM F477
Integral Bell Joint:	ASTM D3139
Certifications:	ANSI/NSF Standard 61 UL Standard 1285 DR18 & DR14: FM 1612
Applications:	Water
Color:	Blue
Lay Length:	20'
Installation:	North American Pipe's Installation Guide for PVC Pressure Pipe

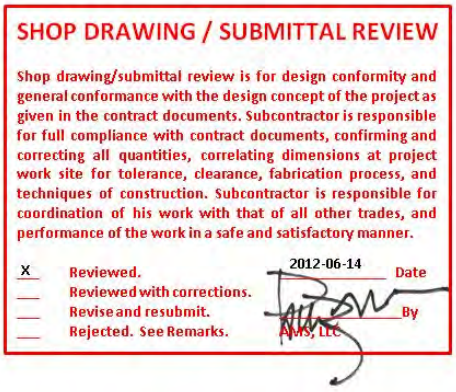
Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

Hutsonville APD Closure

HUT-APD-SUB-015-03-PCP – filter sock

02620 2.1.C Subdrainage – filter sock

Submittal No.	Date	Contact	Phone no.
SUB-015-03	2012-06-1	Paul Zinsious AMS	502-640-2918



Electronic Filing: Received, Clerk's Office 09/28/2020

ADS FILTER SOCK SPECIFICATION

Scope

This specification describes 2- through 24-inch (50- to 600 mm) ADS SOCK synthetic wrap.

Filter Fabric Requirements

- The ADS SOCK shall meet the requirements of ASTM D6707.
- ADS sock products as listed on this specification meet Ontario Provincial Standard Specification 1860, Material Specifications for Geotextiles, dated March 1998.

Filter Fabric Properties

Property	Test Method	
Material	-	Polyester
Fabric	-	Knitted
Permitivity (min.)	ASTM D4491	5.5 sec^{-1}
Puncture Resistance (min.)	ASTM D6241	1000 N
AOS (max.)	ASTM D4751	0.600 mm 30 U.S. Sieve
FOS (max.)	CAN/CGSB-148.1, M10-94	450 microns
Mass (relaxed)	ASTM D3887	3.0-3.9 oz/yd^2
Mass (applied minimum)		2.7-3.5 oz/yd^2
Thickness (min.)	ASTM D4491	24.0 mils
Permeability (K) (min.)	ASTM D4491	0.390 cm/sec
Burst Strength (min.)	ASTM D3887	830 kpa
Air Permeability (min.)	ASTM D737	700 ft^3/ft^2/min
Water Flow Rate (min.)	ASTM D4491 (2" constant head)	300 $gal/min/ft^2$
Yarn Denier	-	150
Specific Gravity	-	1.3
Melt Temperature	-	450° F

©ADS, Inc., May 2010

Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

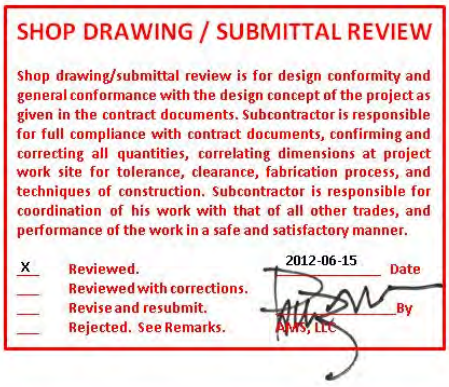
Hutsonville APD Closure

HUT-APD-SUB-016-01-HDPE welding

2640-1.4.A HDPE Piping - Qualifications-Welding Supervisor

2640-3.3.A HDPE Piping - Temperature, Fusion Pressure, and Graphic…

Submittal No.	Date	Contact	Phone no.
SUB-016-01	2012-06-15	Paul Zinsious AMS	502-640-2918



Electronic Filing: Received, Clerk's Office 09/28/2020

BONDER PERFORMANCE QUALIFICATION RECORD
(BPQR) H.D.P.E. Butt Fusion

TEST RESULTS

BPQR No. HDPE-1 PQR No. HDPE-1 BPS No. HDPE-1 Date 11/28/11

Bonderer's Name Scott Burch (Stamp# 9326) Test Joint Diameter 14"

Guided Bend Test (If Applicable)

Specimen No.	Type	Diameter	Remarks	Pass	Fail
1. Root Bend	DR11	14"	Bent over Root	☒	☐
2. Face Bend	DR11	14"	Bent over Face	☒	☐

VISUAL TEST:

Specimen No.	Joint No.	Diameter	Remarks	Pass	Fail
1. Root Bend	DR11	14"	Acceptable profile	☒	☐
2. Face Bend	DR11	14"	Acceptabe profile	☒	☐

HYDROSTATIC TEST 3 TIMES MAWP (If Applicable)

Joint No.	Diameter	MAWP	Test PSI	Pass	Fail
1.				☐	☐

We certify that the information in this record is correct and that the test bonded joint(s) were prepared, bonded, and tested in accordance with the requirements of Freitag-Weinhardt, FW-HDPE-1 Welding *Procedure and Qualification Specification.*

Date 11/28/2011 Approved By Charles Wilde

Title Quality Manager

Company: Freitag-Weinhardt, Inc.

Electronic Filing: Received, Clerk's Office 09/28/2020

WELDING PROCEDURE
&
QUALIFICATION SPECIFICATION

NO. HDPE-1

FOR

BUTT FUSION

OF

H.D.P.E PIPE, VALVES, FITTINGS

Rev 2

THIS DOCUMENT IS THE PROPERTY OF

Freitag-Weinhardt, Inc.

(Company)

Document No. HDPE 1

FREITAG-WEINHARDT, INC.

Freitag-Weinhardt, Inc HDPE PIPE/FITTINGS BUTT FUSION BONDING PROCEDURE HDPE - 1	Revision : 2 Date: July 7, 2009

Scope: Butt fusion bonding high-density polyethylene (HDPE) piping and fittings. This butt fusion bonding procedure is acceptable for use on Local Plumbing Code, NFDA and Factory Mutual HDPE plastic pipe where formal qualification is required in accordance with Project Specifications.

Materials to be Joined:	**Diameter and Thickness Range Qualified:**	
Pipe: ASTM D3350, PE	Diameter	Thickness
Fittings: ASTM D3350, PE	Pipe: Table 1, 2, 3, 4	Table 1, 2,3, 4
Resin: 345464C	Fitting: Table 1, 2, 3, 4	Table 1, 2, 3, 4
Other:		
Joint Design Butt Fusion	**Procedure Qualification Record:** In accordance with Project Specification.	

Butt Fusion Machines-
1"-4" OD Pipe- McElroy Model Pitbull #14, No Data Logger (Mechanical Bonding)
2"-8" OD Pipe- McElroy Model 28 with Data Logger
8"-24" OD Pipe- McElroy Model 824 with Data Logger
4"-12" OD Pipe- McElroy Model 412 with Data Logger

Note- This procedure was specifically prepared for the above pipe/fitting materials and butt fusion machines and is not suitable for any other pipe/fitting material or butt fusion machine combination. If other pipe/fitting materials or butt fusion machines are contemplated for use, preparation and issuance of a suitable butt fusion bonding procedure for those materials and butt fusion machine combinations. The Tables in this procedure contain the butt fusion parameters specifically for the materials and machines listed herein.

* All fusion machines shall be supplied with the appropriate clamp insets for all pipe diameters that will be bonded.
* Spare facer blades.
* Must have sufficient amount of pipe support stands for each machine in operation.
* Stub end holder for butt fusion.
* Hydraulic extension hoses as necessary for ditch fusion.
* All fusion machines shall be supplied with a heater plate, properly sized heater adapters, and a built in surface temperature pyrometer . Hand held infared heat indicator will be used to verify temperture per checklist.

* Where power is not available, electrical generator(s) sized in accordance with the fusion machine manufacturer's recommendations.
* Clean rags or paper towels with isopropyl alcohol and or approved alcohol wipes for one time use to clean the facer plate and blades, hot plate and prepared pipe ends.

Document No. HDPE 1

FREITAG-WEINHARDT, INC.

* Electric or gas powered chain saws, with extra chains and extra chain guides that can use a water/detergent mix as the chain lubricant. **Warning-** Oil is **"prohibited"** as a chain lubricant. The exhaust on gas powered chain saws must be directed away from the HDPE pipe surface. Oil deposits on the HDPE pipe from the chain lubricant or engine exhaust must be removed.

Daily Fusion Machine Maintenance Checklist:

1. At the start of each shift for each fusion machine used, complete top section of Form 1a or 1b as applicable.

Daily Heater Maintenance Checklist:

1. At the start of each shift for each heater used, complete the bottom section of Form 1a or 1b as applicable.

Bonding Procedure:

1. When fusing full-length pipe, position pipe support roller stands on each end of the fusion machine to help support and align the pipe. On shorter lengths use stands needed on each side of the fusion machine if at all possible.
2. Sections of pipe that have visible oil, hydraulic fluid, gasoline, diesel or other oily contaminate must be cleaned prior to installation in fusion machine. Solvent or detergent cleaning is acceptable.
3. Clamp the two pipe sections in the jaws. On short sections of pipe or fittings that use only one clamp, it is important that they are properly oriented in the clamp to avoid an uneven fusion bead. Install the long item that uses two stationary clamps first, and face it square. Place the short item loosley in the moving clamp and butt it flush against the face of the stationary item. Tighten the clamp on the short item, insuring the item stays flush with the stationary item. When both items are short they should be butted flush and kept flush until they are both tightly clamped in the fusion machine. **Caution-**The weld face of each short item must be square prior to final butt fusion set up. Other methods of insuring proper pipe to pipe or pipe to fitting orientation will be considered when submitted for review.
4. It is acceptable to directly bond fittings that are one SDR larger than the pipe SDR, otherwise the fitting must be counter bored to a depth of 1 1/2 to 2 inches with a trailing tapered transition of 33-45 degrees. In instances where the maximum counter bore shoulder height is no greater than the maximum allowable single bead width (see Tables as applicable), a trailing tapered transition is preferred, but not necessary. Actual fitting end wall thickness measurements shall be made for fabricated or mitered fittings to verify the fitting dimension is no more than one SDR larger than the pipe size. The minimum wall thickness for the pipe size shall be used as the basis of comparison. Fittings, due to their size or configuration, that cannot be counter bored shall have pre-bored and tapered pup piece bonded onto the fitting prior to installation in the piping system. Fitting configurations that deviate from these requirments shall be reviewed and dispositioned by project engineering on an item by item basis.
5. If necessary, use the lifting roller (on machines that have a lifting roller) to help straighten the pipe long enough to get it clamped in the jaws.
6. Position the facer betweem the two ends of pipe.
7. Face the pipe until no visible gap exists
8. Remove facer.
9. Bring the two ends of pipe together at fusion pressure to make sure they don't slip in the clamp jaws. If slippage occurs, the pipe will have to be reloaded in the jaws and facing repeated until no slippage occurs.

Document No. HDPE 1

FREITAG-WEINHARDT, INC.

Bonding Procedure: (continued)

10. Move the pipe ends together and visually check for alignment. There shall not be any visible gap between the two pipe faces. The OD misalignment shall be less than 10% of the pipe wall thickness. The pipe clamps shall be adjusted as necessary until pipe ends are propely aligned. Pipe ends that are necked down and are difficult to align shall be cut off a minmum of 6 inches. Out of round pipe that cannot be aligned may be cut off from 6 to 24 inches prior to attempting realignment. **Caution-** The pipe shall not be contaminated by chain saw chain oil or direct impingement of the exhaust on gasoline powered chain saws (see last comment in above tools and equipment section).
11. Prior to final trimming, to control dust intrusion and to preclude rapid internal cooling of the pipe, insure open ends of the pipe are covered with a cap or a plastic bag tapered to the pipe. Also clean the pipe ends prior to final trimming using clean rags or paper towell and a 70-98% solution of isoproply alcohol.
12. Clean both sides of the heater plate using paper towel or clean rags and isopropyl alcohol just prior to heating pipe.
13. The isopropyl alcohol shall be dispensed using a plastic bottle or hand spray bottles. Used rags or paper towels shall be discarded.
14. Once the pipe is aligned and final trimmed, insert the heater plate and heat the pipe in accordance with Table 1, 2 ,3 or 4 depending on the pipe size and fusion machine being used.
15. Once the heater is clear of the pipe ends, quickly move the carriage to the left (or together depending on the fusion machine being used) and bring the pipe ends together and hold them at fusion pressure through the fusion time and cool down times listed in Table 1,2 , 3 or 4. At any time after bonding, the pipe end covers may be removed to aid in cooling.
16. <u>When using a Fully Hydraulic Butt Fusion Machine</u> the operator shall monitor the pressure gauge to insure the machine maintains the fusion pressure according to the values and times listed in the approprite Table.
17. <u>When using a Manual Hydraulic Butt Fusion Machine</u> the operator shall monitor the pressure gauge and and maintain the fusion pressure according to the values and time listed in Table.
18. <u>When using a Mechanical Butt Fusion Machine</u> the operator shall bring the pressure/torque up the valve required and once achieved then the locking cam shall be engaged to hold the pressure for the time listed.
19. Once the pipe has been maintained under pressure for the minimum time indicated in the appropriate Table, and has cooled per table the clamps can be removed from the pipe
20. At this point the pipe may be handled very carefully insuring no stresses are induced on the competed bond. If pipe is to be rough handled, end pulled or lifted where the pipe bond area bends or is stretched, then the pipe must be additionally cooled in accordance with Figure 1.

Bonding Qualification Procedure:

1. When the Machine butt fusion technique is used for bonding HDPE pipe and fitting, destructive testing of trial samples shall be performed:
   * At the start of each shift, unless bonder has already been tested on previous shift.
   * When the ambient temperature changes more than 30 deg F.
   * Pipe Diameter Changes,
   * Or the pipe wall thickness changes.

Document No. HDPE 1

FREITAG-WEINHARDT, INC.

Bonding Qualification Procedure: (continued)

2. The primary destructive fusion bond test to be used shall be the bend strap test. The bend strap test shall be be prepared as follows:
   * A trial fusion bond shall be made and allowed to cool to ambient temperature;
   * A test strap that is at least 15 pipe wall thicknesses long on each side o the fused joing, and aobut 1-1/2 wall thicknesses wides shall be cut from the pipe;
   * The strap shall be bent across the root (root bend) so that both ends of the strap touch;
   * Any disbondment or cracking at the fusion bond is unacceptable.

   If failure occurs, fusion procedures and/or machine set-up shall be changed, and a new trial fusion bond and bent strap test speciman prepared and tested. Production fusion bonding shall not proceed until a test joint has passed the strap test. A test strap from thick wall may require considerable force to bend.

3. A continuous data recording system ("data-logger") shall be approved for substitution of portions of the required production testing. Production bend testing shall be mandatory (See Paragraph 2 above) when the continuous data recording system is not utilized. Seller shall submit detaild, including any forms, for approval by the Buyer. Approval for use of a continuous data recording system, in lieu of production bend testing, shall be based on acceptable output.

Shipping, Handling, Unloading and Storage of Pipe and Fittings:

During shipping, handling or storage, pipe and fittings shall be bundled or stacked in accordance with the pipe/fitting manufacturer's recommendations. Escessive bundling or stacking that results in bends, knicks, or uncorrectable ovality shall be rejected. Nylon straps shall be used to tie down loads during shipping. Wide web nylon slings and spreader bars shall be used during pipe handling. Chains, cables shall not be used for material handling. Cuts and gouges greater than 10% of the pipe wall thickness shall be cut out and discarded. Minor scuffing or scratching is acceptable.

Environmental Requirements:

Outside Temperature: 50F to 100F Method of Measurement: Thermometer

(Actual pipe temperature at the time of fusion, will indicate bonding procedure requirements such as heat soak time. Temperatures outside this range shall require special fusion temperature/heat soak time charts.)

Particulates: Indications of airborne/surface dust, grit, chemicals or other contaminants will require cleaning to maintain fusion equipment cleanliness and inparticular pipe and end face cleanliness prior to and during fusing activities.

Bonding Documentation:

1. At the beginning of every shift the fusion machine, facer unit and heaters shall be inspected in accordance with the maintenance checklist Form 1a or 1b as applicable. Items on the checklist that are not applicable to a given machine can be ignored and items missing shall be added.
2. At the beginning of each shift and at any time power is lost pr pipe size is changed, the heater plate shall be checked for proper heat level. Refer to Table 1, 2,3, or 4 for parameters applicable for the fusion machine being used.
3. The actual bonding parameters used for reach and every bond shall be documented.
4. HDPE Bonder Certification shall be documented.

Document No. HDPE 1

FREITAG-WEINHARDT, INC.

Bonder Qualification:

1. Every HDPE Bonder shall receive training on the use of the specific fusion machine and the bonding procedure, and shall perform at least one pipe to pipe bond on each fusion machine that they will be required to use. The field-welding engineer shall select the Bonder qualification pipe size, normally the larges pipe OD or within 25% of the largest pipe OD, to be bonded on a specific fusion machine. The Bonder must satisfactorily demonstrate his/her knowledge on the bonding procedure, the use of the specific fusion machine and make at least one pipe to pipe test bond. The test bond can either be cut out of the pipe and bend tested or the bonded pipe can be hydrotested.
2. The Bonder qualification test shall be documented on HDPE Bonder Certification Record (Test Strap Log) and shall include copies of Daily Bonding Report for the test bond.

Inspection:

1. Visual inspection shall include the following-
   - Proper ID of the item
   - Proper DR for pipe to fitting bonds (check actual wall thickness and fabricated or mitered fittings for possible counter boring)
   - Alignment of the item during fit up
   - Completed fusion bead width
   - Surface gouges, kinks, cuts or cracks
   - Evidence of mishandling
   - Documentation of the work in progress or completed
2. Visually inspect at least 5% of each Bonder's work. The fusion beads shall be within the minimum and maximum limits listed in the bonding procedure. All fusion beads shall be uniformly shaped and sized the full circumference of the bond.
3. Visually observe the Bonder perform a bond on approximately one of every 20 bonds. The Field Welding Engineer has the discretion to extend or reduce the inspection frequency based on past performance.
4. Bonds that are visually suspect or where it has been determined that the Bonder has not followed approved procedures shall require the bond to be cut out and three inside face bend back test performed. Should the bend back samples fail, further cut outs from other bonds from the same Bonder's work shall be made until all bend back tests pass.

Bonding Parameters:

Table 1: 2"-8" OD Pipe- McElroy Model 28 with Data Logger
Table 2: 8"-24" OD Pipe- McElroy Model 824 with Data Logger
Table 3: 1"-4" OD Pipe-McElroy Model Pitbull 314 - No Data Logger (Mechanical Bonding)
Table 4: 4"-12" OD Pipe- McElroy Model 412 with Data Logger

Freltag-Weinhardt
Mechanical Constructors

ELECTROFUSION - HDPE-2

FORM 1A DAILY MAINTENANCE CHECKLIST

PROJECT: _____ MANUFACTURE: _____

JOB #: _____ Checker: _____

LINE # _____ SPEC./TYPE: _____

Electrofusion machine ID _____ DATE/TIME:: _____

Electrofusion Bonding

	SAT.	UNSAT.	NA	COMMENTS: needs repair
Electrofusion Processor is clean	( )	( )	( )	_____
All wiring in good condition	( )	( )	( )	_____
Power source in good condition	( )	( )	( )	_____
electric cords acceptable	( )	( )	( )	_____
leads/cables in good condition	( )	( )	( )	_____
FACER/ Scraping tools correct	( )	( )	( )	_____
isoproply alcohol for cleaning	( )	( )	( )	_____
acceptable markers	( )	( )	( )	_____
pipe clamps	( )	( )	( )	_____
fitting restraints	( )	( )	( )	_____
heater surface CLEAN AND IN GOOD CONDITION	( )	( )	( )	_____

CONTRACTOR REP: _____ DATE _____

INSPECTION REP: _____ DATE _____

Freitag-Weinhardt
Mechanical Constructors

HDPE PIPE/FITTINGS BUTT FUSION BONDING PROCEDURE
HDPE-1

REVISION:2
DATE:7/6/09

FORM1a-HYDRAULIC BONDING EQUIPMENT MAITENANCE CHECKLIST			
Daily Fusion Machine Checklist		**Date/Time:**	
Fusion Machine ID:		**Checker:**	
Item to Check	**Satisfactory**	**Needs Repair**	**Repair comment**
1. Fusion Machine is clean			
2. Hydraulic Reservoir is filled to correct level.			
3. Hydraulic gauges are calibrated.			
4. Hydraulic cylinders are free of leaks, scratches, or gouges.			
5. All pivot points lubricated(jaws, front axle)			
6. All hydraulic hoses free of leaks and in good condition.			
7. All hardware is with unit.(inserts, pins, etc.)			
8. Inserts fit and pin properly.			
9. All rest buttons are on facer.			
10. Rest buttons are on inner movable and inner fixed jaw.			
11. Pipe lift and roller lubricated and in good condition.			
12. Brake functions properly.			
13. Jaws are aligned properly.			
14. Power cord and plug in good condition.			
15. Spare fuses in electric control panel.			
16.All hydraulic valves and pressure reducing valves function.			
17. All nuts and bolts are tight.			
18. Generator in good condition and voltage output correct.			
19. All wiring in good condition and functions properly.			
Daily Facer Unit Maintenance Checklist		**Face Unit ID:**	
Item to Check	**Satisfactory**	**Needs Repair**	**Repair comment**
1. Facer motor rotates the facer properly.			
2. Facer is secure to support arms and in alignment with jaws.			
3. Facer hydraulic cylinder travel is adjusted correctly.			
4. Cutting blades are sharp and properly positioned.			
5. Facer is clean, free of dirt, oil, grease, etc.			
Item to Check	**Satisfactory**	**Needs Repair**	**Repair comment**
1. Verify cord and plug are in good condition.			
2. Verify heater surface is clean and in good condition.			
3. Verify heater is secured to support arms and in alignment with jaws.			
4. Verify heater hydraulic cylinder travel is adjusted correctly.			
5. Verify the thermometer is in good working order.			
6. Test temp. controller by allowing heater to cycle 4 times.			
7. Surface temperature of heater shall be checked with a pyrometer at the start of each shift, when pipe size changes during the shift, and whenever power is lost to the heater. Test 4 spots at (12,3. 6 and 9 O' clock) on each side of heater in the area of contact for each pipe size being welded.			
8. Pyrometer calibration verified at the start of each shift using a standard Pyrometer/Calibrator			
9.Check receptacles for damage.			

FREITAG-WEINHARDT, INC.
MECHANICAL CONSTRUCTORS

HDPE PIPE/FITTINGS BUTT FUSION BONDING PROCEDURE
HDPE- 1

Revision: 2
Date: 7-6-09

FORM 1b – MECHANICAL BONDING EQUIPMENT MAINTENANCE CHECKLIST

Daily Fusion Machine Maintenance Checklist:

Date/Time: _____ / _____

Fusion Machine ID: _____ Checker: _____

Item to Check	Satisfactory	Needs Repair	Repair Comment
1. Unit- Machine is clean			
2. Unit- Clamp knob bearings lubricated and moves freely			
3. Unit- Moveable jaw lubricated and moves freely			
4. Unit- Locking cam works properly			
5. Unit- Guide rods are not damaged			
6. Unit- Clamping jaw and insert grooves are clean			
7. Unit- Spring clips work properly			
8. Unit- All nuts and bolts are tight			
9. Unit- Lever handles are with unit			
10. Unit- Torque wrench adapter available and in good condition			
11. Unit- Torque wrench is available, calibrated and in good condition			
12. Chassis- Brake and unit lockdown clamps are adjusted properly			
13. Chassis- Outrigger adjusting screws work freely			
14. Chassis- All nuts and bolts tight			

Daily Facer Unit Maintenance Checklist:

Facer Unit ID: _____

Item to Check	Satisfactory	Needs Repair	Repair Comment
1. Facer motor rotates the facer properly			
2. Facer is secure to support arms and in alignment with jaws			
3. Facer hydraulic cylinder travel is adjusted correctly			
4. Cutting blades are sharp and properly positioned			
5. Facer is clean, free of dirt, oil, grease, etc.			

Daily Heater Maintenance Checklist:

Heater Plate ID: _____

Item to Check	Satisfactory	Needs Repair	Repair Comment
1. Verify cord and plug are in good condition			
2. Verify heater surface is clean and in good condition			
3. Verify heater is secured to support arms and in alignment with jaws			
4. Verify heater hydraulic cylinder travel is adjusted correctly			
5. Verify thermometer is in good working order			
6. Test temp controller by allowing heater to cycle 4 times			
7. Surface Temperature of heater shall be checked with a pyrometer at the start of each shift, when pipe sizes change during the shift and whenever power is lost to the heater. Test 4 spots (at 12, 3, 6 and 9 O'clock) on each side of heater in the area of contact for each pipe size being welded.			
8. Pyrometer calibration verified at the start of every shift using a standard Pyrometer / Calibrator.			
9. Check receptacles for damage			

Daily Data Logger Maintenance Checklist:

Data Logger ID: _____

Item to Check	Satisfactory	Needs Repair	Repair Comment
1. Condition of wiring and unit is properly functioning			
2. Verify Output coincide with Maintenance Outputs above.			

FREITAG-WEINHARDT, INC.

Table 1

HDPE-1

McElroy Model 28 HDPE FUSION DATA with Data Logger							Bead Melt	DR11	DR9
SIZE	Wall TK	Grade	IFP	GaugePress.	Drag Press.	Fusion Pressure	Size	Cool Time	Cool Time
2	0.216	DR11	75	23	Min. 30	53	1/8" - 3/16"	2 min.	n/a
3	0.318	DR11	75	51	Min. 30	81	1/8" - 3/16"	3 min.	n/a
4	0.409	DR11	75	84	Min. 30	114	1/8" - 3/16"	4 min.	n/a
6	0.762	DR11	75	181	Min. 30	211	1/8" - 3/16"	6 min.	n/a
8	0.784	DR11	75	308	Min. 30	338	3/16" - 1/4"	8 min.	n/a
2	0.264	DR9	75	28	Min. 30	58	1/8" - 3/16"	n/a	3 min.
3	0.389	DR9	75	61	Min. 30	91	1/8" - 3/16"	n/a	4.5 min.
4	0.5	DR9	75	100	Min. 30	130	1/8" - 3/16"	n/a	6 min.
6	0.736	DR9	75	217	Min. 30	247	1/8" - 3/16"	n/a	9 min.
8	0.958	DR9	75	368	Min. 30	398	3/16" - 1/4"	n/a	12 min.

Note: Allowable Butt Fusion Temperature Range is Min. 400 To Max. 450 degrees F

Pipe O.D. Alignment < 10 % of wall thickness , Cool Time is 30 - 90 seconds per 1" of pipe size.

** Data Logger will be used to record Time of Weld, Date of Weld, Welder ID, Drag, Fusion Pressure Temperature and Cooling Time

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FREITAG-WEINHARDT, INC.

Table 2

HDPE -1

McElroy Model 824 HDPE FUSION DATA with Data Logger							Bead Melt	DR11	DR9
SIZE	Wall TK	Grade	IFP	GaugePress.	Drag Press.	Fusion Pressure	Size	Cool Time	Cool Time
8	0.784	DR11	75	49	Min. 30	79	3/16" - 1/4"	8 min.	n/a
10	0.977	DR11	75	76	Min. 30	106	3/16" - 1/4"	10 min.	n/a
12	1.159	DR11	75	108	Min. 30	138	3/16" - 1/4"	12 min.	n/a
16	1.455	DR11	75	169	Min. 30	199	1/4" - 7/16"	16 min.	n/a
18	1.636	DR11	75	214	Min. 30	244	1/4" - 7/16"	18 min.	n/a
20	1.818	DR11	75	265	Min. 30	295	1/4" - 7/16"	20 min.	n/a
24	2.182	DR11	75	381	Min. 30	411	1/4" - 7/16"	24 min.	n/a
8	0.958	DR9	75	59	Min. 30	89	3/16" - 1/4"	n/a	12 min.
10	1.194	DR9	75	91	Min. 30	121	3/16" - 1/4"	n/a	15 min
12	1.417	DR9	75	128	Min. 30	158	3/16" - 1/4"	n/a	18 min.
16	1.778	DR9	75	202	Min. 30	232	1/4" - 7/16"	n/a	24 min.
18	2	DR9	75	256	Min. 30	286	1/4" - 7/16"	n/a	27 min.
20	2.222	DR9	75	316	Min. 30	346	1/4" - 7/16"	n/a	30 min.
24	2.667	DR9	75	455	Min. 30	485	1/4" - 7/16"	n/a	36 min.

Note: Allowable Butt Fusion Temperature Range is Min. 400 To Max. 450 degrees F

Pipe O.D. Alignment < 10 % of wall thickness , Cool Time is 30 - 90 seconds per 1" of pipe size.

* Data Logger will be used to record Time of Weld, Date of Weld, Welder ID, Drag, Fusion Pressure Temperature and Cooling Time

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FREITAG-WEINHARDT, INC.

Table 3

HDPE-1

McElroy Model 14 HDPE FUSION DATA no Data Logger							Bead Melt	DR11	DR9
SIZE	Wall TK	Grade	IFP	GaugePress.	Drag Press.	Fusion Pressure	Size	Cool Time	Cool Time
1	0.12	DR11	n/a	n/a	n/a	Lever Locking Cam	1/32" - 1/8"	1 min.	n/a
2	0.216	DR11	n/a	n/a	n/a	Lever Locking Cam	1/8" - 3/16"	2 min.	n/a
3	0.318	DR11	n/a	n/a	n/a	Lever Locking Cam	1/8" - 3/16"	3 min.	n/a
4	0.409	DR11	n/a	n/a	n/a	Lever Locking Cam	1/8" - 3/16"	4 min.	n/a
2	0.264	DR9	n/a	n/a	n/a	Lever Locking Cam	1/8" - 3/16"	n/a	3 min.
3	0.389	DR9	n/a	n/a	n/a	Lever Locking Cam	1/8" - 3/16"	n/a	4.5 min.
4	0.5	DR9	n/a	n/a	n/a	Lever Locking Cam	1/8" - 3/16"	n/a	6 min.

Note: Allowable Butt Fusion Temperature Range is Min. 400 To Max. 450 degrees F

Pipe O.D. Alignment < 10 % of wall thickness , Cool Time is 30 - 90 seconds per 1" of pipe size.

** NO Data Logger (MECHANICAL BONDING) Record Bonding Data on HDPE Data Logger Sheet, Require Test Daily

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FREITAG-WEINHARDT, INC.

Table 4

HDPE-1

McElroy Model 412 HDPE FUSION DATA with Data Logger							Bead Melt	DR11	DR9
SIZE	Wall TK	Grade	IFP	GaugePress.	Drag Press.	Fusion Pressure	Size	Cool Time	Cool Time
4	0.409	DR11	75	33	Min. 30	63	1/8" - 3/16"	4 min.	n/a
6	0.762	DR11	75	73	Min. 30	103	1/8" - 3/16"	6 min.	n/a
8	0.784	DR11	75	123	Min. 30	153	3/16" - 1/4"	8 min.	n/a
10	0.977	DR11	75	191	Min. 30	221	3/16" - 1/4"	10 min.	n/a
12	1.159	DR11	75	269	Min. 30	299	3/16" - 1/4"	12 min.	n/a
4	0.5	DR9	75	100	Min. 30	130	1/8" - 3/16"	n/a	6 min.
6	0.736	DR9	75	217	Min. 30	247	1/8" - 3/16"	n/a	9 min.
8	0.958	DR9	75	368	Min. 30	398	3/16" - 1/4"	n/a	12 min.
10	1.194	DR9	75	228	Min. 30	258	3/16" - 1/4"	n/a	15 min.
12	1.417	DR9	75	321	Min. 30	351	3/16" - 1/4"	n/a	18 min.

Note: Allowable Butt Fusion Temperature Range is Min. 400 To Max. 450 degrees F

Pipe O.D. Alignment < 10 % of wall thickness , Cool Time is 30 - 90 seconds per 1" of pipe size.

** Data Logger will be used to record Time of Weld, Date of Weld, Welder ID, Drag, Fusion Pressure Temperature and Cooling Time

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FREITAG-WEINHARDT, INC.

HDPE-1 BF Bonding
Bonder Qualification

HDPE Test Strap Log

No.	Bonder ID	Date	Size	Spec.	Q.C.Accept	Witness	Comments
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

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FREITAG-WEINHARDT, INC.

HDPE-1 BF Bonding
Bonder Continuity

HDPE RE-Test Strap Log

No.	DATE	Size	MACHINE	Q.C. Accept	RETEST DUE BY SIZE	Comments DR11 Qualification
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Note : Date Trained 11/14/2011 HDPE-1

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INSTALLER CERTIFICATE OF ACCEPTANCE

(Form CQAP-4.1)

INSTALLER: AMS **DATE:** 6-11-12

GEOSYNTHETIC MATERIAL: 40 mil textured HDPE

AREA ACCEPTED: A

INSTALLER: The undersigned authorized representative of the Installer certifies that the representative or a staff member has visually inspected the geosynthetic material daily for the above referenced area and has found the surface to be acceptable for installation of the vegetative layer.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Randy Porter

Printed Name of Installer's Authorized Representative: Randy Porter

Title of Installer's Authorized Representative: Site manager

Date: 6-11-12

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: _____

Date: _____

Signature of CQA Officer: Anna Saindon

Printed Name of CQA Officer: Anna Saindon

Date: 6-18-12

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE

(Form CQAP-4.1)

INSTALLER: AMS **DATE:** 7-03-12

GEOSYNTHETIC MATERIAL: 40 mil textured HDPE

AREA ACCEPTED: C

INSTALLER: The undersigned authorized representative of the Installer certifies that the representative or a staff member has visually inspected the geosynthetic material daily for the above referenced area and has found the surface to be acceptable for installation of the vegetative layer.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Randy Porter

Printed Name of Installer's Authorized Representative: Randy Porter

Title of Installer's Authorized Representative: Site Manager

Date: 7-03-12

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: _____

Date: _____

Signature of CQA Officer: Anna Saindon

Printed Name of CQA Officer: Anna Saindon

Date: 7-9-12

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE

(Form CQAP-4.1)

INSTALLER: AMS DATE: 7-17-12

GEOSYNTHETIC MATERIAL: 40 mil textured HDPE

AREA ACCEPTED: B

INSTALLER: The undersigned authorized representative of the Installer certifies that the representative or a staff member has visually inspected the geosynthetic material daily for the above referenced area and has found the surface to be acceptable for installation of the vegetative layer.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: Randy Potter

Printed Name of Installer's Authorized Representative: Randy Potter

Title of Installer's Authorized Representative: Site Manager

Date: 7-17-12

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: _____

Date: _____

Signature of CQA Officer: Anna Saindon

Printed Name of CQA Officer: Anna Saindon

Date: 7-23-12

Electronic Filing: Received, Clerk's Office 09/28/2020

INSTALLER CERTIFICATE OF ACCEPTANCE

(Form CQAP-4.1)

INSTALLER: AMS **DATE:** 7-31-12

GEOSYNTHETIC MATERIAL: 40 mil textured HDPE

AREA ACCEPTED: D

INSTALLER: The undersigned authorized representative of the Installer certifies that the representative or a staff member has visually inspected the geosynthetic material daily for the above referenced area and has found the surface to be acceptable for installation of the vegetative layer.

The Installer shall be responsible for the integrity and suitability of the finished geosynthetic material from this date to completion of the installation.

CERTIFICATION OF ACCEPTANCE:

Signature of Installer's Authorized Representative: [signature]

Printed Name of Installer's Authorized Representative: Randy Postel

Title of Installer's Authorized Representative: Site Manager

Date: 7-31-12

CERTIFICATE OF ACCEPTANCE RECEIVED BY CQA OFFICER:

Signature of CQA Officer-in-Absentia (if applicable): _____

Printed Name of CQA Officer-in-Absentia: _____

Date: _____

Signature of CQA Officer: [signature]

Printed Name of CQA Officer: Anna Saindon

Date: 8-3-12

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A Leaktest has been requested by the customer and performed on the following gauge for the company below:

Model	Serial #:	Cs-137 Serial #	Am241:Be Serial#	Leaktest Date
MC1DRP	80108947	08947	08947	3/19/2012

Contact: Brandon Robbs Email: b robbs@geotechnology.com

Compay: Geotechnology (St Louis) Phone: 314.568.9073 Fax: 314.241.3526

Shipping Address: 11816 Lackland Rd Ste 150 City: St Louis St: Zip:

Center: Michigan Technician: SJ

InstroTek, Inc.
Grand Rapids, MI

Gauge Model:	MC1DRP	Calib. Date:	3/23/2012
Gauge S/N:	8947	Dens. Std. Count:	47854
		Moist. Std Count:	8958

Calibration Counts

Depth	MAG	M/A	Alum	Lime	Granite	A	B	C
0	30516	23037	16933	21190	16989	2.799022	60.77459487	0.164614
AC	58332	44587	31884	47243	35471	4.129142	83.92637224	0.079317
2	136903	103770	71385	97004	71228	9.408374	101.2325715	-0.3751
3	0	0	0	0	0	0	0	0
4	125769	88500	56737	81591	55616	12.77338	67.24602136	0.066464
5	0	0	0	0	0	0	0	0
6	95530	60925	36064	55528	35130	17.62485	47.31290383	0.199994
7	0	0	0	0	0	0	0	0
8	62620	36606	19940	32462	19399	18.26501	39.4279878	0.1295
9	0	0	0	0	0	0	0	0
10	38178	20446	10682	17922	10382	19.8705	32.27909868	0.098673
11	0	0	0	0	0	0	0	0
12	18376	11414	6128	10036	6148	18.26694	28.11194145	0.074074

Check Densities

	108.0	132.4	163.7
Depth	MAG	M/A	Alum
0	108.0	132.4	163.7
AC	108.0	132.4	163.7
2	108.0	132.4	163.7
3	108.0	132.4	163.7
4	108.0	132.4	163.7
5	108.0	132.4	163.7
6	108.0	132.4	163.7
7	108.0	132.4	163.7
8	108.0	132.4	163.7
9	108.0	132.4	108.0
10	108.0	132.4	163.7
11	108.0	132.4	108.0
12	108.0	132.4	163.7

Moisture Parameters

Blk 1	Blk 2		
0	37.5	A	B
492	5873	62.42799	-3.42873

InstroTek, Inc.

Expected Standard Count Report

Note: The calculation of the expected density standard count is based on decay of the Cesium 137 source used for density measurements.

Gauge Serial Number:	8947
Gauge Model:	MC1DRP
Calibration Density Standard:	47854
Calibration Date:	3/23/2012

Date	From	To
Apr-12	47348	48305
May-12	47257	48212
Jun-12	47166	48119
Jul-12	47075	48026
Aug-12	46985	47934
Sep-12	46895	47842
Oct-12	46804	47750
Nov-12	46714	47658
Dec-12	46625	47566
Jan-13	46535	47475
Feb-13	46445	47384
Mar-13	46356	47293
Apr-13	46267	47202
May-13	46178	47111
Jun-13	46089	47020
Jul-13	46000	46930
Aug-13	45912	46840
Sep-13	45824	46749

Calibration Technician

3/23/12

Date

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Wagner Equipment Co.

2420 Uravan St.
Aurora, CO 80011.
303-365-3200 office
303-365-3296 fax
www.wagnerequipment.com



Wagner Technology Solutions

May 9, 2012

William Massmann
Massmann Surveying
7751 Carondelet Ave., Ste. 502
Clayton, Missouri 63105

REF: Calibration of Trimble 5603 DR 200 SN# 63320778

Dear Mr. Massmann,

Please note that the above unit has been calibrated to meet with the factory specified tolerances for this unit. The summary of the tolerances is given below. If you require any further details please feel free to call us.

Prism Mode accuracy (STD)	= 0.007 ft ± 2ppm (2mm ± 2 ppm)
Prism Mode accuracy (D- bar)	= 0.003 ft ± 1ppm (1mm ± 1 ppm)
DR Mode accuracy <200 m	= 0.007 ft ± 2ppm (2mm ± 2 ppm)
Angle accuracy	= 3" σ based on DIN 18723

Yours sincerely

Farshad Behbahani
Repair Center Manager-Technology Solutions

Doc: *wagner-cust.massmann-cert.63320778*

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SEILER
INSTRUMENT
& MANUFACTURING COMPANY, INC.
3433 Tree Court Industrial Blvd.
St. Louis, MO 63122 USA
800-489-2282 • 314-968-2282
Fax: 314-968-2637 Corporate
Fax: 314-968-9217 Survey
Fax: 314-968-3601 Microscope

ISO 9001:2008 SEILER Registered October 2003 INSTRUMENT

NIST CERTIFICATE OF CALIBRATION

INSTRUMENT MODEL: TRIMBLE 5603
SERIAL NUMBER: 63321222

DATE CALIBRATED: 5-3-11
EXPIRATION DATE: 5-3-12
STANDARD USED: 71-7020S K&E OPTICAL WEDGE S/N411646
CALIBRATION SYSTEM: SOKKIA SN: 091031, 091032, 091033, 091034
SPECTRA RANGE 894VR S/N 317

CERTIFICATION: AT THE TIME OF CALIBRATION, THIS CERTIFIES THAT THE ABOVE REFERENCED INSTRUMENT WAS CALIBRATED IN ACCORDANCE WITH THE MANUFACTURER'S PROCEDURE. MEASURING AND TEST EQUIPMENT ARE TRACEABLE TO **NIST** STANDARDS. SUPPORTING DOCUMENTATION RELATIVE TO TRACEABILITY IS ON FILE AND IS AVAILABLE FOR EXAMINATION UPON REQUEST. NATIONAL STANDARDS ARE ADMINISTERED BY **NIST** (NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY).

CALIBRATED BY: James Fujarski

CUSTOMER: LAMAC ENG.
323 W. 3RD ST.
MT. CARMEL, IL. 62863

James Fujarski

Jim Fujarski
Service Manager
Seiler Instrument
SUP-7.6,F2 Revision 5

Sept. 4, 2009

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"World Class Accreditation"

The American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

ARDL, INC.
400 Aviation Drive
Mt. Vernon, Illinois 62864
Richard L. Curtin Phone: 618-244-3235
rlcurtin@ardlinc.com

ENVIRONMENTAL

Valid To: March 31, 2013 Certificate Number: 3115.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM v4.1)) accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

ICP-AES Spectrometry, Gas Chromatography, Gas Chromatography/Mass Spectrometry, High Performance Liquid Chromatography, Ion Chromatography

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste
Metals		
Aluminum	EPA 200.7/6010B	EPA 6010B
Antimony	EPA 200.7/6010B	EPA 6010B
Arsenic	EPA 200.7/6010B	EPA 6010B
Barium	EPA 200.7/6010B	EPA 6010B
Beryllium	EPA 200.7/6010B	EPA 6010B
Boron	EPA 200.7/6010B	EPA 6010B
Cadmium	EPA 200.7/6010B	EPA 6010B
Calcium	EPA 200.7/6010B	EPA 6010B
Chromium	EPA 200.7/6010B	EPA 6010B
Cobalt	EPA 200.7/6010B	EPA 6010B
Copper	EPA 200.7/6010B	EPA 6010B
Iron	EPA 200.7/6010B	EPA 6010B
Lead	EPA 200.7/6010B	EPA 6010B
Magnesium	EPA 200.7/6010B	EPA 6010B
Manganese	EPA 200.7/6010B	EPA 6010B
Mercury	EPA 7470A	EPA 7470A/7471A
Nickel	EPA 200.7/6010B	EPA 6010B
Potassium	EPA 200.7/6010B	EPA 6010B

5301 Buckeystown Pike, Suite 350 | Frederick, Maryland 21704-8373 | Phone: 301 644 3248 | Fax: 301 662 2974 | www.A2LA.org

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited DoD ELAP Laboratory

A2LA has accredited

ARDL, INC.

Mount Vernon, IL

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in the current DoD Quality System Manual for Environmental Laboratories (QSM); accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 14th day of November 2011.

President & CEO
For the Accreditation Council
Certificate Number 3115.01
Valid to March 31, 2013

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

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Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste
Metals (Continued)		
Selenium	EPA 200.7/6010B	EPA 6010B
Silver	EPA 200.7/6010B	EPA 6010B
Sodium	EPA 200.7/6010B	EPA 6010B
Thallium	EPA 200.7/6010B	EPA 6010B
Vanadium	EPA 200.7/6010B	EPA 6010B
Zinc	EPA 200.7/6010B	EPA 6010B
Nutrients		
Nitrate (as N)	EPA 300.0	-----
Orthophosphate (as P)	EPA 300.0	-----
Wet Chemistry		
Chloride	EPA 300.0	-----
Fluoride	EPA 300.0	-----
Sulfate	EPA 300.0	-----
Purgeable Organics (Volatiles)		
1,1,1,2-Tetrachloroethane	EPA 8260B/EPA 624	EPA 8260B
1,1,1-Trichloroethane	EPA 8260B/EPA 624	EPA 8260B
1,1,2,2-Tetrachloroethane	EPA 8260B/EPA 624	EPA 8260B
1,1,2-Trichloroethane	EPA 8260B/EPA 624	EPA 8260B
1,1-Dichloroethane	EPA 8260B/EPA 624	EPA 8260B
1,1-Dichloroethene	EPA 8260B/EPA 624	EPA 8260B
1,1-Dichloropropene	EPA 8260B/EPA 624	EPA 8260B
1,2 Dibromoethane (EDB)	EPA 8260B/EPA 624	EPA 8260B
1,2,3-Trichlorobenzene	EPA 8260B/EPA 624	EPA 8260B
1,2,3-Trichloropropane	EPA 8260B/EPA 624	EPA 8260B
1,2,4-Trichlorobenzene	EPA 8260B/EPA 624	EPA 8260B
1,2,4-Trimethylbenzene	EPA 8260B/EPA 624	EPA 8260B
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B/EPA 624	EPA 8260B
1,2-Dichlorobenzene	EPA 8260B/EPA 624	EPA 8260B
1,2-Dichloroethane	EPA 8260B/EPA 624	EPA 8260B
1,2-Dichloropropane	EPA 8260B/EPA 624	EPA 8260B
1,2-Xylene	EPA 8260B/EPA 624	EPA 8260B
1,3,5-Trimethylbenzene	EPA 8260B/EPA 624	EPA 8260B
1,3-Dichlorobenzene	EPA 8260B/EPA 624	EPA 8260B
1,3-Dichloropropane	EPA 8260B/EPA 624	EPA 8260B
1,3-Xylene	EPA 8260B/EPA 624	EPA 8260B
1,4-Dichlorobenzene	EPA 8260B/EPA 624	EPA 8260B
1,4-Isopropyltoluene	EPA 8260B/EPA 624	EPA 8260B
1,4-Xylene	EPA 8260B/EPA 624	EPA 8260B
2-Butanone (MEK)	EPA 8260B/EPA 624	EPA 8260B
2-Chlorotoluene	EPA 8260B/EPA 624	EPA 8260B
2-Hexanone	EPA 8260B/EPA 624	EPA 8260B
4-Chlorotoluene	EPA 8260B/EPA 624	EPA 8260B

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste
Purgeable Organics (Continued)		
4-Methyl-2-pentanone (MIBK)	EPA 8260B/EPA 624	EPA 8260B
Acetone	EPA 8260B/EPA 624	EPA 8260B
Acrylonitrile	EPA 8260B/EPA 624	EPA 8260B
Benzene	EPA 8260B/EPA 624	EPA 8260B
Bromobenzene	EPA 8260B/EPA 624	EPA 8260B
Bromochloromethane	EPA 8260B/EPA 624	EPA 8260B
Bromodichloromethane	EPA 8260B/EPA 624	EPA 8260B
Bromoform	EPA 8260B/EPA 624	EPA 8260B
Bromomethane	EPA 8260B/EPA 624	EPA 8260B
Carbon disulfide	EPA 8260B/EPA 624	EPA 8260B
Carbon tetrachloride	EPA 8260B/EPA 624	EPA 8260B
Chlorobenzene	EPA 8260B/EPA 624	EPA 8260B
Chloroethane	EPA 8260B/EPA 624	EPA 8260B
Chloroform	EPA 8260B/EPA 624	EPA 8260B
Chloromethane	EPA 8260B/EPA 624	EPA 8260B
cis-1,2-Dichloroethene	EPA 8260B/EPA 624	EPA 8260B
cis-1,3-Dichloropropene	EPA 8260B/EPA 624	EPA 8260B
Dibromochloromethane	EPA 8260B/EPA 624	EPA 8260B
Dibromomethane	EPA 8260B/EPA 624	EPA 8260B
Dichlorodifluoromethane	EPA 8260B/EPA 624	EPA 8260B
Ethyl benzene	EPA 8260B/EPA 624	EPA 8260B
Hexachlorobutadiene	EPA 8260B/EPA 624	EPA 8260B
Isopropylbenzene	EPA 8260B/EPA 624	EPA 8260B
m,p-Xylene	EPA 8260B/EPA 624	EPA 8260B
Methylene chloride	EPA 8260B/EPA 624	EPA 8260B
Methyl-t-butyl ether	EPA 8260B/EPA 624	EPA 8260B
Naphthalene	EPA 8260B/EPA 624	EPA 8260B
n-Butylbenzene	EPA 8260B/EPA 624	EPA 8260B
n-Propylbenzene	EPA 8260B/EPA 624	EPA 8260B
Sec-Butylbenzene	EPA 8260B/EPA 624	EPA 8260B
Styrene	EPA 8260B/EPA 624	EPA 8260B
Tert-Butylbenzene	EPA 8260B/EPA 624	EPA 8260B
Tetrachloroethene	EPA 8260B/EPA 624	EPA 8260B
Toluene	EPA 8260B/EPA 624	EPA 8260B
trans-1,2-Dichloroethene	EPA 8260B/EPA 624	EPA 8260B
trans-1,3-Dichloropropene	EPA 8260B/EPA 624	EPA 8260B
Trichloroethene	EPA 8260B/EPA 624	EPA 8260B
Trichlorofluoromethane	EPA 8260B/EPA 624	EPA 8260B
Vinyl chloride	EPA 8260B/EPA 624	EPA 8260B
Xylenes, total	EPA 8260B/EPA 624	EPA 8260B
Extractable Organics (Semivolatiles)		
Acenaphthene	EPA 8270C/EPA 625	EPA 8270C
Acenaphthylene	EPA 8270C/EPA 625	EPA 8270C
Aniline	EPA 8270C/EPA 625	EPA 8270C
Anthracene	EPA 8270C/EPA 625	EPA 8270C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste
Extractable Organics (Continued)		
Benzoic acid	EPA 8270C/EPA 625	EPA 8270C
Benzo (a) anthracene	EPA 8270C/EPA 625	EPA 8270C
Benzo (b) fluoranthene	EPA 8270C/EPA 625	EPA 8270C
Benzo (k) fluoranthene	EPA 8270C/EPA 625	EPA 8270C
Benzo (a) pyrene	EPA 8270C/EPA 625	EPA 8270C
Bis (2-chloroisopropyl) ether	EPA 8270C/EPA 625	EPA 8270C
Bis (2-ethylhexyl) phthalate	EPA 8270C/EPA 625	EPA 8270C
Bis (2-chloroethoxy) methane	EPA 8270C/EPA 625	EPA 8270C
Butyl benzyl phthalate	EPA 8270C/EPA 625	EPA 8270C
4-Chloroaniline	EPA 8270C/EPA 625	EPA 8270C
4-Chloro-3-methylphenol	EPA 8270C/EPA 625	EPA 8270C
2-Chloronaphthalene	EPA 8270C/EPA 625	EPA 8270C
2-Chlorophenol	EPA 8270C/EPA 625	EPA 8270C
4-Chlorophenyl phenyl ether	EPA 8270C/EPA 625	EPA 8270C
Chrysene	EPA 8270C/EPA 625	EPA 8270C
2-Methylphenol (o-Cresol)	EPA 8270C/EPA 625	EPA 8270C
3-Methylphenol (m-Cresol)	EPA 8270C/EPA 625	EPA 8270C
4-Methylphenol (p-Cresol)	EPA 8270C/EPA 625	EPA 8270C
Dibenzo (a,h) anthracene	EPA 8270C/EPA 625	EPA 8270C
Dibenzofuran	EPA 8270C/EPA 625	EPA 8270C
1,2-Dichlorobenzene	EPA 8270C/EPA 625	EPA 8270C
1,3-Dichlorobenzene	EPA 8270C/EPA 625	EPA 8270C
1,4-Dichlorobenzene	EPA 8270C/EPA 625	EPA 8270C
3,3'-Dichlorobenzidine	EPA 8270C/EPA 625	EPA 8270C
2,4-Dichlorophenol	EPA 8270C/EPA 625	EPA 8270C
Diethyl phthalate	EPA 8270C/EPA 625	EPA 8270C
2,4-Dimethylphenol	EPA 8270C/EPA 625	EPA 8270C
Dimethyl phthalate	EPA 8270C/EPA 625	EPA 8270C
Di-n-butyl phthalate	EPA 8270C/EPA 625	EPA 8270C
Di-n-octyl phthalate	EPA 8270C/EPA 625	EPA 8270C
2,4-Dinitrophenol	EPA 8270C/EPA 625	EPA 8270C
2,4-Dinitrotoluene	EPA 8270C/EPA 625	EPA 8270C
2,6-Dinitrotoluene	EPA 8270C/EPA 625	EPA 8270C
1,2-Diphenylhydrazine	EPA 8270C/EPA 625	EPA 8270C
Fluoranthene	EPA 8270C/EPA 625	EPA 8270C
Fluorene	EPA 8270C/EPA 625	EPA 8270C
Hexachlorocyclopentadiene	EPA 8270C/EPA 625	EPA 8270C
Hexachloroethane	EPA 8270C/EPA 625	EPA 8270C
Indeno (1,2,3-cd) pyrene	EPA 8270C/EPA 625	EPA 8270C
Isophorone	EPA 8270C/EPA 625	EPA 8270C
2-Methyl-4,6-Dinitrophenol	EPA 8270C/EPA 625	EPA 8270C
Naphthalene	EPA 8270C/EPA 625	EPA 8270C
2-Nitroaniline	EPA 8270C/EPA 625	EPA 8270C
3-Nitroaniline	EPA 8270C/EPA 625	EPA 8270C
4-Nitroaniline	EPA 8270C/EPA 625	EPA 8270C
Nitrobenzene	EPA 8270C/EPA 625	EPA 8270C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste
Extractable Organics (Continued)		
2-Nitrophenol	EPA 8270C/EPA 625	EPA 8270C
4-Nitrophenol	EPA 8270C/EPA 625	EPA 8270C
N-Nitrosodi-n-propylamine	EPA 8270C/EPA 625	EPA 8270C
N-Nitrosodiphenylamine	EPA 8270C/EPA 625	EPA 8270C
Pentachlorophenol	EPA 8270C/EPA 625	EPA 8270C
Phenanthrene	EPA 8270C/EPA 625	EPA 8270C
Phenol	EPA 8270C/EPA 625	EPA 8270C
1,2,4,5-Tetrachlorobenzene	EPA 8270C/EPA 625	EPA 8270C
2,3,4,5-Tetrachlorophenol	EPA 8270C/EPA 625	EPA 8270C
1,2,4-Trichlorobenzene	EPA 8270C/EPA 625	EPA 8270C
2,4,5-Trichlorophenol	EPA 8270C/EPA 625	EPA 8270C
2,4,6-Trichlorophenol	EPA 8270C/EPA 625	EPA 8270C
Pesticides/Herbicides/PCBs		
Aldrin	EPA 8081B/EPA 608	EPA 8081B
alpha-BHC	EPA 8081B/EPA 608	EPA 8081B
beta-BHC	EPA 8081B/EPA 608	EPA 8081B
delta-BHC	EPA 8081B/EPA 608	EPA 8081B
gamma-BHC	EPA 8081B/EPA 608	EPA 8081B
4,4'-DDD	EPA 8081B/EPA 608	EPA 8081B
4,4'-DDE	EPA 8081B/EPA 608	EPA 8081B
4,4',-DDT	EPA 8081B/EPA 608	EPA 8081B
Dieldrin	EPA 8081B/EPA 608	EPA 8081B
Endosulfan I	EPA 8081B/EPA 608	EPA 8081B
Endosulfan II	EPA 8081B/EPA 608	EPA 8081B
Endosulfan sulfate	EPA 8081B/EPA 608	EPA 8081B
Endrin	EPA 8081B/EPA 608	EPA 8081B
Endrin aldehyde	EPA 8081B/EPA 608	EPA 8081B
Endrin ketone	EPA 8081B/EPA 608	EPA 8081B
Heptachlor	EPA 8081B/EPA 608	EPA 8081B
Heptachlor epoxide	EPA 8081B/EPA 608	EPA 8081B
Methoxychlor	EPA 8081B/EPA 608	EPA 8081B
gamma-Chlordane	EPA 8081B/EPA 608	EPA 8081B
alpha-Chlordane	EPA 8081B/EPA 608	EPA 8081B
PCB-1016 (Aroclor)	EPA 8082/EPA 608	EPA 8082
PCB-1221	EPA 8082/EPA 608	EPA 8082
PCB-1232	EPA 8082/EPA 608	EPA 8082
PCB-1242	EPA 8082/EPA 608	EPA 8082
PCB-1248	EPA 8082/EPA 608	EPA 8082
PCB-1254	EPA 8082/EPA 608	EPA 8082
PCB-1260	EPA 8082/EPA 608	EPA 8082
Hazardous Waste Characteristics		
Explosives	-----	EPA 8330A/B
Toxicity Characteristic Leaching Procedure	-----	EPA 1311

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste
Preparation Methods		
8260B/624	----------	1311- Zero Headspace/5030B
8270C	----------	1311/3510C
8270C	3510C	3550B
8260B	5030B	5035
6010B/200.7	----------	1311/3010A
6010B/200.7	3010A	3050B

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY
NELAP - RECOGNIZED
ENVIRONMENTAL LABORATORY ACCREDITATION

is hereby granted to

ARDL, INC.

400 AVIATION DRIVE, P.O. BOX 1566

MT. VERNON, IL 62864

NELAP ACCREDITED
ACCREDITATION NUMBER #100308

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 186 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 186. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.

Gary Germann
Manager
Environmental Laboratory Accreditation Program

Janet Cruse
Accreditation Officer
Environmental Laboratory Accreditation Program

Certificate No.: 002869
Expiration Date: 04/30/2012
Issued On: 01/25/2012

State of Illinois
Environmental Protection Agency
Awards the Certificate of Approval

Certificate No.: 002869

ARDL, Inc.
400 Aviation Drive, P.O. Box 1566
Mt. Vernon, IL 62864

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Hazardous and Solid Waste, Inorganic

1311

TCLP (Organic and Inorganic)

6010B

Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Calcium	Chromium
Cobalt	Copper	Iron
Lead	Magnesium	Manganese
Nickel	Potassium	Selenium
Silver	Sodium	Strontium
Thallium	Vanadium	Zinc

7470A

Mercury

Hazardous and Solid Waste, Organic

8081A

4,4'-DDD	4,4'-DDE	4,4'-DDT
Aldrin	alpha-BHC	alpha-Chlordane
beta-BHC	delta-BHC	Dieldrin
Endosulfan I	Endosulfan II	Endosulfan sulfate
Endrin	Endrin aldehyde	Endrin ketone
gamma-BHC (Lindane)	gamma-Chlordane	Heptachlor
Heptachlor epoxide	Methoxychlor	

8082

PCB-1016	PCB-1221	PCB-1232
PCB-1242	PCB-1248	PCB-1254
PCB-1260		

8260B

1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene
1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane
1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (EDB)	1,2-Dichlorobenzene	1,2-Dichloroethane
1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene
1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane
2-Butanone (Methyl ethyl ketone, MEK)	2-Chlorotoluene	2-Hexanone
4-Bromofluorobenzene	4-Chlorotoluene	4-Methyl-2-pentanone (Methyl isobutyl ketone

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Hazardous and Solid Waste, Organic

8260B

- Acetone
- Benzene
- Bromobenzene
- Bromochloromethane
- Bromodichloromethane
- Bromoform
- Bromomethane
- Carbon disulfide
- Carbon tetrachloride
- Chlorobenzene
- Chloroethane
- Chloroform
- Chloromethane
- cis-1,2-Dichloroethene
- cis-1,3-Dichloropropene
- Dibromofluoromethane
- Dibromomethane
- Dichlorodifluoromethane
- Dichloromethane (Methylene chloride)
- Ethylbenzene
- Hexachlorobutadiene
- Isopropylbenzene
- Methyl ethyl ketone
- Methyl-t-butyl ether
- m-Xylene
- Naphthalene
- n-Butylbenzene
- n-Propylbenzene
- o-Xylene
- p-Isopropyltoluene
- p-Xylene
- sec-Butylbenzene
- Styrene
- tert-Butylbenzene
- Tetrachloroethene
- Toluene
- trans-1,2-Dichloroethene
- trans-1,3-Dichloropropene
- Trichloroethene
- Trichlorofluoromethane
- Vinyl chloride
- Xylenes (Total)

8270C

- 1,2,4,5-Tetrachlorobenzene
- 1,2,4-Trichlorobenzene
- 1,2-Dichlorobenzene
- 1,2-Diphenylhydrazine
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene
- 2,4,5-Trichlorophenol
- 2,4,6-Trichlorophenol
- 2,4-Dichlorophenol
- 2,4-Dimethylphenol
- 2,4-Dinitrophenol
- 2,4-Dinitrotoluene (2,4-DNT)
- 2,6-Dinitrotoluene (2,6-DNT)
- 2-Chloronaphthalene
- 2-Chlorophenol
- 2-Methylnaphthalene
- 2-Methylphenol (o-Cresol)
- 2-Nitroaniline
- 2-Nitrophenol
- 3,3'-Dichlorobenzidine
- 3-Nitroaniline
- 4,6-Dinitro-2-methylphenol
- 4-Bromophenyl phenyl ether
- 4-Chloro-3-methylphenol
- 4-Chloroaniline
- 4-Chlorophenyl phenyl ether
- 4-Methylphenol (p-Cresol)
- 4-Nitroaniline
- 4-Nitrophenol
- Acenaphthene
- Acenaphthylene
- Aniline
- Anthracene
- Benzidine
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perlyene
- Benzo(k)fluoranthene
- Benzoic acid
- Benzyl alcohol
- Bis(2-chloroethoxy) methane
- Bis(2-chloroethyl) ether
- Bis(2-chloroisopropyl) ether
- Bis(2-ethylhexyl) phthalate
- Butyl benzyl phthalate
- Carbazole
- Chlorfenvinphos
- Chrysene
- Dibenz(a,h)anthracene
- Dibenzofuran
- Dichlorovos
- Diethyl phthalate
- Dimethyl phthalate
- Di-n-butyl phthalate
- Di-n-octyl phthalate
- Fluoranthene
- Fluorene
- Hexachlorobenzene
- Hexachlorobutadiene
- Hexachlorocyclopentadiene
- Hexachloroethane
- Indeno(1,2,3-cd) pyrene
- Isodrin
- Isophorone
- m-Cresol (3-Methylphenol)
- Naphthalene
- Nitrobenzene
- N-Nitrosodimethylamine
- N-Nitrosodi-n-propylamine
- N-Nitrosodiphenylamine
- Pentachlorophenol
- Phenanthrene
- Phenol
- Pyrene
- Pyridine

8330

- 1,3,5-Trinitrobenzene (1,3,5-TNB)
- 1,3-Dinitrobenzene (1,3-DNB)
- 2,4,6-Trinitrotoluene (2,4,6-TNT)
- 2,4-Dinitrotoluene (2,4-DNT)
- 2,6-Dinitrotoluene (2,6-DNT)
- 2-Amino-4,6-dinitrotoluene (2-Am-DNT)
- 4-Amino-2,6-dinitrotoluene (4-Am-DNT)
- Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
- Methyl-2,4,6-trinitrophenylnitramine (Tetryl)
- m-Nitrotoluene (3-Nitrotoluene, 3-NT)
- Nitrobenzene
- Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocin

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Hazardous and Solid Waste, Organic	*8330*	o-Nitrotoluene (2-Nitrotoluene, 2-NT)
p-Nitrotoluene (4-Nitrotoluene, 4-NT)		
Wastewater, Inorganic		
USEPA200.7		
Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Chromium	Cobalt
Copper	Iron	Lead
Manganese	Nickel	Selenium
Silver	Sodium	Thallium
Vanadium	Zinc	
USEPA300.0R2.1		
Chloride	Fluoride	Nitrate
Nitrate-Nitrite (sum)	Sulfate	
Wastewater, Organic		
USEPA608		
4,4'-DDD	4,4'-DDE	4,4'-DDT
Aldrin	alpha-BHC	beta-BHC
delta-BHC	Dieldrin	Endosulfan I
Endosulfan II	Endosulfan sulfate	Endrin
Endrin aldehyde	gamma-BHC (Lindane)	Heptachlor
Heptachlor epoxide	Methoxychlor	
USEPA624		
1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene
1,4-Dichlorobenzene	Benzene	Bromodichloromethane
Bromoform	Bromomethane	Carbon tetrachloride
Chlorobenzene	Chloroethane	Chloroform
Chloromethane	cis-1,3-Dichloropropene	Dichloromethane (Methylene chloride)
Ethylbenzene	Methyl tert-butyl ether (MTBE)	Tetrachloroethene
Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene
Trichloroethene	Trichlorofluoromethane	Vinyl chloride
Xylenes (total)		
USEPA625		
1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene
1,4-Dichlorobenzene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol
2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol
2,4-Dinitrotoluene (2,4-DNT)	2,6-Dinitrotoluene (2,6-DNT)	2-Chloronaphthalene
2-Chlorophenol	2-Methyl-4,6-dinitrophenol	2-Nitrophenol
3,3'-Dichlorobenzidine	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol
4-Chlorophenyl phenyl ether	4-Nitrophenol	Acenaphthene
Acenaphthylene	Anthracene	Benzidine
Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-chloroethoxy) methane

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Wastewater, Organic

USEPA625

- Bis(2-chloroethyl) ether
- Bis(2-ethylhexyl) phthalate
- Chrysene
- Dibenz(a,h)anthracene
- Diethyl phthalate
- Dimethyl phthalate
- Di-n-butyl phthalate
- Di-n-octyl phthalate
- Fluoranthene
- Fluorene
- Hexachlorobenzene
- Hexachlorobutadiene
- Hexachlorocyclopentadiene
- Hexachloroethane
- Indeno(1,2,3-cd) pyrene
- Isophorone
- Naphthalene
- Nitrobenzene
- N-Nitrosodimethylamine
- N-Nitrosodi-n-propylamine
- N-Nitrosodiphenylamine
- Pentachlorophenol
- Phenanthrene
- Phenol
- Pyrene

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY
NELAP - RECOGNIZED
ENVIRONMENTAL LABORATORY ACCREDITATION

is hereby granted to

TEKLAB, INCORPORATED
5445 HORSESHOE LAKE RD.
COLLINSVILLE, IL 62234

NELAP ACCREDITED
ACCREDITATION NUMBER #100226

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 186 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 186. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.

Celeste M. Crowley
Acting Manager
Environmental Laboratory Accreditation Program

John South
Accreditation Officer
Environmental Laboratory Accreditation Program

Certificate No.: 003000
Expiration Date: 01/31/2013
Issued On: 10/18/2012

State of Illinois
Environmental Protection Agency

Certificate No.: 003000

Awards the Certificate of Approval

Teklab, Incorporated
5445 Horseshoe Lake Rd.
Collinsville, IL 62234

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

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Drinking Water, Inorganic

SM2120B,18Ed
Color

SM2130B,18Ed
Turbidity

SM2320B,18Ed
Alkalinity

SM2340B,18Ed
Hardness

SM2340C,18Ed
Hardness

SM2510B,18Ed
Conductivity

SM2540C,18Ed
Total dissolved solids

SM2550,18Ed
Temperature

SM3112B,18Ed
Mercury

SM3113B,18Ed
Antimony
Arsenic
Lead
Selenium

SM4500Cl-G,18Ed
Chlorine (free,combined,total)

SM4500CN-CE,18Ed
Cyanide

SM4500F-C,18Ed
Fluoride

SM4500H-B,18Ed
Hydrogen ion (pH)

SM4500NO2-B,18Ed
Nitrite

SM4500P-E,18Ed
Orthophosphate

SM4500Si-E,18Ed

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Collinsville, IL 62234

Drinking Water, Inorganic	*SM4500Si-E,18Ed*	Silica
SM5310C,19Ed		
Dissolved Organic Carbon	Total Organic Carbon (TOC)	
SM5540C,18Ed		
Foaming agent		
USEPA180.1		
Turbidity		
USEPA200.7R4.4		
Aluminum	Barium	Beryllium
Cadmium	Calcium	Chromium
Copper	Iron	Magnesium
Manganese	Nickel	Silver
Sodium	Zinc	
USEPA200.9R2.2		
Thallium		
USEPA245.1R3.0		
Mercury		
USEPA353.2R2.0		
Nitrate	Nitrite	
Hazardous and Solid Waste, Inorganic		
1010A		
Ignitability		
1020B		
Ignitability		
1311		
TCLP (Organic and Inorganic)		
1312		
Synthetic Precipitation Leaching Procedure		
6010B		
Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Calcium	Chromium
Cobalt	Copper	Iron
Lead	Magnesium	Manganese
Molybdenum	Nickel	Potassium
Selenium	Silver	Sodium
Strontium	Thallium	Tin
Vanadium	Zinc	
7010		
Antimony	Lead	Selenium
Thallium		
7196A		
Chromium VI		

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Hazardous and Solid Waste, Inorganic *7470A*

Mercury

7471B

Mercury

9012A

Cyanide

9014

Cyanide

9020B

TOX - Total Organic Halides

9023

EOX-Extractable Organic Halides

9034

Sulfides

9036

Sulfate

9038

Sulfate

9040B

Hydrogen Ion (pH)

9045C

Hydrogen Ion (pH)

9050A

Specific conductance

9060A

Total Organic Carbon (TOC)

9065

Phenolics

9066

Phenolics

9071B

Oil and Grease Extractable

9095A

Paint Filter

9214

Fluoride

9251

Chloride

Hazardous and Solid Waste, Organic

8015B

1,4-Dioxane	1-Butanol (n-Butyl alcohol)	1-Propanol
2-Methyl-1-propanol (Isobutyl alcohol)	2-Propanol (Isopropyl alcohol)	Diesel range organics (DRO)

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Collinsville, IL 62234

Hazardous and Solid Waste, Organic	*8015B*	Ethanol
Ethylene glycol	Methanol	t-Butyl alcohol
8015C		
1-Propanol (n-Propyl alcohol)	Diesel range organics (DRO)	Ethanol
Isopropyl alcohol (2-Propanol)	Methanol	t-Butyl alcohol (TBA)
8081B		
4,4'-DDD	4,4'-DDE	4,4'-DDT
Alachlor	Aldrin	alpha-BHC
alpha-Chlordane	beta-BHC	Chlordane - not otherwise specified
delta-BHC	Dieldrin	Endosulfan I
Endosulfan II	Endosulfan sulfate	Endrin
Endrin aldehyde	Endrin ketone	gamma-BHC (Lindane)
gamma-Chlordane	Heptachlor	Heptachlor epoxide
Methoxychlor	Toxaphene	
8082		
PCB-1016	PCB-1221	PCB-1232
PCB-1242	PCB-1248	PCB-1254
PCB-1260		
8151A		
2,4,5-T	2,4,5-TP (Silvex)	2,4-D
2,4-DB	3,5-Dichlorobenzoic acid	4-Nitrophenol
Acifluorfen	Bentazon	Chloramben
Dalapon	DCPA diacid	Dicamba
Dichloroprop	Dinoseb	MCPA
MCPP	Pentachlorophenol	Picloram
8260B		
1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene
1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane
1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (EDB)	1,2-Dichlorobenzene	1,2-Dichloroethane
1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene
1,3-Dichloropropane	1,4-Dichlorobenzene	1-Chlorobutane
2,2-Dichloropropane	2-Butanone (Methyl ethyl ketone, MEK)	2-Chloro-1,3-butadiene (Chloroprene)
2-Chloroethyl vinyl ether	2-Chlorotoluene	2-Hexanone
2-Nitropropane	4-Chlorotoluene	4-Methyl-2-pentanone (Methyl isobutyl ketone
Acetone	Acetonitrile	Acrolein (Propenal)
Acrylonitrile	Allyl chloride	Benzene
Bromobenzene	Bromochloromethane	Bromodichloromethane
Bromoform	Bromomethane	Carbon disulfide
Carbon tetrachloride	Chlorobenzene	Chlorodibromomethane (Dibromochlorometha
Chloroethane	Chloroform	Chloromethane
Chloroprene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene
cis-1,4-Dichloro-2-butene	Dibromomethane	Dichlorodifluoromethane
Dichloromethane (Methylene chloride)	Diethyl ether	Ethyl acetate
Ethyl ether	Ethyl methacrylate	Ethylbenzene

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5445 Horseshoe Lake Rd.
Collinsville, IL 62234

Hazardous and Solid Waste, Organic	*8260B*	Hexachlorobutadiene
Hexachloroethane	Isopropyl ether	Isopropylbenzene
Methacrylonitrile	Methyl acrylate	Methyl ethyl ketone
Methyl iodide (Iodmethane)	Methyl isobutyl ketone	Methyl methacrylate
Methyl-t-butyl ether	m-Xylene	Naphthalene
n-Butylbenzene	Nitrobenzene	n-Propylbenzene
o-Xylene	Pentachloroethane	p-Isopropyltoluene
Propionitrile (Ethyl cyanide)	p-Xylene	sec-Butylbenzene
Styrene	t-Butyl alcohol	tert-Butylbenzene
Tetrachloroethene	Tetrahydrofuran	Toluene
trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	trans-1,4-Dichloro-2-butene
Trichloroethene	Trichlorofluoromethane	Trichlorotrifluoroethane
Vinyl acetate	Vinyl chloride	Vinylidene chloride
Xylenes (Total)		
8270C		
1,2,4,5-Tetrachlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene
1,2-Diphenylhydrazine	1,3-Dichlorobenzene	1,4-Dichlorobenzene
1,4-Dioxane	1,4-Naphthoquinone	1-Naphthylamine
2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol
2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene (2,4-DNT)
2,6-Dinitrotoluene (2,6-DNT)	2-Chloronaphthalene	2-Chlorophenol
2-Methylnaphthalene	2-Naphthylamine	2-Nitroaniline
2-Nitrophenol	3,3'-Dichlorobenzidine	3,3'-Dimethylbenzidine
3-Methylcholanthrene	3-Nitroaniline	4,6-Dinitro-2-methylphenol
4-Aminobiphenyl	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol
4-Chloroaniline	4-Chlorophenyl phenyl ether	4-Nitroaniline
4-Nitrophenol	5-Nitro-o-toluidine	7,12-Dimethylbenz(a)anthracene
Acenaphthene	Acenaphthylene	Acetophenone
Aniline	Anthracene	Benzidine
Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene
Benzo(g,h,i)perlyene	Benzo(k)fluoranthene	Benzoic acid
Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate
Carbazole	Carbofuran (Furaden)	Chlorobenzilate
Chrysene	Diallate	Dibenz(a,h)anthracene
Dibenzofuran	Diethyl phthalate	Dimethoate
Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate
Diphenylamine	Ethyl methanesulfonate	Famphur
Fluoranthene	Fluorene	Hexachlorobenzene
Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane
Hexachloropropene	Indeno(1,2,3-cd) pyrene	Isodrin
Isophorone	Isosafrole	m-Cresol (3-Methylphenol)
m-Dinitrobenzene	Methapyrilene	Methyl methanesulfonate
Naphthalene	Nitrobenzene	N-Nitrosodiethylamine
N-Nitrosodimethylamine	N-Nitrosodi-n-butylamine (N-Nitrosodibutylamin	N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine	N-Nitrosomethylethylamine	N-Nitrosopiperidine
N-Nitrosopyrrolidine	O,O,O-Triethyl phosphorothioate	o-Cresol (2-Methylphenol)

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Hazardous and Solid Waste, Organic	*8270C*	o-Toluidine
Parathion	p-Cresol (4-Methylphenol)	p-Dimethylaminoazobenzene
Pentachlorobenzene	Pentachloronitrobenzene	Pentachlorophenol
Phenanthrene	Phenol	Pronamide
Pyrene	Pyridine	Safrole
8270C Mod_Farm Chemicals		
Acetochlor	Alachlor	Atrazine
Butylate	Cyanazine	EPTC
Metolachlor	Metribuzin	Pendimethalin
Simazine	Trifluralin	
Wastewater, Inorganic		
SM2120B,2001		
Color		
SM2130B,2001		
Turbidity		
SM2310B,1997		
Acidity		
SM2320B,1997		
Alkalinity		
SM2340B,1997		
Hardness		
SM2340C,1997		
Hardness		
SM2510B,1997		
Specific conductance		
SM2540B,1997		
Residue (Total)		
SM2540C,1997		
Residue (TDS)		
SM2540D,1997		
Residue (TSS)		
SM2540F,1997		
Residue (Settable solids)		
SM2550B,2000		
Temperature		
SM3112B,2009		
Mercury		
SM3113B,2004		
Antimony	Arsenic	Lead
Selenium	Thallium	
SM3120B,1999		
Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron

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Wastewater, Inorganic	*SM3120B,1999*	Cadmium
Calcium	Chromium	Cobalt
Copper	Iron	Lead
Magnesium	Manganese	Molybdenum
Nickel	Potassium	Selenium
Silver	Sodium	Thallium
Vanadium	Zinc	
SM3500Cr-B,2009		
Chromium VI		
SM4500CL-C,1997		
Chloride		
SM4500CL-E,1997		
Chloride		
SM4500Cl-G,2000		
Chlorine, Total Residual		
SM4500CN-E,1999		
Cyanide		
SM4500CN-G,1999		
Cyanide, Available		
SM4500F-C,1997		
Fluoride		
SM4500H-B,2000		
Hydrogen ion (pH)		
SM4500NH3-H,1997		
Ammonia		
SM4500NO2-B,2000		
Nitrite		
SM4500NO3-F,2000		
Nitrate-nitrite (as N)		
SM4500O-G,2001		
Oxygen - Dissolved		
SM4500P-E,1999		
Orthophosphate (as P)	Phosphorus	
SM4500S-D,2000		
Sulfide		
SM4500SO3-B,2000		
Sulfite		
SM5210B,2001		
Biochemical Oxygen Demand (BOD)	Carbonaceous Biochemical Oxygen Demand (C	
SM5220D,1997		
Chemical Oxygen Demand (COD)		
SM5310C,2000		
Total organic carbon (TOC)		

State of Illinois Certificate No.: 003000

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Teklab, Incorporated
5445 Horseshoe Lake Rd.
Collinsville, IL 62234

Wastewater, Inorganic	*SM5540C,2000*	
Surfactants		
USEPA120.1,1982		
Specific conductance		
USEPA160.4,1971		
Residue (Volatile)		
USEPA1631E		
Mercury		
USEPA1664A		
Oil and Grease		
USEPA180.1R2.0,1993		
Turbidity		
USEPA200.7,1994		
Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Calcium	Chromium
Cobalt	Copper	Iron
Lead	Magnesium	Manganese
Molybdenum	Nickel	Potassium
Selenium	Silver	Sodium
Thallium	Tin	Vanadium
Zinc		
USEPA245.1R3.0,1994		
Mercury		
USEPA335.4R1.0,1993		
Cyanide		
USEPA350.1R2.0,1993		
Ammonia		
USEPA351.2R2.0,1993		
Total Kjeldahl Nitrogen		
USEPA353.2R2.0,1993		
Nitrate	Nitrate-nitrite (as N)	Nitrite (as N)
USEPA365.4,1974		
Phosphorus		
USEPA375.2R2.0,1993		
Sulfate		
USEPA410.4R2.0,1993		
Chemical Oxygen Demand (COD)		
USEPA420.1,1978		
Phenolics		
USEPA420.4R1.0,1993		
Phenolics		
Wastewater, Organic		

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Collinsville, IL 62234

Wastewater, Organic

USEPA608

4,4'-DDD	4,4'-DDE	4,4'-DDT
Aldrin	alpha-BHC	beta-BHC
Chlordane	delta-BHC	Dieldrin
Endosulfan I	Endosulfan II	Endosulfan sulfate
Endrin	Endrin aldehyde	gamma-BHC (Lindane)
Heptachlor	Heptachlor epoxide	Methoxychlor
PCB-1016	PCB-1221	PCB-1232
PCB-1242	PCB-1248	PCB-1254
PCB-1260	Toxaphene	

USEPA624

1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene
1,4-Dichlorobenzene	2-Chloroethylvinyl ether	Acetonitrile
Acrolein (Propenal)	Acrylonitrile	Benzene
Bromodichloromethane	Bromoform	Bromomethane
Carbon tetrachloride	Chlorobenzene	Chloroethane
Chloroform	Chloromethane	cis-1,3-Dichloropropene
Dibromochloromethane	Dichloromethane (Methylene chloride)	Ethylbenzene
Methyl tert-butyl ether (MTBE)	Tetrachloroethene	Toluene
trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichloroethene
Trichlorofluoromethane	Vinyl chloride	Xylenes (total)

USEPA625

1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene
1,4-Dichlorobenzene	2,2-Oxybis(1-chloropropane)	2,4,6-Trichlorophenol
2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol
2,4-Dinitrotoluene (2,4-DNT)	2,6-Dinitrotoluene (2,6-DNT)	2-Chloronaphthalene
2-Chlorophenol	2-Methyl-4,6-dinitrophenol	2-Nitrophenol
3,3'-Dichlorobenzidine	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol
4-Chlorophenyl phenyl ether	4-Nitrophenol	Acenaphthene
Acenaphthylene	Anthracene	Benzidine
Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzyl butyl phthalate
Bis(2-chloroethoxy) methane	Bis(2-chloroethyl) ether	Bis(2-ethylhexyl) phthalate
Chrysene	Dibenz(a,h)anthracene	Diethyl phthalate
Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate
Fluoranthene	Fluorene	Hexachlorobenzene
Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane
Indeno(1,2,3-cd) pyrene	Isophorone	Naphthalene
Nitrobenzene	N-Nitrosodimethylamine	N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine	Pentachlorophenol	Phenanthrene
Phenol	Pyrene	

Ash Management Services, LLC
12601 Plantside Drive
Louisville, Kentucky 40299
Phone: 502-245-1353

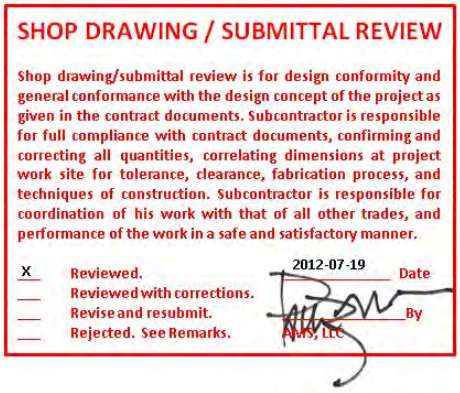
Hutsonville APD Closure

HUT-APD-SUB-027-02 HDPE Welding Certification Revised

02640-1.4.A Qualifications Welding Supervisor [S. Burch and J. Barrett]

Submittal Information

Submittal No.	Date	Contact	Phone no.
SUB-027-02	2012-07-19	Paul Zinsious AMS	502-640-2918



Freitag-Weinhardt, Inc.
5900 North Thirteenth Street
Terre Haute, IN 47805

TELEPHONE (812)-466-9861
FAX (812)-466-7583

LETTER OF TRANSMITTAL

DATE 7-2-12	JOB NO. 3613
RE: Proof of 10,000' of HDPE Piping Experience	

TO:
Ash Management Services, LLC.
12601 Plantside Drive
Louisville, Kentucky 40299

ATTENTION:
Paul H. Zinsious, PMP
Project Controls Manager

WE ARE SENDING YOU:

- ☐ Bid Form
- ☐ Cut Sheets
- ☐ Specifications
- ☐ Drawings
- ☐ Plans
- ☐ Contract Agreement
- ☐ Copy of letter
- ☐ Samples
- ☒ Submittal Data

COPIES	DATE	DESCRIPTION	RETURN
1	7-2-12	Bonder Performance Records (Jarred Barrett & Scott Burch)	
1	7-2-12	Reference	
1	7-2-12	Pipe Product Invoices	

IF ITEMS RECEIVED ARE NOT AS LISTED ABOVE KINDLY NOTIFY US AT ONCE.
THESE ARE TRANSMITTED as checked below

- ☒ For approval
- ☐ Approval as resubmitted
- ☐ Resubmit __ copies for approval
- ☐ For your use
- ☐ Approved as noted
- ☐ Submit _____ copies for distribution
- ☐ As requested
- ☐ Returned for corrections
- ☐ Return 1 signed contract
- ☐ For review and comment
- ☐ For proposal due
- ☐ For Quotation due on

REQUESTED RETURN DATE: July 9, 2012

REMARKS:

SIGNED: Jessica M. Jackson

CC:
- ☒ File- BonderPerformanceRecord.pdf
- ☒ File- Reference.pdf
- ☒ File – PipeProductInvoices.pdf
- ☐ File -
- ☐ File -
- ☐ File -

Electronic Filing: Received, Clerk's Office 09/28/2020

BONDER PERFORMANCE QUALIFICATION RECORD
(BPQR) H.D.P.E. Butt Fusion

TEST RESULTS

BPQR No. HDPE-1 PQR No. HDPE-1 BPS No. HDPE-1 Date 11/9/11

Bonderer's Name JARRED BARRETT STAMP# 4424 Test Joint Diameter 4"

Guided Bend Test (If Applicable)

Specimen No.	Type	Diameter	Remarks	Pass	Fail
1. Root Bend	DR11	4"	STRAP BENT OVER ROOT UNTIL END TOUCH AN EXAMINED.	☑	☐
2. FACE BEND	DR11	4"	STRAP BENT OVER FACE UNTIL ENDS TOUCH AN EXAMINED	☑	☐

VISUAL TEST: 4" COUPON WELD EXAMINED ID/OD

Specimen No.	Joint No.	Diameter	Remarks	Pass	Fail
1. Root Bend	DR11	4"	ACCEPTABLE PROFILE	☒	☐
2. FACE BEND	DR11	4"	ACCEPTABLE PROFILE	☒	☐

HYDROSTATIC TEST 3 TIMES MAWP (If Applicable)

Joint No.	Diameter	MAWP	Test PSI	Pass	Fail
1. N/A				☐	☐

We certify that the information in this record is correct and that the test bonded joint(s) were prepared, bonded, and tested in accordance with the requirements of Freitag-Weinhardt, FW-HDPE-1 Welding *Procedure and Qualification Specification.*

Date 11/9/11 Approved By Charles Wilde

Title Quality Manager

Company: Freitag Weinhardt,

Electronic Filing: Received, Clerk's Office 09/28/2020

FERGUSON®
Industrial Plastics Division
a **WOLSELEY** company

PER THE HEAT FUSION JOINING PROCEDURES SET FORTH IN
PERFORMANCE PIPE'S HEAT FUSION JOINING PROCEDURES AND QUALIFICTION GUIDE PP 750
FOR OPERATOR QUALIFICATION IN THE HEAT FUSION JOINING OF POLYETHYLENE PIPE AND FITTINGS

JARRED BARRETT of FREITAG –WEINHARDT, INC.

HAS SUCCESSFULLY COMPLETED THE FERGUSON INDUSTRIAL PLASTICS' POLYETHYLENE HEAT FUSION JOINING AND QUALIFICATION CLASS
FOR THE PROCESSES OF

MEDIUM DIAMETER HYDRAULIC BUTT FUSION
Per the Heat Fusion Joining procedures presented in Performance Pipe's Heat Fusion Joining Procedures and Qualification Guide PP 750 and utilizing McElroy Mfg., Inc.'s fusion equipment and DataLogger

LARGE DIAMETER HYDRAULIC BUTT FUSION
Per the Heat Fusion Joining procedures presented in Performance Pipe's Heat Fusion Joining Procedures and Qualification Guide PP 750 and utilizing McElroy Mfg., Inc.'s fusion equipment and DataLogger

Bill Breckenridge, Manager of Training and Developing — June 5, 2009
Ferguson Industrial Plastics
Ferguson, a Wolseley company

An individual's qualification will remain valid for a period of one year from the date of course completion, at which time a retest will be required.
A proof of completion is not a warrantee of workmanship or a guarantee of pipeline integrity for any work completed by the above named individual.

Electronic Filing: Received, Clerk's Office 09/28/2020

BONDER PERFORMANCE QUALIFICATION RECORD
(BPQR) H.D.P.E. Butt Fusion

TEST RESULTS

BPQR No. HDPE-1 PQR No. HDPE-1 BPS No. HDPE-1 Date 11/28/11

Bonderer's Name Scott Burch (Stamp# 9326) Test Joint Diameter 14"

Guided Bend Test (If Applicable)

Specimen No.	Type	Diameter	Remarks	Pass	Fail
1. Root Bend	DR11	14"	Bent over Root	☒	☐
2. Face Bend	DR11	14"	Bent over Face	☒	☐

VISUAL TEST:

Specimen No.	Joint No.	Diameter	Remarks	Pass	Fail
1. Root Bend	DR11	14"	Acceptable profile	☒	☐
2. Face Bend	DR11	14"	Acceptabe profile	☒	☐

HYDROSTATIC TEST 3 TIMES MAWP (If Applicable)

Joint No.	Diameter	MAWP	Test PSI	Pass	Fail
1.				☐	☐

We certify that the information in this record is correct and that the test bonded joint(s) were prepared, bonded, and tested in accordance with the requirements of Freitag-Weinhardt, FW-HDPE-1 Welding *Procedure and Qualification Specification.*

Date 11/28/2011 Approved By Charles Wilde

Title Quality Manager

Company: Freitag-Weinhardt, Inc.

Electronic Filing: Received, Clerk's Office 09/28/2020

Reference for

SCOTT BURCH
JARED BARRETT
10,000'+ OF HDPE PIPE INSTALLATION

Will Kaufman
Project Coordinator
Hoosier Energy
812.875.3048

Electronic Filing: Received, Clerk's Office 09/28/2020

PIPE PRODUCTS

A FERGUSON ENTERPRISE

A FERGUSON ENTERPRISE
5420 WEST 84TH ST
INDIANAPOLIS, IN 46268-1519

RECEIVED
NOV 16 2011

INVOICE NUMBER	CUSTOMER	PAGE
2887874	128523	1

7

PLEASE REFER TO INVOICE NUMBER WHEN MAKING PAYMENT AND REMIT TO:

PIPE PRODUCTS #1480
A FERGUSON ENTERPRISE
PO BOX 644054
PITTSBURGH, PA 15264-4054

Please contact with Questions:
317-872-8876

FREITAG-WEINHARDT

00008332 01 MB 0.390 01 TR 036 FRIDCA01 000000
FREITAG WEINHARDT INC
HOOSIER ENERGY
FREITAG WEINHARDT INC
5900 NORTH 13TH STREET
TERRE HAUTE, IN 47805

SHIP TO

FREITAG WEINHARDT
C/O HOOSIER ENERGY MEROM STAT
5500 WEST OLD 54
SULLIVAN, IN 47882

SHIP WHSE.	SELL WHSE.	TAX CODE	CUSTOMER ORDER NUMBER	SALESMAN	JOB NAME	INVOICE DATE	BATCH ID
1483	1483	INE	3564-68730	MDR	HOOSIER ENERGY	11/10/11	106548

ORDERED	SHIPPED	ITEM NUMBER	DESCRIPTION	UNIT PRICE	UM	AMOUNT
			GET A 1% REBATE ON ONLINE ORDERS THRU 12/31/11! BE SURE TO ASK HOW!_			
3300	2100	PE111A1450	14X50 IPS SDR11 HDPE PIPE		C	
1680	1680	PE111AX40	8X40 IPS SDR11 HDPE PIPE 160#		C	
1680	1680	PE111AU40	6X40 IPS SDR11 HDPE PIPE AWWA		C	
5280	5280	PE111AP40	4X40 IPS SDR11 HDPE PIPE AWWA		C	
1400	1400	PE111AK40	2X40 IPS SDR11 HDPE PIPE NSF		C	
1	0	PE111HB914F3	14 IPS SDR11 PC128 90 ELL FAB 3PC		EA	
6	6	PE111AB9K	2 IPS SDR11 HDPE BF 90 ELL MLD		EA	
1	0	PE111HB414F2	14 IPS SDR11 PC128 45 ELL FAB 2PC		EA	
3	3	PE111HB4UF3	6 IPS SDR11 PC128 HDPE 45 FAB 3PC		EA	
11	11	PE111AB4P	4 IPS SDR11 HDPE BF 45 ELL MLD		EA	
19	19	PE111AB4K	2 IPS SDR11 HDPE BF 45 ELL MLD		EA	
3	3	PE111HBCA14F	14 IPS SDR11 HDPE CAP FAB		EA	
3	3	PE111ABCAX	8 IPS SDR11 HDPE BF CAP		EA	
3	3	PE111ABCAU	6 IPS SDR11 HDPE BF CAP MLD		EA	
2	2	PE111ABCAP	4 IPS SDR11 HDPE BF CAP		EA	
1	1	PE111ABCAK	2 IPS SDR11 HDPE BF CAP MLD		EA	
1	1	PE111HBTXPF	8X4 IPS SDR11 PC160 TEE FAB		EA	
2	2	PE111HBTXKF	8X2 IPS SDR11 PC160 TEE FAB		EA	
1	1	PE111HTUPF	6X4 IPS SDR11 PC160 HDPE FAB TEE		EA	
2	2	PE111HBTUKF	6X2 IPS SDR11 PC160 TEE FAB		EA	
8	8	PE111HBTPKF	4X2 IPS SDR11 PC160 TEE FAB		EA	
2	2	PE111ABTP	4 IPS SDR11 HDPE BF TEE MLD		EA	
9	9	PE111ABRPK	4X2 IPS SDR11 HDPE BF RED MLD		EA	
16	16	P7100200CS11	2 MPT CS SDR11 TRAN COUP		EA	
			INVOICE SUB-TOTAL			
			FREIGHT			

3564 70000

TERMS: NET 10TH PROX — **ORIGINAL INVOICE** — **TOTAL DUE** 92,699.07

All accounts are due and payable per the invoiced terms. All past due amounts are subject to a service charge at the maximum rate allowed by state law plus costs of collection including attorney fees if incurred. Freight terms are FOB our dock unless otherwise specified above.

WARRANTY PROVISIONS: SEE REVERSE SIDE A

Electronic Filing: Received, Clerk's Office 09/28/2020

FERGUSON ENTERPRISES, INC.
5420 WEST 84TH STREET
INDIANAPOLIS, IN 46268-1519

INVOICE NUMBER	CUSTOMER	PAGE
2911613-1	128523	1

PLEASE REFER TO INVOICE NUMBER WHEN MAKING PAYMENT AND REMIT TO:

FEI #290
FERGUSON ENTERPRISES INC.
PO BOX 802817
CHICAGO, IL 60680-2817

Please contact with Questions:
317-872-8876

00009754 01 MB 0.390 01 TR 044 FRIDCW01 000000
FREITAG WEINHARDT INC
HOOSIER ENERGY
5900 NORTH 13TH STREET
TERRE HAUTE, IN 47805

SHIP TO:

RECEIVED
DEC 09 2011
FREITAG-WEINHARDT

SHIP WHSE.	SELL WHSE.	TAX CODE	CUSTOMER ORDER NUMBER	SALESMAN	JOB NAME	INVOICE DATE	BATCH ID
290	290	INE	3564-68732	MDR	HOOSIER ENERGY	12/02/11	107734

ORDERED	SHIPPED	ITEM NUMBER	DESCRIPTION	UNIT PRICE	UM	AMOUNT
			PLEASE REFERENCE FEI 290 ON PAYMENT THANKS FOR THE ORDER			
			TAG PO#3564-68732			
523	523	PE111AP40	4X40 IPS SDR11 HDPE PIPE AWWA		C	
			INVOICE SUB-TOTAL			
			FREIGHT			

FERGUSON ENTERPRISES, INC.

3564 70000
NO Receiver

TERMS: NET 10TH PROX — ORIGINAL INVOICE — TOTAL DUE 2,098.69

All accounts are due and payable per the invoiced terms. All past due amounts are subject to a service charge at the maximum rate allowed by state law plus costs of collection including attorney fees if incurred. Freight terms are FOB our dock unless otherwise specified above.

WARRANTY PROVISIONS: SEE REVERSE SIDE A

Electronic Filing: Received, Clerk's Office 09/28/2020

FERGUSON ENTERPRISES, INC.

5420 WEST 84TH STREET
INDIANAPOLIS, IN 46268-1519

INVOICE NUMBER	CUSTOMER	PAGE
2911613	128523	1

PLEASE REFER TO INVOICE NUMBER WHEN MAKING PAYMENT AND REMIT TO:

FEI #290
FERGUSON ENTERPRISES INC.
PO BOX 802817
CHICAGO, IL 60680-2817

Please contact with Questions:
317-872-8876

RECEIVED
NOV 28 2011
FREITAG-WEINHARDT

SHIP TO:

FREITAG WEINHARDT INC
HOOSIER ENERGY
5900 NORTH 13TH STREET
TERRE HAUTE, IN 47805

SHIP WHSE.	SELL WHSE.	TAX CODE	CUSTOMER ORDER NUMBER	SALESMAN	JOB NAME	INVOICE DATE	BATCH ID
290	290	INE	3564-68732	MDR	HOOSIER ENERGY	11/17/11	106961

ORDERED	SHIPPED	ITEM NUMBER	DESCRIPTION	UNIT PRICE	UM	AMOUNT
			GET A 1% REBATE ON ONLINE ORDERS THRU 12/31/11! BE SURE TO ASK HOW!_			
			TAG PO#3564-68732			
640	117	PE111AP40	4X40 IPS SDR11 HDPE PIPE AWWA		C	
			INVOICE SUB-TOTAL			
			FREIGHT			

FERGUSON ENTERPRISES, INC.

3564 70000

NO Receiver
NO PO

TERMS: NET 10TH PROX — ORIGINAL INVOICE — TOTAL DUE 1,256.62

All accounts are due and payable per the invoiced terms. All past due amounts are subject to a service charge at the maximum rate allowed by state law plus costs of collection including attorney fees if incurred. Freight terms are FOB our dock unless otherwise specified above.

WARRANTY PROVISIONS: SEE REVERSE SIDE A

Exhibit 11

Electronic Filing: Received, Clerk's Office 09/28/2020

W137030000 5
06L

Ameren MISSOURI

Development and Resource Center

W137030000 5-5

January 31, 2019

IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

AUG 27 2019

REVIEWER: RDH

IL0000116

Bill Buscher
Groundwater Protection
Division of Water Pollution Control
Illinois Environmental Protection Agency
PO Box 19276
Springfield, IL 62794-9276

RE: Medina Valley Cogen, LLC
Meredosia Energy Center
Ash Pond Closures

Mr. Buscher,

I am pleased to inform you that Medina Valley Cogen, LLC has completed closure of the inactive Fly Ash and Bottom Ash Ponds at Meredosia Power Station. The closure project was deemed substantially complete December 5, 2018 in accordance with the Closure Plan approved by IEPA on March 8, 2017.

Enclosed are two copies of the Construction Quality Assurance (CQA) Report and Certification dated January 18, 2019, as required by Title 35, Part 840, Subpart A, Section 840.134. Please note that the Post-Closure Care Plan was submitted previously and approved by IEPA as part of the Closure Plan.

In accordance with Section 840.144, Annual Reports are due no later than March 28 of each year during the closure and throughout the post-closure care period. Ameren plans to submit an annual report containing groundwater monitoring data and any closure or post-closure activities after December 5, 2018.

If you have any questions or comments regarding this submittal, please contact me at (314) 957-3202 or at mwagstaff@ameren.com.

Sincerely,

Michael J. Wagstaff, P.E.
Consulting Engineer
On behalf of Medina Valley Cogen, LLC

Encl.

cc: D. E. Harley, w/o enclosure
M. Frerking, w/o enclosure
C. Henderson, w/o enclosure
S. B. Knowles, w/o enclosure
C. Giesmann, w/o enclosure
M. Kohlbusch, w/ enclosure (2)

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FEB 06 2019
IEPA/CAS

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FEB 06 2019
IEPA/CAS

Electronic Filing: Received, Clerk's Office 09/28/2020

W6370300005
06L

GEOTECHNOLOGY INC
FROM THE GROUND UP

CONSTRUCTION QUALITY ASSURANCE REPORT
CLOSURE OF THE BOTTOM ASH POND AND FLY ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, MORGAN COUNTY, ILLINOIS

IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

AUG 27 2019

REVIEWER: RDH

Prepared for:

AMEREN ENERGY RESOURCES
ST. LOUIS, MISSOURI

Prepared by:

GEOTECHNOLOGY, INC.
ST. LOUIS, MISSOURI

Date:

JANUARY 18, 2019

Geotechnology Project No.:

J024917.04

SAFETY
QUALITY
INTEGRITY
PARTNERSHIP
OPPORTUNITY
RESPONSIVENESS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOTECHNOLOGY INC
FROM THE GROUND UP

January 18, 2019

Mr. Mike Wagstaff, P.E.
Ameren Energy Resources
3700 South Lindbergh Boulevard
St. Louis, Missouri

RE: Construction Quality Assurance Report
Closure of the Bottom Ash Pond and Fly Ash Pond
Meredosia Power Station
800 South Washington Street
Meredosia, Morgan County, Illinois
Geotechnology Project Number: J024917.04

Dear Mr. Wagstaff:

Attached is the Construction Quality Assurance report for the referenced site. This report is documentation of the activities associated with the closure of the Bottom Ash Pond and the Fly Ash Pond at the Meredosia Power Station in Meredosia, Morgan County, Illinois performed through December 5, 2018. Site activities ceased on December 5, 2018 after reaching substantial completion. Final punch-list activities will be performed after the conclusion of winter weather and will be summarized in an addendum letter.

If you have any questions or comments regarding the attached information, please contact the undersigned at (314) 997-7440.

Very truly yours,

GEOTECHNOLOGY, INC.

Anna M. Saindon, P.E., Ph.D.
Project Manager

JYG/AMS/JAW:jyg/jsj

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PLATES

Figure 1 - Site Overview
Figure 2 - Final As-Built Survey

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Appendix

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1.0 PROJECT BACKGROUND

Geotechnology, Inc. prepared this Construction Quality Assurance (CQA) report for the Bottom Ash Pond and Fly Ash Pond closure at the Meredosia Power Station in Meredosia, Morgan County, Illinois. The CQA report was prepared in general accordance with the Coal Combustion Residual (CCR) surface impoundment closure guidance of 35 Illinois Administrative Code (IAC) 840.146 entitled Site-Specific Closures of Coal Combustion Waste Surface Impoundments Subpart A: Closure of Ash Pond D, Hutsonville Power Station Construction Quality Assurance Program.

The Meredosia Power Station is located in the floodplain east of the Illinois River, south of Meredosia in Morgan County, Illinois, which is located in west-central Illinois. The Meredosia Power Station ash ponds are located in the south half of Section 21 and the north half of Section 28, T.16N, R.13W. The plant generated electricity from 1948 until February 2012. A third ash pond referred to as the "Old Ash Pond" was previously closed, and will not be further discussed in this report. The Bottom Ash Pond and Fly Ash Pond were constructed of native materials. A site overview with key feature locations is provided on Figure 1.

The Bottom Ash Pond was constructed in 1972 with a design surface area of 11 acres, a height of 24 feet and a volume of approximately 90 acre-feet. The Bottom Ash Pond reportedly received low-volume wastewater, bottom ash, and storm water runoff. The site operates under NPDES Permit IL0000116 Outfall 003 for the Bottom Ash Pond.

The Fly Ash Pond was constructed in 1968. The Fly Ash Pond has a surface area of 34 acres, a height of 24 feet and a volume of approximately 500 acre-feet. The Fly Ash Pond reportedly received fly ash, low-volume wastewater, and storm water runoff. The site operates under NPDES Permit IL0000116 Outfall 004 for the Fly Ash Pond. A Fly Ash Stockpile formerly located southeast of the Fly Ash Pond was clean closed as part of closure activities.

Clean closure activities for the Bottom Ash Pond generally consisted of CCR material removal, backfill to design grade with soil fill, construction of surface water control structures, and vegetation. A berm with CCR materials was closed-in-place in order to provide access to a river dock on the site. Closure activities for the berm generally consisted of placement, grading, and compaction of bottom ash and soil fill to design grade and installation of a ClosureTurf system consisting of 40-mil high density polyethylene (HDPE) MicroSpike geomembrane, a synthetic turf geotextile, and sand infill. ArmorFill was placed in the sand infill.

Closure activities for the Fly Ash Pond included placement of CCR materials excavated from the Bottom Ash Pond and the Fly Ash Stockpile, grading and compacting the subgrade to design slopes, construction of surface water control structures, and installation of a ClosureTurf system consisting of 40-mil MicroSpike HDPE geomembrane, a synthetic turf geotextile, and sand infill. ArmorFill will be placed in the sand infill in the stormwater ditches at the perimeter of the Fly Ash Pond in the spring of 2019.

2.0 CLEAN CLOSURE ACTIVITIES

2.1 CCR Removal Activities

CCR was removed from the Bottom Ash Pond and the Fly Ash Stockpile to facilitate clean closure of these areas. The berm in the Bottom Ash Pond was excluded from clean closure activities and is discussed later in this report. CCR removal at the Bottom Ash Pond began on March 12, 2018 and concluded on May 23, 2018. CCR removal at the Fly Ash Stockpile began on June 12, 2018 and concluded on July 11, 2018. A CQA representative periodically observed the CCR removal activities to assess the extent of CCR removal. CCR removed from the Bottom Ash Pond and the Fly Ash Stockpile was placed in the Fly Ash Pond. The CQA Certifications by the CQA Officer are provided in Appendix B. After CCR removal and CQA Officer approval, the areas were brought to final grade, stormwater controls were installed, and the areas were vegetated.

2.2 Coal Pile

The Coal Pile was used to store coal for use at the power plant during operation. The excess coal stored in the Coal Pile after the power plant operation ceased was removed prior to the beginning of this project. Residual coal spoils were present in the coal yard after removal activities were performed. Approximately two feet of soil and residual coal spoils were removed from the Coal Pile and a runoff area southwest of the Coal Pile. The residual coal materials and mixed soils were placed in the Fly Ash Pond. The CQA Certifications by the CQA Officer are provided in Appendix B.

2.3 Survey of Final Grade

The finished grade of the Bottom Ash Pond, the Coal Pile, and the Fly Ash Stockpile was surveyed by a licensed surveyor for a final as-built drawing. The results of the survey are illustrated and summarized on Figure 2.

2.4 Surface Water Management

Surface water management structures in the Bottom Ash Pond, the Coal Pile, and the Fly Ash Stockpile, including ditches and outfalls, were built in accordance with the design and approved modifications thereof.

2.5 Vegetation

After the Bottom Ash Pond, the Coal Pile, and the Fly Ash Stockpile were brought to final grade, they were fertilized and seeded using synthetic mats and straw to establish vegetation.

3.0 SUBGRADE PREPARATION

Subgrade preparation at the Bottom Ash Pond Berm began on June 5, 2018 and was completed on June 29, 2018. Subgrade preparation at the Fly Ash Pond began on May 7, 2018 and was completed on August 14, 2018.

Subgrade preparation activities at the Bottom Ash Pond Berm generally consisted of placement and compaction of fill soils in approximately 12-inch lifts, performing compaction testing, and surveying the final subgrade elevations.

Subgrade preparation activities at the Fly Ash Pond generally consisted of placing CCR material excavated from the Bottom Ash Pond and the Fly Ash Stockpile, placing residual coal spoils and mixed soils from the Coal Pile, grading the CCR materials placed in the Fly Ash Pond, compacting the top 12-inches of subgrade material, performing compaction testing, and surveying the final subgrade elevations. In addition, the prepared subgrade was visually assessed by the CQA Officer to observe that the surface was relatively smooth and free of deleterious materials (i.e. jagged, irregularly-shaped protrusions) that could damage the geomembrane.

3.1 Laboratory Testing

Two soil fill bulk samples and four CCR bulk samples were collected and submitted to the Geotechnology soil laboratory for standard Proctor moisture-density relationship testing. The laboratory testing results are summarized and presented in Appendix C.

One pre-qualification sample was collected of off-site backfill soils to be used as backfill in the Bottom Ash Pond (outside the berm area) and in the Fly Ash Stockpile. Additional conformance samples were collected for every 25,000 cubic yards of backfill brought onto the site. The laboratory testing results are summarized and presented in Appendix C.

3.2 Subgrade Compaction

Moisture/density tests were performed on each 12-inch lift of soil fill placed at the Bottom Ash Pond Berm and on the upper 12 inches of the Fly Ash Pond subgrade. The moisture/density results were compared to the standard Proctor moisture-density relationship laboratory testing data to assess the compaction. The project specifications require the subgrade to be compacted to 90 percent of the maximum standard Proctor dry density. Areas of failed moisture/density tests were re-compacted and re-tested as needed. Based on the laboratory and field testing results, the subgrade was compacted in general conformance with the CQA plan. The field tests are summarized in Table 1 (Bottom Ash Pond Berm) and Table 2 (Fly Ash Pond), and field reports with results are provided in Appendix C.

In addition to moisture/density testing, the Fly Ash Pond and the Bottom Ash Pond Berm subgrade were proof rolled using an 84-inch Sakai smooth drum roller under the observation of a CQA Representative to visually confirm firmness and stability of fill prior to placement of HDPE geomembrane.

Compaction of backfill materials at the Bottom Ash Pond (outside of the berm area) was performed using an 84-inch Sakai smooth drum roller. A proof roll of each lift using the smooth drum roller was used to confirm compaction of the Bottom Ash Pond backfill materials.

3.3 Survey of Final Grade

The finished grade of the Fly Ash Pond was surveyed by a licensed surveyor prior to installation of the geomembrane. The results of the survey are illustrated and summarized on Figure 2.

4.0 HDPE GEOMEMBRANE

40-mil HDPE MicroSpike geomembrane placement at the Bottom Ash Pond Berm began on August 6, 2018 and was completed on August 16, 2018.

40-mil HDPE MicroSpike geomembrane placement at the Fly Ash Pond began on August 17, 2018 and was completed on October 30, 2018.

Site activities ceased on December 5, 2018 after reaching substantial completion. Final punch-list activities will be performed after the conclusion of winter weather and will be summarized in an addendum letter.

Final punch-list activities are not required at the Bottom Ash Pond Berm. Final punch-list activities at the Fly Ash Pond include minor repair to the HDPE geomembrane.

4.1 Prequalification Testing

The geomembrane manufacturer, Agru America, Inc., supplied an inventory list of the 40-mil HDPE MicroSpike geomembrane rolls to the owner and the CQA Officer. The geomembrane manufacturer submitted samples from the prequalification rolls to an independent geosynthetics laboratory for verification of selected manufacturer's guaranteed properties (presented in Appendix D). On each geomembrane roll selected for sampling, a 2-foot long sample was collected along the entire width of the roll.

In addition, the manufacturer submitted documentation that the materials supplied were tested for the parameters listed in the manufacturers list of guaranteed properties at the required testing frequency. The results of the testing, including identification of tested rolls, were submitted to the CQA Officer for review. The manufacturer certified that all tested rolls met the manufacturer's guaranteed properties in accordance with the specified testing frequency rate (Appendix D).

Geomembrane prequalification testing was completed prior to delivery. Copies of the testing results are provided in Appendix D.

4.2 Installer Certification of Placement Surface

The geomembrane installer's inspection and acceptance of the prepared subgrade surface as suitable for the geomembrane installation is documented through Certificates of Acceptance (Appendix F). Certificates of Acceptance were provided to the CQA Officer each day for the area covered by geomembrane that day.

4.3 Seam Overlap Testing

The geomembrane installer arranged the geomembrane panels in an orientation to reduce the number of field seams. Within the geomembrane footprint, seam overlaps were field measured by the geomembrane installer to verify that the required 3 inches of overlap was met for each seam. Seam overlaps were generally "shingled" in the direction of the downslope. The CQA Officer and field representatives made independent measurements of the seam overlaps for additional verification.

4.4 Non-Destructive Testing

The geomembrane installer performed non-destructive testing of seams at the frequency specified in the CQA Plan. The seams were non-destructively tested over the full-length using a vacuum test unit, air pressure test, or other methods (i.e., spark testing for geomembrane boots around penetrations for pipeline supports and electric pole guy wires) approved by the CQA Officer. Vacuum testing and air pressure testing procedures are presented in Sections 4.4.1 and 4.4.2. Testing was completed as the seaming progressed. The CQA Officer and field representatives observed the non-destructive testing performed by the geomembrane installer. The geomembrane installer submitted all non-destructive field-testing results to the CQA Officer (Appendix D).

4.4.1 Air Pressure Testing (Double Fusion Welds)

Double fusion welders were typically used to fuse two panels of geomembrane together. Air pressure testing procedures for double fusion welds follow.

The air pressure test equipment included:

- Air pump (manual or motor driven) or air compressor equipped with pressure gauge capable of generating and sustaining a pressure of 25 to 30 pounds per square inch (psi) and mounted on a cushion to protect the geomembrane,
- Rubber hose with fittings and connections, and
- Sharp hollow needle with pressure gauge.

The air pressure test procedure was as follows:

1. Both ends of the seam to be tested were sealed.
2. A needle was inserted into the tunnel created by the fusion weld.
3. A protective cushion was inserted between the air pump and the geomembrane.
4. The air pump was energized to a pressure between 25 psi and 30 psi. The valve was closed, and the pressure was sustained for a minimum of five minutes.
5. If loss of pressure exceeded 3 psi or did not stabilize, the leaking area was located, then repaired and retested until passing test results were obtained.

6. At the conclusion of a passing air pressure test, the opposite end of the seam was slit and the subsequent drop in pressure was observed. Our observation of the pressure drop indicated that the seam passed.
7. The needle was removed. An extrusion-welded repair is required at each air test penetration.

4.4.2 Vacuum Testing (Extrusion Welds)

Extrusion welds were typically used for repairs and protrusions through the geomembrane. Vacuum testing procedures for extrusion welds follow.

The vacuum test equipment included:

- Vacuum box assembly consisting of a rigid housing with a transparent viewing window, soft neoprene gasket attached to the bottom, port hole or valve assembly and a vacuum gauge;
- Vacuum tank and pump assembly equipped with a pressure controller and pipe connections;
- Rubber pressure or vacuum hose with fittings and connections;
- Bucket; and
- Soapy solution.

The vacuum test procedure was as follows:

1. The vacuum pump was energized and tank pressure was adjusted to approximately 10 inches of mercury.
2. A strip of geomembrane approximately 12 inches wide by 48 inches long (an area larger than the coverage of the vacuum box) was wetted with the soapy solution.
3. The box was placed over the wetted area.
4. The bleed valve was closed and the vacuum valve opened.
5. A leak tight seal was verified.
6. The geomembrane was observed for at least ten seconds through the viewing window for the presence of soap bubbles.
7. When bubbles were not observed after 10 seconds, the vacuum valve was closed, and the bleed valve opened. The box was moved to the next adjoining area, and the process was repeated.
8. All areas where soap bubbles appeared were marked, repaired, and retested until passing test results were obtained.

4.4.3 Spark Testing (Extrusion Welds at Penetrations)

The spark test equipment included:

- An electrically conductive tape or wire placed beneath the seam prior to welding;
- A hand-held holiday spark tester; and
- A conductive wand that generates a high voltage.

The spark test procedure was as follows:

1. Note: Care should be taken if flammable gases may be present in the area of testing.
2. Place the electrically conductive tape or wire beneath the seam prior to welding.
3. A trial seam containing a con-welded segment shall be subject to a visual calibration test to ensure that such a defect will be identified under the planned machine settings and procedures (i.e., exposed wire will cause a spark to occur).
4. Upon completion of the weld, enable the spark tester and hold approximately 1 inch above the weld, moving slowly over the entire length of the weld in accordance with ASTM 6365.
5. A spark indicates a hole in the seam. If there is no spark, the weld has a passing test.
6. Mark, repair, and retest areas where sparks occur.

4.5 Destructive Testing

Destructive seam tests were performed at randomly selected geomembrane locations as seaming work progressed. The purpose of the destructive seam tests was to evaluate seam strength. The CQA Officer or field representatives observed the field destructive testing performed by the geomembrane installer.

The geomembrane installer submitted the results of the field destructive testing to the CQA Officer. An independent laboratory selected by the CQA Officer performed the destructive seam tests, consisting of peel and shear strength testing. The destructive seam testing results (field-testing and independent testing) are presented in Appendix D.

4.5.1 Testing Location and Frequency

The CQA Officer or field representative selected the destructive test locations where seam samples were removed for testing at a minimum frequency of one sample per 500 feet of seaming. This minimum frequency is the average taken throughout the entire area of placement and does not include retests. In addition, the CQA Officer or field representative could select additional destructive seam sample locations at their discretion. Destructive seam test locations include random seam testing and areas of possible defects (excess crystallinity, contamination, offset welds, equipment malfunction).

4.5.2 Sampling Procedures

Destructive seam samples were obtained as the seaming progressed. This method was used to facilitate approval of the destructive testing results prior to covering the geomembrane with the next layer of the closure construction. The CQA Officer or field representative assigned a number to each destructive seam sample and marked the location and seaming information on each collected sample. The destructive seam sample location was recorded on an as-built drawing. The locations of the destructive seam samples were repaired in accordance with the CQA Plan. The repairs were subsequently vacuum tested.

4.5.3 Field Testing

The geomembrane installer used a tensiometer to test four 1-inch wide strips from each sample identified for destructive testing. In accordance with the CQA Plan, the field destructive tests consisted of two samples for peel adhesion and two samples for shear strength. Upon successful field-testing, the remaining destructive seam samples were qualified to be submitted for independent laboratory testing.

4.5.4 Laboratory Testing

Samples that passed the prequalifying field tests were submitted to the independent testing laboratory. Ten specimens from each destructive seam sample were tested: five specimens were tested for shear strength and five specimens were tested for peel adhesion. Laboratory testing was in accordance with "Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods" (ASTM D 6392). Acceptance was based on the criteria outlined in the Geosynthetic Research Institute (GRI) standard GRI GM19 as provided in the CQA Plan.

4.5.5 Procedures for Failed Destructive Tests

If a destructive sample did not pass either a field or a laboratory test, the geomembrane installer had two options to remediate the failure. The geomembrane installer could reconstruct and repair the seam between any two passed test locations completed by the same technician on the same day. Alternatively, the geomembrane installer could trace the welding path to an intermediate location at least 10 feet from the failed test in either direction and take additional destructive seam samples. The additional samples were then field-tested prior to sending to the independent laboratory for testing as previously described. If the additional samples passed, then the seam was reconstructed between the two passing samples. If the additional samples failed, then the process was repeated to establish the zone in which the seam should be reconstructed.

Reconstructed seams were bounded by two locations with passing laboratory destructive tests. In cases that exceeded 150 feet of reconstructed seam, a destructive sample was taken from the zone in the reconstructed area. The geomembrane installer documented the actions taken in conjunction with destructive test failures (Appendix D).

5.0 SYNTHETIC TURF GEOTEXTILE

Synthetic turf geotextile placement at the Bottom Ash Pond Berm began on August 14, 2018 and was completed on August 16, 2018.

Synthetic turf geotextile placement at the Fly Ash Pond began on August 17, 2018 and was completed on November 22, 2018.

Site activities ceased on December 5, 2018 after reaching substantial completion. Final punch-list activities will be performed after the conclusion of winter weather and will be summarized in a Final Construction Quality Assurance Report.

Final punch-list activities are not required at the Bottom Ash Pond Berm. Final punch-list activities at the Fly Ash Pond include minor repair of synthetic turf geotextile.

5.1 Prequalification Testing

The geomembrane manufacturer, Agru America, Inc., supplied an inventory list of the synthetic turf geotextile rolls to the owner and the CQA Officer. The synthetic turf geotextile manufacturer submitted samples from the roll list to an independent geosynthetics laboratory for verification of selected manufacturer's guaranteed properties (presented in Appendix E). On each synthetic turf geotextile roll selected for sampling, a 2-foot long sample was collected along the entire width of the roll.

In addition, the manufacturer submitted documentation that the materials supplied were tested for the parameters listed in the manufacturers list of guaranteed properties at the required testing frequency. The results of the testing, including identification of tested rolls, were submitted to the CQA Officer for review. The manufacturer certified that all tested rolls met the manufacturer's guaranteed properties in accordance with the specified testing frequency rate (Appendix E).

Synthetic turf geotextile prequalification testing was completed prior to delivery. Copies of the testing results are provided in Appendix E.

5.2 Field Installation Monitoring

The CQA Officer or designated representative observed the synthetic turf geotextile as it was placed and welded. The placed synthetic turf geotextile was observed for wrinkles that could fold over and, if observed, required repairs were performed in these areas. The synthetic turf geotextile welds were observed for locations where the surface synthetic turf was melted and, if observed, required repairs were performed in these areas.

6.0 SAND INFILL AND ARMORFILL

Sand infill placement at the Bottom Ash Pond Berm occurred on October 15-16, 2018. ArmorFill placement at the Bottom Ash Pond Berm occurred on October 17, 2018.

Sand infill placement at the Fly Ash Pond began on September 12, 2018 and was substantially completed on November 30, 2018.

One prequalification test and one conformance test were performed for the sand used as synthetic turf geotextile infill. The analytical testing results are provided and summarized in Appendix C.

The sand was spread and brushed into place on the synthetic turf geotextile with a thickness between 0.50 and 0.75 inch. The CQA Officer or designated representative measured the thickness of the sand using a caliper on an approximately 100-foot grid.

Site activities ceased on December 5, 2018 after reaching substantial completion. Final punch-list activities will be performed after the conclusion of winter weather and will be summarized in an addendum letter.

Final punch-list activities are not required at the Bottom Ash Pond Berm.

At the Fly Ash Pond, cold temperatures and wet weather prevented effective sand placement and brushing near the conclusion of site activities for winter weather. Final punch-list activities at the Fly Ash Pond include final brushing and thickness testing of sand on the eastern portion and the perimeter ditch of the Fly Ash Pond, as well as placement, brushing, and testing at HDPE geomembrane repair locations.

7.0 SURFACE WATER MANAGEMENT

Surface water control structures generally included ditch and outlet structures at the Fly Ash Pond perimeter, two outfalls from the site to the Illinois River, and other piping/rip-rap placements on the site. A final as-built survey was performed.

A copy of the surface water management structure survey data is provided on Figure 2. Additional information on the field observations are provided in Appendix A.

8.0 SIGNATURE

As Construction Quality Assurance (CQA) Officer for the construction of the closure of the Fly Ash Pond and the Bottom Ash Pond (from February 9, 2018 to December 5, 2018), located at the Ameren Energy Resources, Meredosia Power Station in Meredosia, Illinois, I am familiar with the plans and specifications, and the CQA Plan as prepared and approved for the project. Based on my observations and the observations of the Construction Quality Assurance Officers-In-Absentia (Steve Graham, Jessie Goodwin, Kyle Henson, and Alyssa Okom), it is my professional opinion that the construction was completed as described in this Report. CQA certification by the owner's representative does not relieve the contractor of their obligations to furnish all work in accordance with the contract.



Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.



NOTES

1. Ground surface contours and aerial photograph provided by David Mason & Associates, Inc. on November 30, 2018.

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: JYG	App'vd By: AMS
Date: 1-16-19	Date: 1-17-19	Date: 1-17-19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
800 South Washington Street
Meredosia, Illinois

SITE OVERVIEW

Project Number J024917.04	FIGURE 1



NOTES

1. Ground surface contours and aerial photograph provided by David Mason & Associates, Inc. on November 30, 2018.
2. Elevations reference to NAVD88.
3. Contour interval is 1 foot.

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: JYG	App'vd By: AMS
Date: 1-16-19	Date: 1-17-19	Date: 1-17-19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
800 South Washington Street
Meredosia, Illinois

FINAL AS-BUILT SURVEY

Project Number J024917.04	FIGURE 2

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BOW REFERENCE SHEET (CD) --- SAME FACILITY

Site Number:	**W1370300005**
Facility Name:	**Ameren Energy Medina Valley Cogen LLC**
File Category:	**06L / Groundwater Closure Reports**
Document Date:	**02/06/2019**

FOR ADDITIONAL INFORMATION ON THIS, SEE CATEGORY UNDER THIS SAME FILE HEADING:	**06L Groundwater Closure Reports** **(CD)**

DATE OF OTHER DOCUMENT		DESCRIPTION OF OTHER DOCUMENT:
02/06/2019		**CD – 01/18/2019**
		CQA Report
		Closure of the Bottom Ash Pond & Fly Ash Pond
		Meredosia Power Station
		PDF files of appendices & other information
		J024917.04

Exhibit 12

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W1191050002

06L

CONSTRUCTION QUALITY ASSURANCE AND CLOSURE REPORT
ASH PONDS 2 & 3 CLOSURE
VENICE POWER STATION
VENICE, ILLINOIS

Aquaterra Project Number 4923.10
November 2012

IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

MAR 27 2018

REVIEWER: RDH

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NOV 7 2012
DIVISION OF PUBLIC WATER SUPPLIES
ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

Prepared For:

Ameren Missouri
3700 South Lindbergh Boulevard
St. Louis, Missouri 63127

AQUATERRA

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CONSTRUCTION QUALITY ASSURANCE AND CLOSURE REPORT
ASH PONDS 2 & 3 CLOSURE
VENICE POWER STATION
VENICE, ILLINOIS

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AQUATERRA

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ENVIRONMENTAL PROTECTION AGENCY
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- Geomembrane Liner Material Inventory Records
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- Geomembrane Liner Panel As-Built Drawing
- Geomembrane Liner Panel Placement Records
- Geomembrane Liner Trial Weld Records
- Geomembrane Liner Seam/Non-Destructive Testing Records
- Geomembrane Liner Additional Non-Destructive Test Records
- Geomembrane Liner Destructive Test Records
- Geomembrane Liner Destructive Laboratory Test Results
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Protective Soil Layer Test Results

CONSTRUCTION QUALITY ASSURANCE AND CLOSURE REPORT
ASH PONDS 2 & 3 CLOSURE
VENICE POWER STATION
NOVEMBER 2012

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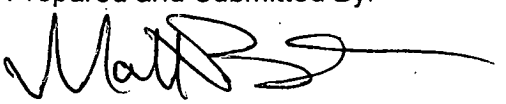
CERTIFICATION

Aquaterra Environmental Solutions, Inc. hereby certifies that the Final Cover Construction and Closure of Ash Ponds 2 & 3 at the Venice Power Station in Venice, Illinois were completed in general accordance with the *Closure Plan, Venice Power Plant Ash Ponds 2 & 3, Venice Power Plant, Venice, Illinois* dated February 4, 2011 (amended March 25, 2011) and the project design plans and specifications.

Prepared and Submitted By:



Matt Ballance, P.E.
Illinois Licensed Professional Engineer No. 062-053087
Aquaterra Environmental Solutions, Inc.



CONSTRUCTION QUALITY ASSURANCE AND CLOSURE REPORT
ASH PONDS 2 & 3 CLOSURE
VENICE POWER STATION
NOVEMBER 2012

1.0 INTRODUCTION

Aquaterra Environmental Solutions, Inc. (Aquaterra) was retained by Ameren Missouri (Ameren) to provide construction quality assurance (CQA) services during the construction of the final cover system and closure of Ash Ponds 2 & 3 at Ameren's Venice Power Station located in Venice, Illinois. Ash Ponds 2 & 3 occupied a total of approximately 59 acres. The Ash Ponds 2 & 3 final cover construction and closure included the following components:

- Clearing and grubbing of each ash pond surface.
- Coal ash grading in each pond to provide a firm subgrade for the geomembrane liner to be installed on top of the coal ash grading layer.
- Installation of 40-mil LLDPE geomembrane liner over both ponds.
- Installation of a double-sided geocomposite comprised of a high-density polyethylene (HDPE) geonet laminated between geotextile layers on top of the geomembrane liner in each pond.
- Placement of a 3-feet thick protective cover layer consisting of 2.5 feet of protective cover soil and 6 inches of topsoil in each pond.
- Installation of pump stations and the associated piping networks in each pond
- Abandonment of former ash pond discharge pipes and removal of related structures.

The Ash Ponds 2 & 3 final cover construction and closure were completed from August 2011 to April 2012. Aquaterra was responsible for observing and documenting the Ash Ponds 2 & 3 final cover construction activities including the installation of geosynthetic materials, protective soil cover, and storm water management controls. Aquaterra's CQA officer and CQA technicians verified the materials used during construction and construction procedures were in general compliance with the *Closure Plan, Venice Power Plant Ash Ponds 2 & 3, Venice Power Plant, Venice, Illinois* (Closure Plan) dated February 4, 2011 (amended March 25, 2011) and the project design plans and specifications. The Closure Plan was approved by the Illinois Environmental Protection Agency (IEPA) on May 6, 2011. A copy of the project as-built construction drawings is included in Appendix A.

The following sections describe the CQA and closure activities performed during construction and present the data generated documenting that the final cover construction and closure for Ash Ponds 2 & 3 were completed in general accordance with the Closure Plan and project design plans and specifications.

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2.0 SCOPE OF WORK

The following CQA activities were performed by Aquaterra during the final cover construction and closure of Ash Ponds 2 & 3 to verify completion in accordance with the Closure Plan and design plans and specifications:

- Observed the coal ash grading surface in each ash pond.
- Observed the construction of and reviewed the construction testing documentation provided by Ameren for the two new storm water pump stations in each pond.
- Observed the grouting and capping of the three former discharge pipes within the ash ponds that previously penetrated the Metro East Sanitary District (MESD) Levee for discharge to the Mississippi River.
- Observed the installation of the two new storm water pump station discharge pipes extending from each new pump station over the MESD Levee to the two new discharge points located along the east bank of the Mississippi River.
- Reviewed the geomembrane liner and geocomposite material conformance test results.
- Observed and documented the placement, seaming, and seam testing of the geomembrane liner installed on top of the coal ash grading layer in each pond.
- Reviewed the placement of geocomposite on top of the geomembrane liner in each pond.
- Observed the placement of the protective soil layer on top of the geocomposite in each ash pond.

The CQA personnel observed and photographed the final cover construction and closure activities for Ash Ponds 2 & 3. The construction photographs are included in Appendix B. The CQA personnel recorded daily CQA activities, construction observations, and field test results on daily field activities reports in accordance with the requirements outlined in the Closure Plan or per standard practices in the industry. Copies of these daily reports are included in Appendix C.

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3.0 PROJECT ORGANIZATION

The following parties had substantial involvement during the final cover construction and closure for the Ash Ponds 2 & 3 at the Venice Power Station:

Owner
Ameren Missouri
3700 South Lindbergh Boulevard
St. Louis, Missouri 63127
Mr. Glenn Eberhart, P.E. – Project Manager
Mr. James Patrick – Construction Manager

Third Party CQA Firm
Aquaterra Environmental Solutions, Inc. (Aquaterra)
13 Executive Drive, Suite 1
Fairview Heights, Illinois 62208
Mr. Matt Ballance, P.E. – CQA Officer
Mr. Andy Limmer, P.G. – Senior Hydrogeologist
Mr. Michael J. Mueller, P.E. – Senior Project Manager
Mr. Collin Carson – CQA Technician
Mr. Randy Homburg – CQA Technician
Mr. Tim Pool – CQA Technician
Mr. Joshua Allen – CQA Technician

General Contractor
Plocher Construction Company, Inc.
2808 Thole-Plocher Road
Highland, Illinois 62249
Mr. Scott Plocher, P.E. - Owner
Mr. Mark Plocher – Site Superintendent

Geosynthetic Liner Installation Contractor
Geo-Synthetics, LLC (GSI)
2401 Pewaukee Road
Waukesha, Wisconsin 53188
Mr. Dave Schuster – Project Manager
Mr. Vince Sisoumphou – Superintendent
Mr. Tok Sisoumphou – Quality Control

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Geosynthetic Testing Laboratory
TRI Environmental, Inc. (TRI)
9603 Bees Cave Road
Austin, Texas 78733
Ms. Jennifer Tenney – Project Manager

Earthwork Contractor
Bloomsdale Excavating Company, Inc. (Bloomsdale Excavating)
12211 State Route Y
Bloomsdale, Missouri 63627
Mr. Chuck Bauman – Site Superintendent

Soil Testing Laboratory
SCI Engineering, Inc.
650 Pierce Boulevard
O'Fallon, Illinois 62269
Mr. Theodore R. Reitz – Project Manager

Surveyor
Kuhlman design Group, Inc.
15 East Washington
Belleville, Illinois 62220
Mr. Michael Huber, P.L.S.
Mr. James P. Barganier, L.S.I.T.

3.1 CQA Officer-In-Absentia Designation

Mr. Matt Ballance, P.E. of Aquaterra, an Illinois-licensed professional engineer, served as the CQA officer during the construction of Ash Ponds 2 & 3 final cover. Mr. Collin Carson was the lead Aquaterra CQA technician. Mr. Randy Homburg, Mr. Tim Pool, and Mr. Josh Allen of Aquaterra additionally served as the CQA technicians during the completion of the Ash Ponds 2 & 3 final cover construction activities as-needed, based on the pace of final construction at the site. Mr. Ballance designated these individuals as the CQA officers-in-absentia to oversee the site construction activities during the times when Mr. Ballance was not on site. Mr. Ballance visited the site on a routine basis and during critical times of construction to observe the Ash Ponds 2 & 3 construction activities and progress. A copy of the written CQA officer-in-absentia designation is included in Appendix D.

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4.0 PROJECT MEETINGS

A series of pre-construction meetings were held during the initial stages of the Ash Ponds 2 & 3 final cover construction and closure project. The pre-construction meetings were held to introduce parties involved in the project, establish lines of communication, develop an understanding of the work including CQA and closure requirements, and review the project schedule and site safety procedures. In addition to the pre-construction meetings, weekly or biweekly construction meetings were held by Ameren and attended by the necessary CQA and contractor personnel. Informal daily meetings were held at the site to address scheduling, specific questions regarding daily work plans, weather conditions, etc. These meetings, where relevant, are summarized in the daily field activities reports included in Appendix C.

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5.0 COAL ASH GRADING LAYER

Following the clearing and grubbing of vegetation from the two ash ponds' surfaces, the coal ash surface in each pond was graded by Bloomsdale Excavating operating as a subcontractor to Plocher Construction to the appropriate elevations and grades in accordance with the Closure Plan and design plans. Prior to the initiation of the placement of the geomembrane liner on top of the coal ash grading layer in each pond, the Aquaterra CQA technician observed the surface of the coal grading layer in each pond for soft or damaged areas. The coal ash grading layer surface in each pond was found to be acceptable to provide a firm base suitable for the geomembrane liner construction. The geomembrane installation contractor, GSI operating as a subcontractor to Plocher Construction, submitted a subgrade acceptance form for each day that geomembrane liner was installed, certifying in writing that the surface on which the geomembrane liner was to be installed was acceptable.

The necessary storm water management controls were implemented during grading of the coal ash layer in each pond to control ash contact water utilizing diversion berms and silt fences during construction. The coal ash grading layer was surveyed to confirm the coal ash grading layer surface in each pond was constructed to the appropriate elevations and grades. The coal ash grading layer in each pond was surveyed on a 100-foot by 100-foot grid. A copy of the certified survey data is included in Appendix E.

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6.0 GEOMEMBRANE LINER

This section describes construction and CQA activities associated with the installation of the geomembrane liner. Approximately 59 total acres of 40-mil smooth LLDPE geomembrane liner was placed on the top of the final coal ash grading layers of Ash Ponds 2 & 3. Approximately 23 acres of 40-mil LLDPE geomembrane liner were placed over Ash Pond 2, and approximately 36 acres of 40-mil LLDPE geomembrane liner were placed over Ash Pond 3. The geomembrane liner was installed above the coal ash grading layer and attached to the sides of the exterior walls of each pump station, as well as on the vertical legs of each existing electric transmission tower in the ash pond areas to provide a geomembrane seal for these structures as indicated in the design plans. The CQA program for the geomembrane liner involved the following:

- Performing the inventory of the geomembrane liner material rolls.
- Confirming the conformance test results met industry specifications.
- Observing geomembrane liner placement and field seaming activities.
- Observing trial welds.
- Observing non-destructive and destructive testing.
- Reviewing destructive test results.
- Observing repairs.

6.1 Surface Acceptance

Before the geomembrane liner installation began, the CQA technician and the geomembrane contractor observed the soil surface over which the geomembrane liner would be placed and found the surface was generally free of irregularities that could damage the geomembrane liner. The geomembrane liner installation contractor accepted the surface for geomembrane liner installation. The geomembrane liner installation contractor's subgrade acceptance report is included in Appendix F.

6.2 Geomembrane Liner Material Inventory and Certifications

The CQA technician inventoried the geomembrane liner rolls delivered to the site. Specific geomembrane liner roll information was documented on a material inventory record form for each roll of geomembrane liner material. The geomembrane liner rolls were observed for possible damage and visible defects. The material inventory records are included in Appendix F.

In accordance with the requirements identified in the project specifications, the geomembrane liner manufacturer provided geomembrane liner material conformance test results for the 40-mil LLDPE geomembrane liner materials. The conformance test results listed on the quality control certificates were compared to the minimum standards listed in Geosynthetic Research Institute's Test Method GM19 (GRI GM 19). The geomembrane liner conformance test results met or exceeded the minimum standards. Copies of the geomembrane liner conformance test results are presented in Appendix F.

6.3 Panel Placement

The CQA technician observed the deployment of the geomembrane liner panels. GSI deployed panels to the required dimensions, assigning each panel an identification number as shown on the GSI geomembrane liner panel as-built drawing included in Appendix F. The panels were temporarily held in place with sand bags. The CQA technician observed the geomembrane liner surface as it was deployed and marked visible defects for repair. The geomembrane liner panel placement records are included in Appendix F.

6.4 Seaming and Testing

The geomembrane liner installation contractor seamed the panels together using fusion and extrusion welding techniques. Seaming was performed using procedures generally consistent with project requirements and standard geomembrane liner installation practices. The testing of the geomembrane liner field seams was completed as the seaming work progressed in the Ash Ponds 2 & 3 areas.

The date, welding machine number, operator, and time were recorded for each seam completed in the Seam/Non-Destructive Test Record. The seams were identified by adjacent panels; for example, a seam between panel P1 and P2 is identified as seam P1/P2. The seam/non-destructive testing logs are included in Appendix F.

6.4.1 Trial Weld Tests

Each welding technician and welding apparatus performed a trial weld each time the equipment was started. If technicians operating a particular piece of equipment changed or the welding apparatus was operated for more than five hours, an additional series of trial weld tests were performed. During each trial weld test, the technician welded an approximately 3-foot long seam in environmental conditions similar to those in which the actual seaming would be performed. Three test specimens were then cut from the trial weld and tested on site for seam strength in peel and shear for both fusion and extrusion welds. The CQA technician also visually observed the seam samples for evidence of overheating

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or over-grinding. If welding equipment did not pass the trial weld test, the welding equipment was either adjusted by the seaming technician and retested or removed from service. The trial welds were performed at the beginning of each day, after each restart of the welding machine, and after five hours of operation. The trial weld records are included in Appendix F.

6.4.2 Non-Destructive Tests

To check for seam continuity, the geomembrane liner installation contractor conducted non-destructive tests on all seams, patches, and repairs as geomembrane installation progressed. For fusion-welded seams, air pressure testing was used to test the integrity of the seams. A pressure loss of more than 2 pounds per square inch (psi) over a 5-minute span indicated a failed test. The seams were then retested or repaired with extrusion welding. For extrusion-welded seams and other irregular areas, the seams were tested using the vacuum box method. The non-destructive tests met the minimum project requirements. The non-destructive test results are included in the seam/non-destructive testing records included in Appendix F.

6.4.3 Destructive Tests

Destructive testing, used to evaluate seam strength, consisted of performing testing in the field. One destructive seam test was completed for approximately every 500 linear feet of seam over the full length of the geomembrane seams. A total of 256 destructive seam samples were collected for testing (see the geomembrane panel as-built layout in Appendix F for the sample locations). Each destructive sample was divided into three sections: one was field-tested by the geomembrane contractor, one was sent to an off-site laboratory, TRI, for laboratory testing, and one was retained as an archive sample by Ameren. The destructive seam samples tested in the field met the minimum project requirements. The destructive seam samples tested in the laboratory by TRI passed the minimum project testing requirements. Two destructive seam tests, DS-177 and DS-183, initially failed the laboratory destructive testing. However, each failing seam sample location was repaired and re-sampled in accordance with GRI GM 19. The new replacement destructive seam tests, DS-177A and DS-177B, were collected 10-feet on either side of DS-177, and both DS-177A and DS-177B passed. The new replacement destructive seam tests, DS-183A and DS-183B, were collected 10-feet on either side of DS-183, and both DS-183A and DS-183B passed. The destructive seam field and laboratory testing results are included in Appendix F.

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6.4.4 Defects and Repairs

The CQA technician monitored the geomembrane liner and seams for defects, holes, blisters, and signs of damage during installation. Portions of the geomembrane or seams that exhibited flaws, holes, or failed non-destructive tests were repaired. Repairs were completed using patching, extrusion welding, cap stripping, or other industry-standard means. Repairs were non-destructively tested using the vacuum box method and satisfied project requirements. The repair records are included in Appendix F.

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7.0 GEOCOMPOSITE

This section describes construction and CQA activities associated with the installation of the geocomposite as part of the Ash Ponds 2 & 3 construction.

7.1 Geocomposite

GSI placed doubled-sided geocomposite panels on top of the geomembrane liner in Ash Ponds 2 & 3 to the required dimensions similar to the geomembrane panel layout. The double-sided geocomposite included a HDPE geonet laminated between two, 6-ounce/square yard geotextiles. The CQA program for the geocomposite installation included the following components:

- Accepting the geocomposite rolls as required by the based on a review of the manufacturer's certifications.
- Reviewing and accepting the geocomposite conformance test results.
- Observing the placement of the geocomposite panels.
- Observing plastic ties and sewing of the geocomposite panels.

7.1.1 Material Acceptance

The CQA technician inventoried the geocomposite rolls delivered to the Venice Power Station. Specific geocomposite roll information was documented on a material inventory record form for each roll of geocomposite material. The geocomposite rolls were examined for possible damage and visible defects. The material inventory records are included in Appendix F.

GSI provided manufacturer's quality control certificates for the two-sided geocomposite rolls delivered to the site. Copies of the certificates are included in Appendix F. The certification sheets were reviewed to verify the geocomposite rolls met the Closure Plan and design requirements and the manufacturer's published material specifications and standards.

7.1.2 Geocomposite Placement

The CQA technician observed the placement of the geocomposite panels over the top of the geomembrane liner without damaging the geomembrane. The CQA technician observed the geocomposite panel surfaces for damage as the geocomposite material was deployed. Damaged panels were repaired. The CQA technician observed the proper overlap of the panels, the connection of the geonet portion of the geocomposite together with plastic ties on a 5-foot spacing, and sewing the geotextile portion of the geocomposite together. The placement of the geocomposite was performed in general compliance with the project

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specifications. The geocomposite was temporarily anchored with sand bags, until the final protective soil layer was constructed.

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8.0 PROTECTIVE SOIL LAYER

The protective soil layer was placed on top of the geocomposite in Ash Ponds 2 & 3. The protective soil layer included 2.5 feet of protective cover soils and 6 inches of topsoil. The initial protective cover soil was generally placed in a minimum 12-inch thick lift across each pond using a low ground pressure bulldozer to avoid damage to the geocomposite. The CQA technician visually screened this material for roots, rocks, and other debris during placement. The CQA technician additionally visually screened the 6-inch thick topsoil layer for the same unacceptable materials. Eleven samples of the protective cover soil were randomly collected, and four samples of the vegetative topsoil material were collected for laboratory analysis in accordance with the project specifications. The soil sample analytical test results met the minimum project requirements. Copies of the soil sample test results are included in Appendix G. The 3-foot thick protective soil layer final survey results are included in Appendix E.

The entire 59-acre area of Ash Ponds 2 & 3 was seeded following the completion of the protective soil layer construction in general accordance with the Closure Plan and design specifications requirements. The work was completed by drilling a mixture of grass seeds (native grasses)into the final cover areas of each pond. The seeded areas were covered with straw.

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9.0 STORM WATER MANAGEMENT CONTROLS

In accordance with the Closure Plan requirements, Aquaterra observed the construction of the new storm water management controls for Ash Ponds 2 & 3. The final cover systems for each pond were designed and constructed to drain inwardly from each pond's perimeter to a new storm water pump station constructed in each pond. Each storm water pump station included a duplex wet well pump system installed in each pump station well vault. The pump stations each were equipped with automatic controls and instrumentation to discharge storm water to new discharge points along the east bank of the Mississippi River. New gravel access roads were constructed to access each pump station location in accordance with the design plans.

The North Pump Station constructed in Ash Pond 2 included an 18-inch HDPE force main discharge pipe that extended over the MESD Levee to a new outfall discharge point along the river bank. The South Pump Station constructed in Ash Pond 3 included a 20-inch HDPE force main discharge pipe that extended over the MESD Levee to a new outfall discharge point along the river bank. The new pump station force mains were constructed in accordance with the design plans and included air relief valves. Each outfall discharge point included pipe outlets constructed and anchored on top of new concrete pads and surrounded by rip rap armor protection. Each pipe outfall was equipped with a pressure flap to open only when the storm water pump stations are in operation.

The new storm water pump stations, force main discharge pipes, and outfalls were constructed in accordance with the Closure Plan and the design plans and specifications. Aquaterra reviewed the construction documentation and test results for the pump stations and appurtenances provided by Ameren to confirm appropriate construction. The new storm water pump stations, force main piping, and outfalls were constructed to the appropriate elevations as indicated on the as-built construction drawings in Appendix A.

Prior to the start of the ash pond final cover construction, three former ash pond drain lines that had extended from the ash ponds and had penetrated the MESD Levee were filled with grout and capped in accordance with the design plans. Three former Illinois Department of Transportation (IDOT) underdrains located in the northeast corner of Ash Pond 2 were relocated as indicated on the design plans

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10.0 GENERAL COMMENTS AND CONCLUSION

Aquaterra Environmental Solutions, Inc. and other firms as described in this report have performed testing and made observations to demonstrate that final cover construction and closure of Ash Ponds 2 & 3 at the Venice Power Station have been completed in general accordance with the *Closure Plan, Venice Power Plant Ash Ponds 2 & 3, Venice Power Plant, Venice, Illinois* and the project design plans and specifications.

Based upon our observations and the enclosed test results, Aquaterra concludes that the final cover construction and closure of Ash Ponds 2 & 3 at the Venice Power Station in Venice, Illinois were completed in general accordance with the *Closure Plan, Venice Power Plant Ash Ponds 2 & 3, Venice Power Plant, Venice, Illinois* and the project design plans and specifications.

This report has been prepared for the exclusive use by Ameren Missouri for the Venice Power Station for specific application to the project discussed and has been prepared in accordance with generally accepted engineering practices.

* * * * * * *

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APPENDIX A

AS-BUILT CONSTRUCTION DRAWINGS

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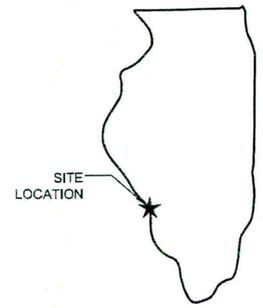
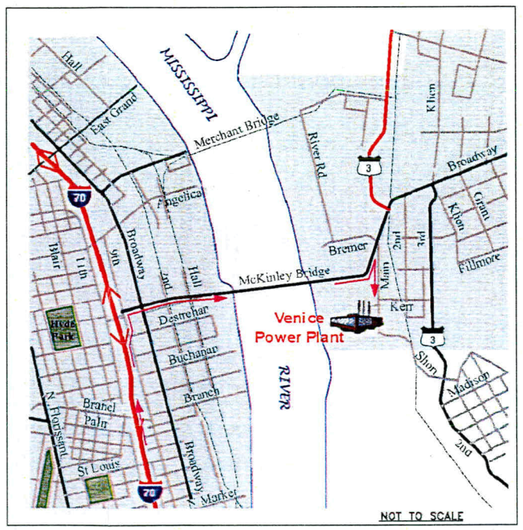
VENICE ASH POND CLOSURE
PHASE II / FINAL COVER
VENICE POWER STATION
CITY OF VENICE, ST. CLAIR COUNTY, ILLINOIS

LIST OF DRAWINGS

TITLE	DRAWING NO.
TITLE SHEET	7824-Y-502159
EXISTING CONDITIONS AND CLEARING PLAN	7824-Y-502160
GEOMEMBRANE SUBGRADE GRADING PLAN	7824-Y-502161
FINAL COVER GRADING AND ELECTRICAL PLAN	7824-Y-502162
FINAL COVER SECTIONS	7824-Y-502163
FINAL COVER SECTIONS AND DETAILS	7824-Y-502164
NORTH PUMP STATION PLAN VIEW	7824-Y-502165
SOUTH PUMP STATION PLAN VIEW	7824-Y-502166
PUMP STATION DISCHARGE PIPING PROFILES	7824-Y-502167
PUMP STATION SECTIONS AND DETAILS	7824-Y-502168
LEVEE CROSSING PLAN - STORM WATER DISCHARGE PIPING	7824-Y-502169
WET WELL PLAN VIEWS - NORTH PUMP STATION	7824-Y-502170
WET WELL SECTIONS - NORTH PUMP STATION	7824-Y-502171
WET WELL PLAN VIEWS - SOUTH PUMP STATION	7824-Y-502172
WET WELL SECTIONS - SOUTH PUMP STATION	7824-Y-502173
WET WELL DETAILS	7824-Y-502174
PUMP STATION & 13.8-KV ELECTRICAL SERVICE DETAILS	7824-Y-502175
ONE LINE DIAGRAM	7801-X-137395



ILLINOIS



SITE VICINITY

PROJECT COORDIINATE SYSTEM

THE PROJECT COORDINATE SYSTEM IS BASED UPON THE ILLINOIS DEPARTMENT OF TRANSPORTATION'S (IDOT'S) COORDINATE SYSTEM FOR THE MISSISSIPPI RIVER BRIDGE (MRB) PROJECT DUE TO THE PROXIMITY OF THAT PROJECT'S ACCESS ROAD 1 TO THE VENICE ASH PONDS. PER SHEET 14, ENTITLED "REFERENCE POINTS', OF IDOT'S "ILLINOIS APPROACH STRUCTURE FOR THE NEW I-70 MISSISSIPPI RIVER BRIDGE", THE MRB COORDINATE SYSTEM IS BASED UPON THE UNIVERSAL TRANSVERSE MERCATOR (UTM) SYSTEM (ZONE 15 NORTH) MODIFIED BY A PROJECTION FACTOR OF 0.999660620 AND CONVERTED TO UNITS OF US SURVEY FEET (1 METER = 2.38083333 US SURVEY FEET). THE UTM COORDINATES OF THE BENCHMARK TO WHICH THE PROJECTION FACTOR WAS APPLIED ARE:

4280127.66 NORTH
748201.64 EAST

THIS BENCHMARK IS LOCATED WITHIN THE CONCRETE MEDIAN ON THE EAST SIDE OF ILLINOIS ROUTE 3 (ST. CLAIR AVE) BETWEEN 2 RAILROAD BRIDGES APPROXIMATELY 0.1 MILE SOUTH OF 1ST STREET (IN FRONT OF 301 ST. CLAIR AVE) IN NATIONAL CITY, ILLINOIS. CONTROL POINTS HAVE BEEN LOCATED ON SITE AS SHOWN ON DRAWING 7824-Y-502160.

THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD 83).

THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

AS-BUILT DRAWING

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REVISION:	DATE:	APP'D BY:
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2. REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1. ISSUED FOR CONSTRUCTION	08/01/11	EJT
0. ISSUED FOR BID (NOT FOR CONSTRUCTION)	06/27/11	EJT

PREPARED FOR Ameren MISSOURI

DRAWN	KNW/RJG 01/21/11
CHK/RVW	EJT 01/21/11
SUPV.	
APPD.	EJT 01/28/11

TITLE SHEET
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION	CLASS
001012	0210

Ameren ST. LOUIS, MISSOURI | 7824-Y-502159 | REV. 2

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VALVE STRUCTURE (TO BE DEMOLISHED) 3 4

MW-1D

MW-1

NW CORNER N:14,047,755 E:2,446,937

NE CORNER N:14,047,755 E:2,446,945

SE CORNER N:14,047,748 E:2,446,945

MISSISSIPPI RIVER

CONTRACTOR NOTES:

1. CONSTRUCT 4-FOOT HIGH (ASH CONTACT WATER) DIVERSION BERM (SEE DETAIL 2, SHEET 7824-Y-202164) AND SILT FENCE (SEE DETAIL 1, SHEET 7824-Y-502164) PRIOR TO ANY LAND DISTURBING ACTIVITIES (INCLUDING CLEARING AND GRUBBING).
2. CLEAR AND GRUB ALL TREES AND BRUSH ON THE NORTHERN SLOPE OF ASH POND 2 AND THE SOUTHERN SLOPE OF ASH POND 3. TREES AND BRUSH SHALL BE CHIPPED AND STOCKPILED OR INCORPORATED INTO THE GEOMEMBRANE SUBGRADE SURFACE, AS DIRECTED BY THE COMPANY.
3. EXISTING VERTICAL VALVE STRUCTURES SHALL BE REMOVED IN THERE ENTIRETY. EXISTING HORIZONTAL PIPE WILL BE ABANDONED IN PLACE.
4. EXISTING HORIZONTAL PIPES PENETRATING THE LEVEE SHALL BE EXCAVATED TO ALLOW VISUAL INSPECTION AND VERIFICATION THAT THEY HAVE BEEN PROPERLY ABANDONED. IF THE PIPE IS FOUND NOT TO BE PLUGGED, IT SHALL BE FILLED WITH NON-SHRINK GROUT EXTENDING 50-FT BEYOND THE INTERIOR AND EXTERIOR TOE OF THE LEVEE IN ACCORDANCE WITH US ARMY CORPS OF ENGINEERS SPECIFICATIONS (SEE DETAIL 3, SHEET 7824-Y-502164).
5. ABANDON EXISTING DRAINAGE PIPE IN PLACE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
6. CONTRACTOR SHALL STORE AND STAGE EQUIPMENT IN A LOCATION APPROVED BY THE COMPANY.

STAND PIPE N:14,047,881 E:2,447,316

STAND PIPE (TO BE DEMOLISHED) 3 4

KDG #3 CONTROL POINT IRON ROD W/CAP EL 436.69

VALVE STRUCTURE N:14,048,748 E:2,447,091

VALVE STRUCTURE (TO BE DEMOLISHED) 3 4

MW-2P

MW-2

MW-2D

ASH POND 3

STAND PIPE (TO BE DEMOLISHED) 3 4

STAND PIPE N:14,048,778 E:2,447,509

MW-AP-2

KDG #2 CONTROL POINT IRON ROD W/CAP EL 433.57

MW-6D

MW-6

ASH POND 2

VALVE STRUCTURE (TO BE DEMOLISHED) 3 4

VALVE STRUCTURE N:14,049,851 E:2,446,777

MW-11

MW-11D

EDSI #101 CONTROL POINT EL 429.97

SW CORNER N:14,049,950 E:2,447,056

CONCRETE VAULT (TO BE DEMOLISHED) 3 4

4-FT. HIGH BERM N:14,050,283 E:2,446,822

NW CORNER N:14,049,971 E:2,447,052

KDG #1 CONTROL POINT IRON ROD W/CAP EL 440.35

STAND PIPE (TO BE DEMOLISHED) 3

STAND PIPE N:14,049,850 E:2,447,105

SE CORNER N:14,049,963 E:2,447,064

NE CORNER N:14,049,975 E:2,447,055

PAD MOUNTED TRANSFORMER

4-FT. HIGH BERM N:14,050,459 E:2,447,449

MW-AP-1A

MW-AP-1

DRAINAGE PIPE 5

PIPE INVERT N:14,049,966 E:2,448,089

PIPE INVERT N:14,049,025 E:2,448,088

IDOT/ABVA #306 CONTROL POINT

IDOT/ABVA #305 CONTROL POINT

45+00

30+00

MW-9

CONCRETE MONITORING WELL PROTECTION APRON

SW CORNER N:14,048,598 E:2,448,391

NW CORNER N:14,048,586 E:2,448,360

MW-8

SE CORNER N:14,048,563 E:2,448,405

NE CORNER N:14,048,594 E:2,448,374

MW-5

MW-5D

EXISTING WASTE WATER TREATMENT SYSTEM AND OUTFALL

IDOT UNDERDRAIN OUTLETS (SEE SOURCE NOTE 3)

PROJECT CONTROL			
CONTROL POINTS			
CONTROL POINT NO.	NORTH	EAST	ELEVATION
KDG #1	14,050,281.53	2,446,783.55	440.35
KDG #2	14,047,872.84	2,447,893.46	433.57
KDG #3	14,048,741.10	2,447,233.50	436.69
EDSI #101	140,050,282.50	2,448,711.98	423.74
IDOT #304	14,050,114.22	2,447,638.71	-
IDOT #305	14,049,735.26	2,447,867.90	-
IDOT #306	14,049,008.74	2,448,189.88	-

LEGEND

- EXISTING GROUND CONTOURS (5-FT CONTOUR INTERVAL)
- EXISTING GROUND CONTOURS (1-FT CONTOUR INTERVAL)
- OEL — EXISTING OVERHEAD ELECTRICAL
- ELC — EXISTING UNDERGROUND ELECTRICAL
- EXISTING POWER POLE
- EXISTING TREELINE
- EXISTING ELECTRICAL TRANSMISSION TOWER
- EXISTING FENCE
- 45+00 EXISTING IDOT ACCESS ROAD
- MW-3 EXISTING MONITORING WELL
- MW-AP-2 EXISTING MONITORING WELL (ABANDONED BY OTHERS)
- MW-11 / MW-11D NEW MONITORING WELL (INSTALLED BY OTHERS)
- 161 EXISTING CAHOKIA-ROXFORD 345kV TRANSMISSION LINE TOWER AND OPERATING NO.
- EXISTING RAILROAD
- SILT FENCE

SOURCE NOTES:

1. THIS DRAWING WAS DEVELOPED FROM A TOPOGRAPHIC SURVEY OF THE ASH PONDS AND METRO EAST SANITARY DISTRICT LEVEE BY KUHLMANN DESIGN GROUP, INC. (KDG) IN SEPTEMBER 2010. THIS INFORMATION WAS REFERENCED TO THE PROJECT COORDINATE SYSTEM (SEE TITLE SHEET, NO. 7824-Y-502159).
2. TOPOGRAPHY ALONG THE RIVER BANK AND NORTH OF THE ASH PONDS WAS SUPPLEMENTED WITH DATA FROM AN AERIAL SURVEY PERFORMED BY WALKER ASSOCIATES, INC. DATED 02/25/98, DIGITAL FILE "VP0209.dwg" DATED 03/23/98. THIS DATA WAS ROTATED AND TRANSLATED FROM THE COORDINATE SYSTEM FOR THE VENICE POWER PLANT TO THE PROJECT COORDINATE SYSTEM.
3. TOPOGRAPHY UNDERDRAIN OUTLET LOCATIONS FOR IDOT'S ACCESS ROAD ARE BASED UPON DESIGN (NOT AS-BUILT) INFORMATION PROVIDED BY IDOT VIA CRAWFORD, MURPHY, & TILLY, INC., INCLUDING DIGITAL FILES ENTITLED; "J610984_ACCESS_ROADS_ALIGN.DGN", "J610984_ACCESS_ROADS_PROFILES.DGN" J610984_ACCESS_ROADS_PROP.DGN", AND "ACCESS ROAD_XS-AC01.DGN" DATED 06/28/10. THIS INFORMATION WAS REFERENCED TO THE PROJECT COORDINATE SYSTEM.

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SCALE IN FEET

AS-BUILT DRAWING

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6.			
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2.	REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1.	ISSUED FOR CONSTRUCTION	08/01/11	EJT
0.	ISSUED FOR BID (NOT FOR CONSTRUCTION)	06/27/11	EJT

PREPARED FOR Ameren MISSOURI

DRAWN RJG/KNW 01/21/11

CHK/RVW EJT 01/21/11

SUPV.

APPD. EJT 01/28/11

EXISTING CONDITIONS AND CLEARING PLAN
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012

CLASS 0210

Ameren ST. LOUIS, MISSOURI

7824-Y-502160

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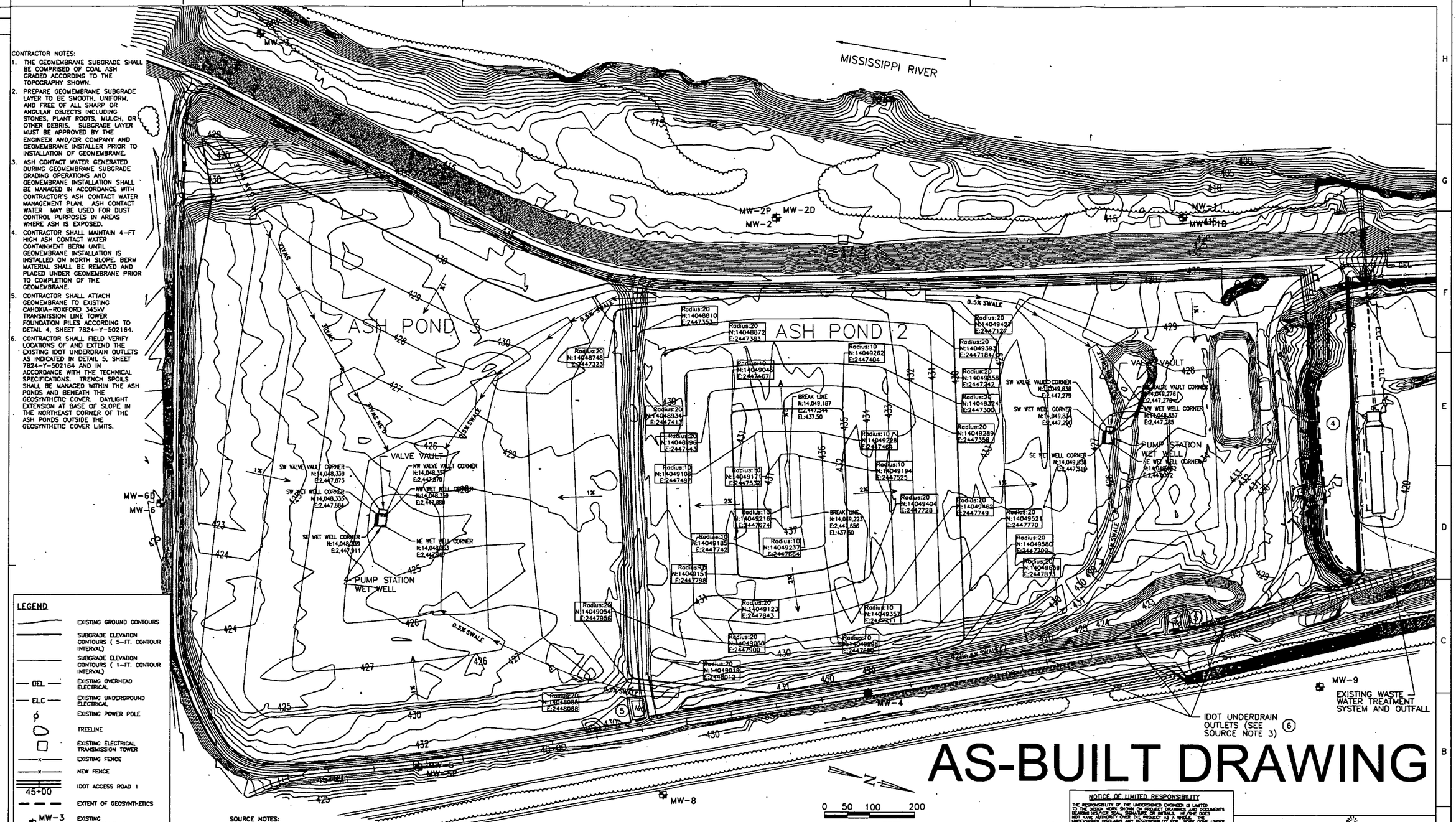
CONTRACTOR NOTES:

1. THE GEOMEMBRANE SUBGRADE SHALL BE COMPRISED OF COAL ASH GRADED ACCORDING TO THE TOPOGRAPHY SHOWN.
2. PREPARE GEOMEMBRANE SUBGRADE LAYER TO BE SMOOTH, UNIFORM, AND FREE OF ALL SHARP OR ANGULAR OBJECTS INCLUDING STONES, PLANT ROOTS, MULCH, OR OTHER DEBRIS. SUBGRADE LAYER MUST BE APPROVED BY THE ENGINEER AND/OR COMPANY AND GEOMEMBRANE INSTALLER PRIOR TO INSTALLATION OF GEOMEMBRANE.
3. ASH CONTACT WATER GENERATED DURING GEOMEMBRANE SUBGRADE GRADING OPERATIONS AND GEOMEMBRANE INSTALLATION SHALL BE MANAGED IN ACCORDANCE WITH CONTRACTOR'S ASH CONTACT WATER MANAGEMENT PLAN. ASH CONTACT WATER MAY BE USED FOR DUST CONTROL PURPOSES IN AREAS WHERE ASH IS EXPOSED.
4. CONTRACTOR SHALL MAINTAIN 4-FT HIGH ASH CONTACT WATER CONTAINMENT BERM UNTIL GEOMEMBRANE INSTALLATION IS INSTALLED ON NORTH SLOPE. BERM MATERIAL SHALL BE REMOVED AND PLACED UNDER GEOMEMBRANE PRIOR TO COMPLETION OF THE GEOMEMBRANE.
5. CONTRACTOR SHALL ATTACH GEOMEMBRANE TO EXISTING CAHOKIA-ROXFORD 345kV TRANSMISSION LINE TOWER FOUNDATION PILES ACCORDING TO DETAIL 4, SHEET 7824-Y-502164.
6. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF AND EXTEND THE EXISTING IDOT UNDERDRAIN OUTLETS AS INDICATED IN DETAIL 5, SHEET 7824-Y-502164 AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS. TRENCH SPOILS SHALL BE MANAGED WITHIN THE ASH PONDS AND BENEATH THE GEOSYNTHETIC COVER. DAYLIGHT EXTENSION AT BASE OF SLOPE IN THE NORTHEAST CORNER OF THE ASH PONDS OUTSIDE THE GEOSYNTHETIC COVER LIMITS.



LEGEND

- EXISTING GROUND CONTOURS
- SUBGRADE ELEVATION CONTOURS (5-FT. CONTOUR INTERVAL)
- SUBGRADE ELEVATION CONTOURS (1-FT. CONTOUR INTERVAL)
- OHL — EXISTING OVERHEAD ELECTRICAL
- ELC — EXISTING UNDERGROUND ELECTRICAL
- EXISTING POWER POLE
- TREELINE
- EXISTING ELECTRICAL TRANSMISSION TOWER
- EXISTING FENCE
- NEW FENCE
- 45+00 IDOT ACCESS ROAD 1
- EXTENT OF GEOSYNTHETICS
- MW-3 EXISTING MONITORING WELL
- EXISTING CAHOKIA-ROXFORD 345kV TRANSMISSION LINE TOWER AND OPERATING NO.
- EXISTING RAILROAD
- 4-FT HIGH ASH CONTACT WATER BERM
- IDOT UNDERDRAIN OUTLET EXTENSION
- SILT FENCE

SOURCE NOTES:

1. THIS DRAWING WAS DEVELOPED FROM A TOPOGRAPHIC SURVEY OF THE ASH PONDS AND METRO EAST SANITARY DISTRICT LEVEE BY KUHLMANN DESIGN GROUP, INC. (KDG) IN SEPTEMBER 2010. THIS INFORMATION WAS REFERENCED TO THE PROJECT COORDINATE SYSTEM (SEE TITLE SHEET, NO. 7824-Y-502159).
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SCALE IN FEET

AS-BUILT DRAWING

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4.			
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2.	REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1.	ISSUED FOR CONSTRUCTION	08/01/11	EJT
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PREPARED FOR Ameren MISSOURI

DRAWN	RJG/KWW 01/21/11
CHK/RVW	EJT 01/21/11
SUPV.	
APPD.	EJT 01/28/11

GEOMEMBRANE SUBGRADE GRADING PLAN
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION	CLASS
001012	0210

Ameren ST. LOUIS, MISSOURI | 7824-Y-502161 | REV. 2

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LEGEND

- EXISTING GROUND CONTOURS
- FINAL ELEVATION CONTOURS (5-FT. CONTOUR INTERVAL)
- FINAL ELEVATION CONTOURS (1-FT. CONTOUR INTERVAL)
- NEW UNDERGROUND ELECTRICAL
- EXISTING UNDERGROUND ELECTRICAL
- EXISTING ABOVEGROUND ELECTRICAL ELECTRICAL
- EXISTING POWER POLE
- EXISTING TREELINE
- EXISTING ELECTRICAL TRANSMISSION TOWER
- 45+00 EXISTING IDOT ACCESS ROAD
- NEW STORM WATER DISCHARGE PIPE
- MW-7 EXISTING MONITORING WELL
- EXISTING CAHOKIA-ROXFORD 345kV TRANSMISSION LINE TOWER AND OPERATING NO.
- EXISTING RAILROAD
- NEW RIPRAP APRON
- EXISTING FENCE

CONTRACTOR NOTES:

1. PLACE 3 FEET OF COVER MATERIAL OVER THE GEOCOMPOSITE DRAINAGE LAYER. COVER MATERIAL FILL SHALL CONSIST OF 2 FEET 6 INCHES OF GENERAL FILL AND 6 INCHES OF TOPSOIL MEETING THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
2. FILL PLACED ON THE GEOCOMPOSITE SHOULD BE FREE OF ANGULAR OR SHARP MATERIALS INCLUDING STONES, WOOD, CONCRETE OR METAL THAT COULD PUNCTURE OR TEAR THE GEOMEMBRANE DURING FILLING AND GRADING ACTIVITIES. COVER FILL WILL BE SUBJECT TO COMPANY AND/OR ENGINEER INSPECTION AND APPROVAL PRIOR TO USE.
3. LINE SWALES WITH SINGLE WIDTH OF EROSION MAT PER SPECIFICATIONS. CENTER MAT ON SWALE INVERT.
4. SEED AND MULCH ALL AREAS DISTURBED BY THE WORK IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
5. MAINTAIN THE SILT FENCE ALONG THE NORTH SLOPE OF ASH POND 2 UNTIL FINAL STABILIZATION AND ACCEPTANCE OF WORK.

GENERAL NOTES:

1. ALL EQUIPMENT ASSOCIATED WITH THE 13.8KV DISTRIBUTION EXTENSION SHALL BE PROVIDED BY CONTRACTOR. REFER TO STANDARD DETAILS IN APPENDIX L OF THE SPECIFICATIONS FOR AMEREN SPEC'S AND DETAILS REFERENCED IN THE KEY NOTES.

KEY NOTES:

1. HANDHOLE SHALL BE LOCATED AT A MAXIMUM 500 FOOT SPACING.
2. CONDUIT SHALL BE INSTALLED ON TOP OF UNER AND FILL PROVIDED OVER THE TOP OF THE CONDUIT. CONDUIT TO BE 36" BELOW TOP OF FILL. REFER TO AMEREN SPEC 2.2.225 FOR 13.8KV UNDERGROUND CABLE REQUIREMENTS.

KEY NOTES:

3. EXISTING 13.8KV POLE SHALL HAVE A NEW CROSS ARM INSTALLED ON THE ~~NORTH~~ SOUTH SIDE OF THE POLE FOR A NEW FUSED CUTOUT SWITCH. PROVIDE NEW 15A FUSED CUTOUT SWITCH ON NEW CROSS ARM. THIS CUTOUT SWITCH SHALL BE USED FOR THE NEW TRANSFORMER FOR EACH PUMP STATION. PROVIDE JUMPER CABLES FROM EXISTING DEADEND TO EACH FUSED CUTOFF SWITCH. ROUTE RIGID METAL CONDUIT 15' UP POLE AND TRANSITION TO PVC CONDUIT. PVC CONDUIT SHALL BE ROUTED UP TO 3' BELOW LOCATION OF NEW CROSSARM. PROVIDE CONDUIT SUPPORTS AS REQUIRED. THIS CONDUIT SHALL BE INSTALLED ON EAST SIDE OF POLE BELOW NEW FUSED CUTOUT SWITCH. REFER TO UNDERGROUND ELECTRICAL TRANSITION DETAIL FOR UNDERGROUND INSTALLATION AND AMEREN DETAILS DS 04 00 41, DS 10 12 10, AND SPEC 18.

KEY NOTES:

4. DUCTBANK SHALL BE MINIMUM 19" WIDE BY 8" DEEP AND REINFORCED WITH 4000 PSI CONCRETE. REFER TO AMEREN SPEC 6 FOR ADDITIONAL REQUIREMENTS.

MISSISSIPPI RIVER

ASH POND 3

ASH POND 2

A1

A2

MW-1 MW-2P MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9

EXISTING 13.8KV DISTRIBUTION POLE (3)

NEW 13.8KV HANDHOLE (1)

NEW 13.8KV CABLE. PROVIDE 3-#2 WITH 4/0 BONDING WIRE IN 4" PVC CONDUIT (CA-023). PROVIDE SPARE 4" PVC CONDUIT (2)

NEW 13.8KV CABLE. PROVIDE 3-#2 WITH 4/0 BONDING WIRE IN 4" PVC CONDUIT (CA-022). PROVIDE SPARE 4" PVC CONDUIT (2)

ELECTRICAL BOX

PROVIDE CONCRETE ENCASED DUCTBANK UNDER EXISTING DRIVE (4)

NEW 112.5KVA TRANSFORMER (XFMR-01) AND PAD

NEW 112.5KVA TRANSFORMER (XFMR-02) AND PAD

50-FT

ACCESS ROAD TURN AROUND RADIUS:50-FT. FROM N:14,049,911 E:2,447,309

ACCESS ROAD CENTER LINE END N:14,049,933 E:2,447,349

ACCESS ROAD TURN AROUND RADIUS:50-FT. FROM N:14,048,413 E:2,447,905

ACCESS ROAD CENTER LINE END N:14,048,430 E:2,447,953

ACCESS ROAD CENTER LINE START N:14,048,676 E:2,448,328

ACCESS ROAD CENTER LINE START N:14,050,202 E:2,447,622

EXISTING WASTE WATER TREATMENT SYSTEM

DRAINAGE AREA	SQUARE FEET
A1	1,622,746
A2	973,448

SOURCE NOTES:

1. THIS DRAWING WAS DEVELOPED FROM A TOPOGRAPHIC SURVEY OF THE ASH PONDS AND METRO EAST SANITARY DISTRICT LEVEE BY KUHLMANN DESIGN GROUP, INC. (KDG) IN SEPTEMBER 2010. THIS INFORMATION WAS REFERENCED TO THE PROJECT COORDINATE SYSTEM (SEE TITLE SHEET, NO. 7824-Y-502159).
2. TOPOGRAPHY ALONG THE RIVER BANK AND NORTH OF THE ASH PONDS WAS SUPPLEMENTED WITH DATA FROM AN AERIAL SURVEY PERFORMED BY WALKER ASSOCIATES, INC. DATED 02/25/98, DIGITAL FILE "VP0209.dwg" DATED 03/23/98. THIS DATA WAS ROTATED AND TRANSLATED FROM THE COORDINATE SYSTEM FOR THE VENICE POWER PLANT TO THE PROJECT COORDINATE SYSTEM.
3. TOPOGRAPHY OF IDOT'S ACCESS ROAD 1 IS BASED UPON DESIGN INFORMATION PROVIDED BY IDOT VIA CRAWFORD, MURPHY, & TILLY, INC., INCLUDING DIGITAL FILES ENTITLED; "J610984_ACCESS_ROADS_ALIGN.DGN", "J610984_ACCESS_ROADS_PROFILES.DGN" J610984_ACCESS_ROADS_PROP.DGN", AND "ACCESS ROAD_XS-AC01.DGN" DATED 06/28/10. THIS INFORMATION WAS REFERENCED TO THE PROJECT COORDINATE SYSTEM.

N

0 50 100 200

SCALE IN FEET

AS-BUILT DRAWING

REVISION:	DATE:	APP'D BY:
6.		
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4.		
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2. REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1. ISSUED FOR CONSTRUCTION	08/01/11	EJT
0. ISSUED FOR BID (NOT FOR CONSTRUCTION)	06/27/11	EJT

NOTICE OF LIMITED RESPONSIBILITY

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PREPARED FOR Ameren

DRAWN	RJC/KKW 01/21/11
CHK/RVW	EJT 01/21/11
SUPV.	
APPD.	EJT 01/28/11

FINAL COVER GRADING AND ELECTRICAL PLAN
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012 | CLASS 0210

Ameren ST. LOUIS, MISSOURI | 7824-Y-502162 | REV. 2

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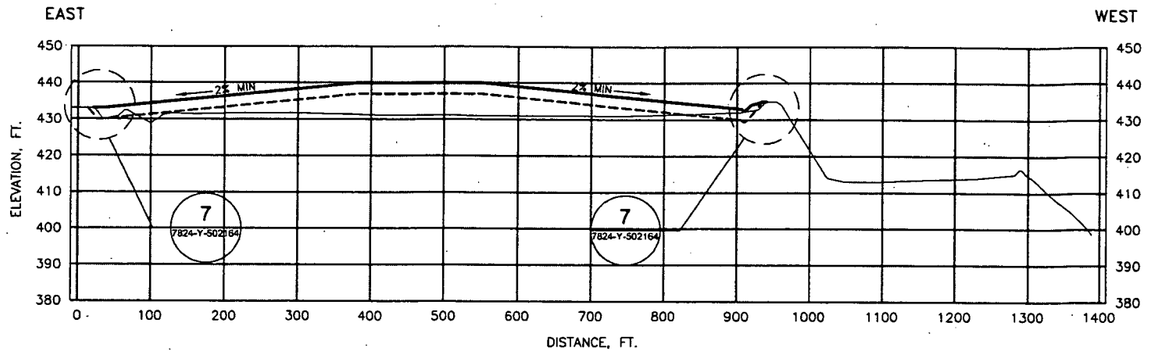
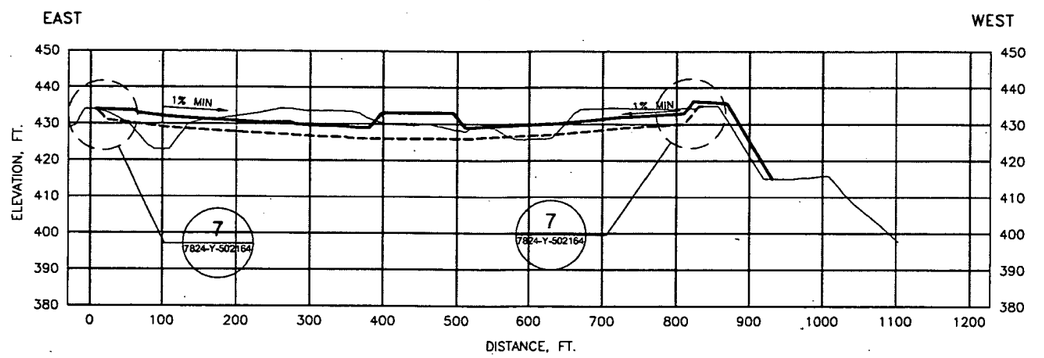
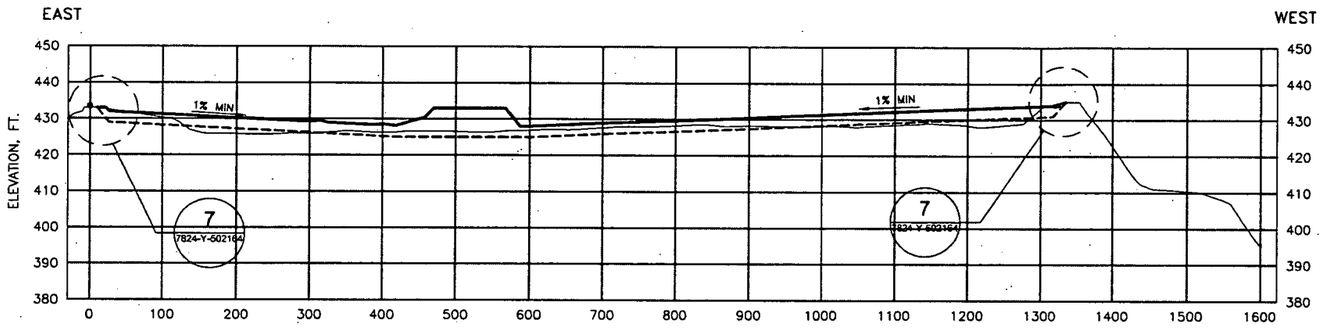


A CROSS SECTION
7824-Y-502162



B CROSS SECTION
7824-Y-502162



C CROSS SECTION
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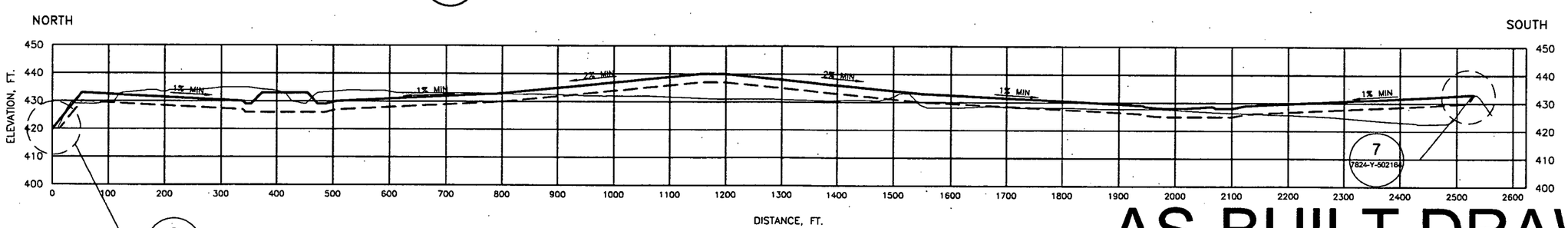
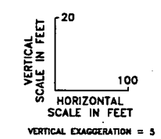


D CROSS SECTION
7824-Y-502162



LEGEND

- EXISTING GROUND SURFACE
- GEOMEMBRANE SUBGRADE SURFACE
- FINAL GROUND SURFACE

AS-BUILT DRAWING

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CHK/RVW EJT 01/21/11
SUPV.
APPD. EJT 01/28/11
LOCATION 001012
CLASS 0210

FINAL COVER SECTIONS
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

Ameren ST. LOUIS, MISSOURI

7824-Y-502163

REV. 2

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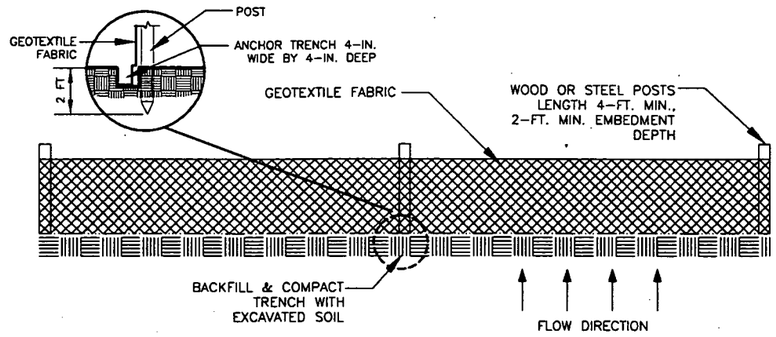
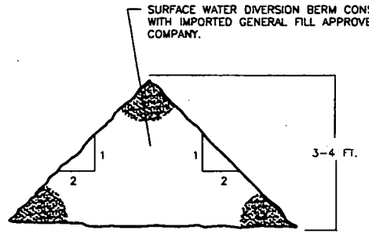
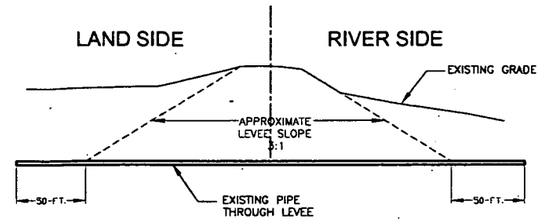


1 (7823-Y-502160) SILT FENCE DETAIL (TYP)
NOT TO SCALE

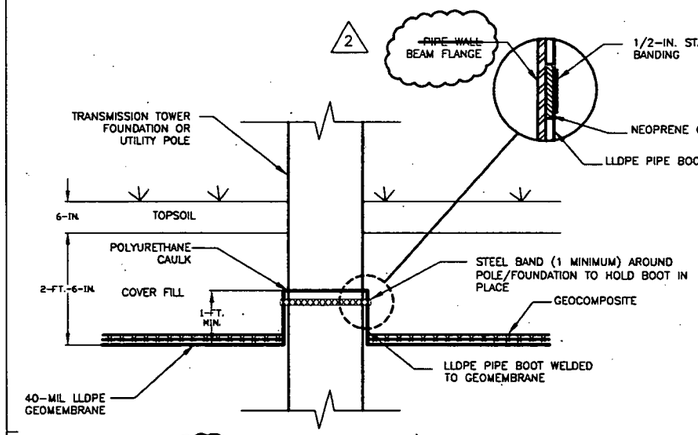


2 (7823-Y-502160) TYPICAL SURFACE WATER DIVERSION BERM SECTION
NOT TO SCALE



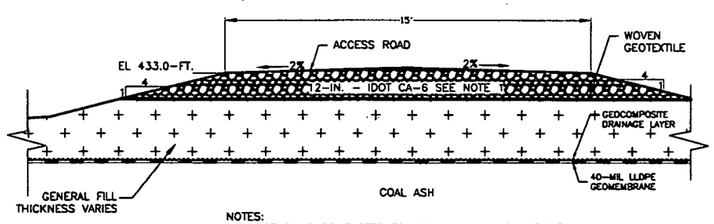
NOTE:
1. PIPE SHALL BE FILLED WITH NON-SHRINK GROUT EXTENDING 50 FEET BEYOND THE INTERIOR AND EXTERIOR TOE OF THE LEVEE IN ACCORDANCE WITH U.S. ARMY CORPS OF ENGINEERS SPECIFICATIONS.

3 (7823-Y-502160) EXISTING PIPE GROUTING DETAIL
NOT TO SCALE



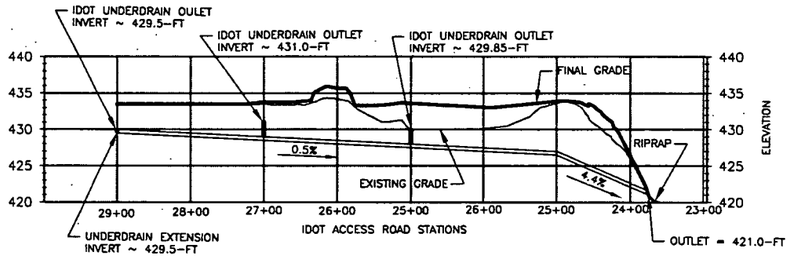
NOTE:
GRANULAR BENTONITE PLACED IN WEB OF TRANSMISSION TOWER PILE BEAM TO ACHIEVE BOOT SEAL. 2

4 (7823-Y-502161) EXISTING TRANSMISSION TOWER PENETRATION DETAIL
NOT TO SCALE



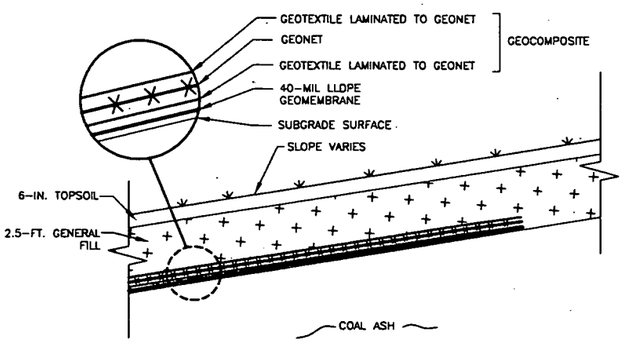
NOTES:
1. IDOT CA-6 COMPACTED TO 90% MAXIMUM DRY DENSITY AS IDENTIFIED BY MODIFIED PROCTOR METHOD (ASTM D1557).

6 (7823-Y-502162) TYPICAL ACCESS ROAD CROSS SECTION
NOT TO SCALE

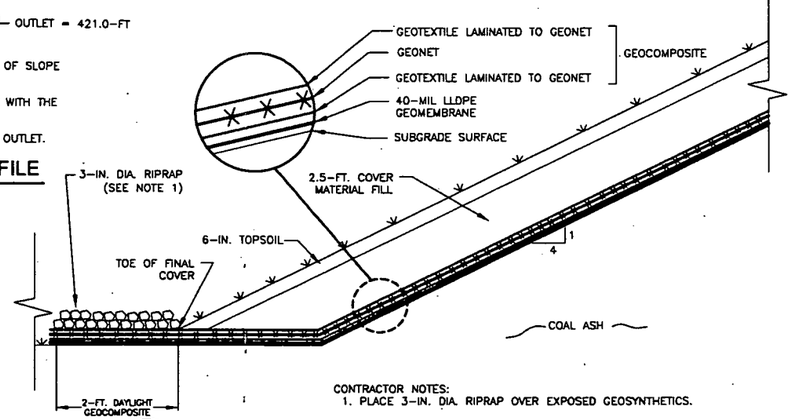


NOTES:
1. FIELD LOCATE IDOT UNDERDRAIN OUTLETS AND EXTEND TO BASE OF SLOPE ALONG NORTH END OF GEOSYNTHETIC COVER LIMITS.
2. EXTEND UNDERDRAIN OUTLET AS INDICATED AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
3. PLACE 4-FT. X 4FT. APRON OF 3-IN. DIA. RIPRAP AT BASE OF OUTLET.

5 (7823-Y-502161) IDOT UNDERDRAIN OUTLET EXTENSION PROFILE



7 (7823-Y-502163) TYPICAL GEOSYNTHETIC PERIMETER DETAIL
NOT TO SCALE



CONTRACTOR NOTES:
1. PLACE 3-IN. DIA. RIPRAP OVER EXPOSED GEOSYNTHETICS.

8 (7823-Y-502163) NORTH GEOSYNTHETIC PERIMETER DETAIL
NOT TO SCALE

AS-BUILT DRAWING

NOTICE OF LIMITED RESPONSIBILITY
THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE ACCEPTABLE WORK SHOWN ON PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SIGNATURE OR INITIALS. THE UNDERSIGNED DOES NOT HAVE RESPONSIBILITY FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES. THE UNDERSIGNED DISCLAIMS ANY RESPONSIBILITY FOR WORK DONE UNDER SUBSEQUENT REVISIONS AND ANY OTHER DOCUMENTS ASSOCIATED WITH THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

PREPARED FOR Ameren

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0. ISSUED FOR BID (NOT FOR CONSTRUCTION)	06/27/11	EJT

DRAWN RLH/KWB 01/21/11
CHK/RVW EJT 01/21/11
SUPV.
APP'D. EJT 01/28/11

FINAL COVER SECTIONS AND DETAILS
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012
CLASS 0210
Ameren ST. LOUIS, MISSOURI
7824-Y-502164
REV. 2

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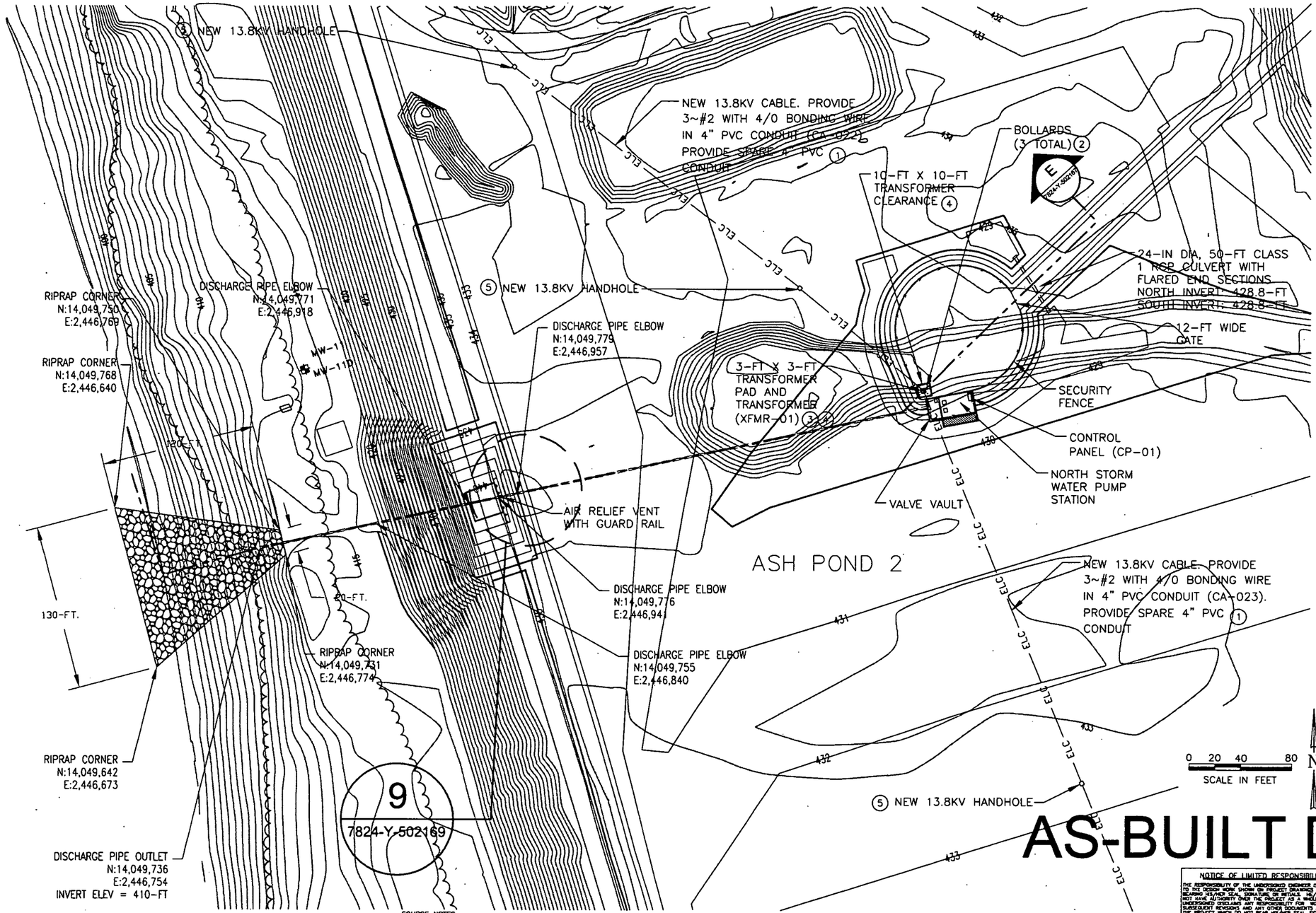

LEGEND

- EXISTING GROUND CONTOURS
- FINAL ELEVATION CONTOURS (5-FT. CONTOUR INTERVAL)
- FINAL ELEVATION CONTOURS (1-FT. CONTOUR INTERVAL)
- NEW STORM WATER DISCHARGE PIPE
- EXISTING TREELINE
- EXISTING ELECTRICAL TRANSMISSION TOWER
- MW-11 / MW-11D — EXISTING MONITORING WELL
- NEW RIPRAP APRON
- NEW UNDERGROUND ELECTRICAL
- NEW SECURITY FENCE

GENERAL NOTES:

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2. REFER TO GROUNDING DETAIL FOR GROUNDING REQUIREMENTS.

KEY NOTES:

1. REFER TO AMEREN SPEC 2.2.225 FOR 13.8KV UNDERGROUND CABLE REQUIREMENTS.
2. REFER TO AMEREN DETAIL 59 81 51 10 FOR BOLLARD REQUIREMENTS.
3. REFER TO AMEREN DETAILS 59 81 51 11, 13 00 04 01, SPEC 18 AND SPEC 18B FOR TRANSFORMER PAD REQUIREMENTS.
4. REFER TO AMEREN DETAILS 59 51 53 40 AND 51 12 02 ** FOR TRANSFORMER REQUIREMENTS.
5. HANDHOLES SHALL BE LOCATED AT 500 FOOT SPACING.

SOURCE NOTES:
1. THIS DRAWING WAS DEVELOPED FROM A TOPOGRAPHIC SURVEY OF THE ASH PONDS AND METRO EAST SANITARY DISTRICT LEVEE BY KUHLMANN DESIGN GROUP, INC. (KDG) IN SEPTEMBER 2010. THIS INFORMATION WAS REFERENCED TO THE PROJECT COORDINATE SYSTEM (SEE TITLE SHEET, NO. 7824-Y-502159).
2. TOPOGRAPHY ALONG THE RIVER BANK AND NORTH OF THE ASH PONDS WAS SUPPLEMENTED WITH DATA FROM AN AERIAL SURVEY PERFORMED BY WALKER ASSOCIATES, INC. DATED 02/25/98, DIGITAL FILE "VP0209.dwg" DATED 03/23/98. THIS DATA WAS ROTATED AND TRANSLATED FROM THE COORDINATE SYSTEM FOR THE VENICE POWER PLANT TO THE PROJECT COORDINATE SYSTEM.

AS-BUILT DRAWING

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PREPARED FOR Ameren

DRAWN	RJG/RJH 01/21/11
CHK/RVW	EJT 01/21/11
SUPV.	
APPD.	EJT 01/28/11

NORTH PUMP STATION PLAN VIEW
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012 | CLASS 0210

Ameren ST. LOUIS, MISSOURI | 7824-Y-502165 | REV. 2

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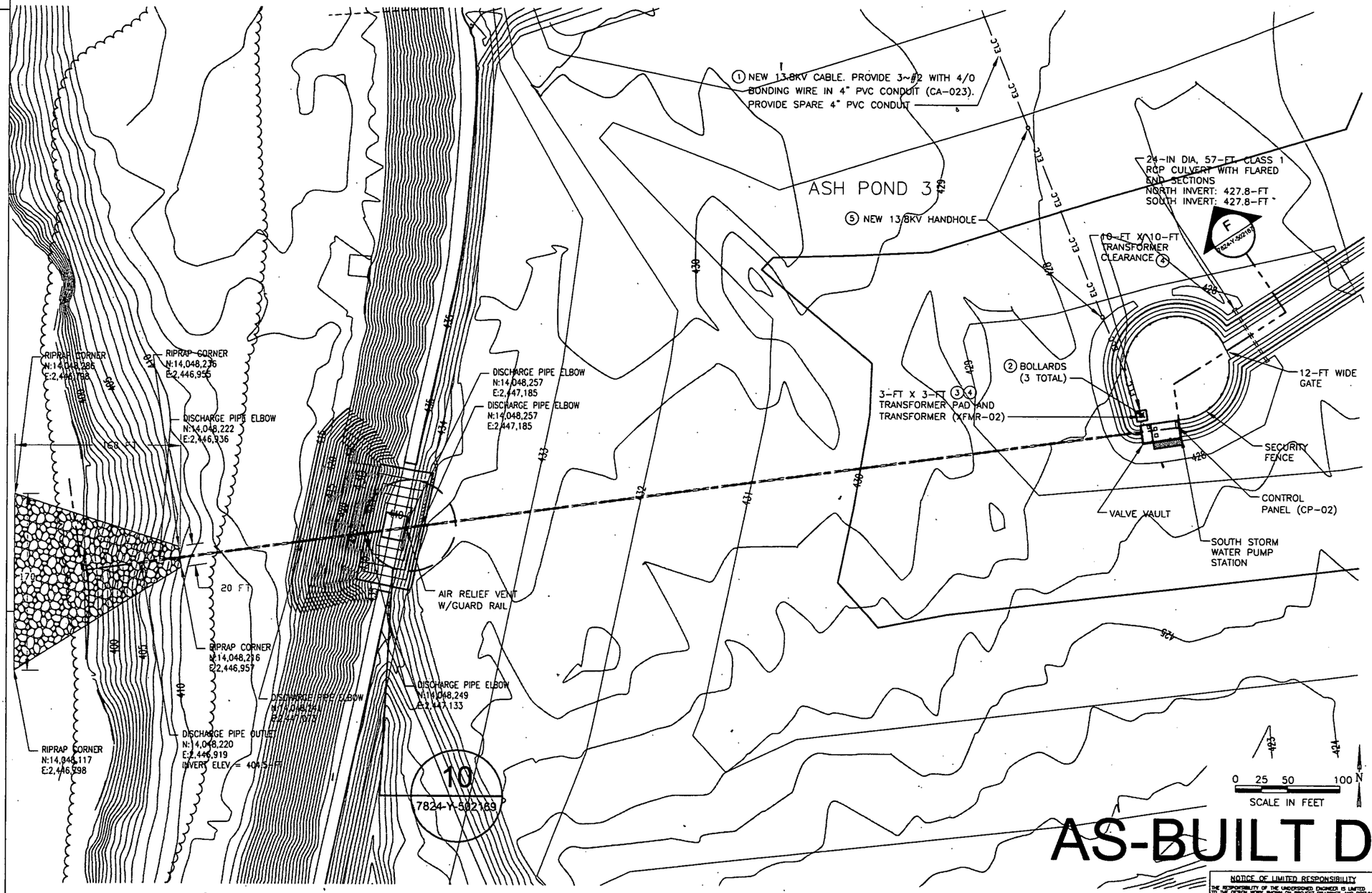

LEGEND

- EXISTING GROUND CONTOURS
- FINAL ELEVATION CONTOURS (5-FT. CONTOUR INTERVAL)
- FINAL ELEVATION CONTOURS (1-FT. CONTOUR INTERVAL)
- NEW STORM WATER DISCHARGE PIPE
- EXISTING TREELINE
- EXISTING ELECTRICAL TRANSMISSION TOWER
- MW-3 EXISTING MONITORING WELL
- NEW RIPRAP APRON
- NEW UNDERGROUND ELECTRICAL LINE
- NEW SECURITY FENCE

GENERAL NOTES:

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PREPARED FOR Ameren

DRAWN	RJC/RLH 01/21/11
CHK/RVW	EJT 01/21/11
SUPV.	
APPD.	EJT 01/28/11
LOCATION	001012
CLASS	0210

SOUTH PUMP STATION PLAN VIEW
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

Ameren ST. LOUIS, MISSOURI | 7824-Y-502166 | REV. 2

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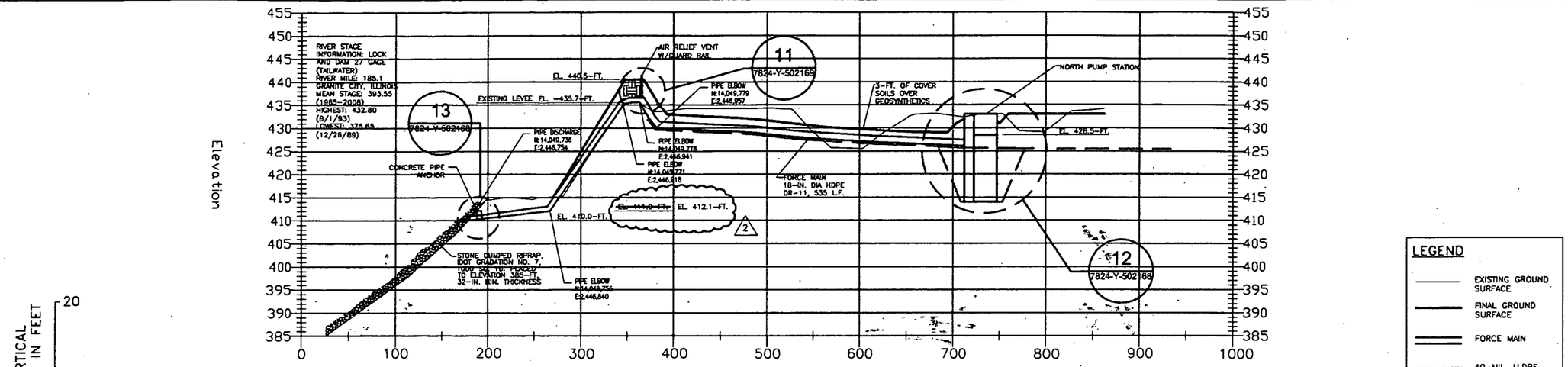


VERTICAL SCALE IN FEET: 20

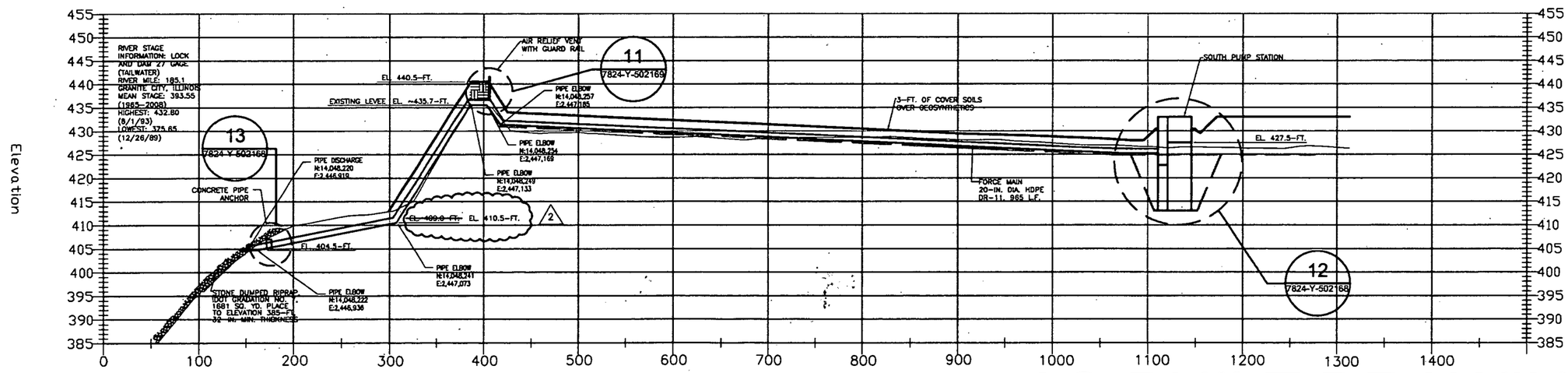
HORIZONTAL SCALE IN FEET: 100

VERTICAL EXAGGERATION = 5

E 7824-Y-502165 — NORTH PUMP STATION AND FORCE MAIN PROFILE

LEGEND

- EXISTING GROUND SURFACE
- FINAL GROUND SURFACE
- FORCE MAIN
- 40–MIL. LLDPE LINER WITH GEOMEMBRANE DRAINAGE LAYER
- COMPACTED EARTH



F 7824-Y-502166 — SOUTH PUMP STATION AND FORCE MAIN PROFILE

AS-BUILT DRAWING

NOTICE OF LIMITED RESPONSIBILITY

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2.	REVISED TO REFLECT AS–BUILT CONDITIONS	05/29/12	GME
1.	ISSUED FOR CONSTRUCTION	08/01/11	EJT
0.	ISSUED FOR BID (NOT FOR CONSTRUCTION)	06/27/11	EJT
REVISION:		DATE:	APP'D BY:

DRAWN KDW/RJG 01/21/11
CHK/RVW EJT/RJG 01/21/11
SUPV.
APPD. EJT 01/28/11

PUMP STATION DISCHARGE PIPING PROFILES
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012 | CLASS 0210

Ameren ST. LOUIS, MISSOURI | 7824–Y–502167 | REV. 2

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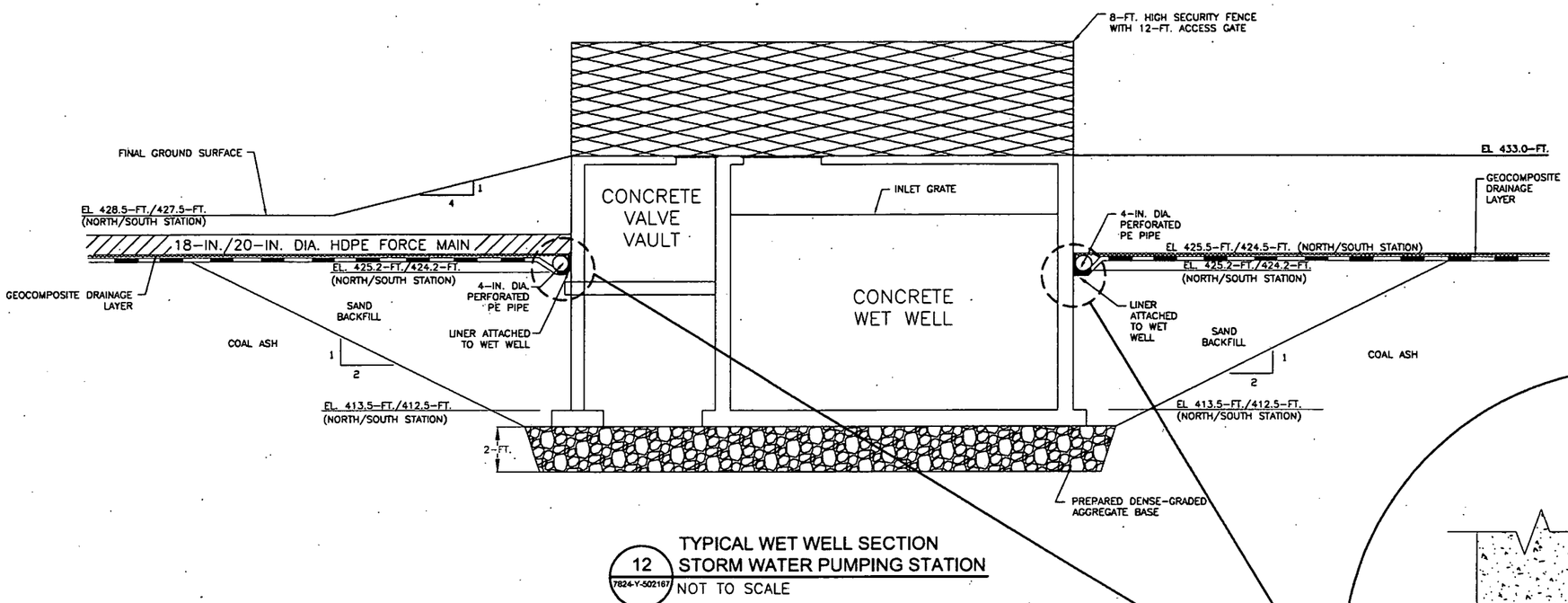
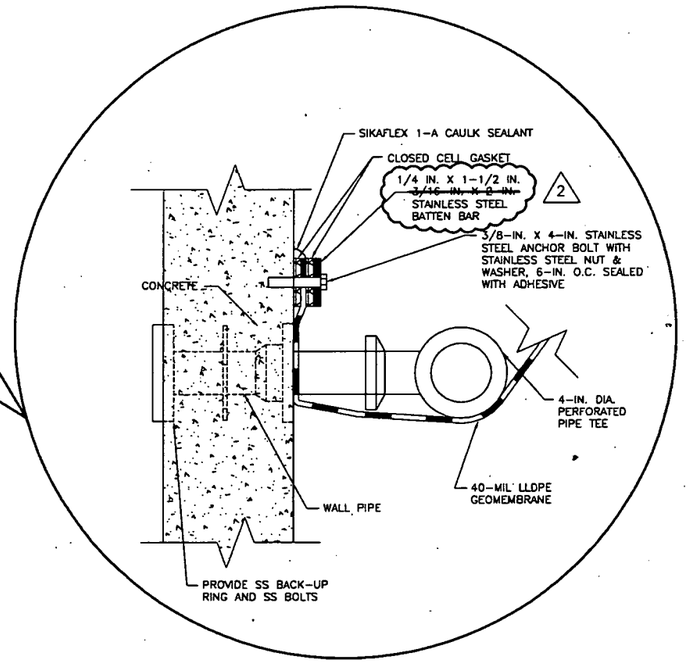
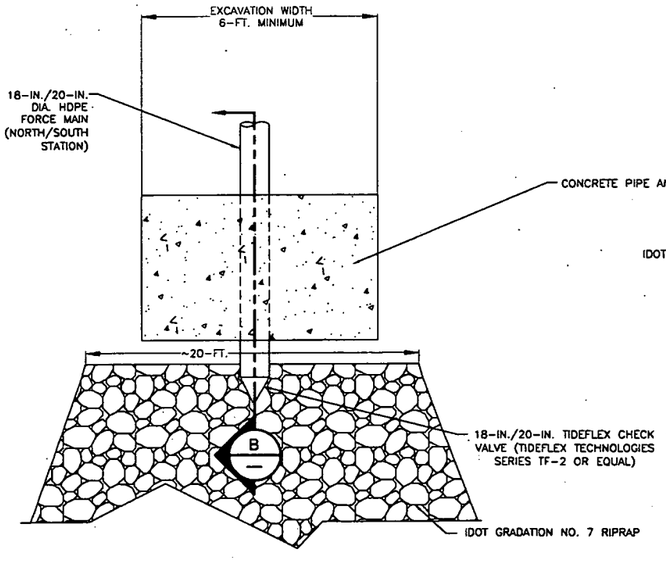
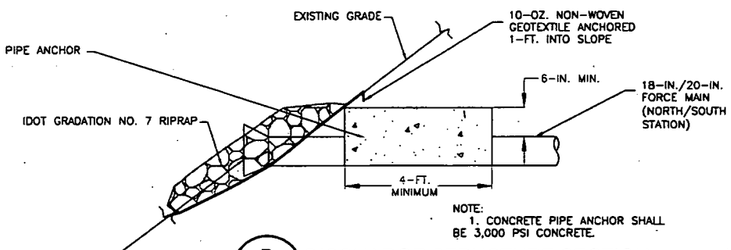


12 TYPICAL WET WELL SECTION STORM WATER PUMPING STATION
7824-Y-502167
NOT TO SCALE





13 TYPICAL OUTFALL STRUCTURE DETAIL
7824-Y-502167
NOT TO SCALE



NOTE:
1. CONCRETE PIPE ANCHOR SHALL BE 3,000 PSI CONCRETE.

B DISCHARGE STRUCTURE SECTION
NOT TO SCALE

AS-BUILT DRAWING

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PREPARED FOR Ameren

DRAWN RLH/KRW 01/21/11
CHK/RVW EJT 01/21/11
SUPV.
APPD. EJT 01/28/11

PUMP STATIONS
SECTIONS AND DETAILS
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012
CLASS 0210

Ameren ST. LOUIS, MISSOURI
7824-Y-502168
REV. 2

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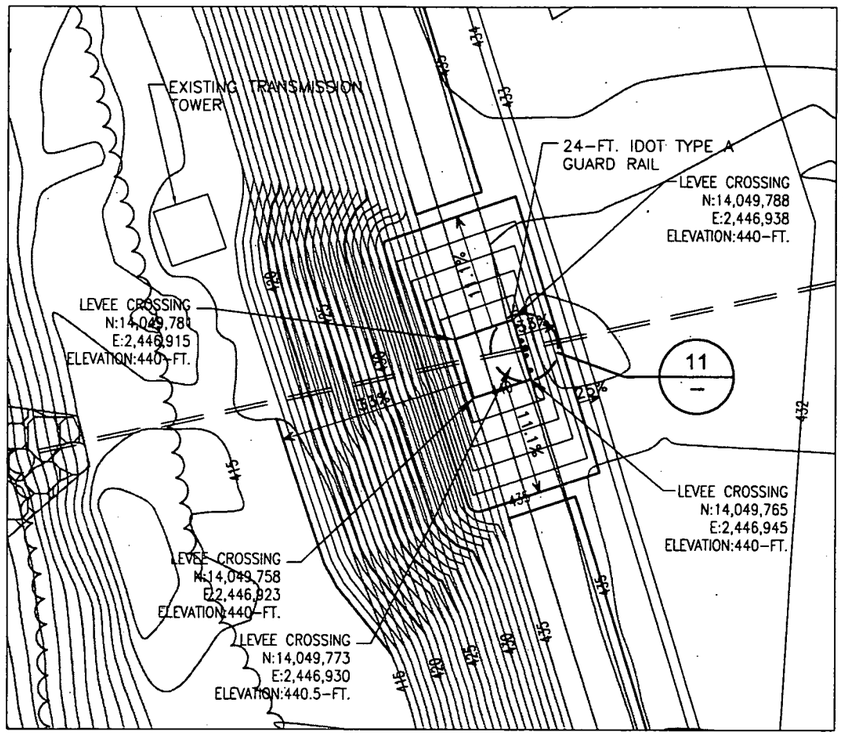
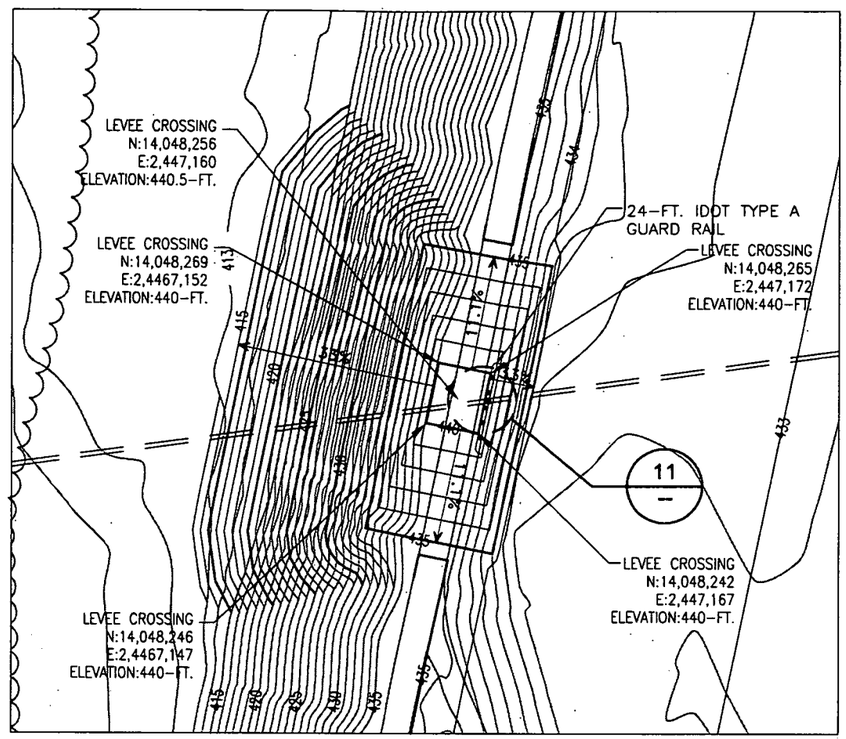
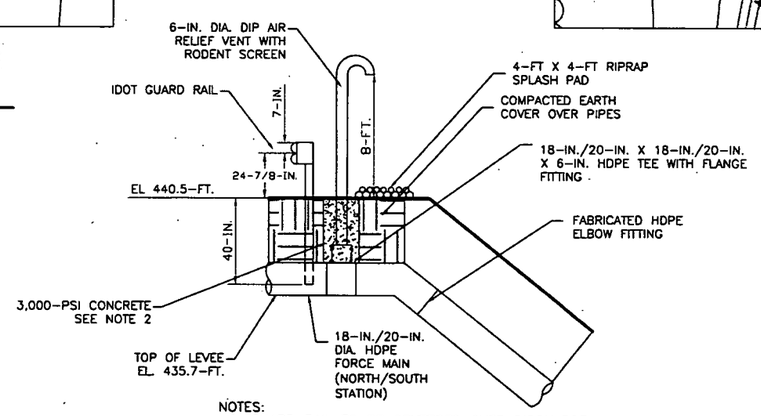


9 / 7824-Y-502165
NORTH PUMP STATION DISCHARGE PIPE LEVEE CROSSING PLAN VIEW
NOT TO SCALE



10 / 7824-Y-502166
SOUTH PUMP STATION DISCHARGE PIPE LEVEE CROSSING PLAN VIEW
NOT TO SCALE



NOTES:
1. GUARD RAIL TO BE CENTERED OVER DISCHARGE PIPE NOT TO PENETRATE DISCHARGE PIPE.

2. ENCASE BURIED PORTION OF AIR RELIEF VALVE IN 3,000-PSI CONCRETE DOWN TO TOP OF DISCHARGE PIPE.

11 / --
TYPICAL AIR RELIEF VENT DETAIL
NOT TO SCALE

AS-BUILT DRAWING

NOTICE OF LIMITED RESPONSIBILITY
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PREPARED FOR Ameren ILLINOIS

DRAWN	KNW 04/27/11
CHK/RVW	RJG/EJT 04/27/11
SUPV.	
APPD.	EJT 05/04/11

LEVEE CROSSING PLAN - STORM WATER DISCHARGE PIPING
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012 | CLASS 0210

Ameren | ST. LOUIS, MISSOURI | 7824-Y-502169 | REV. 2

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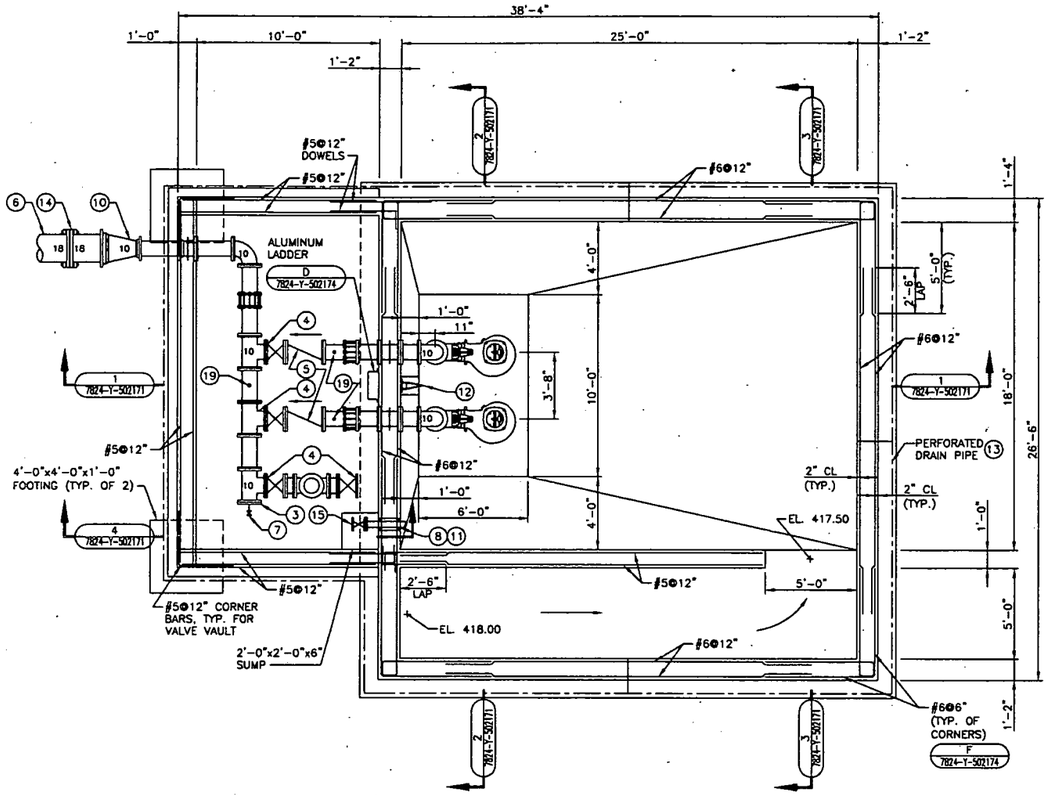
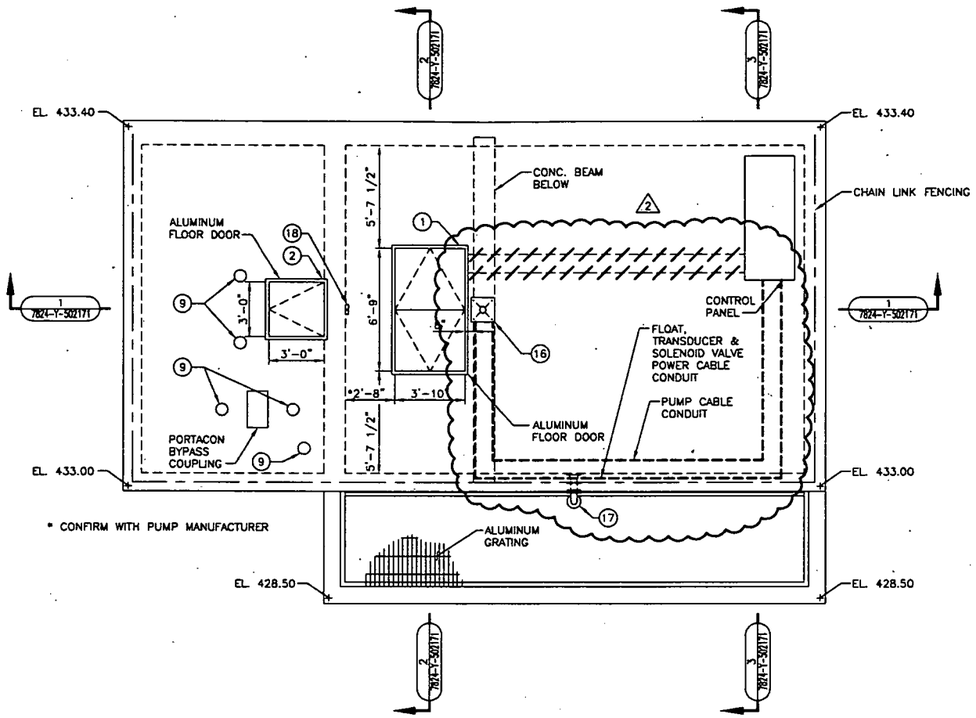


NORTH POND PUMP STATION LOWER PLAN

0 1' 2' 4' 8'



NORTH POND PUMP STATION UPPER PLAN

0 1' 2' 4' 8'

GENERAL NOTES:

1. DRAWINGS OF PUMPING STATION PIPING, PUMPS AND COVERS ARE DETAILED USING FLYGT EQUIPMENT.
2. STAINLESS STEEL CABLE FOR HOISTING PUMPS SHALL BE FASTENED TO COVER LID PER SPECIFICATIONS.
3. STATION PIPING, FITTINGS, AND VALVES SHALL BE AWWA C151 DUCTILE IRON, SPECIAL THICKNESS CLASS 53, CONFORMING TO SPECIFICATIONS.
4. CONTRACTOR INSTALLING PUMPS SHALL CHECK ALIGNMENT OF PUMPS AND GUIDE BARS WITH CASTINGS BEFORE ASSEMBLY TO ALLOW PROPER REMOVAL OF PUMPS.
5. EXACT DIMENSIONS AND POSITION OF PUMP ACCESS HATCH IN TOP SLAB SHALL BE PROVIDED BY PUMP MANUFACTURER TO ALLOW PROPER POSITIONING OF GUIDE RAILS AND UNRESTRICTED REMOVAL OF PUMPS.
6. ALL ANCHORS, BOLTS AND FABRICATED METAL WITHIN WET WELL SHALL BE STAINLESS STEEL.
7. SEE SPECIFICATIONS FOR CONDUIT, FITTINGS, AND INSTALLATION REQUIREMENTS OF ELECTRICAL WORK BETWEEN WET WELL AND MOTOR CONTROL PANEL. ALL ELECTRICAL WORK AND EQUIPMENT IN WETWELL AND HATCH OPENINGS SHALL BE RATED FOR A CLASS I, DIVISION 2, GROUP D LOCATION.
8. CONTRACTOR IS CAUTIONED THAT NOT ALL PIPING AND FITTINGS ARE SHOWN. CONTRACTOR SHALL FURNISH ALL PIPING AND FITTINGS REQUIRED TO COMPLETE THE INSTALLATION WITH NO ADDITIONAL COST TO OWNER.
9. PROVIDE ADDITIONAL REINFORCING AT OPENINGS IN WALLS AND SLABS PER DETAIL C (7824-Y-502174).

KEY NOTES:

1. PUMP ACCESS FLOOR DOOR.
2. VALVE VAULT ACCESS DOOR.
3. BLIND FLANGE WITH 2 1/2-INCH SCREWED HOLE AT INVERT OF DUCTILE IRON PIPE.
4. 10-INCH PLUG VALVE WITH EXTENDED STEM TO VALVE BOX IN TOP SLAB.
5. 10-INCH CHECK VALVE. LOCATE LEVER AND WEIGHT NORTH OF NORTH CHECK VALVE AND SOUTH OF SOUTH CHECK VALVE.
6. 18-INCH HDPE SDRII FORCE MAIN.
7. 2 1/2-INCH SOLENOID OPERATED BALL VALVE. POWER TO SOLENOID VALVE SHALL BE FROM PUMP STATION CONTROL PANEL.
8. INSTALL 4-INCH PIPE THROUGH WALL. SEAL ANNULAR SPACE WITH LINK SEAL ON BOTH INNER AND OUTER FACES.
9. VALVE BOX CAST IN TOP SLAB (TYP.). CONTRACTOR TO COORDINATE LOCATION OF VALVE BOXES DIRECTLY OVER OPERATING NUTS ON EXTENSION STEMS.
10. 10x18-INCH INCREASER.
11. 4-INCH DI DRAIN PIPE.
12. PRESSURE RELIEF VALVE NEAR CENTER OF WEST EXTERIOR WETWELL WALL, I.E. 414.00, SEE DETAIL E (7824-Y-502174). LEAVE OPENING IN CONCRETE FILLET FOR VALVE.
13. 4" PVC PERFORATED DRAIN PIPE W/GEOTEXTILE WRAP, TYPICAL, ALL AROUND WET WELL, I.E. 425.20, CONNECT TO DUCTILE IRON TEE AND PENETRATE THROUGH NORTH, EAST, AND SOUTH WET WELL WALLS AT THREE LOCATIONS, WITH DUCTILE IRON WALL PIPE, ALSO SEE TYPICAL WETWELL SECTION ON 7824-Y-502168.
14. CONNECT DUCTILE IRON PIPE TO HDPE PER DETAIL J (7824-Y-502174).
15. 4-INCH PLUG VALVE WITH STEM EXTENSION TO VALVE BOX IN TOP SLAB.
16. PORTABLE S.S. DAVIT CRANE W/PEDESTAL BASE (1000 LB. CAPACITY). LOCATE PER MFR. DIRECTION.
17. 4" DUCTILE IRON FLGxFLG VENT PIPING @ EL. 431.67, CENTER IN SOUTH WALL. PROVIDE 24 MESH S.S. SCREEN AND FOLLOWER FLANGE.
18. EMBEDDED GREY IRON FALL PROTECTION TIE-OFF ANCHOR WITH MINIMUM 5000 LB LOAD CAPACITY, PACIFIC MARINE & INDUSTRIAL MODEL PJ3490, 3 1/2" EMBED, MOUNT FLUSH WITH TOP SURFACE OF TOP SLAB, CENTER ON FLOOR DOOR IN NORTH AND SOUTH DIRECTION.
19. PROVIDE 1/2" TAPS, BALL VALVES AND REMOVABLE PIPE END CAP AS SHOWN FOR PRESSURE GAGE CONNECTIONS.

AS-BUILT DRAWING

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PREPARED FOR Ameren MISSOURI

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2.	REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1.	ISSUED FOR CONSTRUCTION	08/2/11	EJT
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REVISION:		DATE:	APP'D BY:

DRAWN JRH 05/14/11
CHK/RVW DDR/PJD 05/14/11
SUPV.
APPD. DDR 05/27/11

WET WELL PLAN VIEWS - NORTH PUMP STATION
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012
CLASS 0210

Ameren ST. LOUIS, MISSOURI

7824-Y-502170

REV. 2

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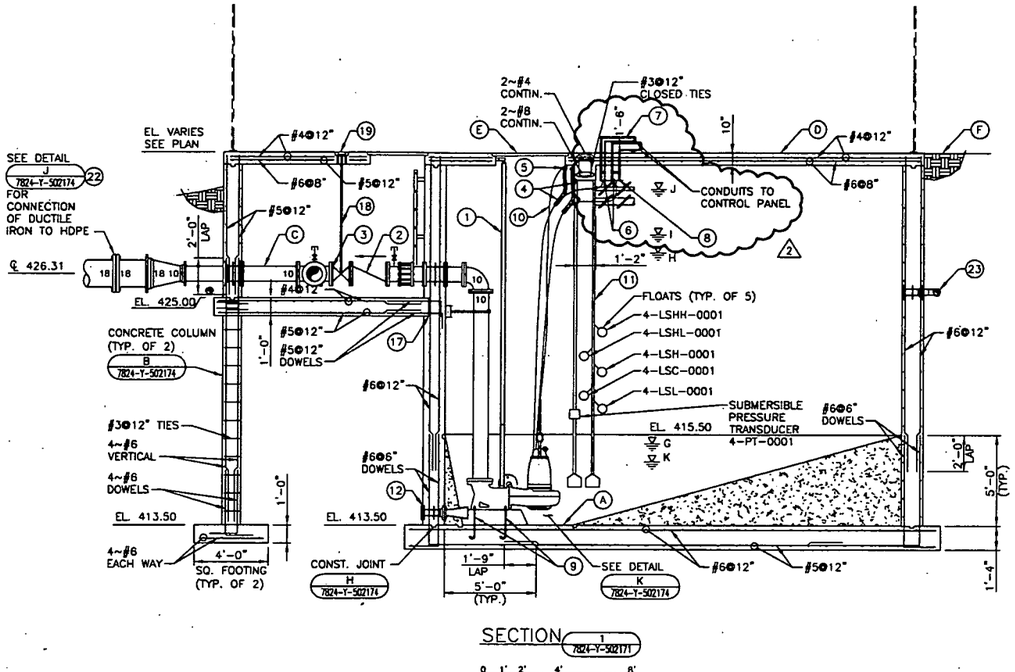

SECTION 1 7824-Y-502171

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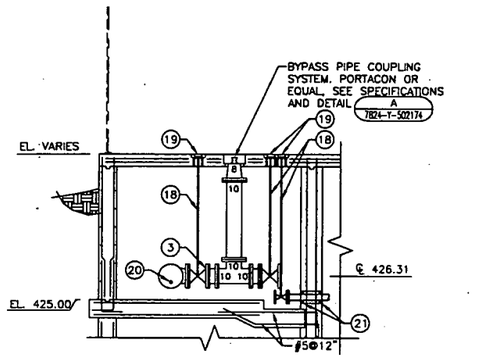


SECTION 4 7824-Y-502171

0 1' 2' 4' 8'

REBAR LAP LENGTHS				
BAR SIZE	WALL		SLAB	
	HORIZ.	VERT.	TOP MAT	BOTTOM MAT
#3	1'-6"	1'-6"	1'-6"	1'-6"
#4	1'-10"	1'-6"	1'-10"	1'-6"
#5	2'-2"	1'-9"	2'-2"	1'-9"
#6	2'-6"	2'-0"	2'-6"	2'-0"

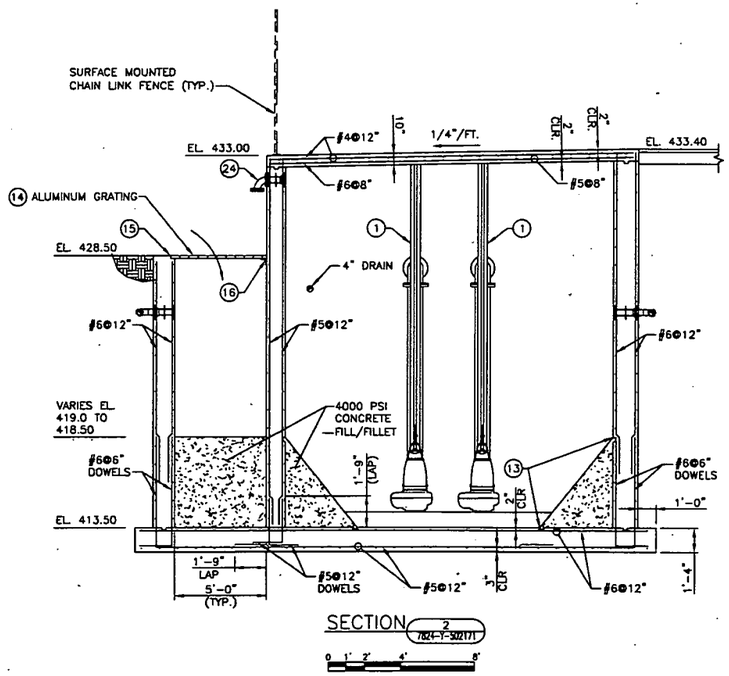
PUMPING STATION ELEVATIONS		
TAG	DESCRIPTION	NORTH POND ELEVATION
A	FLOOR ELEV. OF MANHOLE (WETWELL)	413.50
C	CENTERLINE ELEV. OF FORCE MAIN	426.31
D	ELEV. OF TOP OF SLAB	433.40-433.00
E	ELEV. OF TOP OF CASTING ℄ CENTER	433.20
F	ELEV. OF FINISHED GRADE AT P.S.	VARIES
G	COMMON PUMPS OFF	418.00
H	LEAD PUMP ON	428.50
I	LAG PUMP ON/HIGH WATER LEVEL	429.50
J	HIGH-HIGH WATER LEVEL	432.00
K	LOW WATER LEVEL	417.00
	STATION FORCE MAIN DIAMETER (INCHES)	10-IN
	DIMENSION ℄ TO ℄ OF PUMPS	44-IN
	DIMENSION ℄ TO ℄ OF VALVES	44-IN

GENERAL NOTES:

1. SEE TYPICAL WETWELL SECTION FOR STORM WATER PUMPING STATION ON DRAWING 7824-Y-502168-1 FOR STORM BASE UNDER PUMPING STATIONS, GEO MEMBRANE LINER, BACKFILL MATERIAL AND OTHER REQUIREMENTS NOT SHOWN ON THIS DRAWING.
2. IN WALLS, PLACE HORIZONTAL BARS OUTSIDE OF VERTICAL BARS.
3. ALL CONCRETE SHALL BE CLASS A OR A-FA AS SPECIFIED.
4. PROVIDE ADDITIONAL REINFORCING AT OPENINGS IN WALLS AND SLABS PER DETAIL C 7824-Y-502174.

KEY NOTES:

(1) 3-INCH STAINLESS STEEL GUIDE RAILS.
(2) 10-INCH CHECK VALVE.
(3) 10-INCH PLUG VALVE.
(4) STAINLESS STEEL WIRE MESH GRIP (TYP. OF FLOAT, TRANSDUCER AND PUMP CABLES).
(5) 3/8-INCH STAINLESS STEEL HOOKS ATTACHED TO TOP OF WET WELL. ONE FOR EACH CABLE.
(6) INSULATED THROAT BUSHING (TYP.).
△2 (7) 1-INCH PVC COATED RIGID CONDUIT (TYP. FOR EACH FLOAT SUBMERSIBLE PRESSURE TRANSDUCER CABLE AND SOLENOID VALVE POWER CABLE).
(8) 2-INCH PVC COATED RIGID CONDUIT (TYP. FOR EACH PUMP CABLE).
(9) ANCHOR BOLTS PER MANUFACTURER'S RECOMMENDATIONS.
(10) SS CABLE.
(11) REMOVABLE FLOAT AND TRANSDUCER SUPPORTS (2) (SS CABLE AND PVC COATED WEIGHT).
(12) PRESSURE RELIEF VALVE NEAR CENTER OF WEST EXTERIOR WETWELL WALL, I.E. 414.00, SEE DETAIL E 7824-Y-502174. LEAVE OPENING IN CONCRETE FILLET FOR VALVE.
(13) 2x6 KEYWAY, TYPICAL EACH END OF ALL CONCRETE FILLETS.
(14) ALUMINUM GRATING TO HAVE 2 1/4 x 3/16" BEARING BARS SPACED 3 9/16" O.C.
(15) CONTINUOUS EMBEDDED ∠2 1/2" x 2 1/2" x 1/4" ALUMINUM GRATING SUPPORT ANGLE WITH STRAP ANCHORS @ MAX. 24" O.C.
(16) CONTINUOUS ∠2 1/2" x 2 1/2" x 1/4" ALUMINUM GRATING SUPPORT ANGLE FASTENED TO CONCRETE W/5/8" DIA. S.S. EXPANSION BOLTS @18" O.C.
(17) 2"x12" CONTINUOUS BLOCK OUT FOR SLAB BEARING.
(18) EXTEND STEM TO VALVE BOX IN TOP SLAB (TYP.).
(19) VALVE BOX (TYP.).
(20) 2 1/2-INCH SOLENOID CONTROLLED BALL VALVE THREADED INTO BLIND FLANGE AT INVERT OF DUCTILE IRON PIPE.
(21) SEAL ANNULAR SPACE AROUND 4-INCH DRAIN PIPE WITH LINK SEAL ON BOTH INNER AND OUTER FACES.
(22) HDPE TO DUCTILE IRON CONNECTION. SEE DETAIL J 7824-Y-502174.
(23) 4" POLYETHYLENE PERFORATED DRAIN PIPE W/GEOTEXTILE WRAP, TYPICAL ALL AROUND WET WELL. I.E. 425.20, CONNECT TO DUCTILE IRON TEE AND PENETRATE THROUGH NORTH, EAST, AND SOUTH WET WELL WALLS AT THREE LOCATIONS, WITH DUCTILE IRON WALL PIPE, ALSO SEE TYPICAL WETWELL SECTION ON 7824-Y-502168.
(24) 4" DUCTILE IRON FLGxFLG VENT PIPING ℄ EL. 431.67, CENTER IN SOUTH WALL. PROVIDE 24 MESH S.S. SCREEN AND FOLLOWER FLANGE.



SECTION 2 7824-Y-502171

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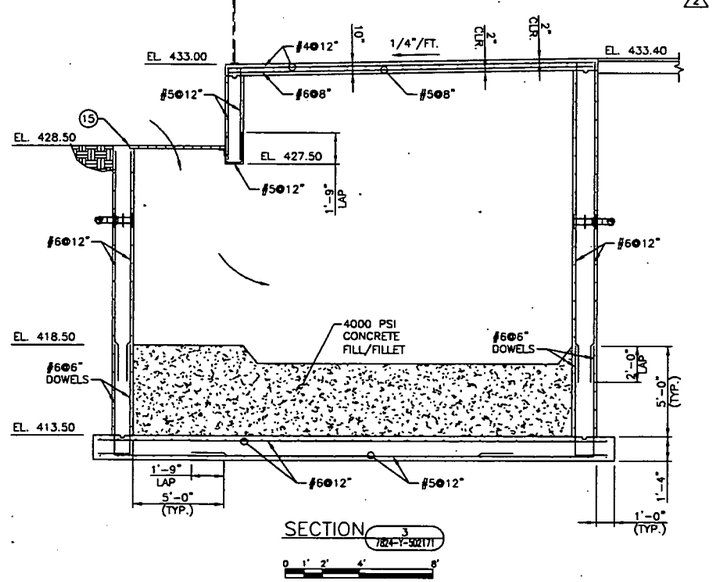

SECTION 3 7824-Y-502171

0 1' 2' 4' 8'

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DRAWN JBH 05/14/11
CHK/P/R
DDR/P.JD 05/14/11
SUPV.
APP'D. DDR 05/27/11

WET WELL SECTIONS - NORTH PUMP STATION
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012
CLASS 0210
REV. 2

Ameren ST. LOUIS, MISSOURI

7824-Y-502171

AS-BUILT DRAWING

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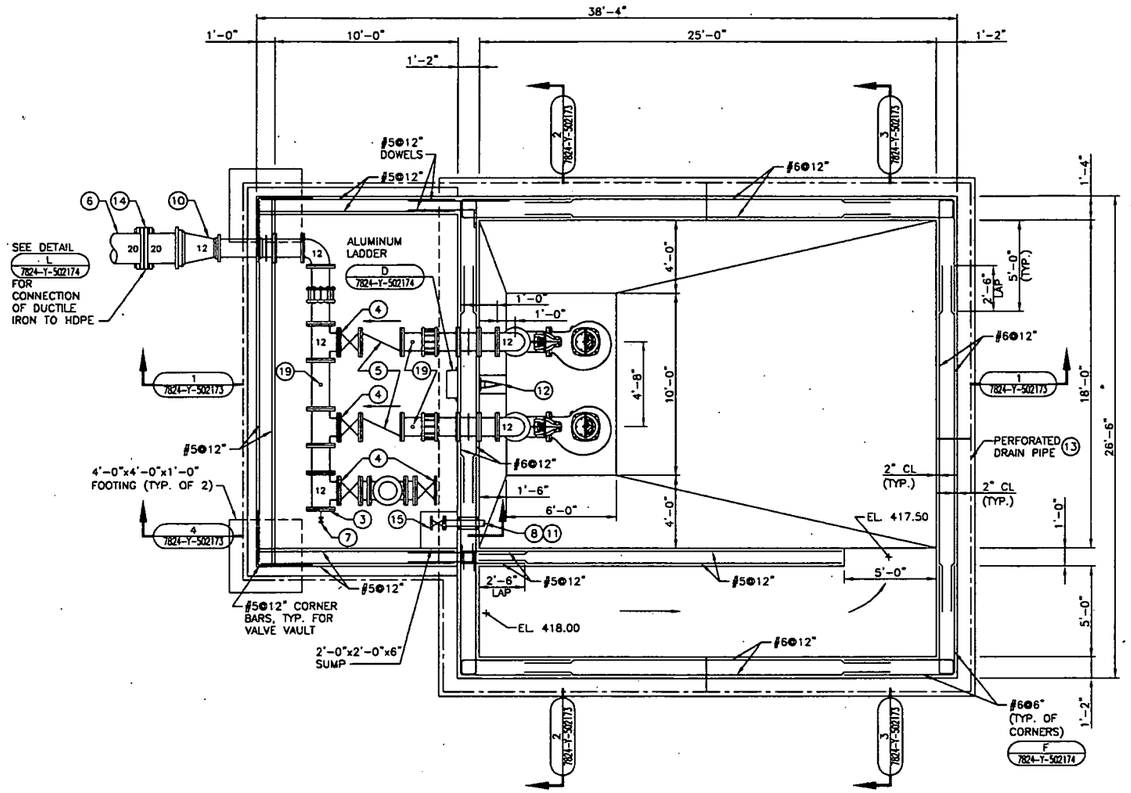
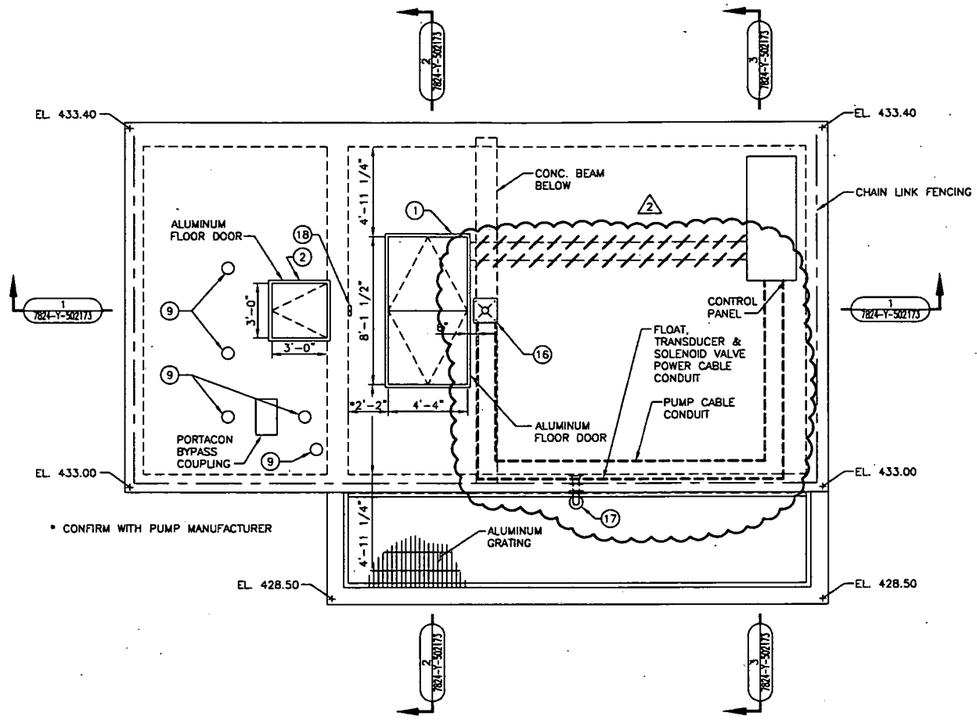


SOUTH POND PUMP STATION LOWER PLAN

0 1' 2' 4' 8'



SOUTH POND PUMP STATION UPPER PLAN

0 1' 2' 4' 8'

GENERAL NOTES:

1. DRAWINGS OF PUMPING STATION PIPING, PUMPS AND COVERS ARE DETAILED USING FLYGT EQUIPMENT.
2. STAINLESS STEEL CABLE FOR HOISTING PUMPS SHALL BE FASTENED TO COVER LID PER SPECIFICATIONS.
3. STATION PIPING, FITTINGS, AND VALVES SHALL BE AWWA C151 DUCTILE IRON, SPECIAL THICKNESS CLASS 53, CONFORMING TO SPECIFICATIONS.
4. CONTRACTOR INSTALLING PUMPS SHALL CHECK ALIGNMENT OF PUMPS AND GUIDE BARS WITH CASTINGS BEFORE ASSEMBLY TO ALLOW PROPER REMOVAL OF PUMPS.
5. EXACT DIMENSIONS AND POSITION OF PUMP ACCESS HATCH IN TOP SLAB SHALL BE PROVIDED BY PUMP MANUFACTURER TO ALLOW PROPER POSITIONING OF GUIDE RAILS AND UNRESTRICTED REMOVAL OF PUMPS.
6. ALL ANCHORS, BOLTS AND FABRICATED METAL WITHIN WET WELL SHALL BE STAINLESS STEEL.
7. SEE SPECIFICATIONS FOR CONDUIT, FITTINGS, AND INSTALLATION REQUIREMENTS OF ELECTRICAL WORK BETWEEN WET WELL AND MOTOR CONTROL PANEL. ALL ELECTRICAL WORK AND EQUIPMENT IN WETWELL AND HATCH OPENINGS SHALL BE RATED FOR A CLASS I, DIVISION 2, GROUP D LOCATION.
8. CONTRACTOR IS CAUTIONED THAT NOT ALL PIPING AND FITTINGS ARE SHOWN. CONTRACTOR SHALL FURNISH ALL PIPING AND FITTINGS REQUIRED TO COMPLETE THE INSTALLATION WITH NO ADDITIONAL COST TO OWNER.
9. PROVIDE ADDITIONAL REINFORCING AT OPENINGS IN WALLS AND SLABS PER DETAIL C 7824-Y-502174.

KEY NOTES:

1. PUMP ACCESS FLOOR DOOR.
2. VALVE VAULT ACCESS DOOR.
3. BLIND FLANGE WITH 2 1/2-INCH SCREWED HOLE AT INVERT OF DUCTILE IRON PIPE.
4. 12-INCH PLUG VALVE WITH EXTENDED STEM TO VALVE BOX IN TOP SLAB.
5. 12-INCH CHECK VALVE. LOCATE LEVER AND WEIGHT NORTH OF NORTH CHECK VALVE AND SOUTH OF SOUTH CHECK VALVE.
6. 20-INCH HDPE SDR11 FORCE MAIN.
7. 2 1/2-INCH SOLENOID OPERATED BALL VALVE. POWER TO SOLENOID VALVE SHALL BE FROM PUMP STATION CONTROL PANEL.
8. INSTALL 4-INCH PIPE THROUGH WALL. SEAL ANNULAR SPACE WITH LINK SEAL ON BOTH INNER AND OUTER FACES.
9. VALVE BOX CAST IN TOP SLAB (TYP.). CONTRACTOR TO COORDINATE LOCATION OF VALVE BOXES DIRECTLY OVER OPERATING NUTS ON EXTENSION STEMS.
10. 12x20-INCH INCREASER.
11. 4-INCH DI DRAIN PIPE.
12. PRESSURE RELIEF VALVE NEAR CENTER OF WEST EXTERIOR WETWELL WALL, I.E. 414.00, SEE DETAIL E 7824-Y-502174. LEAVE OPENING IN CONCRETE FILLET FOR VALVE.
13. 4" PVC PERFORATED DRAIN PIPE W/GEOTEXTILE WRAP, TYPICAL ALL AROUND WET WELL, I.E. 425.20, CONNECT TO DUCTILE IRON TEE AND PENETRATE THROUGH NORTH, EAST, AND SOUTH WET WELL WALLS AT THREE LOCATIONS, WITH DUCTILE IRON WALL PIPE, ALSO SEE TYPICAL WETWELL SECTION ON 7824-Y-502168.
14. CONNECT DUCTILE IRON PIPE TO HDPE PER DETAIL J 7824-Y-502174.
15. 4-INCH PLUG VALVE WITH STEM EXTENSION TO VALVE BOX IN TOP SLAB.
16. PORTABLE S.S. DAVIT CRANE W/PEDESTAL BASE (1000 LB. CAPACITY). LOCATE PER MFR. DIRECTION.
17. 4" DUCTILE IRON FLGxFLG VENT PIPING @ EL. 431.67, CENTER IN SOUTH WALL. PROVIDE 24 MESH S.S. SCREEN AND FOLLOWER FLANGE.
18. EMBEDDED GREY IRON FALL PROTECTION TIE-OFF ANCHOR WITH MINIMUM 5000 LB LOAD CAPACITY, PACIFIC MARINE & INDUSTRIAL MODEL P3490, 3 1/2" EMBED, MOUNT FLUSH WITH TOP SURFACE OF TOP SLAB, CENTER ON FLOOR DOOR IN NORTH AND SOUTH DIRECTION.
19. PROVIDE 1/2" TAPS, BALL VALVES AND REMOVABLE PIPE END CAP AS SHOWN FOR PRESSURE GAGE CONNECTIONS.

AS-BUILT DRAWING

NOTICE OF LIMITED RESPONSIBILITY
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PREPARED FOR Ameren Missouri

	REVISION:	DATE:	APP'D BY:
6.			
5.			
4.			
3.			
2.	REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1.	ISSUED FOR CONSTRUCTION	08/2/11	EJT
0.	ISSUED FOR BID(NOT FOR CONSTRUCTION)	06/27/11	EJT

DRAWN JRH 06/14/11
CHK/RVW DDR/PJD 06/14/11
SUPV.
APP'D. DDR 06/27/11

WET WELL PLAN VIEWS - SOUTH PUMP STATION
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012 | CLASS 0210

Ameren ST. LOUIS, MISSOURI | 7824-Y-502172 | REV. 2

12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

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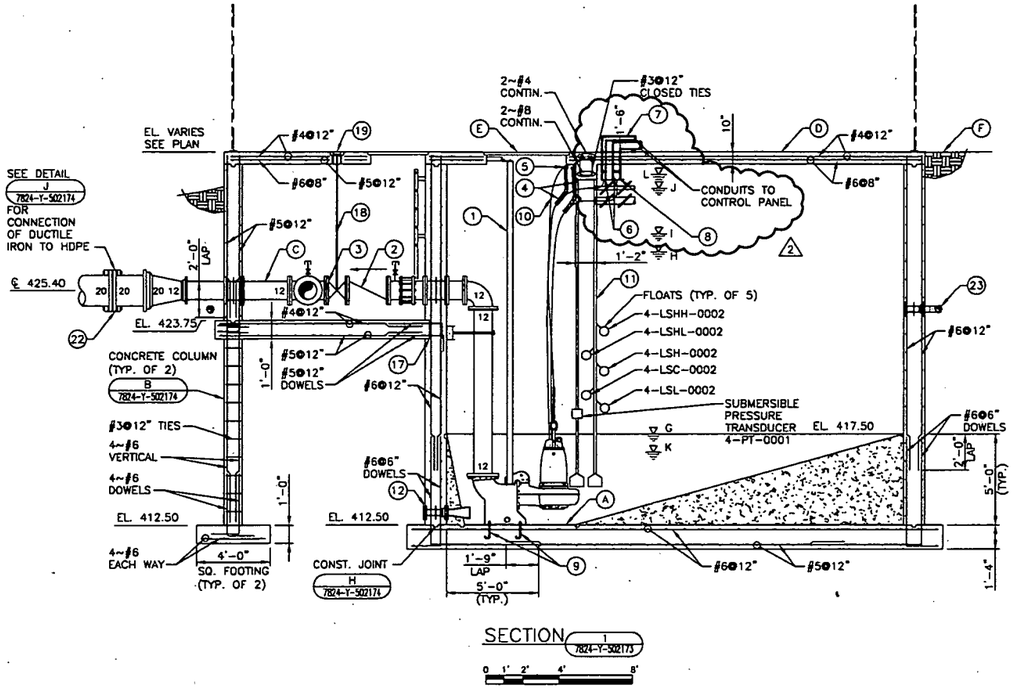
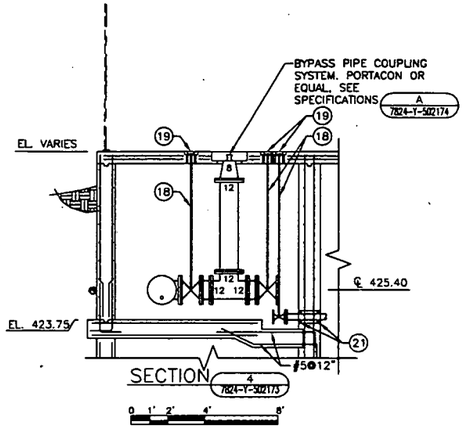
REV.	W.O. 15614	



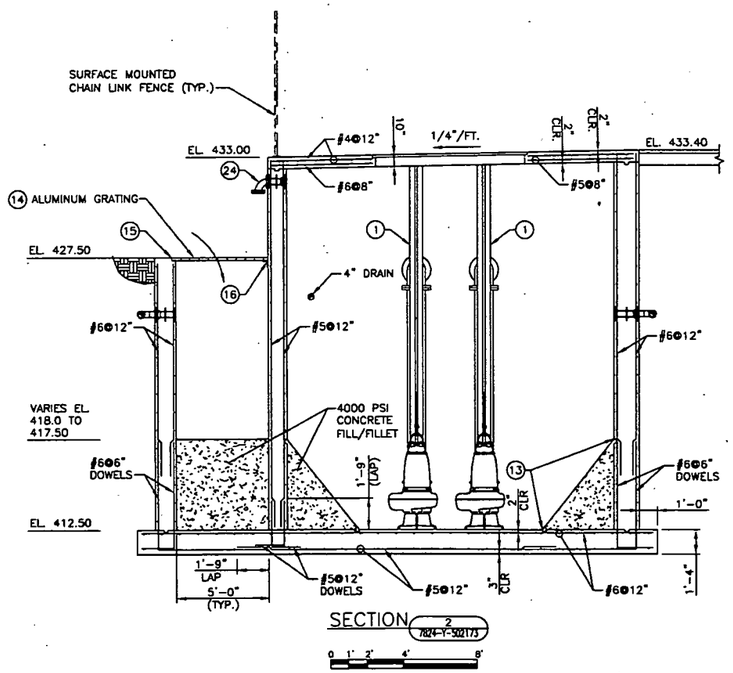


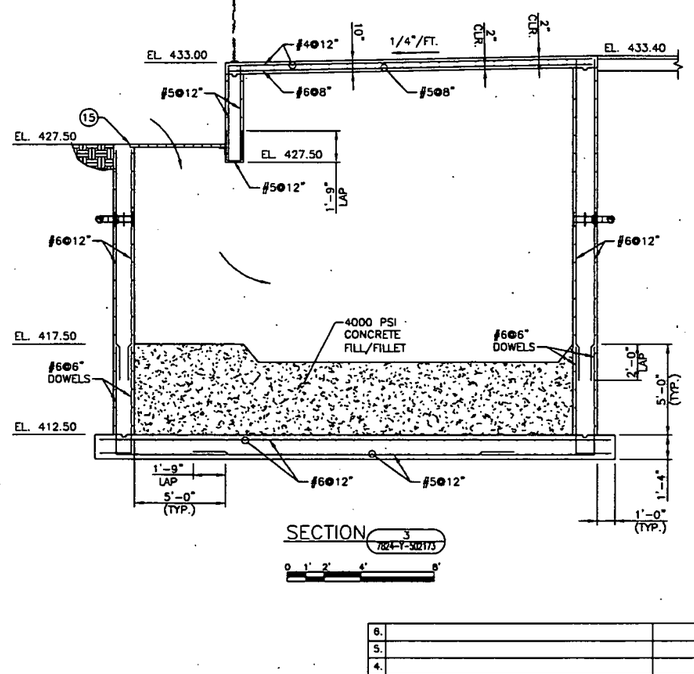
PUMPING STATION ELEVATIONS

TAG	DESCRIPTION	SOUTH POND ELEVATION
A	FLOOR ELEV. OF MANHOLE (WETWELL)	412.50
C	CENTERLINE ELEV. OF FORCE MAIN	425.40
D	ELEV. OF TOP OF SLAB	433.40-433.00
E	ELEV. OF TOP OF CASTING ⊕ CENTER	433.20
F	ELEV. OF FINISHED GRADE AT P.S.	VARIES
G	COMMON PUMPS OFF	417.50
H	LEAD PUMP ON	427.50
I	LAG PUMP ON/HIGH WATER LEVEL	428.50
J	HIGH-HIGH WATER LEVEL	431.00
K	LOW WATER LEVEL	416.50
	STATION FORCE MAIN DIAMETER (INCHES)	12-IN
	DIMENSION ℄ TO ℄ OF PUMPS	56-IN
	DIMENSION ℄ TO ℄ OF VALVES	56-IN

REBAR LAP LENGTHS

BAR SIZE	WALL		SLAB	
	HORIZ.	VERT.	TOP MAT	BOTTOM MAT
#3	1'-6"	1'-6"	1'-6"	1'-6"
#4	1'-10"	1'-6"	1'-10"	1'-6"
#5	2'-2"	1'-9"	2'-2"	1'-9"
#6	2'-6"	2'-0"	2'-6"	2'-0"





GENERAL NOTES:

1. SEE TYPICAL WETWELL SECTION FOR STORM WATER PUMPING STATION ON DRAWING 7824-Y-502168-1 FOR STORM BASE UNDER PUMPING STATIONS, GEO MEMBRANE LINER, BACKFILL MATERIAL AND OTHER REQUIREMENTS NOT SHOWN ON THIS DRAWING.
2. IN WALLS, PLACE HORIZONTAL BARS OUTSIDE OF VERTICAL BARS.
3. ALL CONCRETE SHALL BE CLASS A OR A-FA AS SPECIFIED.
4. PROVIDE ADDITIONAL REINFORCING AT OPENINGS IN WALLS AND SLABS PER DETAIL C 7824-Y-502174.

KEY NOTES:

1. 3-INCH STAINLESS STEEL GUIDE RAILS.
2. 12-INCH CHECK VALVE.
3. 12-INCH PLUG VALVE.
4. STAINLESS STEEL WIRE MESH GRIP (TYP. OF FLOAT, TRANSDUCER AND PUMP CABLES).
5. 3/8-INCH STAINLESS STEEL HOOKS ATTACHED TO TOP OF WET WELL. ONE FOR EACH CABLE.
6. INSULATED THROAT BUSHING (TYP.).
2 7. 1-INCH PVC COATED RIGID CONDUIT (TYP. FOR EACH FLOAT SUBMERSIBLE PRESSURE TRANSDUCER CABLE AND SOLENOID VALVE POWER CABLE).
8. 2-INCH PVC COATED RIGID CONDUIT (TYP. FOR EACH PUMP CABLE).
9. ANCHOR BOLTS PER MANUFACTURER'S RECOMMENDATIONS.
10. SS CABLE.
11. REMOVABLE FLOAT AND TRANSDUCER SUPPORTS (2) (SS CABLE AND PVC COATED WEIGHT).
12. PRESSURE RELIEF VALVE NEAR CENTER OF WEST EXTERIOR WETWELL WALL, I.E. 414.00, SEE DETAIL E 7824-Y-502174. LEAVE OPENING IN CONCRETE FILLET FOR VALVE.
13. 2x6 KEYWAY, TYPICAL EACH END OF ALL CONCRETE FILLETS.
14. ALUMINUM GRATING TO HAVE 2 1/4 x 3/16" BEARING BARS SPACED 3 9/16" O.C.
15. CONTINUOUS EMBEDDED ∠2 1/2" x 2 1/2" x 1/4" ALUMINUM GRATING SUPPORT ANGLE WITH STRAP ANCHORS @ MAX. 24" O.C.
16. CONTINUOUS ∠2 1/2" x 2 1/2" x 1/4" ALUMINUM GRATING SUPPORT ANGLE FASTENED TO CONCRETE W/5/8" DIA. S.S. EXPANSION BOLTS @18" O.C.
17. 2"x12" CONTINUOUS BLOCK OUT FOR SLAB BEARING.
18. EXTEND STEM TO VALVE BOX IN TOP SLAB (TYP.).
19. VALVE BOX (TYP.).
20. 2 1/2-INCH SOLENOID CONTROLLED BALL VALVE THREADED INTO BLIND FLANGE AT INVERT OF DUCTILE IRON PIPE.
21. SEAL ANNULAR SPACE AROUND 4-INCH DRAIN PIPE WITH LINK SEAL ON BOTH INNER AND OUTER FACES.
22. HDPE TO DUCTILE IRON CONNECTION. SEE DETAIL J 7824-Y-502174.
23. 4" POLYETHYLENE PERFORATED DRAIN PIPE W/GEOTEXTILE WRAP, TYPICAL ALL AROUND WET WELL, I.E. 425.20, CONNECT TO DUCTILE IRON TEE AND PENETRATE THROUGH NORTH, EAST, AND SOUTH WET WELL WALLS AT THREE LOCATIONS, WITH DUCTILE IRON WALL PIPE, ALSO SEE TYPICAL WETWELL SECTION ON 7824-Y-502168.
24. 4" DUCTILE IRON FLGxFLG VENT PIPING ℄ EL. 431.67, CENTER IN SOUTH WALL. PROVIDE 24 MESH S.S. SCREEN AND FOLLOWER FLANGE.

NOTICE OF LIMITED RESPONSIBILITY
THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE LOCATION AND DESIGN OF PROJECT EXCAVATIONS AND EMBANKMENTS BEARING HIS/HER SEAL. SIGNATURE OF INITIALS HEREON DOES NOT MAKE HIM/HER A PARTY TO THE CONSTRUCTION CONTRACT AND HE/SHE SHALL NOT BE HELD RESPONSIBLE OR LIABLE FOR "WORK DONE UNDER HAZARDOUS CONDITIONS" AND NOTIFICATIONS OR DAMAGES ASSOCIATED WITH THE PROJECT WHEN DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

PREPARED FOR Ameren Missouri

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DRAWN JBH 06/14/11
CHK/RVW DDR/PJD 06/14/11
SUPV.
APPD. DDR 06/27/11

WET WELL SECTIONS - SOUTH PUMP STATION
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012
CLASS 0210
REV. 2

Ameren ST. LOUIS, MISSOURI

7824-Y-502173

AS-BUILT DRAWING

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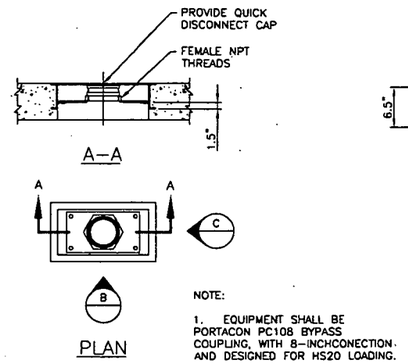
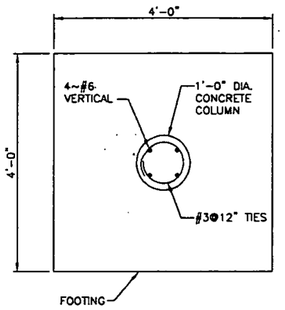


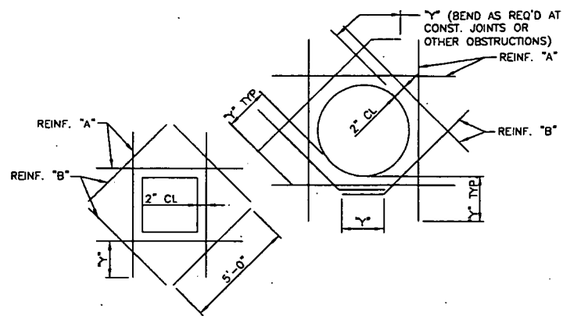
NOTE:

1. EQUIPMENT SHALL BE PORTACON PC108 BYPASS COUPLING, WITH 8–INCHCONECTION AND DESIGNED FOR HS20 LOADING.

A 7824-Y-502174 BYPASS COUPLING DETAIL
NO SCALE



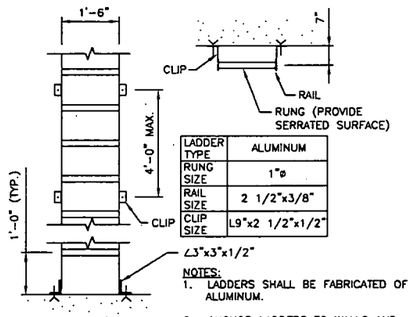
B 7824-Y-502174 COLUMN DETAIL
NO SCALE



NOTES:

1. MOVE REINF. MAX. OF 2" TO CLEAR OPENING. CUT REMAINING BAR THROUGH OPENING. WHERE REINF. MUST BE CUT, ADD REINF. "A" AT LEAST EQUAL IN AREA TO THAT WHICH WAS CUT AND EXTEND BEYOND OPENING DISTANCE "Y".
2. DIAGONAL BARS "B" TO BE PLACED:
   A. AT ℄ OF WALL WHERE ONE LAYER OF REINF. IS PROVIDED.
   B. AT EACH FACE OF WALL WHERE TWO LAYERS OF REINF. ARE PROVIDED.
   C. AT TOP & BOTTOM OF ALL SLABS.
3. UNLESS OTHERWISE NOTED, SIZE OF REINF. "B" SHALL BE THE SIZE OF THE LARGEST REINF. BAR CUT.
4. Y = LAP LENGTH (SEE TABLE ON DRAWING 7824-Y-502171-2.
5. THIS DETAIL IS TO BE USED WHEN NO OTHER DETAIL IS SPECIFIED.
6. MINIMUM REINF. "A" & "B" AROUND ANY AND ALL OPENINGS SHALL BE #4 BARS.

C 7824-Y-502174 REINFORCEMENT AT CONCRETE OPENINGS
NO SCALE

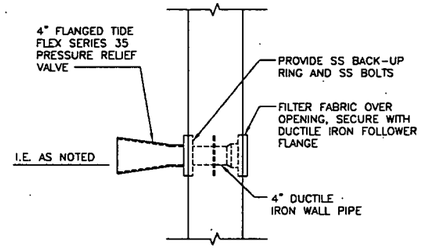


LADDER TYPE	ALUMINUM
RUNG SIZE	1"ø
RAIL SIZE	2 1/2"x3/8"
CLIP SIZE	L9"x2 1/2"x1/2"

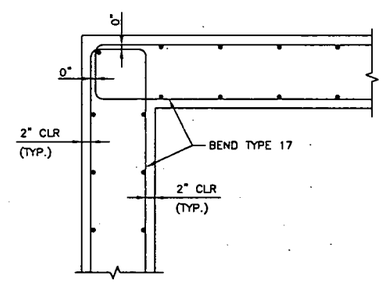
NOTES:

1. LADDERS SHALL BE FABRICATED OF ALUMINUM.
2. ANCHOR LADDERS TO WALLS AND FLOOR PER MFR. REQUIREMENTS SUBJECT TO ENGINEER APPROVAL.

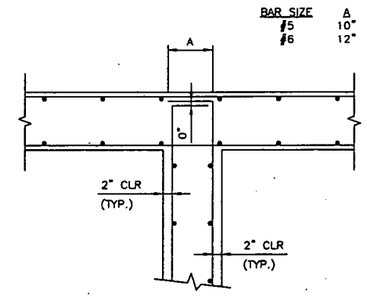
D 7824-Y-502174 LADDER
NO SCALE



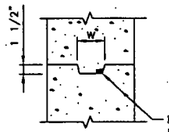
E 7824-Y-502174 PRESSURE RELIEF VALVE
NO SCALE



F 7824-Y-502174 WETWELL CORNER REINFORCING
NO SCALE



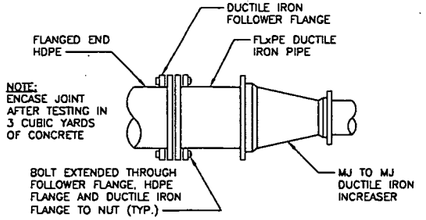
G 7824-Y-502174 WETWELL TEE REINFORCING
NO SCALE



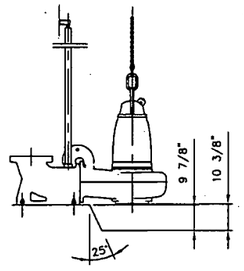
NOTES:

1. RUN REINF. CONTINUOUS THROUGH JOINT.
2. STOP KEYWAYS AND WATER STOPS IN VERTICAL JOINTS 6" BELOW EXPOSED TOP OF WALL.
3. W=3 1/2".
4. DETAIL DEPICTS JOINT WITHIN WALLS OR SLABS. DETAIL ALSO APPLIES TO WALL/SLAB INTERSECTIONS.
5. APPLY BONDING AGENT TO JOINT AS SPECIFIED.

H 7824-Y-502174 CONSTRUCTION JOINT
NO SCALE



J 7824-Y-502174 HDPE CONNECTION TO DUCTILE IRON PIPE DETAIL
NO SCALE



K 7824-Y-502174 PUMP BASE DETAIL
NO SCALE

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PREPARED FOR Ameren MISSOURI

DRAWN JSH 05/14/11
CHK/RVW DDR/PJD 05/14/11
SUPV.
APPD. DDR 06/27/11

WET WELL DETAILS
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012
CLASS 0210

Ameren ST. LOUIS, MISSOURI

7824–Y–502174

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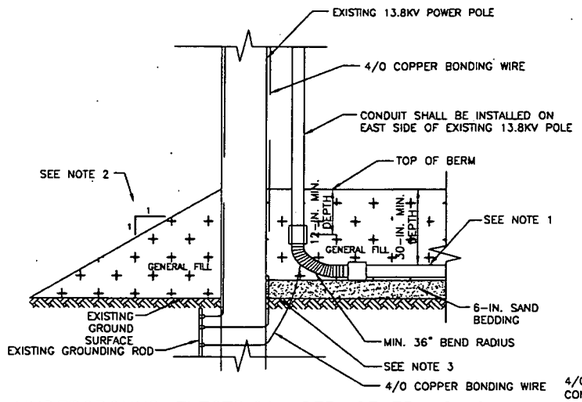
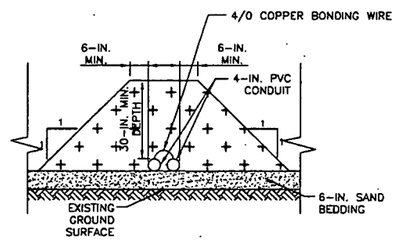


UNDERGROUND ELECTRICAL SERVICE TRANSITION

NO SCALE

NOTES:

1. PLACE CONDUIT ALONG THE EXISTING GROUND SURFACE FOR 170-FT (SEE "UNDERGROUND ELECTRICAL SERVICE BERM" BELOW) AND THEN BURY CONDUIT 30-IN. MIN. BELOW EXISTING GROUND SURFACE.
2. ADJUST SLOPE AS NECESSARY TO AVOID INCURSION INTO EXISTING ROADWAY.
3. THERE IS AN EXISTING 4" CONDUIT THAT IS CAPPED AT THE BASE OF THE POLE THAT SHALL BE EXTENDED ABOVE THE NEW BERM.
4. REFER TO APPENDIX L OF THE SPECIFICATIONS FOR AMEREN DETAILS DS 04 00 41, DS 10 12 10, AND SPEC 16.

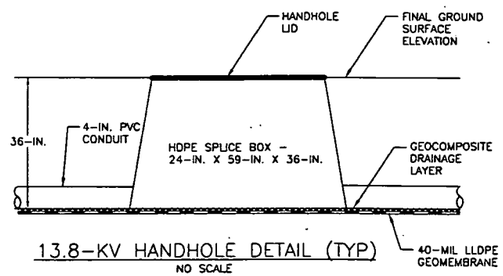


UNDERGROUND ELECTRICAL SERVICE BERM

NO SCALE

NOTES:

1. INSTALL CONDUIT A MINIMUM OF 2-IN. APART.
2. REFER TO APPENDIX L FOR AMEREN SPEC 6.

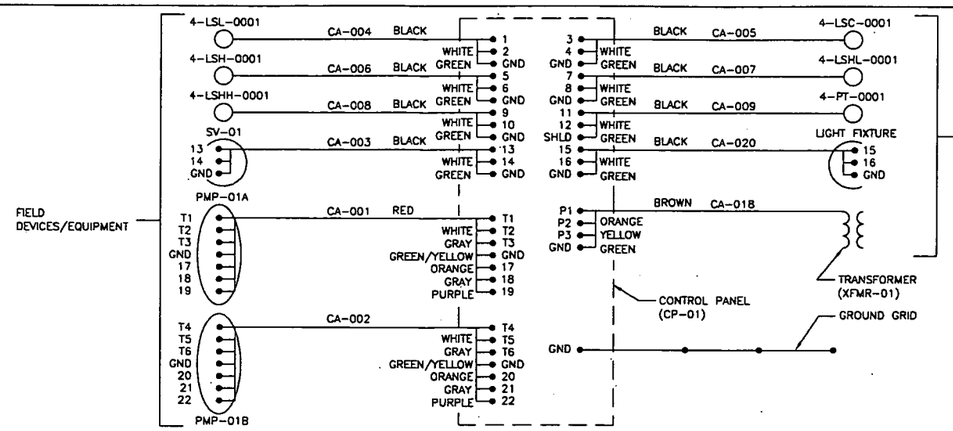


13.8-KV HANDHOLE DETAIL (TYP)

NO SCALE

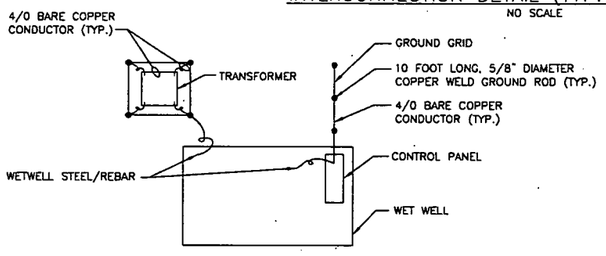
NOTES:

1. EXCAVATE AND INSTALL BOX SO THAT CONDUITS REMAIN AT GEOCOMPOSITE DRAINAGE LAYER.
2. INSTALL CONDUITS THRU KNOCKOUTS, OR BORE HOLES IN BOX. SEAL CONDUITS AT BOX INTERFACE.



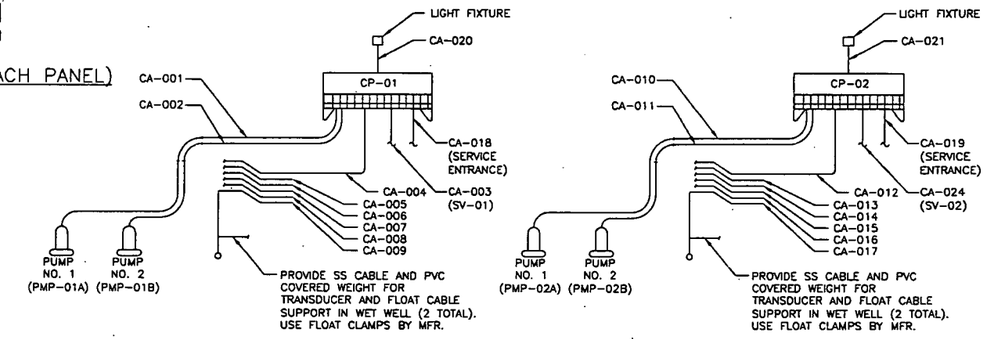
INTERCONNECTION DETAIL (TYP. OF EACH PANEL)

NO SCALE



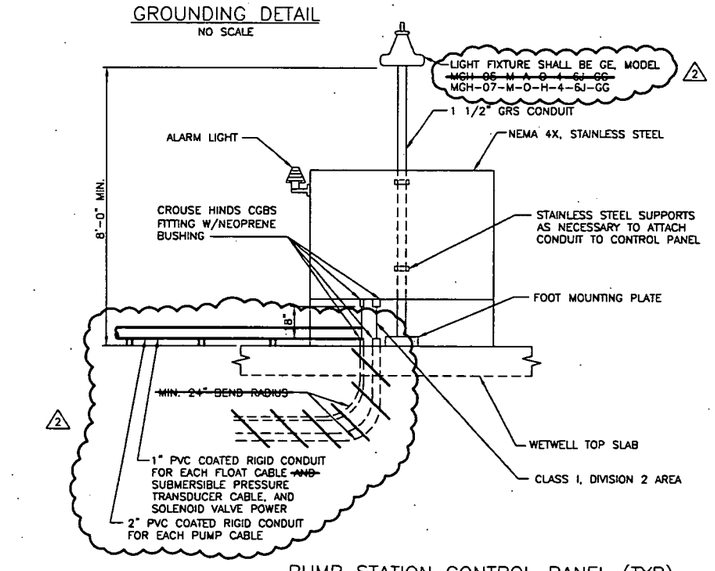
GROUNDING DETAIL

NO SCALE



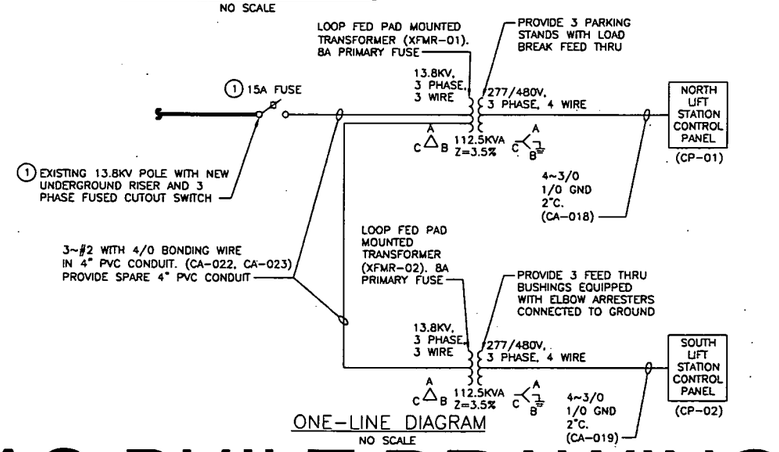
PUMPING STATION RISERS

NO SCALE



PUMP STATION CONTROL PANEL (TYP)

NO SCALE



ONE-LINE DIAGRAM

NO SCALE

GENERAL NOTES:

1. REFER TO AMEREN STANDARD ELECTRICAL SPEC 2.2.225 FOR CABLING REQUIREMENTS IN APPENDIX L OF SPECIFICATIONS.
2. REFER TO APPENDIX M IN THE SPECIFICATIONS FOR AMEREN CABLE SCHEDULE.

KEY NOTES:

(1) PROVIDE S&C ELECTRIC COMPANY, XS SERIES FUSED CUTOUT SWITCH. REFER TO AMEREN DETAIL 10 00 01 01 IN APPENDIX L OF THE SPECIFICATIONS FOR ADDITIONAL FUSING REQUIREMENTS.

AS-BUILT DRAWING

NOTICE OF LIMITED RESPONSIBILITY

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REVISION:	DATE:	APP'D BY:
6.		
5.		
4.		
3.		
2. REVISED TO REFLECT AS-BUILT CONDITIONS	05/29/12	GME
1. ISSUED FOR CONSTRUCTION	08/2/11	EJT
0. ISSUED FOR BID (NOT FOR CONSTRUCTION)	06/27/11	EJT

PREPARED FOR Ameren MISSOURI

DRAWN: LMH 08/14/11
CKD/RVW: MDC/SPZ 08/27/11
SUPV.
APPD.: BMS 08/14/11

PUMP STATION & 13.8-KV ELECTRICAL SERVICE DETAILS
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012 | CLASS 0210

Ameren ST. LOUIS, MISSOURI | 7824-Y-502175 | REV. 2

12 11 10 9 8 7 6 5 4 3 2 1

H G F E D C B A

Electronic Filing: Received, Clerk's Office 09/28/2020

APPENDIX B

CONSTRUCTION PHOTOGRAPHS

Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10



Photo #1

Photographer: Collin Carson

Date: 8-29-11

Description: Grouting of the south existing discharge pipes.



Photo #2

Photographer: Collin Carson

Date: 8-29-11

Description: Completed south discharge pipes being grouted.



Photo #3

Photographer: Collin Carson

Date: 8-31-11

Description: Grouting north discharge pipes on the west side of the levee.

Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10

Photo #7

Photographer: Collin Carson

Date: 9-28-11

Description: Completed extrusion welds booted on a transmission tower at the south pond.



Photo #8

Photographer: Collin Carson

Date: 10-03-11

Description: GSI crew members fusion welding at the south pond.

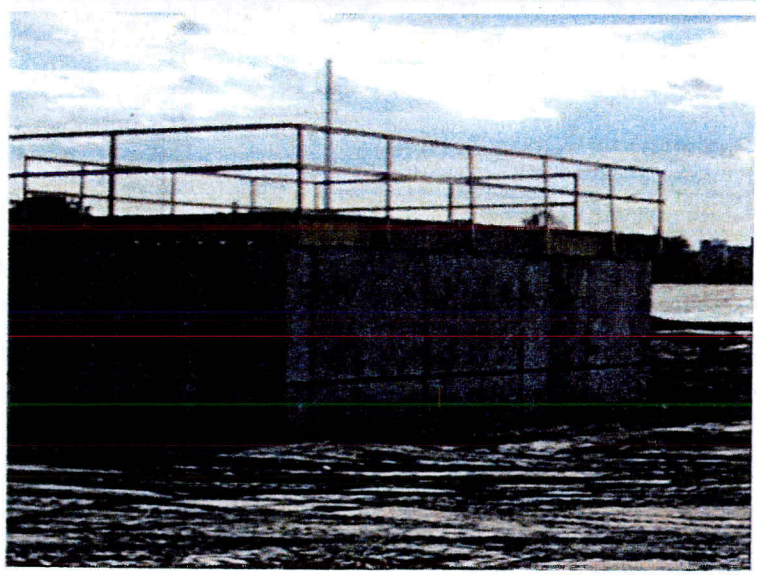


Photo #9

Photographer: Collin Carson

Date: 10-04-11

Description: North pump station being constructed.



Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10

Photo #4

Photographer: Collin Carson

Date: 9-07-11

Description: South pump station being constructed.



Photo #5

Photographer: Collin Carson

Date: 9-18-11

Description: View of subgrade from the south pond looking north.

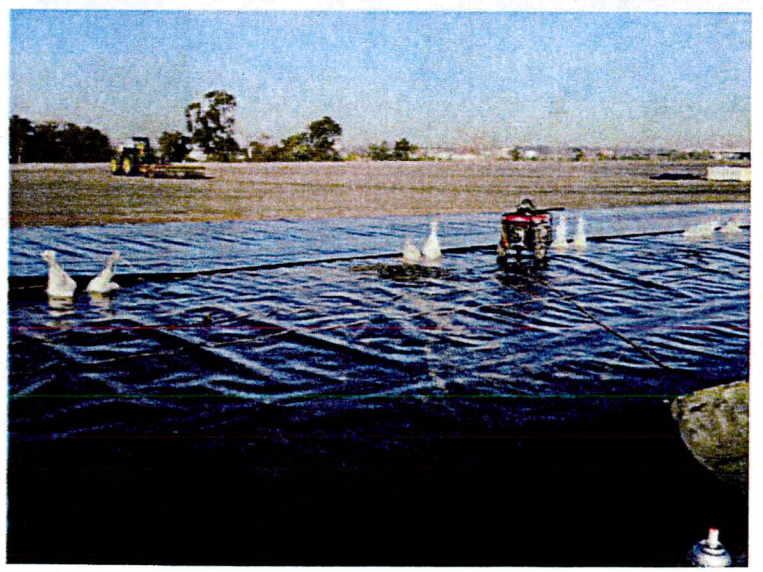


Photo #6

Photographer: Collin Carson

Date: 9-18-11

Description: Subgrade being rolled and graded. View from the south pond looking west.



Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10

Photo #10

Photographer: Collin Carson

Date: 10-04-11

Description: North pump station with pump and fuel tank being positioned.

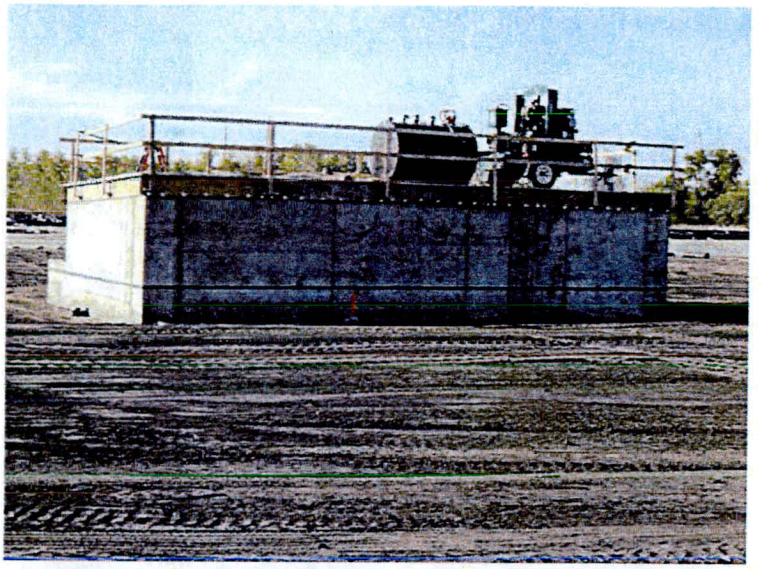


Photo #11

Photographer: Collin Carson

Date: 10-04-11

Description: Fill dirt being brought to the south pond. View looking south.



Photo #12

Photographer: Collin Carson

Date: 10-04-11

Description: Fill dirt being pushed into place by a dozer at the south pond. View looking west.



Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10

Photo #13

Photographer: Collin Carson

Date: 10-05-11

Description: GSI extrusion welding at the north pump station.



Photo #14

Photographer: Collin Carson

Date: 10-14-11

Description: View of subgrade from the north pond.

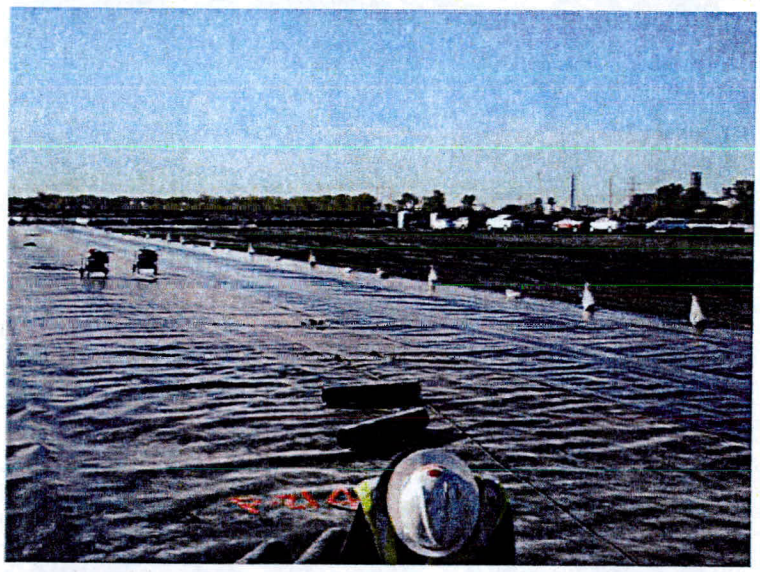


Photo #15

Photographer: Collin Carson

Date: 10-14-11

Description: Geocomposite held in place with sandbags at the south pond. View looking east.



Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10



Photo #16

Photographer: Collin Carson

Date: 10-24-11

Description: Geocomposite being sewn by a sewing machine. Photo taken at the high point between Pond 2 & 3 looking southwest.



Photo #17

Photographer: Collin Carson

Date: 10-25-11

Description: New south discharge pipe being put into place over levee road. View looking west.



Photo #18

Photographer: Collin Carson

Date: 11-12-11

Description: Vegetative cover graded in the south pond. View looking east.

Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10

Photo #19

Photographer: Collin Carson

Date: 11-21-11

Description: Fill dirt placed into the north pond. View looking south.



Photo #20

Photographer: Collin Carson

Date: 11-21-11

Description: Vegetative cover being placed in the north pond. View looking north.



Photo #21

Photographer: Collin Carson

Date: 11-21-11

Description: Vegetative cover in place and graded in the southwest corner of Pond 3. View looking east.



Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10



Photo #22

Photographer: Collin Carson

Date: 11-21-11

Description: Electric line and conduit being run to and from south pump station.



Photo #23

Photographer: Collin Carson

Date: 11-29-11

Description: Geocomposite being deployed in the north pond. View looking south.

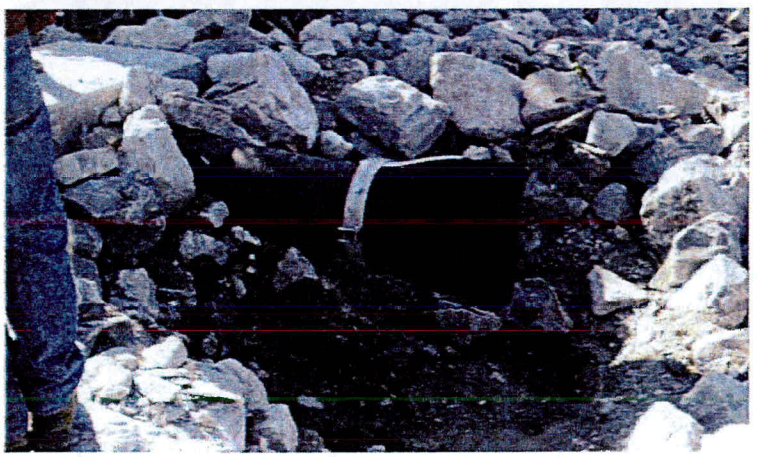


Photo #24

Photographer: Collin Carson

Date: 4-09-12

Description: New discharge pipe at the north side.

Ash Ponds 2 & 3 Closure
Venice Power Station
Aquaterra Project No. 4923.10



Photo #25

Photographer: Collin Carson

Date: 4-09-12

Description: Air being supplied to north discharge pipe.



Photo #26

Photographer: Collin Carson

Date: 4-10-12

Description: New discharge pipe at the south side.

Electronic Filing: Received, Clerk's Office 09/28/2020

APPENDIX C

DAILY FIELD ACTIVITIES REPORTS

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Ponds 2 & 3

Date: August 29, 2011
Start Time: 1300
Stop Time: 1500

Task: CQA

Weather Information
High 86° F -Low 65°F, Sunny, 5-10 mph West Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	Aquaterra-CMC
Bloomsdale Excavating-Supervisor Chuck Bauman	
4 Deere Tractors/1 CASE/4with double pans/1box	
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	
steer	

Work Areas/Boundaries
Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
None

Tests Completed/Observed
None

Work Comments/Observations and Test Results
Met with Mark Plocher of Plocher Construction and went over schedule and plan of attack regarding the pipe grouting and the 40mil. LLDPE liner installation. After meeting with Mr. Plocher, Josh Allen and Collin Carson visted Pond 3 and documented the excavation of the existing discharge pipe located at the south end of the project site.

Material(s) Delivered to Site
None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Ponds 2 & 3

Date: August 30, 2011
Start Time: 0800
Stop Time: 1300

Task: Ash Pond Closure CQA

Weather Information High 90° F -Low 64°F, Sunny, 5-10 mph South Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid
steer

Aquaterra-CMC

Work Areas/Boundaries

Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

Met with Matt Ballance, Scott & Mark Plocher, Glenn Eberhart, & James Patrick from 0830-1030. Discussed scheduling and tasks needed to be completeted in the scheduled time frame. Retrieved material inventory certification logs from Mark Plocher and verified that the correct amount of inventory was delivered. Met with Chuck Bauman from Bloomsdale Excavating, and discussed the subgrade and what will be the necessary standard for the deployment of the FML.

Material(s) Delivered to Site

None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: August 31, 2011
Start Time: 1300
Stop Time: 1530

Task: Fly Ash Pond Closure CQA

Weather Information

High 96° F -Low 69°F, Sunny, 10-15 mph South Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid
steer

Aquaterra-CMC

Work Areas/Boundaries

Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

Met with two laborers and James Patrick of Ameren. The laborers mixed 8 bags of Dayton Superior 107 Advantage grout, 50lb bags. The laborers poured 4 bags in each pipe on the east side of the levee. The pipe on the west side of the levee had aleady been plugged with grout.

Material(s) Delivered to Site

None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 1, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0900*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1530*
Project Location:	*Venice, IL*		
	Ponds 2 & 3		

Task: *Fly Ash Pond Closure CQA*

Weather Information *High 100° F -Low 68°F, Sunny, 5-10 mph South Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
Aquaterra-CMC
Badger Daylighting
Howard Concrete Pumping, Inc.

Work Areas/Boundaries

Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

Met with James Patrick and Mark Plocher at 0900 and they began to direct the grouting of the center pipe, located in the middle of both Ponds 2 & 3, from the west side. A plug was purchased to plug up the pipe because the valve would not close. 2 laborers assisted, 1 trackhoe operator dug around the pipe to create better access as well as 1 employee from Badger Daylilghting. An employee from Howard Concrete Pumping, Inc. was there to pump grout into the entire length of pipe, starting from the west side (Mississippi River) until it came out the east end. The plug was no longer necessary, instead a metal hatch was fabricated. It took 12 yards of grout to fill the entire length of pipe.

Material(s) Delivered to Site

12 yards of grout

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 2

Date: September 6, 2011
Start Time: 0830
Stop Time: 1200

Task: Fly Ash Pond Closure CQA

Weather Information
High 72° F -Low 48°F, Sunny, 10-15 mph N.W. Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid
steer
Aquaterra-CMC
CSI concrete trucks
Howard Concrete Pumping, Inc.

Work Areas/Boundaries
Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
None

Tests Completed/Observed
None

Work Comments/Observations and Test Results
Arrived on site at 0830. North pipe area was completely prepped and ready to be filled with grout. CSI was here as well as a Howard Concrete Pumping truck. In all 10 yards of grout were used to fill the north pipe, located in Pond 2. It was too dark to photograph the grout on the east side (Pond 2 side of levee), but I witnessed the grout flowing into east end from west end.

Material(s) Delivered to Site
10 yards of grout

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 9, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*1030*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1400*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 70° F -Low 56°F, Cloudy, Misty 5-10 mph NW Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

Met with Mark Plocher and James Patrick about scheduling for GSI. Met with Vince S. the superintendent for GSI and discussed schedule concerning the liner installation. Talked with surveyors about which certification was needed so suitable subgrade was prepared correctly for GSI, and be approved by Aquaterra.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 10, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1500*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 69° F -Low 58°F, Cloudy, Misty 5-10 mph NW Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

Met with GSI who spent their time preparing the job site for the deployment of FML. Operators moved rolls of inventory from staging area to actual project site and filled sand bags. Due to the weather the GSI superintendent made the call to not deploy FML unitl the following Monday, 9-12-11.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

AQUATERRA

ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 12, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1900*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 85° F -Low 58°F, Cloudy, Misty 5-10 mph S. Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*Panels 1-16, 304, 304 SF=6.98 Acres*
Air Tests	*12,867 LF Fusion Welded=26 Destructs*

Work Comments/Observations and Test Results

Met with GSI at 0700 and began deploying liner by 0730. James Patrick of Ameren was on-site all day observing the progress, that GSI makes. By the end of the day 16 panels of FML were deployed.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 13, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1800*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 89° F -Low 61°F, Cloudy, Misty 5-10 mph S. Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/TWP*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*246,120 SF=5.658 Acres*
Air Tests	*11,304 LF Fusion Welded=22 Destructs*

Work Comments/Observations and Test Results

Had 0730 meeting with Ameren group. Met GSI immedietaley thereafter and they began deploying. James Patrick wants survey markers where the acceptable subgrade meets the unacceptable. Seam 3-4 on the liner did not seam well due to the fly ash subgrade. The fly ash would roll up into the wedge and would deter it from moving forward, which in turn created "Burnouts." GSI began implementing a "Rub-sheet" which seperated the subgrade and the wedge from actually having direct contact with each other.

Material(s) Delivered to Site

None

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: September 14, 2011
Start Time: 0700
Stop Time: 1230

Task: Liner CQA

Weather Information High 69° F -Low 46°F, Cloudy, Rainy 5-10 mph NE Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

Air Tests

Work Comments/Observations and Test Results

Met with GSI superintendent at 0900, he sent laborers home. He kept his 2 QC's to try and finish some air testing. It rained the entire time. I collected destructs and shipped them off to TRI Environmental in Austin, Texas. By the time GSI called it a day it was 1230.

Material(s) Delivered to Site

None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 15, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 63° F -Low 46°F, Sunny, 5-10 mph NW Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

Air Tests

Work Comments/Observations and Test Results

Met with GSI superintendent at 0700 and talked about plan of attack. Mark Plocher is on vacation till next week, Skip Gall will be supervising until then. Due to all of the rain, there are no laborers on site, so there was no deployment of FML. 2 QC's completed air tests & 1 technician lystered patches on ares to be repaired. More destructs were laid out. TRI called and all destructs that were sent to lab had passed.

Material(s) Delivered to Site

40mil LLDPE Liner

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 16, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1800*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 64° F -Low 51°F; Partly Cloudy, 5-10 mph S. Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*177,996 SF=4.08 Acres*
Air Tests	*8,808 LF Fusion Welded=18 Destructs*

Work Comments/Observations and Test Results

Met with GSI and they began deploying FML. Met with surveyors from KDG, and pointed out which areas were to be certified. At days end GSI deployed panels 37-60. Because of so many repairs and destructs, I was still working on panels 16-36. I laid out up to destruct 58.

Material(s) Delivered to Site

2 Loads of 40mil LLDPE Liner

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: September 17, 2011
Start Time: 0700
Stop Time: 1730

Task: Liner CQA

Weather Information High 67° F -Low 51°F, Partly Cloudy, 5-10 mph E. Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds
Air Tests

Work Comments/Observations and Test Results

Met with GSI and Vince, the superintendent, decided to dedicate the day solely to to catching up on all repairs and air tests. I also laid out 18 destructs.

Material(s) Delivered to Site

None

Collin Carson
Aquaterra Personnel

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DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: September 19, 2011
Start Time: 0700
Stop Time: 1730

Task: Liner CQA

Weather Information
High 71° F -Low 57°F, Misty, Cloudy, 5-10 mph E. Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries
Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
Vacuum Box

Tests Completed/Observed
Vacuum Tests

Work Comments/Observations and Test Results
Met with GSI at 0700 and they began deploying geocomposite. Two technicians made repairs, and two other technicians vacuum tested the completed repairs. I was able to get caught up on all air testing. I also was able to send 50 destructs to TRI Environmental.

Material(s) Delivered to Site
None

Collin Carson
Aquaterra Personnel

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 20, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 80° F -Low 58°F, Sunny, 0-5 mph S. Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Vacuum Box

Tensiometer

Tests Completed/Observed

Vacuum Tests	*95,736 SF=2.20 Acres*
Trial Welds	*4,031 LF Seamed=8 Destructs*

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began deploying geocomposite and making repairs and vacuum testing the repairs. At 1230 GSI deployed FML in the southeast location of the project. Panels 61-75 were deployed.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

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DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: September 21, 2011
Start Time: 0700
Stop Time: 1800

Task: Liner CQA

Weather Information High 76° F -Low 50°F, Sunny, 0-5 mph S. Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	GSI-Supervisor Vince Sisoumphou
Bloomsdale Excavating-Supervisor Chuck Bauman	2 QC's-Tok S. & Kasol P.
4 Deere Tractors/1 CASE/4with double pans/1box	Support Truck & Van
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	1 - Kubota ATV 1-Deere Gator
steer	Aquaterra-CMC

Work Areas/Boundaries
Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
Tensiometer

Tests Completed/Observed

Trial Welds	222,721 SF=5.11 Acres
Air Testing	10,272 LF Seamed=21 Destructs

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began deploying FML and continued doing so until the late evening. At night's end GSI deployed panels 76-99. KDG, the surveyors, came out to the project site and certified more acceptable subgrade. I laid out destructs 85-95.

Material(s) Delivered to Site
None

Collin Carson
Aquaterra Personnel

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 22, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1230*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information

High 68° F -Low 51°F, Sunny, 0-5 mph NW. Winds
Rain came after Lunch

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/TWP*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*144,660 SF=3.30 Acres*
Air Testing	*4,991 LF Seamed=10 Destructs*

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began deploying FML and continued doing so until rain came. Panels 100-112 were deployed by 1200.

Material(s) Delivered to Site

Concrete

Collin Carson/Timothy Pool

Aquaterra Personnel

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ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 23, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information

High 70° F -Low 51°F, Sunny, 0-5 mph E. Winds
Rain came after Lunch

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-JA/TWP*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer
Vacuum Box

Tests Completed/Observed

Trial Welds	*70,196 SF=1.61 Acres*
Air Testing	*4,282 LF Seamed=9 Destructs*
Vacuum Tests	

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began deploying FML and continued doing so until rain came. Deployed panels 113 to 118.

Material(s) Delivered to Site

2 Loads of 40mil LLDPE

Joshua Allen/Timothy Pool
Aquaterra Personnel

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DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: September 26, 2011
Start Time: 0700
Stop Time: 1730

Task: Liner CQA

Weather Information High 68° F -Low 49°F, Sunny, 15-20 mph W. Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC/TP

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds
Air Testing

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began the day by deploying geocomposite. GSI had to prepare an area because the dirt trucks arrived for the first time. The area to begin accepting dirt was located in the southeast section of the project site in Pond 3. KDG, the surveyors, certified more subgrade to the north. Winds became too strong after lunch. GSI bagged up and secured all FML that has already been deployed then focused on repairs and the deployment of geocomposite.

Material(s) Delivered to Site

Fill dirt
3 Truck loads of geocomposite

Collin Carson/Timothy Pool
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: September 27, 2011
Start Time: 0700
Stop Time: 1730

Task: Liner CQA

Weather Information High 71° F -Low 58°F, Partly Cloudy, 10-15 mph NW. Winds

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	GSI-Supervisor Vince Sisoumphou
Bloomsdale Excavating-Supervisor Chuck Bauman	2 QC's-Tok S. & Kasol P.
4 Deere Tractors/1 CASE/4with double pans/1box	Support Truck & Van
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	1 - Kubota ATV 1-Deere Gator
steer	Aquaterra-CMC/TP

Work Areas/Boundaries
Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
Tensiometer
Vacuum Box

Tests Completed/Observed

Trial Welds	
Air Testing	
Vacuum Tests	

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began the day by deploying geocomposite and making repairs. GSI deployed 3 add-on panels located on the very south and west sides of the project to cover exposed fly ash. GSI air tested, welded, and vacuum tested the add-ons.

Material(s) Delivered to Site

Fill dirt	
4 Truck loads of geocomposite	

Collin Carson/Timothy Pool
Aquaterra Personnel

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ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 28, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 74° F -Low 59°F, Partly Cloudy, 5-10 mph S. Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/TWP*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*215,336 SF=4.94 Acres*
Air Testing	*12,196 LF Seamed=24 Destructs*

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began the day by deploying FML. GSI deployed FML until 1545, because they ran out of acceptable subgrade and could no longer deploy FML. Deployed panels 119 to 126, 99A to 76A, and 36A to 26A. GSI then went back to deploying geocomposite until 1730. More destructs were laid out as well.

Material(s) Delivered to Site

Fill dirt

7 Truck loads of geocomposite

Collin Carson/Timothy Pool

Aquaterra Personnel

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ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 29, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 80° F -Low 53°F, Sunny, 0-5 mph S. Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/TWP*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*215,336 SF=4.94 Acres*
Air Testing	*12,196 LF Seamed=24 Destructs*

Work Comments/Observations and Test Results

Met with GSI at 0700 and they began the day by making repairs, air testing, and deploying geocomposite. Fill dirt continued to be placed on geocomposite throughout the entire day. Beginning at 1000 Bloomsdale & Plocher began excavating 5' deep around the pylons of the power transformer located on the east side and south of the north power transformer, located at panel 103. After lunch winds became strong, 20-30 mph north and the possibility of "blacking out," the south pond becmae impossible. GSI continued making repairs and deploying geocomposite. I sent destructs 96-149 to TRI Environmental.

Material(s) Delivered to Site

Fill dirt

5 Truck loads of geocomposite

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*September 30, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 70° F -Low 50°F, Sunny, 10-20 mph NW Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer & Vacuum Box

Tests Completed/Observed

Trial Welds & Vacuum Tests

Work Comments/Observations and Test Results

Too windy to deploy in the morning hours, GSI then worked on repairs and deploying geocomposite. It was too windy to deploy after lunch as well. GSI continued with the same progress, making repairs and deploying geocomposite, GSI continued this work until 1730. Fill dirt was constatly hauled in throughout the entire day.

Material(s) Delivered to Site

Dirt & five loads of Geocomposite

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 1, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 70° F -Low 50°F, Sunny, 10-20 mph NW Winds*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-TWP*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*73,590 SF=1.69 Acres*
Air Tests	*7,504 LF Fusion Welded=15 Destructs*

Work Comments/Observations and Test Results

GSI deployed FML all day totalling 26 panels - 19A to 25A and 127 to 135. Dirt was hauled in as well, all day. Destructs were laid out.

Material(s) Delivered to Site

Dirt

Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 3, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 77° F -Low 39°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*133,213 SF=3.05 Acres*
Air Tests	*6000 LF Fusion Welded=12 Destructs*

Work Comments/Observations and Test Results

GSI began the day by deploying FML - panels 136 to 153 and 104A to 114A. Dirt trucks continued to haul the entire day. After lunch GSI deployed geocomposite and made more repairs. They continued with that progress until 1730.

Material(s) Delivered to Site

Dirt

Collin Carson

Aquaterra Personnel

AQUATERRA

ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 4, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Ponds 2 & 3		

Task: *Liner CQA*

Weather Information *High 78° F -Low 49°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/TWP*

Work Areas/Boundaries

Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds

Vacuum Tests

Work Comments/Observations and Test Results

Beginning at 0700 GSI began deploying geocomposite and making repairs. GSI also made repairs under the power transformer, located on the east side, out of the two it's the one more to the south. Fill dirt was hauled in throughout the entire day, as well. The same progress was made until 1730.

Material(s) Delivered to Site

Fill dirt

Geocomposite

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 5, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 78° F -Low 49°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds

Vacuum Tests

Work Comments/Observations and Test Results

GSI continued with the same progress as the previous day, 10-4-11 with repairs and the deployment of geocomposite.

Material(s) Delivered to Site

Fill dirt

Geocomposite

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 6, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 3		

Task: *Liner CQA*

Weather Information *High 84° F -Low 48°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid
steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC/TWP

Work Areas/Boundaries

Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer/Vacuum Box

Tests Completed/Observed

Trial Welds
Vacuum Tests

Work Comments/Observations and Test Results

GSI continued with the same progress as the previous day, 10-5-11 with repairs and the deployment of geocomposite.

Material(s) Delivered to Site

Fill dirt

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 7, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Ponds 2 & 3		

Task: *Liner CQA*

Weather Information *High 84° F -Low 51°F, Sunny, 5-10 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer/Vacuum Box

Tests Completed/Observed

Trial Welds

Vacuum Tests

Work Comments/Observations and Test Results

GSI continued once again deploying geocomposite and making repairs. Fill dirt continues to be hauled in on areas that have been tested and covered with geocomposite. Construction of the pipeline that will discharge from the south pump station to the river, began on the west side of the levee on 10/6/11 and continued into today. This has been documented via photographs.

Material(s) Delivered to Site

Fill dirt

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 8, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Ponds 2 & 3		

Task: *Liner CQA*

Weather Information *High 83° F -Low 51°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Ponds 2 & 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds

Work Comments/Observations and Test Results

GSI continued to make repairs and to deploy geocomposite. They continued with the same progress all day.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 10, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1800*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 79° F -Low 52°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*Panels 158-199=206,729 Sq. ft. =4.74 Acres*
Air Tests	*10,069 LF Seamed=20 Destructrs*

Work Comments/Observations and Test Results

GSI began the day by prepping area for the deployment of FML in the north Pond 2 section. Panels 158 to 199 were deployed. Additional air test numbers will start over with the number 1, beginning today. Electrical conduit was brought to the site today for the pump station structures, from the staging area.

Material(s) Delivered to Site

Fill dirt

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 11, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1800*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 79° F -Low 56°F, Cloudy, Chance of Rain 0-5 mph S.E. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*Panels 200-211=55,972 SF=1.28 Acres*
Air Tests	*2,942 LF Seamed=6 Destructs*

Work Comments/Observations and Test Results

GSI began by deploying FML while also making repairs. GSI deployed Panels 200-211. Beginning after 1100 GSI continued making repairs and deploying geocomposite simultaneously.

Material(s) Delivered to Site

Fill dirt

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 12, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1000*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 75° F -Low 55°F, Cloudy, Rainy, 0-5 mph N. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Vacuum Box

Tests Completed/Observed

Trial Welds

Vacuum Tests

Work Comments/Observations and Test Results

GSI began the day by deploying geocomposite, pulling destructs, and making patches on repairs. At 1000 the rain really came down and GSI stopped work for the day.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

AQUATERRA

ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 13, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 73° F -Low 48°F, Misty, Cloudy, 0-5 mph N. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer/Vacuum Box

Tests Completed/Observed

Trial Welds

Vacuum Tests

Work Comments/Observations and Test Results

GSI deployed geocomposite over tested and passed areas, Panels 158-211.

Material(s) Delivered to Site

Fill dirt

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 14, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1700*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 73° F -Low 47°F, Sunny, Windy, 20-30 mph W. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid
steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC/TWP

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds
75,262 SF=1.73 Acres

Work Comments/Observations and Test Results

By 1130 GSI had deployed Panels 212-222, but stopped deployment due to the windy conditons. After lunch GSI made repairs and deployed geocomposite.

Material(s) Delivered to Site

Fill dirt

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 17, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1100*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 63° F -Low 42°F, Cloudy, 5-10 mph NW. Winds, Rain later in afternoon*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/TWP*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*115,714Sq. ft=2.65 Acres*
Air Tests	*5,708 L:F Seamed=11 Destructs*

Work Comments/Observations and Test Results

By 1130 GSI had deployed Panels 212-222, but stopped deployment due to the windy conditons. After lunch GSI made repairs and deployed geocomposite.

Material(s) Delivered to Site

Fill dirt

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 19, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1100*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 54° F -Low 46°F, Cloudy, Rainy, 10-15 mph NW. Winds,*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/RRA*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Vacuum Box

Tests Completed/Observed

Trial Welds

Vacuum Tests

Work Comments/Observations and Test Results

GSI worked in the rain unitl 1100, when it became too much to work in. Before 1100 geocomposite was deployed and a minimal amount of repairs were made. GSI did employ the use of a tent to shield the repairs from moisture, that then allowed them to make the repairs.

Material(s) Delivered to Site

None

Collin Carson/Ryan Ayers

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 20, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 56° F -Low 35°F, Windy, 20-25 mph NW. Winds,*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid
steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC/TWP

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer
Vacuum Box

Tests Completed/Observed

Trial Welds
Vacuum Tests
Destructive Field Tests

Work Comments/Observations and Test Results

GSI began the day by deploying geocomposite and making repairs. CMC layed out destructs and all passed in the field. After lunch same progress was made, and work until 1600.

Material(s) Delivered to Site

None

Collin Carson/Timothy Pool

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 21, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1530*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 62° F -Low 42°F, Sunny, 5-10 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-TWP*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Vacuum Box

Tests Completed/Observed

Trial Welds	*155,509 SF=3.57 Acres*
Vacuum Tests	*6,339 LF Seamed=13 Destructs*
Air Tests	

Work Comments/Observations and Test Results

Throughout the entire day GSI deployed FML, all while testing everything as it was laid out.

Material(s) Delivered to Site

None

Timothy Pool

Aquaterra Personnel

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ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 24, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1730*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 72° F -Low 54°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Tests Completed/Observed

Trial Welds	*176,537 SF=4.05 Acres*
Air Tests	*8,116 LF Seamed=16 Destructs*

Work Comments/Observations and Test Results

GSI began the day by continuing to deploy FML and make repairs at the same time. By lunch 2.5 acres of FML have been deployed. Fill dirt was continually hauled in as well. 4 Acres were deployed by days end, roughly leaving 2 acres to go until project would completely be covered by 40mil LLDPE liner.

Material(s) Delivered to Site

Fill dirt

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 25, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 72° F -Low 54°F, Sunny, 0-5 mph S. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher.	*GSI-Supervisor Vince Sisoumphou*
Bloomsdale Excavating-Supervisor Chuck Bauman	*2 QC's-Tok S. & Kasol P.*
4 Deere Tractors/1 CASE/4with double pans/1box	*Support Truck & Van*
scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid	*1 - Kubota ATV 1-Deere Gator*
steer	*Aquaterra-CMC/RRA*

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer

Vacuum Box

Tests Completed/Observed

Trial Welds	*71,838 SF=1.65 Acres*
Air Tests	*3,589 LF Seamed=7 Destructs*
Vacuum Tests	

Work Comments/Observations and Test Results

GSI began the day by deploying in the northeast comer of project site. By 1200 GSI had finished deploying FML. After lunch, it became too windy to deploy geocomposite. GSI focused on repairing around the north pump station structure because of the forecasted weather.

Material(s) Delivered to Site

Fill dirt

Collin Carson/Ryan Ayers

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 26, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1300*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 67° F -Low 43F, Sunny, 10-15 mph NW. Winds, Rain developing after Lunch*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC/RRA

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tests Completed/Observed

Work Comments/Observations and Test Results

GSI began the day by deploying geocomposite and making the final repairs. By 1200 it began raining and GSI called an early end to the day.

Material(s) Delivered to Site

Fill dirt

Collin Carson/Ryan Ayers

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 27, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 56° F -Low 36°F Cloudy, 10-15 mph NW. Winds, Rain in the Morning*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tests Completed/Observed

Work Comments/Observations and Test Results

GSI continued to deploy geocomposite and make final repairs.

Material(s) Delivered to Site

None

Collin Carson

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 28, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 62° F -Low 35°F Sunny, 5-10 mph NW. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC/RRA

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tests Completed/Observed

Work Comments/Observations and Test Results

GSI continued to deploy geocomposite and make final repairs.

Material(s) Delivered to Site

Fill dirt

Collin Carson/Ryan Ayers

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*October 31, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1600*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 65° F -Low 38°F Sunny, 5-10 mph W. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer
Vacuum Box

Tests Completed/Observed

Trial Welds
Vacuum Tests

Work Comments/Observations and Test Results

GSI deployed geocomposite and finished making repairs on the north side of project (bottom of north ditch). Plocher construction laborers as well as Bloomsdale's operators prepped subgrade area so GSI can complete the FML on entire project.

Material(s) Delivered to Site

Fill dirt/Top soil

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 2

Date: November 1, 2011
Start Time: 0700
Stop Time: 1600

Task: Liner CQA

Weather Information High 72° F -Low 36°F Sunny, 5-10 mph W. Wind

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince Sisoumphou
2 QC's-Tok S. & Kasol P.
Support Truck & Van
1 - Kubota ATV 1-Deere Gator
Aquaterra-CMC

Work Areas/Boundaries
Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
Tensiometer

Tests Completed/Observed
Trial Welds

Work Comments/Observations and Test Results
GSI added FML sections to the already placed panels, located on the north side of the project in the north ditch. Geocomposite was deployed until the final available roll was deployed. GSI ordered 3 more acres of geocomposite and said that will have to remobilize to finish the work later in the month of November.

Material(s) Delivered to Site
Fill dirt/Top soil

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

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DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*November 21, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1700*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 50° F -Low 40°F Cloudy, 5-10 mph W. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Eddy Newell
1 QC/ 4 Laborers
1 Support Truck
Aquaterra-RA

Work Areas/Boundaries

Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

GSI straightened out geocomposite blown out of place from strong winds. After GSI fixed the material they then depolyed 6 rolls of geocomposite. At the end of the day GSI deployed 33,600 square feet of geocomposite.

Material(s) Delivered to Site

None

Ryan Ayers

Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 2

Date: November 23, 2011
Start Time: 0700
Stop Time: 1700

Task: Liner CQA

Weather Information
High 53° F -Low 39°F Cloudy, 5-10 mph N. Wind

Contractors, Personnel, and Equipment On Site
Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Eddy Newell
1 QC/ 12 Laborers
3 Support Trucks/2 ATV's
Aquaterra-CMC

Work Areas/Boundaries
Pond 2

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
None

Tests Completed/Observed
None

Work Comments/Observations and Test Results
Met with GSI's superintendent Eddy Newell. He explained to me how slow things are going with the wet conditions. There were 10 laborers total, but 2 more showed up. Talked with Mark Plocher and he said that on Friday the south pump structure will be ready for GSI to make a "boot" repair.

Material(s) Delivered to Site
None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 2

Date: November 25, 2011
Start Time: 0700
Stop Time: 1700

Task: Liner CQA

Weather Information

High 64° F -Low 38°F Cloudy, 10-20 mph S. Wind

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Eddy Newell
1 QC/ 12 Laborers
3 Support Trucks/2 ATV's
Aquaterra-CMC

Work Areas/Boundaries

Pond 2 Geocomposite Install & Pond 3 Boot on West side of South Pond Structure.

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

None

Tests Completed/Observed

None

Work Comments/Observations and Test Results

GSI cleaned mud off very northern edge of project of FML located in the ditch, so GSI could finish deploying geocomposite. GSI also worked on placing a boot on the south pump structure.

Material(s) Delivered to Site

None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name:	*Ameren*	**Date:**	*November 28, 2011*
Aquaterra Project Name:	*Fly Ash Pond Closure*	**Start Time:**	*0700*
Aquaterra Project Number:	*4923.10*	**Stop Time:**	*1700*
Project Location:	*Venice, IL*		
	Pond 2		

Task: *Liner CQA*

Weather Information *High 45° F -Low 30°F Cloudy, 5-10 mph N.W. Wind*

Contractors, Personnel, and Equipment On Site

Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Eddy Newell
1 QC/ 12 Laborers
3 Support Trucks/2 ATV's
Aquaterra-CMC

Work Areas/Boundaries

Pond 2 Geocomposite Install & Pond 3 Boot on West side of South Pond Structure.

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Vacuum Box
Tensiometer

Tests Completed/Observed

Trial Weld
Vacuum Test

Work Comments/Observations and Test Results

GSI completed geocomposite on north section of project. Also, GSI completed repair (boot) on the south pump structure discharge pipe. The North pump structure is not ready for repair at this time. It is unknown when GSI will be able to make this repair.

Material(s) Delivered to Site

None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

DAILY FIELD ACTIVITIES REPORT

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Aquaterra Project Number: 4923.10
Project Location: Venice, IL
Pond 3

Date: March 1, 2012
Start Time: 1630
Stop Time: 1830

Task: Liner CQA

Weather Information
High 63° F -Low 40°F Sunny, 10-15 mph South Wind

Contractors, Personnel, and Equipment On Site
Plocher Const.-Supervisor Mark Plocher
Bloomsdale Excavating-Supervisor Chuck Bauman
4 Deere Tractors/1 CASE/4 with double pans/1box scraper/2 Trackhoes/1 water truck/2 Lull Lifts/CAT skid steer
GSI-Supervisor Vince S.
2 QC/ 20 Laborers
1 Support Truck/1 John Deere Gator
Aquaterra-CMC

Work Areas/Boundaries
Pond 3

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation
Vacuum Box
Tensiometer

Tests Completed/Observed
Trial Weld
Vacuum Test

Work Comments/Observations and Test Results
A large air bubble was trapped under the liner near the south pump station. Plocher punctured the liner to release the air. GSI arrived onsite at 1700 and made the repair at the puncture point. Bloomsdale covered the repair area with dirt due to the impending rain. Left site at 1830.

Material(s) Delivered to Site
None

Collin Carson
Aquaterra Personnel

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.

Electronic Filing: Received, Clerk's Office 09/28/2020

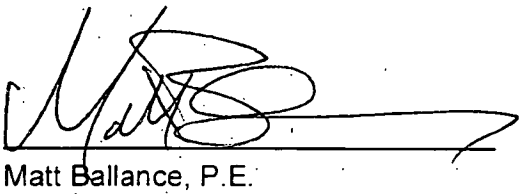
APPENDIX D

CQA OFFICER-IN-ABSENTIA DOCUMENTATION

CQA Officer-In-Absentia Designation
Ash Ponds 2 & 3 Closure
Venice Power Station

As the construction quality assurance (CQA) officer assigned to the completion of the final cover construction and closure of the Ash Ponds 2 & 3 at the Venice Power Station in Venice, Illinois, I assume full responsibility for the CQA services performed during the completion of this project. I will be absent at times from the project site during the completion of the ash pond closure construction.

During my absence from the site, I appoint Collin Carson, Randy Homburg, Tim Pool, and Josh Allen of Aquaterra to serve the CQA roles of project CQA technician and CQA Officer-in-Absentia to perform the required CQA services and oversee the project construction activities. These individuals are technically qualified and experienced to perform the CQA services. I assume responsibility for all inspections and reports completed by the CQA officer-in-absentia during the absence of the CQA officer.



Matt Ballance, P.E.
CQA Officer

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APPENDIX E

SURVEY RECORDS

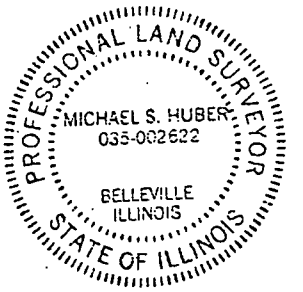
September 22, 2011

Scott Plocher
Plocher construction
2808 Thole Plocher Road, Highland, Il. 62249

Cc: Aquaterra – Environmental
Attn: Matthew Ballance

Kuhlmann Design Group, inc. on September 21, 2011 performed an as-built survey of the south Ash pond closure area at the Ameren Venice Power Plant. During the as-built survey of ground data, specific vertical datum at pre-determined horizontal positions were checked for vertical accuracy collected on September 15, 2011. The following is the data comparison by point number that was collected:

Point Number	Elev. 9-15-11	Elev. 9-16-11 (KDG)	Diff.
1	430.30	430.32	.02
2	430.25	430.27	.02
3	429.75	429.77	.02
4	429.25	429.27	.02
5	428.70	428.72	.02
6	428.00	428.02	.02



Michael S. Huber 9.22.11

Michael S. Huber, PLS — Date
Illinois PLS NO. 035.002622 EXP: 11/30/12

Electronic Filing: Received, Clerk's Office 09/28/2020

October 13, 2011

Scott Plocher
Plocher construction
2808 Thole Plocher Road, Highland, Il. 62249

Cc: Aquaterra – Environmental
Attn: Matthew Ballance

Kuhlmann Design Group, inc. on October 13, 2011 performed an as-built survey of the south Ash pond closure area at the Ameren Venice Power Plant. During the as-built survey of ground data, specific vertical datum at pre-determined horizontal positions were checked for vertical accuracy collected on October 12, 2011. The following is the data comparison by point number that was collected:

Point Number	Elev. 10-12-11	Elev. 10-13-11 (KDG)	Diff.
1220	428.05	428.04	.01
1223	428.09	428.10	.01
1226	428.11	428.10	.01
1230	427.85	427.83	.02
1238	427.12	427.08	.04
1244	427.23	427.20	.03
1248	428.78	428.77	.01
1253	428.65	428.62	.03
1255	427.36	427.33	.03
1262	428.59	428.55	.04
1268	429.62	429.58	.04
1270	428.41	428.39	.02
1273	427.53	427.51	.02
1276	427.81	427.78	.03
1279	429.35	429.31	.04
1285	429.77	429.76	.01
1288	428.54	428.52	.02
1291	428.58	428.55	.03
1293	428.57	428.58	.01
1295	429.24	429.20	.04

Michael S. Huber, PLS — Date
Illinois PLS NO. 035.002622 EXP: 11/30/12

April 5, 2012

Scott Plocher
Plocher construction
2808 Thole Plocher Road, Highland, Il. 62249

Cc: Aquaterra – Environmental
Attn: Matthew Ballance

Kuhlmann Design Group, inc. on April 4, 2012 performed an as-built survey of the south Ash pond closure area at the Ameren Venice Power Plant. During the as-built survey of finish ground data, specific vertical datum at pre-determined horizontal positions were checked for vertical accuracy collected on April 3, 2012. The following is the data comparison by point number that was collected:

Point Number	Elev. 4-3-12	Elev. 4-4-12 (KDG	Diff.
288	435.38	435.41	-0.03
292	439.56	439.55	0.01
294	436.77	436.75	0.02
296	433.67	433.66	0.01
297	433.66	433.69	-0.03
300	437.62	437.66	-0.04
303	437.22	437.24	-0.02
2351	433.30	433.38	-0.08
2354	435.49	435.56	-0.07
2357	435.40	435.43	-0.03
2362	434.78	434.82	-0.04
2366	432.87	432.89	-0.02
2372	434.97	434.99	-0.02
2373	435.38	435.38	0.00
2376	431.86	431.82	0.04
2380	433.41	433.47	-0.06
2383	433.65	433.62	0.03
2387	433.72	433.79	-0.07
2392	431.68	431.68	0.00
2395	432.44	432.50	-0.06
2398	432.14	432.15	-0.01
2400	431.72	431.68	0.05
2403	435.51	435.51	0.00
2405	430.91	430.92	-0.01
2407	431.33	431.33	0.00
2411	431.18	431.18	0.00
2417	433.57	433.59	-0.02
2420	430.40	430.38	0.02

2424	430.31	430.36	-0.05
2428	436.29	436.35	-0.06
2435	438.16	438.11	0.05
2469	433.42	433.48	-0.06
2471	430.67	430.72	-0.04
2479	431.51	431.44	0.07
2482	434.07	434.10	-0.03
2484	431.50	431.41	0.09
2486	432.95	432.89	0.06
2490	430.92	430.92	0.00
2493	433.51	433.55	-0.04
2497	433.39	433.45	-0.06
2500	431.57	431.62	-0.05
2502	431.46	431.42	0.04
2504	432.92	432.92	0.00
2506	432.47	432.45	0.02
2510	432.62	432.64	-0.01
2512	433.44	433.49	-0.05
2522	437.10	437.11	-0.01
2531	424.58	424.56	0.02
2534	421.57	421.61	-0.04
2537	421.66	421.60	0.06
2540	421.47	421.52	-0.05
2546	432.90	432.86	0.04
2550	433.33	433.30	0.03
2553	433.25	433.23	0.02
2559	433.41	433.42	-0.01
2561	433.09	433.11	-0.02
2563	433.12	433.12	0.00
2564	433.09	433.08	0.01
2566	432.97	432.92	0.06
2568	432.93	432.95	-0.02
2569	433.11	433.09	0.02
2571	432.84	432.87	-0.03
2573	433.08	433.10	-0.02
2575	432.94	432.89	0.05
2577	432.95	432.91	0.04
2579	432.89	432.88	0.01
2581	433.11	433.11	0.00
2902	429.33	429.26	0.07
2904	429.47	429.38	0.09
2908	429.73	429.73	0.00
2911	430.22	430.20	0.02
2914	430.57	430.51	0.06
2916	430.87	430.84	0.03
2919	431.37	431.36	0.01
2922	432.14	432.22	-0.08
2925	432.86	432.85	0.01
2934	430.80	430.86	-0.06
2938	429.38	429.36	0.02

2943	428.88	428.91	-0.03
2947	431.71	431.68	0.03
2950	431.07	431.04	0.03
2953	430.11	430.18	-0.07
2956	429.67	429.59	0.08
2959	428.61	428.60	0.01
2963	428.55	428.51	0.04
2966	428.86	428.90	-0.04
2970	428.16	428.16	0.00
2973	428.38	428.32	0.06
2977	428.30	428.37	-0.07
2980	428.21	428.26	-0.05
2983	428.47	428.52	-0.05
2986	429.43	429.49	-0.06
2989	430.01	430.06	-0.05
2992	430.54	430.59	-0.05
2995	431.55	431.60	-0.05
2998	432.07	432.13	-0.06
2999	432.88	432.91	-0.03
3002	433.03	432.99	0.04
3005	432.88	432.83	0.05
3008	432.83	432.81	0.02
3011	433.02	432.99	0.03
3014	432.99	433.06	-0.07
3017	433.02	433.00	0.02
3020	433.05	433.00	0.06
3022	433.63	433.63	0.00
3026	432.82	432.79	0.03
3029	432.64	432.70	-0.06
3032	432.78	432.87	-0.09
3036	432.85	432.86	-0.01
3039	432.71	432.64	0.07
3042	432.64	432.70	-0.06
3045	432.83	432.83	0.00
3048	432.50	432.47	0.03

Michael S. Huber, PLS Date
Illinois PLS NO. 035.002622 EXP: 11/30/12

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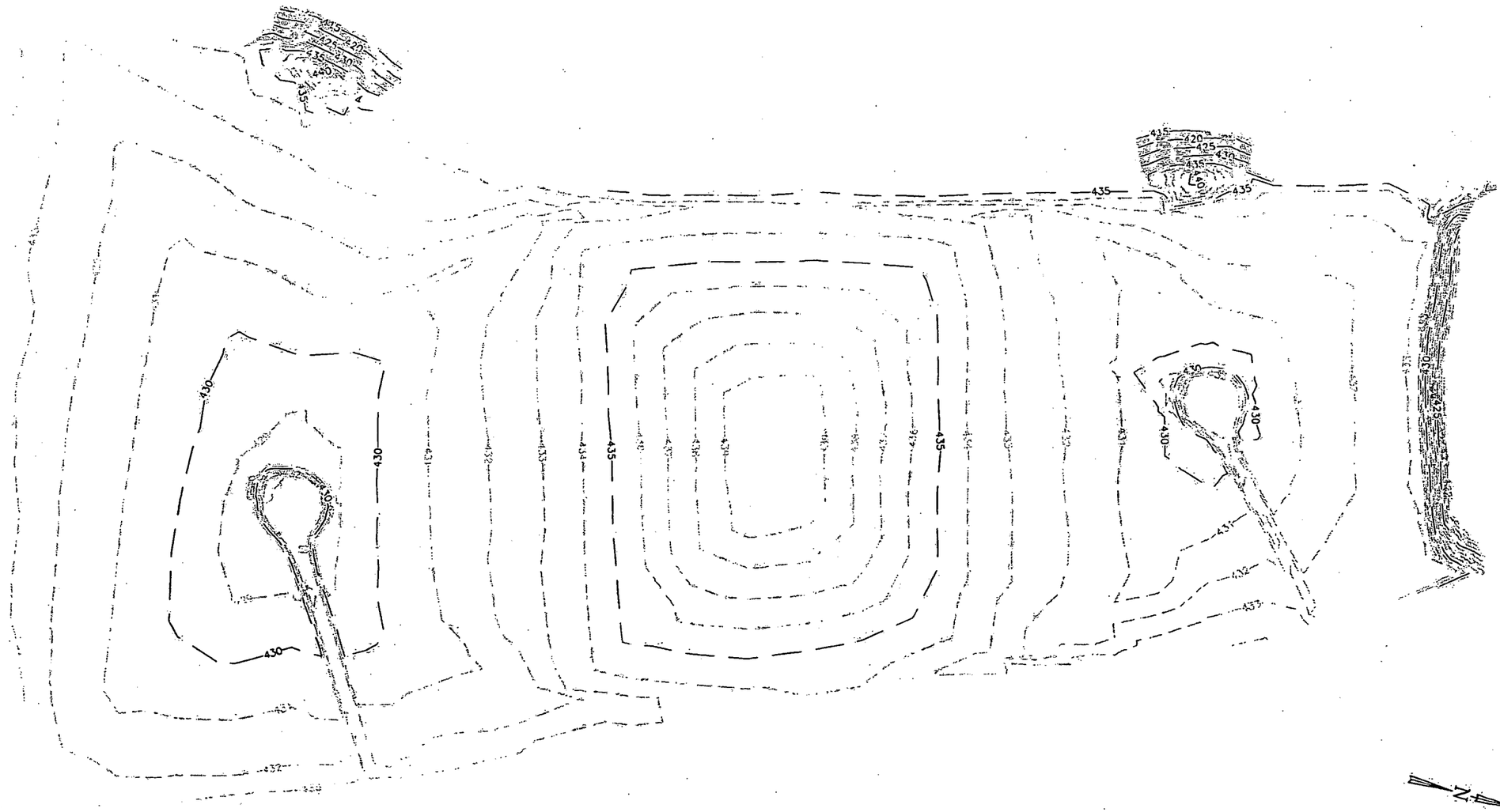

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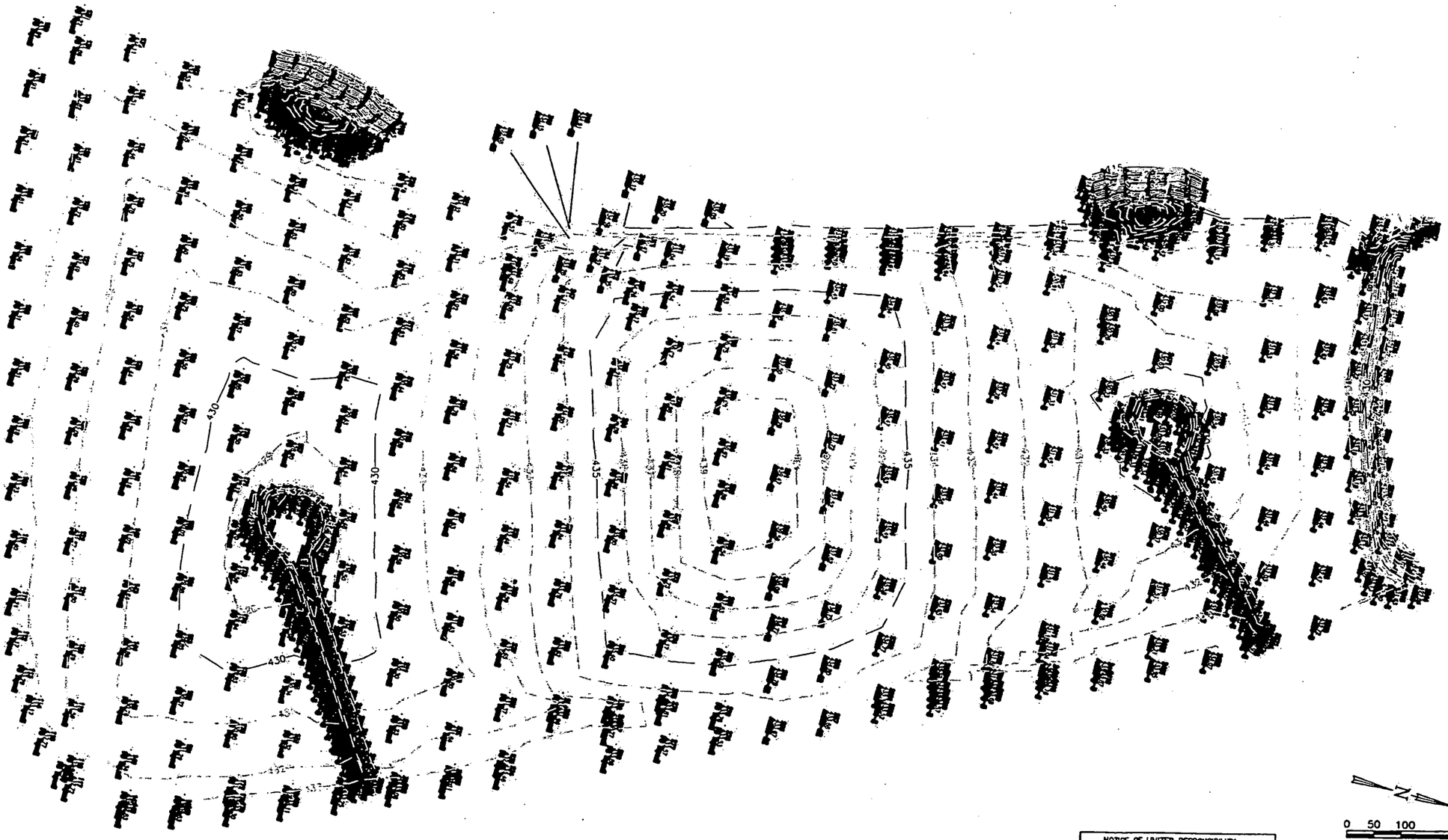

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CHK/REVW

SUPV.

APPD.

FINAL GRADING TIN MODEL
ASH POND CLOSURE PLAN
VENICE POWER STATION
VENICE, ILLINOIS

LOCATION 001012

CLASS 0210

Ameren ST. LOUIS, MISSOURI

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APPENDIX F

GEOMEMBRANE LINER AND GEOCOMPOSITE INSTALLATION DOCUMENTATION

Included in this Appendix:

- Geomembrane Liner Contractor's Subgrade Acceptance Report
- Geomembrane Liner Material Inventory Records
- Geomembrane Liner Conformance Test Results
- Geocomposite Conformance Test Results
- Geomembrane Liner Panel As-Built Drawing
- Geomembrane Liner Panel Placement Records
- Geomembrane Liner Trial Weld Records
- Geomembrane Liner Seam/Non-Destructive Testing Records
- Geomembrane Liner Additional Non-Destructive Test Records
- Geomembrane Liner Destructive Test Records
- Geomembrane Liner Destructive Laboratory Test Results
- Geomembrane Liner Repair Records

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GEOMEMBRANE LINER CONTRACTOR'S SUBGRADE ACCEPTANCE REPORT

Subgrade Surface Acceptance

Date: 9/12/2011

Project: AMEREN VENICE Superintendent: VINCE SISOUMPHOU

Project # 31045

Location: Venice, IL **Partial:** 1 **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 1 TO PANELS 16 ON ASH POND #3.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 1 Area Accepted 306,240 s.f. Total Area Accepted to date: 306,240 s.f.

Subgrade Acceptance

Sheet___of___

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Subgrade Surface Acceptance

Date: 9/13/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 17 TO PANELS 36 ON ASH POND #3.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 2 Area Accepted 246,120 s.f. Total Area Accepted to date: 552,360 s.f.

Subgrade Acceptance

Sheet ___ of ___

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Subgrade Surface Acceptance

Date: 9/17/2011

Project: AMEREN VENICE Superintendent: VINCE SISOUMPHOU

Project # 31045

Location: Venice, IL **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 37 TO PANELS 60 ON ASH POND #3.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 3 Area Accepted 177,984 s.f. Total Area Accepted to date: 730,344 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 9/20/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 61 TO PANELS 75 ON ASH POND #3.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 4 Area Accepted 95,736 s.f. Total Area Accepted to date: 826,080 s.f.

Subgrade Acceptance

Sheet___of___

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Subgrade Surface Acceptance

Date: 9/21/2011

Project: AMEREN VENICE Superintendent: VINCE SISOUMPHOU

Project # 31045

Location: Venice, IL **Partial:** XXX **Final:**

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 76 TO PANELS 99 ON ASH POND #3.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 5 Area Accepted 222,721 s.f. Total Area Accepted to date: 1,048,803 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 9/22/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 100 TO PANELS 112 ON ASH POND #3 AND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 6 Area Accepted 144,660 s.f. Total Area Accepted to date: 1,193,463 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 9/23/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 113 TO PANELS 118 ON ASH POND #3 AND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 7 Area Accepted 68,162 s.f. Total Area Accepted to date: 1,261,625 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 9/28/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 119 TO PANELS 126 AND 99A TO 76A, 36A-26A ON ASH POND #3 AND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 8 Area Accepted 215,336 s.f. Total Area Accepted to date: 1,476,961 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/1/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 19A TO PANELS 25A AND 127 TO 135 ON ASH POND #3 AND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 9 Area Accepted 73,590 s.f. Total Area Accepted to date: 1,550,551 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/3/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 136 TO PANELS 153 AND 104A TO 114A ON ASH POND #3 AND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 10 Area Accepted 133,213 s.f. Total Area Accepted to date: 1,683,764 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/10/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 154 TO PANELS 199 ON POND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 11 Area Accepted 206,729 s.f. Total Area Accepted to date: 1,890,493 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/11/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 200 TO PANELS 211 ON POND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 12 Area Accepted 55,972 s.f. Total Area Accepted to date: 1,946,465 s.f.

Subgrade Acceptance

Sheet___of___

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/15/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 212 TO PANELS 222 ON POND #2

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 13 Area Accepted 75,262 s.f. Total Area Accepted to date: 2,021,727 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/17/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:**

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 223 TO PANELS 238 ON POND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 14 Area Accepted 115,720 s.f. Total Area Accepted to date: 2,137,447 s.f.

Subgrade Acceptance

Sheet ___ of ___

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/21/2011

Project: AMEREN VENICE Superintendent: VINCE SISOUMPHOU

Project # 31045

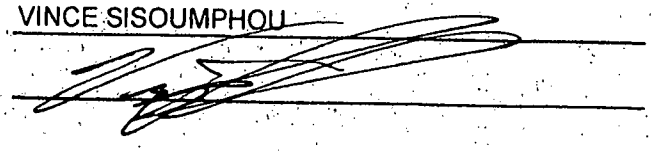
Location: Venice, IL **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 239 TO PANELS 264 ON POND #2

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU



For Owner / Contractor

Collin Carson



Acceptance Number: 15 Area Accepted 155,595 s.f. Total Area Accepted to date: 2,293,042 s.f.

Electronic Filing: Received, Clerk's Office 09/28/2020

Subgrade Surface Acceptance

Date: 10/24/2011

Project: **AMEREN VENICE** Superintendent: **VINCE SISOUMPHOU**

Project # **31045**

Location: **Venice, IL** **Partial:** XXX **Final:** _____

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSI does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

FROM PANEL 265 TO PANELS 297 ON POND #2.

For GEO-SYNTHETICS, INC.

VINCE SISOUMPHOU

For Owner / Contractor

Collin Carson

Acceptance Number: 16 Area Accepted 176,537 s.f. Total Area Accepted to date: 2,469,579 s.f.

Subgrade Acceptance

Sheet___of___

Electronic Filing: Received, Clerk's Office 09/28/2020

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOMEMBRANE LINER MATERIAL INVENTORY RECORDS

Material Inventory Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*

Project Location: *Venice, Illinois*

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
08/25/11	101162093	BL-0055974	22.5	870	19575	08/25/11	09/20/11	Panels 62 & 63
08/25/11	101162096	BL-0055974	22.5	870	19575	08/25/11	10/01/11	Panels 134, 157, & 102A
08/25/11	101162099	BL-0055974	22.5	870	19575	08/25/11	10/01/11	Panels 139-141
08/25/11	101162100	BL-0055974	22.5	870	19575	08/25/11	09/20/11	Panels 74, 75, 114, 114A
08/25/11	101162101	BL-0055974	22.5	870	19575	08/25/11	09/12/11	Panel 6
08/25/11	101162102	BL-0055974	22.5	870	19575	08/25/11	09/13/11	Panel 17
08/25/11	101162104	BL-0055974	22.5	870	19575	08/25/11	09/13/11	Panel 18
08/25/11	101162105	BL-0055974	22.5	870	19575	08/25/11	09/26/11	Panels 124 & 125
08/25/11	101162115	BL-0055974	22.5	870	19575	08/25/11	09/12/11	Panel 2
08/25/11	101162116	BL-0055974	22.5	870	19575	08/25/11	10/01/11	Panels 137 & 138
08/25/11	101162117	BL-0055974	22.5	870	19575	08/25/11	09/12/11	Panel 1
08/25/11	101162124	BL-0055974	22.5	870	19575	08/25/11	09/20/11	Panels 67-70
08/25/11	101162122	BL-0055949	22.5	870	19575	08/25/11	10/21/11	Panels 263 & 265-267
08/25/11	101162131	BL-0055949	22.5	870	19575	08/25/11	10/21/11	Panels 239 & 240
08/25/11	101162133	BL-0055949	22.5	870	19575	08/25/11	10/17/11	Panels 228-230
08/25/11	101162134	BL-0055949	22.5	870	19575	08/25/11		
08/25/11	101162136	BL-0055949	22.5	870	19575	08/25/11	10/25/11	Panels 312 & 313
08/25/11	101162137	BL-0055949	22.5	870	19575	08/25/11	10/25/11	Panels 308, 310, 311, 314, & 315
08/25/11	101162152	BL-0055949	22.5	870	19575	08/25/11	10/24/11	Panels 294 & 296
08/25/11	101162154	BL-0055949	22.5	870	19575	08/25/11	10/21/11	Panels 259-262

Electronic Filing: Received, Clerk's Office 09/28/2020

Material Inventory Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*
Project Location: *Venice, Illinois*

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
08/25/11	101162162	BL-0055949	22.5	870	19575	08/25/11	10/25/11	Panels 299 & 301-304
08/25/11	101162170	BL-0055949	22.5	870	19575	08/25/11	10/24/11	Panels 295, 297, 298, & 300
08/25/11	101162174	BL-0055949	22.5	870	19575	08/25/11	10/24/11	Panels 278-280
08/25/11	101162180	BL-0055949	22.5	870	19575	08/25/11	10/25/11	Panels 305-307 & 309
08/25/11	101162142	BL-0055994	22.5	870	19575	08/25/11	10/21/11	Panels 243-245
08/25/11	101162144	BL-0055994	22.5	870	19575	08/25/11	10/24/11	Panels 286, 287, & 289
08/25/11	101162150	BL-0055994	22.5	870	19575	08/25/11	10/24/11	Panels 283-285 & 288
08/25/11	101162151	BL-0055994	22.5	870	19575	08/25/11	10/21/11	Panels 241 & 242
08/25/11	101162153	BL-0055994	22.5	870	19575	08/25/11	10/24/11	Panels 290-293
08/25/11	101162175	BL-0055994	22.5	870	19575	08/25/11	10/21/11	Panels 255-258
08/25/11	101162176	BL-0055994	22.5	870	19575	08/25/11	10/21/11	Panels 248-250
08/25/11	101162177	BL-0055994	22.5	870	19575	08/25/11	10/24/11	Panels 281 & 282
08/25/11	101162178	BL-0055994	22.5	870	19575	08/25/11	10/17/11	Panels 234-236
08/25/11	101162179	BL-0055994	22.5	870	19575	08/25/11	10/17/11	Panels 237 & 238
08/25/11	101162191	BL-0055994	22.5	870	19575	08/25/11	10/24/11	Panels 268-270 & 272
08/25/11	101162192	BL-0055994	22.5	870	19575	08/25/11	10/24/11	Panels 276 & 277
08/25/11	101162091	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 31, 31A, & 174
08/25/11	101162092	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 32 & 32A
08/25/11	101162094	BL-0055986	22.5	870	19575	08/25/11	10/10/11	Panels 192-194
08/25/11	101162095	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 28, 28A, & 147

Electronic Filing: Received, Clerk's Office 09/28/2020

Material Inventory Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond 2 & 3 Closure
Project Location: Venice, Illinois
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Material Type: GSE UltraFlex 040mil Avg 22.5'

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
08/25/11	101162109	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 19 & 19A
08/25/11	101162114	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 27 & 27A
08/25/11	101162121	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 20 & 20A
08/25/11	101162130	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 23 & 23A
08/25/11	101162140	BL-0055986	22.5	870	19575	08/25/11	09/20/11	Panels 71-73
08/25/11	101162141	BL-0055986	22.5	870	19575	08/25/11	09/20/11	Panels 64-66
08/25/11	101162145	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 35, 35A, 171, & 172
08/25/11	101162194	BL-0055986	22.5	870	19575	08/25/11	09/13/11	Panels 24 & 24A
08/25/11	101162088	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 12
08/25/11	101162143	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 14
08/25/11	101162147	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 9
08/25/11	101162149	BL-0055997	22.5	870	19575	08/25/11	09/21/11	Panels 88, 88A, & 162
08/25/11	101162160	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 7
08/25/11	101162161	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 11
08/25/11	101162167	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 3
08/25/11	101162168	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 8
08/25/11	101162169	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 10
08/25/11	101162171	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 15
08/25/11	101162172	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 16
08/25/11	101162182	BL-0055997	22.5	870	19575	08/25/11	09/12/11	Panel 13

Electronic Filing: Received, Clerk's Office 09/28/2020

Material Inventory Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*
Project Location: *Venice, Illinois*

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
08/25/11	101162103	BL-0055978	22.5	870	19575	08/25/11	10/14/11	Panels 218-220
08/25/11	101162107	BL-0055978	22.5	870	19575	08/25/11	10/10/11	Panel 177
08/25/11	101162108	BL-0055978	22.5	870	19575	08/25/11	09/16/11	Panels 37 & 38
08/25/11	101162110	BL-0055978	22.5	870	19575	08/25/11	10/21/11	Panels 246 & 247
08/25/11	101162111	BL-0055978	22.5	870	19575	08/25/11	10/24/11	Panels 271 & 273-275
08/25/11	101162118	BL-0055978	22.5	870	19575	08/25/11	09/21/11	Panels 80, 80A, & 158
08/25/11	101162119	BL-0055978	22.5	870	19575	08/25/11	09/13/11	Panels 33, 33A, & 146
08/25/11	101162126	BL-0055978	22.5	870	19575	08/25/11	09/13/11	Panels 34, 34A, & 166
08/25/11	101162127	BL-0055978	22.5	870	19575	08/25/11	10/10/11	Panels 198-200
08/25/11	101162128	BL-0055978	22.5	870	19575	08/25/11	09/13/11	Panels 36, 36A, 175, & 176
08/25/11	101162138	BL-0055978	22.5	870	19575	08/25/11	10/21/11	Panels 251-254
08/25/11	101162139	BL-0055978	22.5	870	19575	08/25/11	10/11/11	Panel 207-211, & 215
08/25/11	101162173	BL-0055942	22.5	870	19575	08/25/11	10/14/11	Panels 216 & 217
08/25/11	101162181	BL-0055942	22.5	870	19575	08/25/11	09/13/11	Panels 22 & 22A
08/25/11	101162184	BL-0055942	22.5	870	19575	08/25/11	10/11/11	Panels 201-203
08/25/11	101162189	BL-0055942	22.5	870	19575	08/25/11	10/11/11	Panels 204-206
08/25/11	101162190	BL-0055942	22.5	870	19575	08/25/11	09/13/11	Panels 21 & 21A
08/25/11	101162193	BL-0055942	22.5	870	19575	08/25/11	10/14/11	Panels 212-214
08/25/11	101162195	BL-0055942	22.5	870	19575	08/25/11	09/13/11	Panels 26 & 26A
08/25/11	101162196	BL-0055942	22.5	870	19575	08/25/11	09/12/11	Panel 4

Electronic Filing: Received, Clerk's Office 09/28/2020

Material Inventory Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*
Project Location: *Venice, Illinois*

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
08/25/11	101162197	BL-0055942	22.5	870	19575	08/25/11	09/13/11	Panels 30, 30A, 155, & 156
08/25/11	101162198	BL-0055942	22.5	870	19575	08/25/11	09/13/11	Panels 25 & 25A
08/25/11	101162199	BL-0055942	22.5	870	19575	08/25/11	09/12/11	Panel 5
08/25/11	101162200	BL-0055942	22.5	870	19575	08/25/11	09/13/11	Panels 29, 29A, & 154
08/25/11	101162120	BL-0055939	22.5	870	19575	08/25/11	09/22/11	Panel 113
08/25/11	101162129	BL-0055939	22.5	870	19575	08/25/11	09/22/11	Panels 110 & 110A
08/25/11	101162132	BL-0055939	22.5	870	19575	08/25/11	09/21/11	Panels 86, 86A, & 127
08/25/11	101162135	BL-0055939	22.5	870	19575	08/25/11	10/17/11	Panels 231-233
08/25/11	101162157	BL-0055939	22.5	870	19575	08/25/11	10/17/11	Panels 224 & 225
08/25/11	101162158	BL-0055939	22.5	870	19575	08/25/11	10/17/11	Panels 226 & 227
08/25/11	101162159	BL-0055939	22.5	870	19575	08/25/11	09/22/11	Panels 111 & 111A
08/25/11	101162163	BL-0055939	22.5	870	19575	08/25/11	09/22/11	Panels 112 & 112A
08/25/11	101162164	BL-0055939	22.5	870	19575	08/25/11	09/16/11	Panels 39, 40, & 42
08/25/11	101162165	BL-0055939	22.5	870	19575	08/25/11	09/21/11	Panels 87, 87A, 129-133, & 135
08/25/11	101162166	BL-0055939	22.5	870	19575	08/25/11	09/16/11	Panels 56, 58, & 60
08/25/11	101162183	BL-0055939	22.5	870	19575	08/25/11	10/14/11	Panels 221, 222 & 223
09/13/11	101162576	BL-0056519	22.5	870	19575	09/13/11	09/28/11	Panels 97, 97A, 185, & 186
09/13/11	101162577	BL-0056519	22.5	870	19575	09/13/11	09/22/11	Panels 106 & 106A
09/13/11	101162578	BL-0056519	22.5	870	19575	09/13/11	09/22/11	Panels 103, 104, & 104A
09/13/11	101162579	BL-0056519	22.5	870	19575	09/13/11	09/22/11	Panels 107 & 107A

Electronic Filing: Received, Clerk's Office 09/28/2020

Material Inventory Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*
Project Location: *Venice, Illinois*

Aquaterra CQA Technician: *Collin Carson*

Aquaterra Project Number: *4923.10*
Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
09/13/11	101162580	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 99, 99A, & 188
09/13/11	101162581	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 98, 98A, & 187
09/13/11	101162588	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 81, 81A, & 159
09/13/11	101162589	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 84, 84A, 178, & 179
09/13/11	101162590	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 83, 83A, & 161
09/13/11	101162593	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 85, 85A, & 128
09/13/11	101162596	BL-0056519	22.5	870	19575	09/13/11	09/21/11	Panels 82, 82A, & 160
09/13/11	101162571	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 52 & 54
09/13/11	101162572	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 41 & 44
09/13/11	101162573	BL-0056523	22.5	870	19575	09/13/11	09/20/11	Panels 76, 76A, & 182
09/13/11	101162574	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 48 & 50
09/13/11	101162575	BL-0056523	22.5	870	19575	09/13/11	09/20/11	Panels 77, 77A, & 181
09/13/11	101162584	BL-0056523	22.5	870	19575	09/13/11	09/22/11	Panels 109 & 109A
09/13/11	101162585	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 51 & 53
09/13/11	101162586	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 55 & 57
09/13/11	101162587	BL-0056523	22.5	870	19575	09/13/11	09/22/11	Panels 108 & 108A
09/13/11	101162592	BL-0056523	22.5	870	19575	09/13/11	09/20/11	Panels 78, 78A, & 180
09/13/11	101162594	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 47 & 49
09/13/11	101162595	BL-0056523	22.5	870	19575	09/13/11	09/16/11	Panels 43, 45, & 46
09/14/11	101162551	BL-0056581	22.5	870	19575	09/14/11		

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Material Inventory Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*
Project Location: *Venice, Illinois*
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*
Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
09/14/11	101162559	BL-0056581	22.5	870	19575	09/14/11	10/03/11	Panels 142-145
09/14/11	101162560	BL-0056581	22.5	870	19575	09/14/11	09/23/11	Panels 116 & 117
09/14/11	101162561	BL-0056581	22.5	870	19575	09/14/11		
09/14/11	101162562	BL-0056581	22.5	870	19575	09/14/11		
09/14/11	101162563	BL-0056581	22.5	870	19575	09/14/11	09/26/11	Panels 122 & 123
09/14/11	101162564	BL-0056581	22.5	870	19575	09/14/11	09/26/11	Panels 120, 121, & 126
09/14/11	101162565	BL-0056581	22.5	870	19575	09/14/11	10/03/11	Panels 148-151
09/14/11	101062566	BL-0056581	22.5	870	19575	09/14/11	09/23/11	Panel 115
09/14/11	101162567	BL-0056581	22.5	870	19575	09/14/11	10/03/11	Panels 152 & 153
09/14/11	101162568	BL-0056581	22.5	870	19575	09/14/11	09/21/11	Panels 96, 96A, & 184
09/14/11	101162569	BL-0056581	22.5	870	19575	09/14/11	09/23/11	Panels 118 & 119
09/14/11	101162086	BL-0056580	22.5	870	19575	09/14/11	09/21/11	Panels 92, 92A, 168, & 169
09/14/11	101162087	BL-0056580	22.5	870	19575	09/14/11	09/21/11	Panels 94, 94A, & 173
09/14/11	101162089	BL-0056580	22.5	870	19575	09/14/11	10/10/11	Panels 195-197
09/14/11	101162090	BL-0056580	22.5	870	19575	09/14/11	10/10/11	Panels 189-191
09/14/11	101162097	BL-0056580	22.5	870	19575	09/14/11	09/28/11	Panels 79 & 79A
09/14/11	101162098	BL-0056580	22.5	870	19575	09/14/11	09/21/11	Panels 91, 91A, & 167
09/14/11	101162106	BL-0056580	22.5	870	19575	09/14/11	09/21/11	Panels 90, 90A, & 165
09/14/11	101162123	BL-0056580	22.5	870	19575	09/14/11	09/21/11	Panels 95, 95A, & 183
09/14/11	101162155	BL-0056580	22.5	870	19575	09/14/11	09/16/11	Panels 59 & 61

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Material Inventory Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Pond 2 & 3 Closure*
Project Location: *Venice, Illinois*
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*
Material Type: *GSE UltraFlex 040mil Avg 22.5'*

Date Received	Roll No.	Lot/ Batch	Roll Size			QC Docs Received	Date Used	Remarks
			Width (ft)	Length (ft)	Area (sq. ft)			
09/14/11	*101162570*	*BL-0056580*	*22.5*	*870*	*19575*	*09/14/11*	*09/21/11*	*Panels 93, 93A, & 170*
09/14/11	*101162582*	*BL-0056580*	*22.5*	*870*	*19575*	*09/14/11*	*09/21/11*	*Panels 89, 89A, 163, & 164*
09/13/11	*101162583*	*BL-0056580*	*22.5*	*870*	*19575*	*09/13/11*	*10/01/11*	*Panels 100-102, 105, & 136*

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GEOMEMBRANE LINER CONFORMANCE TEST RESULTS

GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: 8/23/2011

Sales Order No.	*Customer Name*	*Project Location*	*Product Name*	*BOL Number*
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0055939

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162120	41	39	240	235	1159	1215	23	26	94	0.928	2.98	10
101162129	41	39	222	222	1097	1201	25	24	93	0.927	2.57	10
101162132	41	39	238	220	1195	1191	25	24	92	0.927	2.66	10
101162135	41	39	233	220	1213	1195	26	25	92	0.928	2.70	10
101162157	41	39	224	217	1132	1142	24	24	90	0.928	2.57	10
101162158	42	38	238	224	1166	1085	25	24	89	0.928	2.34	10
101162159	42	38	238	224	1166	1085	25	24	89	0.928	2.34	10
101162163	41	38	218	230	1129	1249	28	25	89	0.928	2.54	10
101162164	41	38	211	197	1148	1094	27	25	91	0.928	2.62	10
101162165	41	39	211	197	1148	1094	27	25	91	0.928	2.62	10
101162166	41	39	205	210	1095	1056	25	24	90	0.927	2.59	10
101162183	42	39	221	217	991	1159	30	30	96	0.928	2.29	10

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ROLL TEST DATA REPORT

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Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0055974

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162093	42	38	199	188	951	1031	27	27	90	0.929	2.56	10
101162096	40	39	194	199	921	1178	26	26	86	0.929	2.43	10
101162099	41	38	181	187	854	1086	27	26	87	0.929	2.59	10
101162100	41	38	205	187	997	1167	27	25	87	0.929	2.49	10
101162101	41	38	205	187	997	1167	27	25	87	0.929	2.49	10
101162102	41	38	197	190	960	1137	27	26	89	0.929	2.49	10
101162104	42	38	199	198	950	1138	28	27	89	0.929	2.35	10
101162105	42	36	199	198	950	1138	28	27	89	0.929	2.41	10
101162115	40	40	237	212	1145	1126	25	26	93	0.929	2.41	10
101162116	41	40	237	212	1145	1126	25	26	93	0.929	2.67	10
101162117	41	40	230	228	1131	1184	26	26	95	0.930	2.67	10
101162124	40	38	230	209	1139	1158	24	24	89	0.928	2.69	10
											2.51	10

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Sales Order No.	*Customer Name*	*Project Location*	*Product Name*	*BOL Number*
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0055949

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162122	40	36	237	229	1180	1191	26	24	91	0.928	2.41	10
101162131	41	38	237	215	1182	1180	25	23	91	0.928	2.67	10
101162133	41	39	238	220	1195	1191	25	24	92	0.927	2.66	10
101162134	41	38	233	220	1213	1195	26	25	92	0.928	2.70	10
101162136	41	38	186	210	924	1154	27	25	91	0.928	2.76	10
101162137	41	38	186	210	924	1154	27	25	91	0.928	2.76	10
101162152	41	38	230	208	1175	1151	25	24	88	0.928	2.60	10
101162154	41	37	231	216	1171	1180	26	24	91	0.928	2.52	10
101162162	41	38	218	230	1129	1249	28	25	89	0.928	2.54	10
101162170	41	38	218	183	1094	1093	25	25	92	0.927	2.48	10
101162174	40	38	237	219	1183	1197	27	27	90	0.927	2.28	10
101162180	41	39	219	214	1088	1161	26	24	92	0.928	2.54	10

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Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0055994

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D5693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162142	41	38	227	238	1113	1192	26	24	92	0.927	2.74	10
101162144	42	39	237	193	1160	1079	28	26	91	0.927	2.64	10
101162150	41	38	229	200	1142	1129	28	26	90	0.928	2.70	10
101162151	41	38	229	200	1142	1129	26	26	90	0.928	2.70	10
101162153	41	39	230	208	1175	1151	25	24	88	0.928	2.60	10
101162175	40	38	237	219	1183	1197	27	27	90	0.927	2.28	10
101162176	40	37	221	216	1147	1177	25	25	91	0.927	2.32	10
101162177	41	37	221	216	1147	1177	25	25	91	0.927	2.32	10
101162178	41	38	219	208	1153	1103	28	27	92	0.928	2.53	10
101162179	41	38	219	208	1153	1103	28	27	92	0.928	2.53	10
101162191	41	38	212	218	1002	1173	31	28	96	0.928	2.27	10
101162192	41	38	215	228	998	1211	29	28	95	0.928	2.21	10

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Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0065986

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162091	41	37	194	182	918	1080	28	27	89	0.929	2.54	10
101162092	41	38	199	188	951	1031	27	27	90	0.929	2.56	10
101162094	41	38	195	197	919	1158	26	25	82	0.929	2.48	10
101162095	41	38	195	197	919	1158	26	25	82	0.929	2.48	10
101162109	41	38	183	189	914	1107	24	25	89	0.931	2.30	10
101162114	41	38	221	223	1119	1203	25	24	92	0.931	2.47	10
101162121	41	38	237	229	1180	1191	26	24	91	0.928	2.85	10
101162130	41	40	237	215	1182	1180	25	23	91	0.928	2.87	10
101162140	41	39	230	171	1120	1000	27	24	95	0.929	2.79	10
101162141	42	39	230	171	1120	1000	27	24	95	0.929	2.79	10
101162145	42	37	237	193	1160	1079	26	26	91	0.927	2.64	10
101162194	41	38	222	229	1009	1206	28	27	97	0.928	2.35	10

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Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0065942

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Visual in Cat1-Cat2)
101162173	41	38	230	221	1179	1177	26	24	94	0.927	2.38	10
101162181	42	38	219	214	1088	1161	26	24	92	0.928	2.54	10
101162184	41	39	212	218	998	1192	27	25	98	0.928	2.15	10
101162189	40	38	206	210	972	1148	30	29	96	0.928	2.20	10
101162190	41	37	212	218	1002	1173	31	28	96	0.928	2.27	10
101162193	41	38	215	228	998	1211	29	26	95	0.928	2.21	10
101162195	40	38	222	229	1009	1206	28	27	97	0.928	2.35	10
101162196	41	38	221	212	1009	1121	30	26	97	0.929	2.27	10
101162197	41	37	221	212	1009	1121	30	26	97	0.929	2.27	10
101162198	41	38	209	222	960	1195	24	26	98	0.929	2.23	10
101162199	41	37	209	222	960	1195	24	26	98	0.929	2.23	10
101162200	40	38	209	186	853	994	28	30	97	0.929	2.15	10

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ROLL TEST DATA REPORT

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Report Date: 8/24/2011

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0055997

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D5883 (ppi) MD	Break Strength ASTM D5883 (ppi) TD	Break Elongation ASTM D5883 (%) MD	Break Elongation ASTM D5883 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162088	41	37	193	180	949	1044	28	27	88	0.929	2.52	10
101162143	42	38	227	238	1113	1192	26	24	92	0.927	2.74	10
101162147	41	38	219	208	1123	1102	27	25	92	0.927	2.73	10
101162149	41	38	226	186	1152	1034	26	23	89	0.928	2.73	10
101162160	41	40	238	224	1166	1085	25	24	89	0.928	2.34	10
101162161	40	39	227	214	1160	1176	25	23	88	0.928	2.61	10
101162167	41	38	205	210	1095	1056	25	24	90	0.927	2.59	10
101162168	41	38	225	200	1121	1089	27	24	90	0.927	2.55	10
101162169	41	38	225	200	1121	1089	27	24	90	0.927	2.55	10
101162171	41	38	218	183	1094	1093	25	25	92	0.927	2.48	10
101162172	42	38	230	221	1179	1177	26	24	94	0.927	2.38	10
101162182	41	39	221	217	991	1159	30	30	96	0.928	2.29	10

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ROLL TEST DATA REPORT

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Report Date: 8/23/2011

Sales Order No.	*Customer Name*	*Project Location*	*Product Name*	*BOL Number*
SO-065168	GSI – Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0055978

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162103	41	38	197	190	960	1137	27	26	89	0.929	2.35	10
101162107	42	39	174	178	830	1029	27	26	86	0.929	2.49	10
101162108	41	37	183	189	914	1107	24	25	89	0.931	2.30	10
101162110	41	38	193	197	962	1143	27	26	88	0.931	2.47	10
101162111	41	38	193	197	962	1143	27	26	88	0.931	2.47	10
101162118	41	39	230	228	1131	1184	26	26	95	0.930	2.69	10
101162119	41	40	240	235	1159	1216	23	26	94	0.928	2.88	10
101162126	42	39	224	227	1128	1196	26	24	90	0.929	2.64	10
101162127	41	40	224	227	1128	1196	26	24	90	0.929	2.64	10
101162128	42	38	222	222	1097	1201	25	24	93	0.927	2.57	10
101162138	41	38	220	210	1116	1168	27	25	90	0.927	2.66	10
101162139	41	38	220	210	1116	1168	27	25	90	0.927	2.66	10

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GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: 9/13/2011

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0056519

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162576	41	38	198	229	940	1254	30	28	97	0.932	2.75	10
101162577	42	37	198	229	940	1254	30	28	97	0.932	2.75	10
101162578	42	37	207	214	1001	1179	28	26	95	0.932	2.73	10
101162579	41	37	207	214	1001	1179	28	26	95	0.932	2.73	10
101162580	42	37	212	224	1020	1245	27	26	96	0.933	2.60	10
101162581	41	37	212	224	1020	1245	27	26	96	0.933	2.82	10
101162583	41	37	217	205	1061	1129	29	27	99	0.933	2.80	10
101162588	41	36	219	199	1099	985	27	26	98	0.932	2.53	10
101162589	42	37	219	199	1099	985	27	26	98	0.932	2.53	10
101162590	42	38	212	204	1020	1094	25	25	98	0.932	2.37	10
101162593	42	37	200	222	932	1211	24	26	98	0.932	2.30	10
101162596	41	37	213	209	1039	1160	28	26	98	0.932	2.44	10

Laboratory Manager

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GSE Lining Technology, LLC.

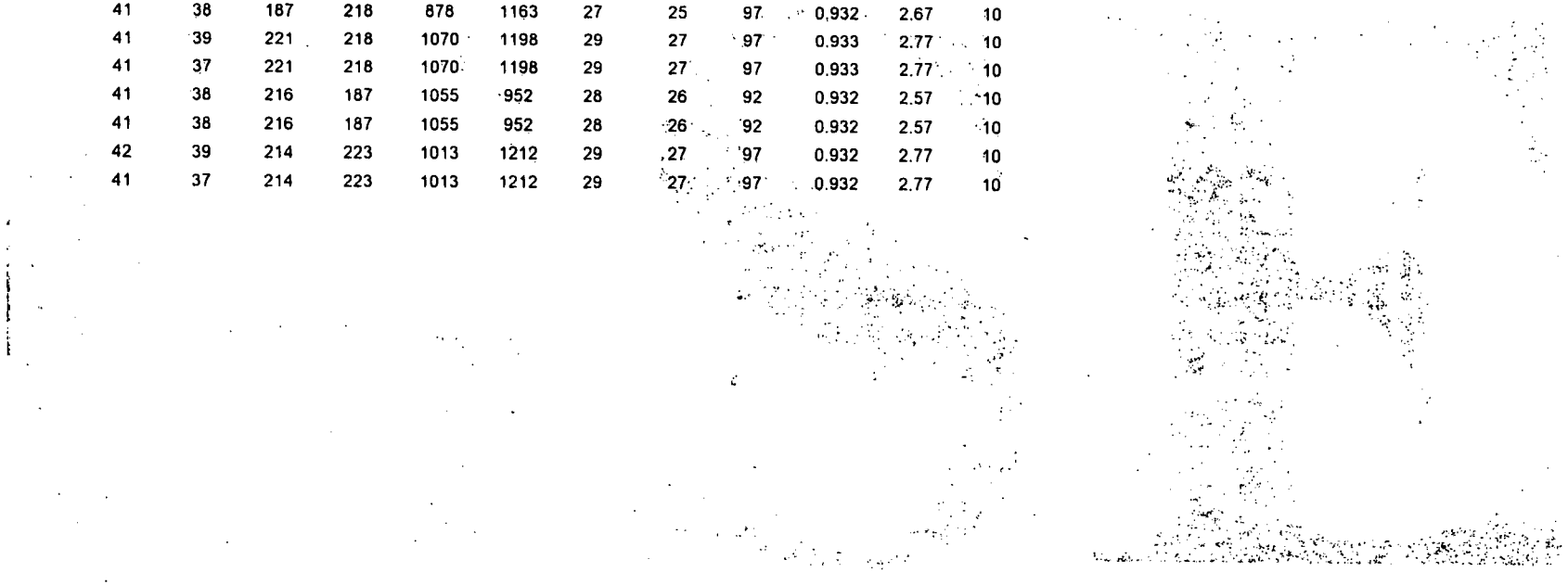
ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: **9/14/2011**

Sales Order No.	*Customer Name*	*Project Location*	*Product Name*	*BOL Number*
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0056581

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162551	44	40	217	217	924	1039	31	29	105	0.932	2.53	10
101162559	41	37	210	188	998	992	28	29	99	0.932	2.84	10
101162560	41	38	197	205	942	1154	28	27	95	0.932	2.75	10
101162561	41	37	197	205	942	1154	28	27	95	0.932	2.75	10
101162562	40	37	187	218	878	1163	27	25	97	0.932	2.67	10
101162563	41	38	187	218	878	1163	27	25	97	0.932	2.67	10
101162564	41	39	221	218	1070	1198	29	27	97	0.933	2.77	10
101162565	41	37	221	218	1070	1198	29	27	97	0.933	2.77	10
101162566	41	38	216	187	1055	952	28	26	92	0.932	2.57	10
101162567	41	38	216	187	1055	952	28	26	92	0.932	2.57	10
101162568	42	39	214	223	1013	1212	29	27	97	0.932	2.77	10
101162569	41	37	214	223	1013	1212	29	27	97	0.932	2.77	10



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GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

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Report Date: **9/13/2011**

Sales Order No.	*Customer Name*	*Project Location*	*Product Name*	*BOL Number*
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0056523

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162571	41	38	211	203	984	1034	30	26	95	0.932	2.86	10
101162572	41	38	212	190	1017	992	29	28	98	0.932	2.68	10
101162573	41	37	212	190	1017	992	29	28	98	0.932	2.68	10
101162574	42	38	213	225	1019	1216	30	26	99	0.932	2.86	10
101162575	42	39	213	225	1019	1216	30	26	99	0.932	2.76	10
101162584	41	38	214	214	1038	1167	29	26	99	0.933	2.88	10
101162585	41	37	214	214	1038	1167	29	26	99	0.933	2.80	10
101162586	41	38	215	217	1071	1216	27	26	96	0.933	2.61	10
101162587	41	38	215	217	1071	1216	27	26	96	0.933	2.61	10
101162592	42	38	212	204	1020	1094	25	25	98	0.932	2.37	10
101162594	42	38	200	222	932	1211	24	26	98	0.932	2.30	10
101162595	41	38	213	209	1039	1160	28	26	98	0.932	2.44	10

Laboratory Manager

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ROLL TEST DATA REPORT

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Report Date: 9/14/2011

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-065166	GSI - Wisconsin	Venice IL US	LDS-040AE-BBB-B-00	BL-0056580

Roll Number	Thickness average ASTM D5199 (mils)	Thickness minimum ASTM D5199 (mils)	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833(lbs)	ASTM D1505 Density (g/cc)	ASTM D4218 Carbon Black Content (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
101162086	41	38	198	179	975	1067	27	25	88	0.929	2.56	10
101162087	42	37	198	179	975	1067	27	25	88	0.929	2.56	10
101162089	41	37	193	180	949	1044	28	27	88	0.929	2.52	10
101162090	41	38	194	182	918	1080	28	27	89	0.929	2.54	10
101162097	41	37	194	199	921	1178	26	26	86	0.929	2.43	10
101162098	41	38	181	187	854	1086	27	26	87	0.929	2.59	10
101162106	42	40	174	178	830	1029	27	26	86	0.929	2.49	10
101162123	40	36	230	209	1139	1158	24	24	89	0.928	2.75	10
101162155	41	39	231	216	1171	1180	26	24	91	0.928	2.52	10
101162570	40	37	211	203	984	1034	30	26	95	0.932	2.86	10
101162582	40	37	217	205	1061	1129	29	27	99	0.933	2.79	10

Laboratory Manager Jane Allen

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GSE Lining Technology, Inc.

Weld Lot Data Report

LOT IDENTIFICATION		RESIN INFORMATION	
Rod Lot Number	121004644	*Resin Lot*	CBE812100
Product Name	VFROD5MM	*Resin Type*	7104
Production Date	7/20/2011	*Resin Vendor*	Chevron Phillips

Physical Property	*Test Method*	*Test Results*
Carbon Content, %	ASTM D4218	2.35
Thickness, mil	ASTM D374*	194

APPROVED
D.G.
7/20/2011
QA

GSE Lining Technology, Inc.

Weld Lot Data Report

LOT IDENTIFICATION		RESIN INFORMATION	
Rod Lot Number	121004664	Resin Lot	CBE812100
Product Name	VFROD5MM	Resin Type	7104
Production Date	8/1/2011	Resin Vendor	Chevron Phillips

Physical Property	Test Method	Test Results
Carbon Content, %	ASTM D4218	2.22
Thickness, mil	ASTM D374*	189

APPROVED
D.G.
8/1/2011
QA

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GEOCOMPOSITE CONFORMANCE TEST RESULTS

SKAPS

September 30, 2011
Geo Synthetics LLC
2401 Pewaukee Rd
Waukesha, WI 53188

Ref. : Ameren Venice Plant, Venice, IL
Customer P.O. # 14926-01
Product : TN 350-2-6

We certify that the TN 350-2-6 drainage geocomposite, meets the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Required Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	300	Minimum
Carbon Black	ASTM D 4218	%	2.0	Minimum
Tensile Strength	ASTM D 5035	lbs/in	75	Minimum
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	Minimum
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MARV[5]
Transmissivity[1]	ASTM D 4716	m^2/sec	6.0 x 10^{-3}	MARV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV
Grab Strength	ASTM D 4632	lbs	160	MARV
Puncture Resistance	ASTM D 4833	lbs	90	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2	110	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.50	MARV
Permeability	ASTM D 4491	cm/sec	0.3	MARV
AOS	ASTM D 4751	US Sieve	70	MARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.01 and a confining pressure of 1000 psf between ottawa sand & textured liner after 100 hours.
2 Condition 190/2.16
3 Geotextile and Geonet properties are prior to lamination.
4 Geotextile data is provided by the supplier.
5 MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

Sincerely,
Nilay Patel
Nilay Patel
QA Manager

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : info@skaps.com

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
1	44171010001	44171010001 - N	4417.146	4417.173	1.51	3.77	6.45×10^{-3}
2	44171010002	44171010002 - N	4417.146	4417.173			
3	44171010003	44171010003 - N	4417.146	4417.173			
4	44171010004	44171010004 - N	4417.146	4417.173			
5	44171010005	44171010005 - N	4417.146	4417.173			
6	44171010006	44171010006 - N	4417.146	4417.173			
7	44171010007	44171010007 - N	4417.146	4417.173			
8	44171010008	44171010008 - N	4417.146	4417.173			
9	44171010009	44171010009 - N	4417.146	4417.173			
10	44171010010	44171010010 - N	4417.146	4417.173			
11	44171010011	44171010011 - N	4417.016	4417.122			
12	44171010012	44171010012 - N	4417.016	4417.122			
13	44171010013	44171010013 - N	4417.016	4417.122			
14	44171010014	44171010014 - N	4417.016	4417.122			
15	44171010015	44171010015 - N	4417.016	4417.122			
16	44171010016	44171010016 - N	4417.016	4417.122			
17	44171010017	44171010017 - N	4417.016	4417.122			
18	44171010018	44171010018 - N	4417.016	4417.122			
19	44171010019	44171010019 - N	4417.016	4417.122			
20	44171010020	44171010020 - N	4417.016	4417.122	1.44	1.94	
21	44171010021	44171010021 - N	4417.141	4417.085			
22	44171010022	44171010022 - N	4417.141	4417.085			
23	44171010023	44171010023 - N	4417.141	4417.085			
24	44171010024	44171010024 - N	4417.141	4417.085			
25	44171010025	44171010025 - N	4417.141	4417.085			
26	44171010026	44171010026 - N	4417.141	4417.085			
27	44171010027	44171010027 - N	4417.141	4417.085			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010001 - N	CHVX890461	0.9562	386	2.74	117	
44171010002 - N	CHVX890461	0.9562				
44171010003 - N	CHVX890461	0.9562				
44171010004 - N	CHVX890461	0.9562				
44171010005 - N	CHVX890461	0.9562				
44171010006 - N	CHVX890461	0.9562				
44171010007 - N	CHVX890461	0.9562				
44171010008 - N	CHVX890461	0.9562				
44171010009 - N	CHVX890461	0.9562				
44171010010 - N	CHVX890461	0.9562				
44171010011 - N	CHVX890461	0.9562				
44171010012 - N	CHVX890461	0.9562				
44171010013 - N	CHVX890461	0.9562				
44171010014 - N	CHVX890461	0.9562				
44171010015 - N	CHVX890461	0.9562				
44171010016 - N	CHVX890461	0.9562				
44171010017 - N	CHVX890461	0.9562				
44171010018 - N	CHVX890461	0.9562				
44171010019 - N	CHVX890461	0.9562				
44171010020 - N	CHVX890461	0.9562	381	2.76	115	
44171010021 - N	CHVX890461	0.9562				
44171010022 - N	CHVX890461	0.9562				
44171010023 - N	CHVX890461	0.9562				
44171010024 - N	CHVX890461	0.9562				
44171010025 - N	CHVX890461	0.9562				
44171010026 - N	CHVX890461	0.9562				
44171010027 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
28	44171010028	44171010028 - N	4417.141	4417.085			
29	44171010029	44171010029 - N	4417.141	4417.085			
30	44171010030	44171010030 - N	4417.141	4417.085			
31	44171010031	44171010031 - N	4417.191	4417.205			
32	44171010032	44171010032 - N	4417.191	4417.205			
33	44171010033	44171010033 - N	4417.191	4417.205			
34	44171010034	44171010034 - N	4417.191	4417.205			
35	44171010035	44171010035 - N	4417.191	4417.205			
36	44171010036	44171010036 - N	4417.191	4417.205			
37	44171010037	44171010037 - N	4417.191	4417.205			
38	44171010038	44171010038 - N	4417.191	4417.205			
39	44171010039	44171010039 - N	4417.191	4417.205			
40	44171010040	44171010040 - N	4417.191	4417.205	1.40	3.23	
41	44171010041	44171010041 - N	4417.094	4417.210			
42	44171010042	44171010042 - N	4417.094	4417.210			
43	44171010043	44171010043 - N	4417.094	4417.210			
44	44171010044	44171010044 - N	4417.094	4417.210			
45	44171010045	44171010045 - N	4417.094	4417.210			
46	44171010046	44171010046 - N	4417.094	4417.210			
47	44171010047	44171010047 - N	4417.094	4417.210			
48	44171010048	44171010048 - N	4417.094	4417.210			
49	44171010049	44171010049 - N	4417.094	4417.210			
50	44171010050	44171010050 - N	4417.094	4417.210			
51	44171010051	44171010051 - N	4417.263	4417.081			
52	44171010052	44171010052 - N	4417.263	4417.081			
53	44171010053	44171010053 - N	4417.263	4417.081			
54	44171010054	44171010054 - N	4417.263	4417.081			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010028 - N	CHVX890461	0.9562				
44171010029 - N	CHVX890461	0.9562				
44171010030 - N	CHVX890461	0.9562				
44171010031 - N	CHVX890461	0.9562				
44171010032 - N	CHVX890461	0.9562				
44171010033 - N	CHVX890461	0.9562				
44171010034 - N	CHVX890461	0.9562				
44171010035 - N	CHVX890461	0.9562				
44171010036 - N	CHVX890461	0.9562				
44171010037 - N	CHVX890461	0.9562				
44171010038 - N	CHVX890461	0.9562				
44171010039 - N	CHVX890461	0.9562				
44171010040 - N	CHVX890461	0.9562	384	2.53	119	
44171010041 - N	CHVX890461	0.9562				
44171010042 - N	CHVX890461	0.9562				
44171010043 - N	CHVX890461	0.9562				
44171010044 - N	CHVX890461	0.9562				
44171010045 - N	CHVX890461	0.9562				
44171010046 - N	CHVX890461	0.9562				
44171010047 - N	CHVX890461	0.9562				
44171010048 - N	CHVX890461	0.9562				
44171010049 - N	CHVX890461	0.9562				
44171010050 - N	CHVX890461	0.9562				
44171010051 - N	CHVX890461	0.9562				
44171010052 - N	CHVX890461	0.9562				
44171010053 - N	CHVX890461	0.9562				
44171010054 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
55	44171010055	44171010055 - N	4417.263	4417.081			
56	44171010056	44171010056 - N	4417.263	4417.081			
57	44171010057	44171010057 - N	4417.263	4417.081			
58	44171010058	44171010058 - N	4417.263	4417.081			
59	44171010059	44171010059 - N	4417.263	4417.081			
60	44171010060	44171010060 - N	4417.263	4417.081	1.26	2.82	
61	44171010061	44171010061 - N	4417.192	4417.264			
62	44171010062	44171010062 - N	4417.192	4417.264			
63	44171010063	44171010063 - N	4417.192	4417.264			
64	44171010064	44171010064 - N	4417.192	4417.264			
65	44171010065	44171010065 - N	4417.192	4417.264			
66	44171010066	44171010066 - N	4417.192	4417.264			
67	44171010067	44171010067 - N	4417.192	4417.264			
68	44171010068	44171010068 - N	4417.192	4417.264			
69	44171010069	44171010069 - N	4417.192	4417.264			
70	44171010070	44171010070 - N	4417.192	4417.264			
71	44171010071	44171010071 - N	4417.222	4417.160			
72	44171010072	44171010072 - N	4417.222	4417.160			
73	44171010073	44171010073 - N	4417.222	4417.160			
74	44171010074	44171010074 - N	4417.222	4417.160			
75	44171010075	44171010075 - N	4417.222	4417.160			
76	44171010076	44171010076 - N	4417.222	4417.160			
77	44171010077	44171010077 - N	4417.222	4417.160			
78	44171010078	44171010078 - N	4417.222	4417.160			
79	44171010079	44171010079 - N	4417.222	4417.160			
80	44171010080	44171010080 - N	4417.222	4417.160	1.77	2.83	
81	44171010081	44171010081 - N	4417.148	4417.045			

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : info@skaps.com

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010055 - N	CHVX890461	0.9562				
44171010056 - N	CHVX890461	0.9562				
44171010057 - N	CHVX890461	0.9562				
44171010058 - N	CHVX890461	0.9562				
44171010059 - N	CHVX890461	0.9562				
44171010060 - N	CHVX890461	0.9562	387	2.59	122	
44171010061 - N	CHVX890461	0.9562				
44171010062 - N	CHVX890461	0.9562				
44171010063 - N	CHVX890461	0.9562				
44171010064 - N	CHVX890461	0.9562				
44171010065 - N	CHVX890461	0.9562				
44171010066 - N	CHVX890461	0.9562				
44171010067 - N	CHVX890461	0.9562				
44171010068 - N	CHVX890461	0.9562				
44171010069 - N	CHVX890461	0.9562				
44171010070 - N	CHVX890461	0.9562				
44171010071 - N	CHVX890461	0.9562				
44171010072 - N	CHVX890461	0.9562				
44171010073 - N	CHVX890461	0.9562				
44171010074 - N	CHVX890461	0.9562				
44171010075 - N	CHVX890461	0.9562				
44171010076 - N	CHVX890461	0.9562				
44171010077 - N	CHVX890461	0.9562				
44171010078 - N	CHVX890461	0.9562				
44171010079 - N	CHVX890461	0.9562				
44171010080 - N	CHVX890461	0.9562	383	2.44	120	
44171010081 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
82	44171010082	44171010082 - N	4417.148	4417.045			
83	44171010083	44171010083 - N	4417.148	4417.045			
84	44171010084	44171010084 - N	4417.148	4417.045			
85	44171010085	44171010085 - N	4417.148	4417.045			
86	44171010086	44171010086 - N	4417.148	4417.045			
87	44171010087	44171010087 - N	4417.148	4417.045			
88	44171010088	44171010088 - N	4417.148	4417.045			
89	44171010089	44171010089 - N	4417.148	4417.045			
90	44171010090	44171010090 - N	4417.148	4417.045			
91	44171010091	44171010091 - N	4417.157	4417.047			
92	44171010092	44171010092 - N	4417.157	4417.047			
93	44171010093	44171010093 - N	4417.157	4417.047			
94	44171010094	44171010094 - N	4417.157	4417.047			
95	44171010095	44171010095 - N	4417.157	4417.047			
96	44171010096	44171010096 - N	4417.157	4417.047			
97	44171010097	44171010097 - N	4417.157	4417.047			
98	44171010098	44171010098 - N	4417.157	4417.047			
99	44171010099	44171010099 - N	4417.157	4417.047			
100	44171010100	44171010100 - N	4417.157	4417.047	1.35	2.61	
101	44171010101	44171010101 - N	4417.124	4417.193			
102	44171010102	44171010102 - N	4417.124	4417.193			
103	44171010103	44171010103 - N	4417.124	4417.193			
104	44171010104	44171010104 - N	4417.124	4417.193			
105	44171010105	44171010105 - N	4417.124	4417.193			
106	44171010106	44171010106 - N	4417.124	4417.193			
107	44171010107	44171010107 - N	4417.124	4417.193			
108	44171010108	44171010108 - N	4417.124	4417.193			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010082 - N	CHVX890461	0.9562				
44171010083 - N	CHVX890461	0.9562				
44171010084 - N	CHVX890461	0.9562				
44171010085 - N	CHVX890461	0.9562				
44171010086 - N	CHVX890461	0.9562				
44171010087 - N	CHVX890461	0.9562				
44171010088 - N	CHVX890461	0.9562				
44171010089 - N	CHVX890461	0.9562				
44171010090 - N	CHVX890461	0.9562				
44171010091 - N	CHVX890461	0.9562				
44171010092 - N	CHVX890461	0.9562				
44171010093 - N	CHVX890461	0.9562				
44171010094 - N	CHVX890461	0.9562				
44171010095 - N	CHVX890461	0.9562				
44171010096 - N	CHVX890461	0.9562				
44171010097 - N	CHVX890461	0.9562				
44171010098 - N	CHVX890461	0.9562				
44171010099 - N	CHVX890461	0.9562				
44171010100 - N	CHVX890461	0.9562	380	2.39	124	
44171010101 - N	CHVX890461	0.9562				
44171010102 - N	CHVX890461	0.9562				
44171010103 - N	CHVX890461	0.9562				
44171010104 - N	CHVX890461	0.9562				
44171010105 - N	CHVX890461	0.9562				
44171010106 - N	CHVX890461	0.9562				
44171010107 - N	CHVX890461	0.9562				
44171010108 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
109	44171010109	44171010109 - N	4417.124	4417.193			
110	44171010110	44171010110 - N	4417.124	4417.193			
111	44171010111	44171010111 - N	4417.041	4417.194			
112	44171010112	44171010112 - N	4417.041	4417.194			
113	44171010113	44171010113 - N	4417.041	4417.194			
114	44171010114	44171010114 - N	4417.041	4417.194			
115	44171010115	44171010115 - N	4417.041	4417.194			
116	44171010116	44171010116 - N	4417.041	4417.194			
117	44171010117	44171010117 - N	4417.041	4417.194			
118	44171010118	44171010118 - N	4417.041	4417.194			
119	44171010119	44171010119 - N	4417.041	4417.194			
120	44171010120	44171010120 - N	4417.041	4417.194	1.71	3.27	
121	44171010121	44171010121 - N	4417.059	4417.115			
122	44171010122	44171010122 - N	4417.059	4417.115			
123	44171010123	44171010123 - N	4417.059	4417.115			
124	44171010124	44171010124 - N	4417.059	4417.115			
125	44171010125	44171010125 - N	4417.059	4417.115			
126	44171010126	44171010126 - N	4417.059	4417.115			
127	44171010127	44171010127 - N	4417.059	4417.115			
128	44171010128	44171010128 - N	4417.059	4417.115			
129	44171010129	44171010129 - N	4417.059	4417.115			
130	44171010130	44171010130 - N	4417.059	4417.115			
131	44171010131	44171010131 - N	4417.201	4417.120			
132	44171010132	44171010132 - N	4417.201	4417.120			
133	44171010133	44171010133 - N	4417.201	4417.120			
134	44171010134	44171010134 - N	4417.201	4417.120			
135	44171010135	44171010135 - N	4417.201	4417.120			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010109 - N	CHVX890461	0.9562				
44171010110 - N	CHVX890461	0.9562				
44171010111 - N	CHVX890461	0.9562				
44171010112 - N	CHVX890461	0.9562				
44171010113 - N	CHVX890461	0.9562				
44171010114 - N	CHVX890461	0.9562				
44171010115 - N	CHVX890461	0.9562				
44171010116 - N	CHVX890461	0.9562				
44171010117 - N	CHVX890461	0.9562				
44171010118 - N	CHVX890461	0.9562				
44171010119 - N	CHVX890461	0.9562				
44171010120 - N	CHVX890461	0.9562	385	2.40	121	
44171010121 - N	CHVX890461	0.9562				
44171010122 - N	CHVX890461	0.9562				
44171010123 - N	CHVX890461	0.9562				
44171010124 - N	CHVX890461	0.9562				
44171010125 - N	CHVX890461	0.9562				
44171010126 - N	CHVX890461	0.9562				
44171010127 - N	CHVX890461	0.9562				
44171010128 - N	CHVX890461	0.9562				
44171010129 - N	CHVX890461	0.9562				
44171010130 - N	CHVX890461	0.9562				
44171010131 - N	CHVX890461	0.9562				
44171010132 - N	CHVX890461	0.9562				
44171010133 - N	CHVX890461	0.9562				
44171010134 - N	CHVX890461	0.9562				
44171010135 - N	CHVX890461	0.9562				

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Product : **TN 350-2-6**
Project : **Ameren Venice Plant, Venice, IL**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
136	44171010136	44171010136 - N	4417.201	4417.120			
137	44171010137	44171010137 - N	4417.201	4417.120			
138	44171010138	44171010138 - N	4417.201	4417.120			
139	44171010139	44171010139 - N	4417.201	4417.120			
140	44171010140	44171010140 - N	4417.201	4417.120	1.42	3.47	
141	44171010141	44171010141 - N	4417.261	4417.073			
142	44171010142	44171010142 - N	4417.261	4417.073			
143	44171010143	44171010143 - N	4417.261	4417.073			
144	44171010144	44171010144 - N	4417.261	4417.073			
145	44171010145	44171010145 - N	4417.261	4417.073			
146	44171010146	44171010146 - N	4417.261	4417.073			
147	44171010147	44171010147 - N	4417.261	4417.073			
148	44171010148	44171010148 - N	4417.261	4417.073			
149	44171010149	44171010149 - N	4417.261	4417.073			
150	44171010150	44171010150 - N	4417.261	4417.073			
151	44171010151	44171010151 - N	4417.150	4417.199			
152	44171010152	44171010152 - N	4417.150	4417.199			
153	44171010153	44171010153 - N	4417.150	4417.199			
154	44171010154	44171010154 - N	4417.150	4417.199			
155	44171010155	44171010155 - N	4417.150	4417.199			
156	44171010156	44171010156 - N	4417.150	4417.199			
157	44171010157	44171010157 - N	4417.150	4417.199			
158	44171010158	44171010158 - N	4417.150	4417.199			
159	44171010159	44171010159 - N	4417.150	4417.199			
160	44171010160	44171010160 - N	4417.150	4417.199	1.59	3.31	
161	44171010161	44171010161 - N	4417.119	4417.202			
162	44171010162	44171010162 - N	4417.119	4417.202			

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : info@skaps.com

SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010136 - N	CHVX890461	0.9562				
44171010137 - N	CHVX890461	0.9562				
44171010138 - N	CHVX890461	0.9562				
44171010139 - N	CHVX890461	0.9562				
44171010140 - N	CHVX890461	0.9562	382	2.35	125	
44171010141 - N	CHVX890461	0.9562				
44171010142 - N	CHVX890461	0.9562				
44171010143 - N	CHVX890461	0.9562				
44171010144 - N	CHVX890461	0.9562				
44171010145 - N	CHVX890461	0.9562				
44171010146 - N	CHVX890461	0.9562				
44171010147 - N	CHVX890461	0.9562				
44171010148 - N	CHVX890461	0.9562				
44171010149 - N	CHVX890461	0.9562				
44171010150 - N	CHVX890461	0.9562				
44171010151 - N	CHVX890461	0.9562				
44171010152 - N	CHVX890461	0.9562				
44171010153 - N	CHVX890461	0.9562				
44171010154 - N	CHVX890461	0.9562				
44171010155 - N	CHVX890461	0.9562				
44171010156 - N	CHVX890461	0.9562				
44171010157 - N	CHVX890461	0.9562				
44171010158 - N	CHVX890461	0.9562				
44171010159 - N	CHVX890461	0.9562				
44171010160 - N	CHVX890461	0.9562	388	2.43	120	
44171010161 - N	CHVX890461	0.9562				
44171010162 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
163	44171010163	44171010163 - N	4417.119	4417.202			
164	44171010164	44171010164 - N	4417.119	4417.202			
165	44171010165	44171010165 - N	4417.119	4417.202			
166	44171010166	44171010166 - N	4417.119	4417.202			
167	44171010167	44171010167 - N	4417.119	4417.202			
168	44171010168	44171010168 - N	4417.119	4417.202			
169	44171010169	44171010169 - N	4417.119	4417.202			
170	44171010170	44171010170 - N	4417.119	4417.202			
171	44171010171	44171010171 - N	4417.007	4417.184			
172	44171010172	44171010172 - N	4417.007	4417.184			
173	44171010173	44171010173 - N	4417.007	4417.184			
174	44171010174	44171010174 - N	4417.007	4417.184			
175	44171010175	44171010175 - N	4417.007	4417.184			
176	44171010176	44171010176 - N	4417.007	4417.184			
177	44171010177	44171010177 - N	4417.007	4417.184			
178	44171010178	44171010178 - N	4417.007	4417.184			
179	44171010179	44171010179 - N	4417.007	4417.184			
180	44171010180	44171010180 - N	4417.007	4417.184	1.83	3.45	
181	44171010181	44171010181 - N	4417.228	4417.103			
182	44171010182	44171010182 - N	4417.228	4417.103			
183	44171010183	44171010183 - N	4417.228	4417.103			
184	44171010184	44171010184 - N	4417.228	4417.103			
185	44171010185	44171010185 - N	4417.228	4417.103			
186	44171010186	44171010186 - N	4417.228	4417.103			
187	44171010187	44171010187 - N	4417.228	4417.103			
188	44171010188	44171010188 - N	4417.228	4417.103			
189	44171010189	44171010189 - N	4417.228	4417.103			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010163 - N	CHVX890461	0.9562				
44171010164 - N	CHVX890461	0.9562				
44171010165 - N	CHVX890461	0.9562				
44171010166 - N	CHVX890461	0.9562				
44171010167 - N	CHVX890461	0.9562				
44171010168 - N	CHVX890461	0.9562				
44171010169 - N	CHVX890461	0.9562				
44171010170 - N	CHVX890461	0.9562				
44171010171 - N	CHVX890461	0.9562				
44171010172 - N	CHVX890461	0.9562				
44171010173 - N	CHVX890461	0.9562				
44171010174 - N	CHVX890461	0.9562				
44171010175 - N	CHVX890461	0.9562				
44171010176 - N	CHVX890461	0.9562				
44171010177 - N	CHVX890461	0.9562				
44171010178 - N	CHVX890461	0.9562				
44171010179 - N	CHVX890461	0.9562				
44171010180 - N	CHVX890461	0.9562	380	2.37	122	
44171010181 - N	CHVX890461	0.9562				
44171010182 - N	CHVX890461	0.9562				
44171010183 - N	CHVX890461	0.9562				
44171010184 - N	CHVX890461	0.9562				
44171010185 - N	CHVX890461	0.9562				
44171010186 - N	CHVX890461	0.9562				
44171010187 - N	CHVX890461	0.9562				
44171010188 - N	CHVX890461	0.9562				
44171010189 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
190	44171010190	44171010190 - N	4417.228	4417.103			
191	44171010191	44171010191 - N	4417.017	4417.163			
192	44171010192	44171010192 - N	4417.017	4417.163			
193	44171010193	44171010193 - N	4417.017	4417.163			
194	44171010194	44171010194 - N	4417.017	4417.163			
195	44171010195	44171010195 - N	4417.017	4417.163			
196	44171010196	44171010196 - N	4417.017	4417.163			
197	44171010197	44171010197 - N	4417.017	4417.163			
198	44171010198	44171010198 - N	4417.017	4417.163			
199	44171010199	44171010199 - N	4417.017	4417.163			
200	44171010200	44171010200 - N	4417.017	4417.163	1.22	1.99	
201	44171010201	44171010201 - N	4417.067	4417.076			
202	44171010202	44171010202 - N	4417.067	4417.076			
203	44171010203	44171010203 - N	4417.067	4417.076			
204	44171010204	44171010204 - N	4417.067	4417.076			
205	44171010205	44171010205 - N	4417.067	4417.076			
206	44171010206	44171010206 - N	4417.067	4417.076			
207	44171010207	44171010207 - N	4417.067	4417.076			
208	44171010208	44171010208 - N	4417.067	4417.076			
209	44171010209	44171010209 - N	4417.067	4417.076			
210	44171010210	44171010210 - N	4417.067	4417.076			
211	44171010211	44171010211 - N	4417.060	4417.214			
212	44171010212	44171010212 - N	4417.060	4417.214			
213	44171010213	44171010213 - N	4417.060	4417.214			
214	44171010214	44171010214 - N	4417.060	4417.214			
215	44171010215	44171010215 - N	4417.060	4417.214			
216	44171010216	44171010216 - N	4417.060	4417.214			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010190 - N	CHVX890461	0.9562				
44171010191 - N	CHVX890461	0.9562				
44171010192 - N	CHVX890461	0.9562				
44171010193 - N	CHVX890461	0.9562				
44171010194 - N	CHVX890461	0.9562				
44171010195 - N	CHVX890461	0.9562				
44171010196 - N	CHVX890461	0.9562				
44171010197 - N	CHVX890461	0.9562				
44171010198 - N	CHVX890461	0.9562				
44171010199 - N	CHVX890461	0.9562				
44171010200 - N	CHVX890461	0.9562	386	2.30	123	
44171010201 - N	CHVX890461	0.9562				
44171010202 - N	CHVX890461	0.9562				
44171010203 - N	CHVX890461	0.9562				
44171010204 - N	CHVX890461	0.9562				
44171010205 - N	CHVX890461	0.9562				
44171010206 - N	CHVX890461	0.9562				
44171010207 - N	CHVX890461	0.9562				
44171010208 - N	CHVX890461	0.9562				
44171010209 - N	CHVX890461	0.9562				
44171010210 - N	CHVX890461	0.9562				
44171010211 - N	CHVX890461	0.9562				
44171010212 - N	CHVX890461	0.9562				
44171010213 - N	CHVX890461	0.9562				
44171010214 - N	CHVX890461	0.9562				
44171010215 - N	CHVX890461	0.9562				
44171010216 - N	CHVX890461	0.9562				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
217	44171010217	44171010217 - N	4417.060	4417.214			
218	44171010218	44171010218 - N	4417.060	4417.214			
219	44171010219	44171010219 - N	4417.060	4417.214			
220	44171010220	44171010220 - N	4417.060	4417.214	1.27	3.64	
221	44171010221	44171010221 - N	4417.258	4417.197			
222	44171010222	44171010222 - N	4417.258	4417.197			
223	44171010223	44171010223 - N	4417.258	4417.197			
224	44171010224	44171010224 - N	4417.258	4417.197			
225	44171010225	44171010225 - N	4417.258	4417.197			
226	44171010226	44171010226 - N	4417.258	4417.197			
227	44171010227	44171010227 - N	4417.258	4417.197			
228	44171010228	44171010228 - N	4417.258	4417.197			
229	44171010229	44171010229 - N	4417.258	4417.197			
230	44171010230	44171010230 - N	4417.258	4417.197			
231	44171010231	44171010231 - N	4417.185	4417.075			
232	44171010232	44171010232 - N	4417.185	4417.075			
233	44171010233	44171010233 - N	4417.185	4417.075			
234	44171010234	44171010234 - N	4417.185	4417.075			
235	44171010235	44171010235 - N	4417.185	4417.075			
236	44171010236	44171010236 - N	4417.185	4417.075			
237	44171010237	44171010237 - N	4417.185	4417.075			
238	44171010238	44171010238 - N	4417.185	4417.075			
239	44171010239	44171010239 - N	4417.185	4417.075			
240	44171010240	44171010240 - N	4417.185	4417.075	1.41	2.08	
241	44171010241	44171010241 - N	4417.031	4417.251			
242	44171010242	44171010242 - N	4417.031	4417.251			
243	44171010243	44171010243 - N	4417.031	4417.251			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010217 - N	CHVX890461	0.9562				
44171010218 - N	CHVX890461	0.9562				
44171010219 - N	CHVX890461	0.9562				
44171010220 - N	CHVX890461	0.9562	383	2.58	117	
44171010221 - N	CHVX890461	0.9562				
44171010222 - N	CHVX890461	0.9562				
44171010223 - N	CHVX890461	0.9562				
44171010224 - N	CHVX890461	0.9562				
44171010225 - N	CHVX890461	0.9562				
44171010226 - N	CHVX890461	0.9562				
44171010227 - N	CHVX890461	0.9562				
44171010228 - N	CHVX890461	0.9562				
44171010229 - N	CHVX890461	0.9562				
44171010230 - N	CHVX890461	0.9562				
44171010231 - N	CHVX890461	0.9562				
44171010232 - N	CHVX890461	0.9562				
44171010233 - N	CHVX890461	0.9562				
44171010234 - N	CHVX890461	0.9562				
44171010235 - N	CHVX890461	0.9562				
44171010236 - N	CHVX890461	0.9562				
44171010237 - N	CHVX890461	0.9562				
44171010238 - N	CHVX890461	0.9562				
44171010239 - N	CHVX890461	0.9562				
44171010240 - N	CHVX890461	0.9562	390	2.54	121	
44171010241 - N	CHVX890461	0.9562				
44171010242 - N	CHVX890461	0.9562				
44171010243 - N	CHVX890461	0.9562				

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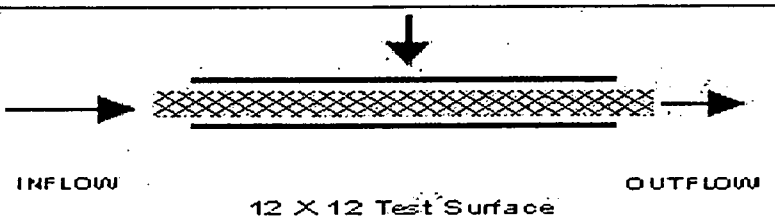
ASTM D 4716

Client:	Geo Synthetics LLC.	**Job #**	4417
Project:	Ameren Venice Plant, Venice, IL		
Product:	TN 350-2-6		

Test Configuration:



Test Information:

Boundary Conditions:	Ottawa Sand Geocomposite Textured Liner	**Normal Load:** **Gradient:** **Seating Time:** **Flow Direction:**	1000 0.01 100 hours MD

Test Results:

Roll No.	Pressure, psf	Gradient	Transmissivity, m^2/sec
			100 hours
44171010001	1000	0.01	6.45×10^{-3}

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POLYETHYLENE RESIN CERTIFICATION

Customer Name : Geo Synthetics LLC
Project Name : Ameren Venice Plant, Venice, IL
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 350-2-6

We, the Geonet Manufacturer, hereby certify the following for the material delivered to the above referenced project:

Resin Supplier	Resin Production Plant	Resin Brand Name	Resin Lot Number	Property	Test Method	Units	Resin Supplier Value	Tested Value*
Chevron Phillips Chemical Company	Chevron, TX	HDPE	CHVX890461	Density	ASTM D1505	gm / cc	0.9500	0.9506
				Melt flow Index	ASTM D1238[(a)]	gm / 10 min	0.32	0.32

(a) Condition 190/2.16
* Data from SKAPS Quality Control

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Electronic Filing: Received, Clerk's Office 09/28/2020

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

GEOCOMP ROLL#	FABRIC ROLL#	WEIGHT oz/sq yd	MD TENSILE lbs.	XMD TENSILE lbs.	PUNCTURE lbs.	AOS us sieve	WATER-FLOW gpm/sq ft	PERM-ABL cm/sec	PERM-ITY sec^{-1}
44171010001	4417.146	6.70	162	178	97	70	134	0.50	1.79
	4417.173	6.62	168	175	95	70	136	0.52	1.82
44171010040	4417.191	6.57	162	178	98	70	136	0.52	1.82
	4417.205	6.61	169	172	96	70	133	0.49	1.77
44171010080	4417.222	6.44	170	179	95	70	133	0.50	1.77
	4417.160	6.50	165	174	96	70	136	0.52	1.82
44171010120	4417.041	6.36	168	175	100	70	136	0.50	1.81
	4417.194	6.38	167	180	97	70	136	0.52	1.82
44171010160	4417.150	6.21	167	180	95	70	136	0.52	1.82
	4417.199	6.56	163	176	95	70	136	0.52	1.82
44171010200	4417.017	6.44	167	180	100	70	136	0.50	1.81
	4417.163	6.51	169	172	100	70	136	0.52	1.82
44171010240	4417.185	6.47	164	170	100	70	136	0.52	1.82
	4417.075	6.28	169	172	97	70	131	0.50	1.75

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Electronic Filing: Received, Clerk's Office 09/28/2020

SKAPS

September 30, 2011
Geo Synthetics LLC
2401 Pewaukee Rd
Waukesha, WI 53188

Ref. : Ameren Venice Plant, Venice, IL
Customer P.O. # 14926-01
Product : TN 350-2-6

We certify that the TN 350-2-6 drainage geocomposite, meets the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Required Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	300	Minimum
Carbon Black	ASTM D 4218	%	2.0	Minimum
Tensile Strength	ASTM D 5035	lbs/in	75	Minimum
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	Minimum
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MARV[5]
Transmissivity[1]	ASTM D 4716	m^2/sec	6.0 x 10^{-3}	MARV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV
Grab Strength	ASTM D 4632	lbs	160	MARV
Puncture Resistance	ASTM D 4833	lbs	90	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2	110	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.50	MARV
Permeability	ASTM D 4491	cm/sec	0.3	MARV
AOS	ASTM D 4751	US Sieve	70	MARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.01 and a confining pressure of 1000 psf between ottawa sand & textured liner after 100 hours.
2 Condition 190/2.16
3 Geotextile and Geonet properties are prior to lamination.
4 Geotextile data is provided by the supplier.
5 MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

Sincerely,
Nilay Patel
Nilay Patel
QA Manager

APPROVED 5 QA

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
244	44171010244	44171010244 - N	4417.031	4417.251			
245	44171010245	44171010245 - N	4417.031	4417.251			
246	44171010246	44171010246 - N	4417.031	4417.251			
247	44171010247	44171010247 - N	4417.031	4417.251			
248	44171010248	44171010248 - N	4417.031	4417.251			
249	44171010249	44171010249 - N	4417.031	4417.251			
250	44171010250	44171010250 - N	4417.031	4417.251			
251	44171010251	44171010251 - N	4417.006	4417.049			
252	44171010252	44171010252 - N	4417.006	4417.049			
253	44171010253	44171010253 - N	4417.006	4417.049			
254	44171010254	44171010254 - N	4417.006	4417.049			
255	44171010255	44171010255 - N	4417.006	4417.049			6.34×10^{-3}
256	44171010256	44171010256 - N	4417.006	4417.049			
257	44171010257	44171010257 - N	4417.006	4417.049			
258	44171010258	44171010258 - N	4417.006	4417.049			
259	44171010259	44171010259 - N	4417.006	4417.049			
260	44171010260	44171010260 - N	4417.006	4417.049	1.55	3.83	
261	44171010261	44171010261 - N	4417.253	4417.025			
262	44171010262	44171010262 - N	4417.253	4417.025			
263	44171010263	44171010263 - N	4417.253	4417.025			
264	44171010264	44171010264 - N	4417.253	4417.025			
265	44171010265	44171010265 - N	4417.253	4417.025			
266	44171010266	44171010266 - N	4417.253	4417.025			
267	44171010267	44171010267 - N	4417.253	4417.025			
268	44171010268	44171010268 - N	4417.253	4417.025			
269	44171010269	44171010269 - N	4417.253	4417.025			
270	44171010270	44171010270 - N	4417.253	4417.025			

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SKAPS

Product : **TN 350-2-6**
Project : **Ameren Venice Plant, Venice, IL**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010244 - N	PSPX002414	0.9567				
44171010245 - N	PSPX002414	0.9567				
44171010246 - N	PSPX002414	0.9567				
44171010247 - N	PSPX002414	0.9567				
44171010248 - N	PSPX002414	0.9567				
44171010249 - N	PSPX002414	0.9567				
44171010250 - N	PSPX002414	0.9567				
44171010251 - N	PSPX002414	0.9567				
44171010252 - N	PSPX002414	0.9567				
44171010253 - N	PSPX002414	0.9567				
44171010254 - N	PSPX002414	0.9567				
44171010255 - N	PSPX002414	0.9567				
44171010256 - N	PSPX002414	0.9567				
44171010257 - N	PSPX002414	0.9567				
44171010258 - N	PSPX002414	0.9567				
44171010259 - N	PSPX002414	0.9567				
44171010260 - N	PSPX002414	0.9567	387	2.34	119	
44171010261 - N	PSPX002414	0.9567				
44171010262 - N	PSPX002414	0.9567				
44171010263 - N	PSPX002414	0.9567				
44171010264 - N	PSPX002414	0.9567				
44171010265 - N	PSPX002414	0.9567				
44171010266 - N	PSPX002414	0.9567				
44171010267 - N	PSPX002414	0.9567				
44171010268 - N	PSPX002414	0.9567				
44171010269 - N	PSPX002414	0.9567				
44171010270 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
271	44171010271	44171010271 - N	4417.024	4417.133			
272	44171010272	44171010272 - N	4417.024	4417.133			
273	44171010273	44171010273 - N	4417.024	4417.133			
274	44171010274	44171010274 - N	4417.024	4417.133			
275	44171010275	44171010275 - N	4417.024	4417.133			
276	44171010276	44171010276 - N	4417.024	4417.133			
277	44171010277	44171010277 - N	4417.024	4417.133			
278	44171010278	44171010278 - N	4417.024	4417.133			
279	44171010279	44171010279 - N	4417.024	4417.133			
280	44171010280	44171010280 - N	4417.024	4417.133	1.29	3.49	
281	44171010281	44171010281 - N	4417.032	4417.100			
282	44171010282	44171010282 - N	4417.032	4417.100			
283	44171010283	44171010283 - N	4417.032	4417.100			
284	44171010284	44171010284 - N	4417.032	4417.100			
285	44171010285	44171010285 - N	4417.032	4417.100			
286	44171010286	44171010286 - N	4417.032	4417.100			
287	44171010287	44171010287 - N	4417.032	4417.100			
288	44171010288	44171010288 - N	4417.032	4417.100			
289	44171010289	44171010289 - N	4417.032	4417.100			
290	44171010290	44171010290 - N	4417.032	4417.100			
291	44171010291	44171010291 - N	4417.262	4417.027			
292	44171010292	44171010292 - N	4417.262	4417.027			
293	44171010293	44171010293 - N	4417.262	4417.027			
294	44171010294	44171010294 - N	4417.262	4417.027			
295	44171010295	44171010295 - N	4417.262	4417.027			
296	44171010296	44171010296 - N	4417.262	4417.027			
297	44171010297	44171010297 - N	4417.262	4417.027			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010271 - N	PSPX002414	0.9567				
44171010272 - N	PSPX002414	0.9567				
44171010273 - N	PSPX002414	0.9567				
44171010274 - N	PSPX002414	0.9567				
44171010275 - N	PSPX002414	0.9567				
44171010276 - N	PSPX002414	0.9567				
44171010277 - N	PSPX002414	0.9567				
44171010278 - N	PSPX002414	0.9567				
44171010279 - N	PSPX002414	0.9567				
44171010280 - N	PSPX002414	0.9567	381	2.32	124	
44171010281 - N	PSPX002414	0.9567				
44171010282 - N	PSPX002414	0.9567				
44171010283 - N	PSPX002414	0.9567				
44171010284 - N	PSPX002414	0.9567				
44171010285 - N	PSPX002414	0.9567				
44171010286 - N	PSPX002414	0.9567				
44171010287 - N	PSPX002414	0.9567				
44171010288 - N	PSPX002414	0.9567				
44171010289 - N	PSPX002414	0.9567				
44171010290 - N	PSPX002414	0.9567				
44171010291 - N	PSPX002414	0.9567				
44171010292 - N	PSPX002414	0.9567				
44171010293 - N	PSPX002414	0.9567				
44171010294 - N	PSPX002414	0.9567				
44171010295 - N	PSPX002414	0.9567				
44171010296 - N	PSPX002414	0.9567				
44171010297 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
298	44171010298	44171010298 - N	4417.262	4417.027			
299	44171010299	44171010299 - N	4417.262	4417.027			
300	44171010300	44171010300 - N	4417.262	4417.027	1.63	3.55	
301	44171010301	44171010301 - N	4417.096	4417.071			
302	44171010302	44171010302 - N	4417.096	4417.071			
303	44171010303	44171010303 - N	4417.096	4417.071			
304	44171010304	44171010304 - N	4417.096	4417.071			
305	44171010305	44171010305 - N	4417.096	4417.071			
306	44171010306	44171010306 - N	4417.096	4417.071			
307	44171010307	44171010307 - N	4417.096	4417.071			
308	44171010308	44171010308 - N	4417.096	4417.071			
309	44171010309	44171010309 - N	4417.096	4417.071			
310	44171010310	44171010310 - N	4417.096	4417.071			
311	44171010311	44171010311 - N	4417.243	4417.230			
312	44171010312	44171010312 - N	4417.243	4417.230			
313	44171010313	44171010313 - N	4417.243	4417.230			
314	44171010314	44171010314 - N	4417.243	4417.230			
315	44171010315	44171010315 - N	4417.243	4417.230			
316	44171010316	44171010316 - N	4417.243	4417.230			
317	44171010317	44171010317 - N	4417.243	4417.230			
318	44171010318	44171010318 - N	4417.243	4417.230			
319	44171010319	44171010319 - N	4417.243	4417.230			
320	44171010320	44171010320 - N	4417.243	4417.230	1.58	2.09	
321	44171010321	44171010321 - N	4417.207	4417.099			
322	44171010322	44171010322 - N	4417.207	4417.099			
323	44171010323	44171010323 - N	4417.207	4417.099			
324	44171010324	44171010324 - N	4417.207	4417.099			

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : info@skaps.com

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010298 - N	PSPX002414	0.9567				
44171010299 - N	PSPX002414	0.9567				
44171010300 - N	PSPX002414	0.9567	388	2.63	118	
44171010301 - N	PSPX002414	0.9567				
44171010302 - N	PSPX002414	0.9567				
44171010303 - N	PSPX002414	0.9567				
44171010304 - N	PSPX002414	0.9567				
44171010305 - N	PSPX002414	0.9567				
44171010306 - N	PSPX002414	0.9567				
44171010307 - N	PSPX002414	0.9567				
44171010308 - N	PSPX002414	0.9567				
44171010309 - N	PSPX002414	0.9567				
44171010310 - N	PSPX002414	0.9567				
44171010311 - N	PSPX002414	0.9567				
44171010312 - N	PSPX002414	0.9567				
44171010313 - N	PSPX002414	0.9567				
44171010314 - N	PSPX002414	0.9567				
44171010315 - N	PSPX002414	0.9567				
44171010316 - N	PSPX002414	0.9567				
44171010317 - N	PSPX002414	0.9567				
44171010318 - N	PSPX002414	0.9567				
44171010319 - N	PSPX002414	0.9567				
44171010320 - N	PSPX002414	0.9567	384	2.28	115	
44171010321 - N	PSPX002414	0.9567				
44171010322 - N	PSPX002414	0.9567				
44171010323 - N	PSPX002414	0.9567				
44171010324 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
325	44171010325	44171010325 - N	4417.207	4417.099			
326	44171010326	44171010326 - N	4417.207	4417.099			
327	44171010327	44171010327 - N	4417.207	4417.099			
328	44171010328	44171010328 - N	4417.207	4417.099			
329	44171010329	44171010329 - N	4417.207	4417.099			
330	44171010330	44171010330 - N	4417.207	4417.099			
331	44171010331	44171010331 - N	4417.224	4417.138			
332	44171010332	44171010332 - N	4417.224	4417.138			
333	44171010333	44171010333 - N	4417.224	4417.138			
334	44171010334	44171010334 - N	4417.224	4417.138			
335	44171010335	44171010335 - N	4417.224	4417.138			
336	44171010336	44171010336 - N	4417.224	4417.138			
337	44171010337	44171010337 - N	4417.224	4417.138			
338	44171010338	44171010338 - N	4417.224	4417.138			
339	44171010339	44171010339 - N	4417.224	4417.138			
340	44171010340	44171010340 - N	4417.224	4417.138	1.85	2.46	
341	44171010341	44171010341 - N	4417.098	4417.091			
342	44171010342	44171010342 - N	4417.098	4417.091			
343	44171010343	44171010343 - N	4417.098	4417.091			
344	44171010344	44171010344 - N	4417.098	4417.091			
345	44171010345	44171010345 - N	4417.098	4417.091			
346	44171010346	44171010346 - N	4417.098	4417.091			
347	44171010347	44171010347 - N	4417.098	4417.091			
348	44171010348	44171010348 - N	4417.098	4417.091			
349	44171010349	44171010349 - N	4417.098	4417.091			
350	44171010350	44171010350 - N	4417.098	4417.091			
351	44171010351	44171010351 - N	4417.051	4417.019			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010325 - N	PSPX002414	0.9567				
44171010326 - N	PSPX002414	0.9567				
44171010327 - N	PSPX002414	0.9567				
44171010328 - N	PSPX002414	0.9567				
44171010329 - N	PSPX002414	0.9567				
44171010330 - N	PSPX002414	0.9567				
44171010331 - N	PSPX002414	0.9567				
44171010332 - N	PSPX002414	0.9567				
44171010333 - N	PSPX002414	0.9567				
44171010334 - N	PSPX002414	0.9567				
44171010335 - N	PSPX002414	0.9567				
44171010336 - N	PSPX002414	0.9567				
44171010337 - N	PSPX002414	0.9567				
44171010338 - N	PSPX002414	0.9567				
44171010339 - N	PSPX002414	0.9567				
44171010340 - N	PSPX002414	0.9567	389	2.55	116	
44171010341 - N	PSPX002414	0.9567				
44171010342 - N	PSPX002414	0.9567				
44171010343 - N	PSPX002414	0.9567				
44171010344 - N	PSPX002414	0.9567				
44171010345 - N	PSPX002414	0.9567				
44171010346 - N	PSPX002414	0.9567				
44171010347 - N	PSPX002414	0.9567				
44171010348 - N	PSPX002414	0.9567				
44171010349 - N	PSPX002414	0.9567				
44171010350 - N	PSPX002414	0.9567				
44171010351 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
352	44171010352	44171010352 - N	4417.051	4417.019			
353	44171010353	44171010353 - N	4417.051	4417.019			
354	44171010354	44171010354 - N	4417.051	4417.019			
355	44171010355	44171010355 - N	4417.051	4417.019			
356	44171010356	44171010356 - N	4417.051	4417.019			
357	44171010357	44171010357 - N	4417.051	4417.019			
358	44171010358	44171010358 - N	4417.051	4417.019			
359	44171010359	44171010359 - N	4417.051	4417.019			
360	44171010360	44171010360 - N	4417.051	4417.019	1.79	2.90	
361	44171010361	44171010361 - N	4417.001	4417.198			
362	44171010362	44171010362 - N	4417.001	4417.198			
363	44171010363	44171010363 - N	4417.001	4417.198			
364	44171010364	44171010364 - N	4417.001	4417.198			
365	44171010365	44171010365 - N	4417.001	4417.198			
366	44171010366	44171010366 - N	4417.001	4417.198			
367	44171010367	44171010367 - N	4417.001	4417.198			
368	44171010368	44171010368 - N	4417.001	4417.198			
369	44171010369	44171010369 - N	4417.001	4417.198			
370	44171010370	44171010370 - N	4417.001	4417.198			
371	44171010371	44171010371 - N	4417.112	4417.131			
372	44171010372	44171010372 - N	4417.112	4417.131			
373	44171010373	44171010373 - N	4417.112	4417.131			
374	44171010374	44171010374 - N	4417.112	4417.131			
375	44171010375	44171010375 - N	4417.112	4417.131			
376	44171010376	44171010376 - N	4417.112	4417.131			
377	44171010377	44171010377 - N	4417.112	4417.131			
378	44171010378	44171010378 - N	4417.112	4417.131			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010352 - N	PSPX002414	0.9567				
44171010353 - N	PSPX002414	0.9567				
44171010354 - N	PSPX002414	0.9567				
44171010355 - N	PSPX002414	0.9567				
44171010356 - N	PSPX002414	0.9567				
44171010357 - N	PSPX002414	0.9567				
44171010358 - N	PSPX002414	0.9567				
44171010359 - N	PSPX002414	0.9567				
44171010360 - N	PSPX002414	0.9567	382	2.46	120	
44171010361 - N	PSPX002414	0.9567				
44171010362 - N	PSPX002414	0.9567				
44171010363 - N	PSPX002414	0.9567				
44171010364 - N	PSPX002414	0.9567				
44171010365 - N	PSPX002414	0.9567				
44171010366 - N	PSPX002414	0.9567				
44171010367 - N	PSPX002414	0.9567				
44171010368 - N	PSPX002414	0.9567				
44171010369 - N	PSPX002414	0.9567				
44171010370 - N	PSPX002414	0.9567				
44171010371 - N	PSPX002414	0.9567				
44171010372 - N	PSPX002414	0.9567				
44171010373 - N	PSPX002414	0.9567				
44171010374 - N	PSPX002414	0.9567				
44171010375 - N	PSPX002414	0.9567				
44171010376 - N	PSPX002414	0.9567				
44171010377 - N	PSPX002414	0.9567				
44171010378 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
379	44171010379	44171010379 - N	4417.112	4417.131			
380	44171010380	44171010380 - N	4417.112	4417.131	1.57	2.77	
381	44171010381	44171010381 - N	4417.026	4417.072			
382	44171010382	44171010382 - N	4417.026	4417.072			
383	44171010383	44171010383 - N	4417.026	4417.072			
384	44171010384	44171010384 - N	4417.026	4417.072			
385	44171010385	44171010385 - N	4417.026	4417.072			
386	44171010386	44171010386 - N	4417.026	4417.072			
387	44171010387	44171010387 - N	4417.026	4417.072			
388	44171010388	44171010388 - N	4417.026	4417.072			
389	44171010389	44171010389 - N	4417.026	4417.072			
390	44171010390	44171010390 - N	4417.026	4417.072			
391	44171010391	44171010391 - N	4417.013	4417.111			
392	44171010392	44171010392 - N	4417.013	4417.111			
393	44171010393	44171010393 - N	4417.013	4417.111			
394	44171010394	44171010394 - N	4417.013	4417.111			
395	44171010395	44171010395 - N	4417.013	4417.111			
396	44171010396	44171010396 - N	4417.013	4417.111			
397	44171010397	44171010397 - N	4417.013	4417.111			
398	44171010398	44171010398 - N	4417.013	4417.111			
399	44171010399	44171010399 - N	4417.013	4417.111			
400	44171010400	44171010400 - N	4417.013	4417.111	1.32	3.10	
401	44171010401	44171010401 - N	4417.020	4417.018			
402	44171010402	44171010402 - N	4417.020	4417.018			
403	44171010403	44171010403 - N	4417.020	4417.018			
404	44171010404	44171010404 - N	4417.020	4417.018			
405	44171010405	44171010405 - N	4417.020	4417.018			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010379 - N	PSPX002414	0.9567				
44171010380 - N	PSPX002414	0.9567	385	2.72	124	
44171010381 - N	PSPX002414	0.9567				
44171010382 - N	PSPX002414	0.9567				
44171010383 - N	PSPX002414	0.9567				
44171010384 - N	PSPX002414	0.9567				
44171010385 - N	PSPX002414	0.9567				
44171010386 - N	PSPX002414	0.9567				
44171010387 - N	PSPX002414	0.9567				
44171010388 - N	PSPX002414	0.9567				
44171010389 - N	PSPX002414	0.9567				
44171010390 - N	PSPX002414	0.9567				
44171010391 - N	PSPX002414	0.9567				
44171010392 - N	PSPX002414	0.9567				
44171010393 - N	PSPX002414	0.9567				
44171010394 - N	PSPX002414	0.9567				
44171010395 - N	PSPX002414	0.9567				
44171010396 - N	PSPX002414	0.9567				
44171010397 - N	PSPX002414	0.9567				
44171010398 - N	PSPX002414	0.9567				
44171010399 - N	PSPX002414	0.9567				
44171010400 - N	PSPX002414	0.9567	380	2.67	121	
44171010401 - N	PSPX002414	0.9567				
44171010402 - N	PSPX002414	0.9567				
44171010403 - N	PSPX002414	0.9567				
44171010404 - N	PSPX002414	0.9567				
44171010405 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
406	44171010406	44171010406 - N	4417.020	4417.018			
407	44171010407	44171010407 - N	4417.020	4417.018			
408	44171010408	44171010408 - N	4417.020	4417.018			
409	44171010409	44171010409 - N	4417.020	4417.018			
410	44171010410	44171010410 - N	4417.020	4417.018			
411	44171010411	44171010411 - N	4417.048	4417.247			
412	44171010412	44171010412 - N	4417.048	4417.247			
413	44171010413	44171010413 - N	4417.048	4417.247			
414	44171010414	44171010414 - N	4417.048	4417.247			
415	44171010415	44171010415 - N	4417.048	4417.247			
416	44171010416	44171010416 - N	4417.048	4417.247			
417	44171010417	44171010417 - N	4417.048	4417.247			
418	44171010418	44171010418 - N	4417.048	4417.247			
419	44171010419	44171010419 - N	4417.048	4417.247			
420	44171010420	44171010420 - N	4417.048	4417.247	1.70	3.65	
421	44171010421	44171010421 - N	4417.187	4417.066			
422	44171010422	44171010422 - N	4417.187	4417.066			
423	44171010423	44171010423 - N	4417.187	4417.066			
424	44171010424	44171010424 - N	4417.187	4417.066			
425	44171010425	44171010425 - N	4417.187	4417.066			
426	44171010426	44171010426 - N	4417.187	4417.066			
427	44171010427	44171010427 - N	4417.187	4417.066			
428	44171010428	44171010428 - N	4417.187	4417.066			
429	44171010429	44171010429 - N	4417.187	4417.066			
430	44171010430	44171010430 - N	4417.187	4417.066			
431	44171010431	44171010431 - N	4417.088	4417.219			
432	44171010432	44171010432 - N	4417.088	4417.219			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010406 - N	PSPX002414	0.9567				
44171010407 - N	PSPX002414	0.9567				
44171010408 - N	PSPX002414	0.9567				
44171010409 - N	PSPX002414	0.9567				
44171010410 - N	PSPX002414	0.9567				
44171010411 - N	PSPX002414	0.9567				
44171010412 - N	PSPX002414	0.9567				
44171010413 - N	PSPX002414	0.9567				
44171010414 - N	PSPX002414	0.9567				
44171010415 - N	PSPX002414	0.9567				
44171010416 - N	PSPX002414	0.9567				
44171010417 - N	PSPX002414	0.9567				
44171010418 - N	PSPX002414	0.9567				
44171010419 - N	PSPX002414	0.9567				
44171010420 - N	PSPX002414	0.9567	384	2.50	123	
44171010421 - N	PSPX002414	0.9567				
44171010422 - N	PSPX002414	0.9567				
44171010423 - N	PSPX002414	0.9567				
44171010424 - N	PSPX002414	0.9567				
44171010425 - N	PSPX002414	0.9567				
44171010426 - N	PSPX002414	0.9567				
44171010427 - N	PSPX002414	0.9567				
44171010428 - N	PSPX002414	0.9567				
44171010429 - N	PSPX002414	0.9567				
44171010430 - N	PSPX002414	0.9567				
44171010431 - N	PSPX002414	0.9567				
44171010432 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
433	44171010433	44171010433 - N	4417.088	4417.219			
434	44171010434	44171010434 - N	4417.088	4417.219			
435	44171010435	44171010435 - N	4417.088	4417.219			
436	44171010436	44171010436 - N	4417.088	4417.219			
437	44171010437	44171010437 - N	4417.088	4417.219			
438	44171010438	44171010438 - N	4417.088	4417.219			
439	44171010439	44171010439 - N	4417.088	4417.219			
440	44171010440	44171010440 - N	4417.088	4417.219	1.21	1.96	
441	44171010441	44171010441 - N	4417.033	4417.011			
442	44171010442	44171010442 - N	4417.033	4417.011			
443	44171010443	44171010443 - N	4417.033	4417.011			
444	44171010444	44171010444 - N	4417.033	4417.011			
445	44171010445	44171010445 - N	4417.033	4417.011			
446	44171010446	44171010446 - N	4417.033	4417.011			
447	44171010447	44171010447 - N	4417.033	4417.011			
448	44171010448	44171010448 - N	4417.033	4417.011			
449	44171010449	44171010449 - N	4417.033	4417.011			
450	44171010450	44171010450 - N	4417.033	4417.011			
451	44171010451	44171010451 - N	4417.002	4417.233			
452	44171010452	44171010452 - N	4417.002	4417.233			
453	44171010453	44171010453 - N	4417.002	4417.233			
454	44171010454	44171010454 - N	4417.002	4417.233			
455	44171010455	44171010455 - N	4417.002	4417.233			
456	44171010456	44171010456 - N	4417.002	4417.233			
457	44171010457	44171010457 - N	4417.002	4417.233			
458	44171010458	44171010458 - N	4417.002	4417.233			
459	44171010459	44171010459 - N	4417.002	4417.233			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010433 - N	PSPX002414	0.9567				
44171010434 - N	PSPX002414	0.9567				
44171010435 - N	PSPX002414	0.9567				
44171010436 - N	PSPX002414	0.9567				
44171010437 - N	PSPX002414	0.9567				
44171010438 - N	PSPX002414	0.9567				
44171010439 - N	PSPX002414	0.9567				
44171010440 - N	PSPX002414	0.9567	388	2.56	125	
44171010441 - N	PSPX002414	0.9567				
44171010442 - N	PSPX002414	0.9567				
44171010443 - N	PSPX002414	0.9567				
44171010444 - N	PSPX002414	0.9567				
44171010445 - N	PSPX002414	0.9567				
44171010446 - N	PSPX002414	0.9567				
44171010447 - N	PSPX002414	0.9567				
44171010448 - N	PSPX002414	0.9567				
44171010449 - N	PSPX002414	0.9567				
44171010450 - N	PSPX002414	0.9567				
44171010451 - N	PSPX002414	0.9567				
44171010452 - N	PSPX002414	0.9567				
44171010453 - N	PSPX002414	0.9567				
44171010454 - N	PSPX002414	0.9567				
44171010455 - N	PSPX002414	0.9567				
44171010456 - N	PSPX002414	0.9567				
44171010457 - N	PSPX002414	0.9567				
44171010458 - N	PSPX002414	0.9567				
44171010459 - N	PSPX002414	0.9567				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
460	44171010460	44171010460 - N	4417.002	4417.233	1.45	2.21	
461	44171010461	44171010461 - N	4417.237	4417.135			
462	44171010462	44171010462 - N	4417.237	4417.135			
463	44171010463	44171010463 - N	4417.237	4417.135			
464	44171010464	44171010464 - N	4417.237	4417.135			
465	44171010465	44171010465 - N	4417.237	4417.135			
466	44171010466	44171010466 - N	4417.237	4417.135			
467	44171010467	44171010467 - N	4417.237	4417.135			
468	44171010468	44171010468 - N	4417.237	4417.135			
469	44171010469	44171010469 - N	4417.237	4417.135			
470	44171010470	44171010470 - N	4417.237	4417.135			
471	44171010471	44171010471 - N	4417.070	4417.182			
472	44171010472	44171010472 - N	4417.070	4417.182			
473	44171010473	44171010473 - N	4417.070	4417.182			
474	44171010474	44171010474 - N	4417.070	4417.182			
475	44171010475	44171010475 - N	4417.070	4417.182			
476	44171010476	44171010476 - N	4417.070	4417.182			
477	44171010477	44171010477 - N	4417.070	4417.182			
478	44171010478	44171010478 - N	4417.070	4417.182			
479	44171010479	44171010479 - N	4417.070	4417.182			
480	44171010480	44171010480 - N	4417.070	4417.182	1.30	2.79	
481	44171010481	44171010481 - N	4417.005	4417.004			
482	44171010482	44171010482 - N	4417.005	4417.004			
483	44171010483	44171010483 - N	4417.005	4417.004			
484	44171010484	44171010484 - N	4417.005	4417.004			
485	44171010485	44171010485 - N	4417.005	4417.004			
486	44171010486	44171010486 - N	4417.005	4417.004			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010460 - N	PSPX002414	0.9567	386	2.27	122	
44171010461 - N	PSPX002414	0.9567				
44171010462 - N	PSPX002414	0.9567				
44171010463 - N	PSPX002414	0.9567				
44171010464 - N	PSPX002414	0.9567				
44171010465 - N	PSPX002414	0.9567				
44171010466 - N	PSPX002414	0.9567				
44171010467 - N	PSPX002414	0.9567				
44171010468 - N	PSPX002414	0.9567				
44171010469 - N	PSPX002414	0.9567				
44171010470 - N	PSPX002414	0.9567				
44171010471 - N	PSPX002414	0.9567				
44171010472 - N	PSPX002414	0.9567				
44171010473 - N	PSPX002414	0.9567				
44171010474 - N	PSPX002414	0.9567				
44171010475 - N	PSPX002414	0.9567				
44171010476 - N	PSPX002414	0.9567				
44171010477 - N	PSPX002414	0.9567				
44171010478 - N	PSPX002414	0.9567				
44171010479 - N	PSPX002414	0.9567				
44171010480 - N	PSPX002414	0.9567	381	2.60	119	
44171010481 - N	PSPX002414	0.9567				
44171010482 - N	PSPX002414	0.9567				
44171010483 - N	PSPX002414	0.9567				
44171010484 - N	PSPX002414	0.9567				
44171010485 - N	PSPX002414	0.9567				
44171010486 - N	PSPX002414	0.9567				

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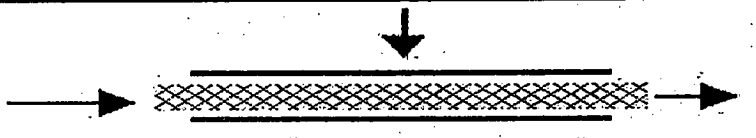
ASTM D 4716

Client:	Geo Synthetics LLC.	**Job #**	4417
Project:	Ameren Venice Plant, Venice, IL		
Product:	TN 350-2-6		

Test Configuration:



12 X 12 Test Surface

Test Information:

Boundary Conditions:	Ottawa Sand Geocomposite Textured Liner	**Normal Load:** **Gradient:** **Seating Time:** **Flow Direction:**	1000 0.01 100 hours MD

Test Results:

Roll No.	Pressure, psf	Gradient	Transmissivity, m^2/sec 100 hours
44171010255	1000	0.01	6.34×10^{-3}

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POLYETHYLENE RESIN CERTIFICATION

Customer Name : Geo Synthetics LLC
Project Name : Ameren Venice Plant, Venice, IL
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 350-2-6

We, the Geonet Manufacturer, hereby certify the following for the material delivered to the above referenced project:

Resin Supplier	Resin Production Plant	Resin Brand Name	Resin Lot Number	Property	Test Method	Units	Resin Supplier Value	Tested Value*
Chevron Phillips Chemical Company	Chevron, TX	HDPE	PSPX002414	Density	ASTM D1505	gm / cc	0.9500	0.9503
				Melt flow Index	ASTM D1238[(a)]	gm / 10 min	0.30	0.30

(a) Condition 190/2.16
* Data from SKAPS Quality Control

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Electronic Filing: Received, Clerk's Office 09/28/2020

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

GEOCOMP ROLL#	FABRIC ROLL#	WEIGHT oz/sq yd	MD TENSILE lbs.	XMD TENSILE lbs.	PUNCTURE lbs.	AOS us sieve	WATER-FLOW gpm/sq ft	PERM-ABL cm/sec	PERM-ITY sec^{-1}
44171010280	4417.024	6.66	163	176	98	70	136	0.50	1.81
	4417.133	6.48	170	179	96	70	134	0.50	1.79
44171010320	4417.243	6.59	163	176	97	70	133	0.50	1.77
	4417.230	6.40	164	170	96	70	133	0.49	1.77
44171010360	4417.051	6.37	166	171	95	70	131	0.50	1.75
	4417.019	6.44	167	180	100	70	136	0.50	1.81
44171010400	4417.013	6.43	162	172	96	70	136	0.50	1.81
	4417.111	6.25	163	176	96	70	134	0.50	1.79
44171010440	4417.088	6.32	168	175	96	70	131	0.50	1.75
	4417.219	6.43	168	175	97	70	133	0.50	1.77
44171010480	4417.070	6.63	165	174	98	70	131	0.50	1.75
	4417.182	6.39	166	171	96	70	136	0.52	1.82

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Electronic Filing: Received, Clerk's Office 09/28/2020

SKAPS

September 30, 2011
Geo Synthetics LLC
2401 Pewaukee Rd
Waukesha, WI 53188

Ref. : Ameren Venice Plant, Venice, IL
Customer P.O. # 14926-01
Product : TN 350-2-6

We certify that the TN 350-2-6 drainage geocomposite, meets the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Required Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	300	Minimum
Carbon Black	ASTM D 4218	%	2.0	Minimum
Tensile Strength	ASTM D 5035	lbs/in	75	Minimum
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	Minimum
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MARV[5]
Transmissivity[1]	ASTM D 4716	m^2/sec	6.0 x 10^{-3}	MARV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV
Grab Strength	ASTM D 4632	lbs	160	MARV
Puncture Resistance	ASTM D 4833	lbs	90	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2	110	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.50	MARV
Permeability	ASTM D 4491	cm/sec	0.3	MARV
AOS	ASTM D 4751	US Sieve	70	MARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.01 and a confining pressure of 1000 psf between ottawa sand & textured liner after 100 hours.
2 Condition 190/2.16
3 Geotextile and Geonet properties are prior to lamination.
4 Geotextile data is provided by the supplier.
5 MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

Sincerely,
Nilay Patel
Nilay Patel
QA Manager

APPROVED 5 QA

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
487	44171010487	44171010487 - N	4417.005	4417.004			
488	44171010488	44171010488 - N	4417.005	4417.004			
489	44171010489	44171010489 - N	4417.005	4417.004			
490	44171010490	44171010490 - N	4417.005	4417.004			
491	44171010491	44171010491 - N	4417.104	4417.218			
492	44171010492	44171010492 - N	4417.104	4417.218			
493	44171010493	44171010493 - N	4417.104	4417.218			
494	44171010494	44171010494 - N	4417.104	4417.218			
495	44171010495	44171010495 - N	4417.104	4417.218			
496	44171010496	44171010496 - N	4417.104	4417.218			
497	44171010497	44171010497 - N	4417.104	4417.218			
498	44171010498	44171010498 - N	4417.104	4417.218			
499	44171010499	44171010499 - N	4417.104	4417.218			
500	44171010500	44171010500 - N	4417.104	4417.218	1.47	2.84	
501	44171010501	44171010501 - N	4417.052	4417.144			
502	44171010502	44171010502 - N	4417.052	4417.144			
503	44171010503	44171010503 - N	4417.052	4417.144			
504	44171010504	44171010504 - N	4417.052	4417.144			
505	44171010505	44171010505 - N	4417.052	4417.144			
506	44171010506	44171010506 - N	4417.052	4417.144			
507	44171010507	44171010507 - N	4417.052	4417.144			
508	44171010508	44171010508 - N	4417.052	4417.144			
509	44171010509	44171010509 - N	4417.052	4417.144			
510	44171010510	44171010510 - N	4417.052	4417.144			6.95×10^{-3}
511	44171010511	44171010511 - N	4417.105	4417.239			
512	44171010512	44171010512 - N	4417.105	4417.239			
513	44171010513	44171010513 - N	4417.105	4417.239			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010487 - N	GOCX058601	0.9563				
44171010488 - N	GOCX058601	0.9563				
44171010489 - N	GOCX058601	0.9563				
44171010490 - N	GOCX058601	0.9563				
44171010491 - N	GOCX058601	0.9563				
44171010492 - N	GOCX058601	0.9563				
44171010493 - N	GOCX058601	0.9563				
44171010494 - N	GOCX058601	0.9563				
44171010495 - N	GOCX058601	0.9563				
44171010496 - N	GOCX058601	0.9563				
44171010497 - N	GOCX058601	0.9563				
44171010498 - N	GOCX058601	0.9563				
44171010499 - N	GOCX058601	0.9563				
44171010500 - N	GOCX058601	0.9563	389	2.33	117	
44171010501 - N	GOCX058601	0.9563				
44171010502 - N	GOCX058601	0.9563				
44171010503 - N	GOCX058601	0.9563				
44171010504 - N	GOCX058601	0.9563				
44171010505 - N	GOCX058601	0.9563				
44171010506 - N	GOCX058601	0.9563				
44171010507 - N	GOCX058601	0.9563				
44171010508 - N	GOCX058601	0.9563				
44171010509 - N	GOCX058601	0.9563				
44171010510 - N	GOCX058601	0.9563				
44171010511 - N	GOCX058601	0.9563				
44171010512 - N	GOCX058601	0.9563				
44171010513 - N	GOCX058601	0.9563				

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
514	44171010514	44171010514 - N	4417.105	4417.239			
515	44171010515	44171010515 - N	4417.105	4417.239			
516	44171010516	44171010516 - N	4417.105	4417.239			
517	44171010517	44171010517 - N	4417.105	4417.239			
518	44171010518	44171010518 - N	4417.105	4417.239			
519	44171010519	44171010519 - N	4417.105	4417.239			
520	44171010520	44171010520 - N	4417.105	4417.239	1.69	3.09	
521	44171010521	44171010521 - N	4417.176	4417.179			
522	44171010522	44171010522 - N	4417.176	4417.179			
523	44171010523	44171010523 - N	4417.176	4417.179			
524	44171010524	44171010524 - N	4417.176	4417.179			
525	44171010525	44171010525 - N	4417.176	4417.179			
526	44171010526	44171010526 - N	4417.176	4417.179			
527	44171010527	44171010527 - N	4417.176	4417.179			
528	44171010528	44171010528 - N	4417.176	4417.179			
529	44171010529	44171010529 - N	4417.176	4417.179			
530	44171010530	44171010530 - N	4417.176	4417.179			
531	44171010531	44171010531 - N	4417.036	4417.093			
532	44171010532	44171010532 - N	4417.036	4417.093			
533	44171010533	44171010533 - N	4417.036	4417.093			
534	44171010534	44171010534 - N	4417.036	4417.093			
535	44171010535	44171010535 - N	4417.036	4417.093			
536	44171010536	44171010536 - N	4417.036	4417.093			
537	44171010537	44171010537 - N	4417.036	4417.093			
538	44171010538	44171010538 - N	4417.036	4417.093			
539	44171010539	44171010539 - N	4417.036	4417.093			
540	44171010540	44171010540 - N	4417.036	4417.093	1.43	2.57	

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SKAPS

Product : **TN 350-2-6**
Project : **Ameren Venice Plant, Venice, IL**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010514 - N	GOCX058601	0.9563				
44171010515 - N	GOCX058601	0.9563				
44171010516 - N	GOCX058601	0.9563				
44171010517 - N	GOCX058601	0.9563				
44171010518 - N	GOCX058601	0.9563				
44171010519 - N	GOCX058601	0.9563				
44171010520 - N	GOCX058601	0.9563	390	2.64	115	
44171010521 - N	GOCX058601	0.9563				
44171010522 - N	GOCX058601	0.9563				
44171010523 - N	GOCX058601	0.9563				
44171010524 - N	GOCX058601	0.9563				
44171010525 - N	GOCX058601	0.9563				
44171010526 - N	GOCX058601	0.9563				
44171010527 - N	GOCX058601	0.9563				
44171010528 - N	GOCX058601	0.9563				
44171010529 - N	GOCX058601	0.9563				
44171010530 - N	GOCX058601	0.9563				
44171010531 - N	GOCX058601	0.9563				
44171010532 - N	GOCX058601	0.9563				
44171010533 - N	GOCX058601	0.9563				
44171010534 - N	GOCX058601	0.9563				
44171010535 - N	GOCX058601	0.9563				
44171010536 - N	GOCX058601	0.9563				
44171010537 - N	GOCX058601	0.9563				
44171010538 - N	GOCX058601	0.9563				
44171010539 - N	GOCX058601	0.9563				
44171010540 - N	GOCX058601	0.9563	387	2.45	118	

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
541	44171010541	44171010541 - N	4417.038	4417.209			
542	44171010542	44171010542 - N	4417.038	4417.209			
543	44171010543	44171010543 - N	4417.038	4417.209			
544	44171010544	44171010544 - N	4417.038	4417.209			
545	44171010545	44171010545 - N	4417.038	4417.209			
546	44171010546	44171010546 - N	4417.038	4417.209			
547	44171010547	44171010547 - N	4417.038	4417.209			
548	44171010548	44171010548 - N	4417.038	4417.209			
549	44171010549	44171010549 - N	4417.038	4417.209			
550	44171010550	44171010550 - N	4417.038	4417.209			
551	44171010551	44171010551 - N	4417.110	4417.147			
552	44171010552	44171010552 - N	4417.110	4417.147			
553	44171010553	44171010553 - N	4417.110	4417.147			
554	44171010554	44171010554 - N	4417.110	4417.147			
555	44171010555	44171010555 - N	4417.110	4417.147			
556	44171010556	44171010556 - N	4417.110	4417.147			
557	44171010557	44171010557 - N	4417.110	4417.147			
558	44171010558	44171010558 - N	4417.110	4417.147			
559	44171010559	44171010559 - N	4417.110	4417.147			
560	44171010560	44171010560 - N	4417.110	4417.147	1.50	2.55	
561	44171010561	44171010561 - N	4417.058	4417.161			
562	44171010562	44171010562 - N	4417.058	4417.161			
563	44171010563	44171010563 - N	4417.058	4417.161			
564	44171010564	44171010564 - N	4417.058	4417.161			
565	44171010565	44171010565 - N	4417.058	4417.161			
566	44171010566	44171010566 - N	4417.058	4417.161			
567	44171010567	44171010567 - N	4417.058	4417.161			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010541 - N	GOCX058601	0.9563				
44171010542 - N	GOCX058601	0.9563				
44171010543 - N	GOCX058601	0.9563				
44171010544 - N	GOCX058601	0.9563				
44171010545 - N	GOCX058601	0.9563				
44171010546 - N	GOCX058601	0.9563				
44171010547 - N	GOCX058601	0.9563				
44171010548 - N	GOCX058601	0.9563				
44171010549 - N	GOCX058601	0.9563				
44171010550 - N	GOCX058601	0.9563				
44171010551 - N	GOCX058601	0.9563				
44171010552 - N	GOCX058601	0.9563				
44171010553 - N	GOCX058601	0.9563				
44171010554 - N	GOCX058601	0.9563				
44171010555 - N	GOCX058601	0.9563				
44171010556 - N	GOCX058601	0.9563				
44171010557 - N	GOCX058601	0.9563				
44171010558 - N	GOCX058601	0.9563				
44171010559 - N	GOCX058601	0.9563				
44171010560 - N	GOCX058601	0.9563	385	2.31	121	
44171010561 - N	GOCX058601	0.9563				
44171010562 - N	GOCX058601	0.9563				
44171010563 - N	GOCX058601	0.9563				
44171010564 - N	GOCX058601	0.9563				
44171010565 - N	GOCX058601	0.9563				
44171010566 - N	GOCX058601	0.9563				
44171010567 - N	GOCX058601	0.9563				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
568	44171010568	44171010568 - N	4417.058	4417.161			
569	44171010569	44171010569 - N	4417.058	4417.161			
570	44171010570	44171010570 - N	4417.058	4417.161			
571	44171010571	44171010571 - N	4417.061	4417.109			
572	44171010572	44171010572 - N	4417.061	4417.109			
573	44171010573	44171010573 - N	4417.061	4417.109			
574	44171010574	44171010574 - N	4417.061	4417.109			
575	44171010575	44171010575 - N	4417.061	4417.109			
576	44171010576	44171010576 - N	4417.061	4417.109			
577	44171010577	44171010577 - N	4417.061	4417.109			
578	44171010578	44171010578 - N	4417.061	4417.109			
579	44171010579	44171010579 - N	4417.061	4417.109			
580	44171010580	44171010580 - N	4417.061	4417.109	1.38	2.28	
581	44171010581	44171010581 - N	4417.170	4417.021			
582	44171010582	44171010582 - N	4417.170	4417.021			
583	44171010583	44171010583 - N	4417.170	4417.021			
584	44171010584	44171010584 - N	4417.170	4417.021			
585	44171010585	44171010585 - N	4417.170	4417.021			
586	44171010586	44171010586 - N	4417.170	4417.021			
587	44171010587	44171010587 - N	4417.170	4417.021			
588	44171010588	44171010588 - N	4417.170	4417.021			
589	44171010589	44171010589 - N	4417.170	4417.021			
590	44171010590	44171010590 - N	4417.170	4417.021			
591	44171010591	44171010591 - N	4417.055	4417.259			
592	44171010592	44171010592 - N	4417.055	4417.259			
593	44171010593	44171010593 - N	4417.055	4417.259			
594	44171010594	44171010594 - N	4417.055	4417.259			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010568 - N	GOCX058601	0.9563				
44171010569 - N	GOCX058601	0.9563				
44171010570 - N	GOCX058601	0.9563				
44171010571 - N	GOCX058601	0.9563				
44171010572 - N	GOCX058601	0.9563				
44171010573 - N	GOCX058601	0.9563				
44171010574 - N	GOCX058601	0.9563				
44171010575 - N	GOCX058601	0.9563				
44171010576 - N	GOCX058601	0.9563				
44171010577 - N	GOCX058601	0.9563				
44171010578 - N	GOCX058601	0.9563				
44171010579 - N	GOCX058601	0.9563				
44171010580 - N	GOCX058601	0.9563	383	2.47	124	
44171010581 - N	GOCX058601	0.9563				
44171010582 - N	GOCX058601	0.9563				
44171010583 - N	GOCX058601	0.9563				
44171010584 - N	GOCX058601	0.9563				
44171010585 - N	GOCX058601	0.9563				
44171010586 - N	GOCX058601	0.9563				
44171010587 - N	GOCX058601	0.9563				
44171010588 - N	GOCX058601	0.9563				
44171010589 - N	GOCX058601	0.9563				
44171010590 - N	GOCX058601	0.9563				
44171010591 - N	GOCX058601	0.9563				
44171010592 - N	GOCX058601	0.9563				
44171010593 - N	GOCX058601	0.9563				
44171010594 - N	GOCX058601	0.9563				

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
595	44171010595	44171010595 - N	4417.055	4417.259			
596	44171010596	44171010596 - N	4417.055	4417.259			
597	44171010597	44171010597 - N	4417.055	4417.259			
598	44171010598	44171010598 - N	4417.055	4417.259			
599	44171010599	44171010599 - N	4417.055	4417.259			
600	44171010600	44171010600 - N	4417.055	4417.259	1.74	3.28	
601	44171010601	44171010601 - N	4417.014	4417.022			
602	44171010602	44171010602 - N	4417.014	4417.022			
603	44171010603	44171010603 - N	4417.014	4417.022			
604	44171010604	44171010604 - N	4417.014	4417.022			
605	44171010605	44171010605 - N	4417.014	4417.022			
606	44171010606	44171010606 - N	4417.014	4417.022			
607	44171010607	44171010607 - N	4417.014	4417.022			
608	44171010608	44171010608 - N	4417.014	4417.022			
609	44171010609	44171010609 - N	4417.014	4417.022			
610	44171010610	44171010610 - N	4417.014	4417.022			
611	44171010611	44171010611 - N	4417.116	4417.250			
612	44171010612	44171010612 - N	4417.116	4417.250			
613	44171010613	44171010613 - N	4417.116	4417.250			
614	44171010614	44171010614 - N	4417.116	4417.250			
615	44171010615	44171010615 - N	4417.116	4417.250			
616	44171010616	44171010616 - N	4417.116	4417.250			
617	44171010617	44171010617 - N	4417.116	4417.250			
618	44171010618	44171010618 - N	4417.116	4417.250			
619	44171010619	44171010619 - N	4417.116	4417.250			
620	44171010620	44171010620 - N	4417.116	4417.250	1.31	2.31	
621	44171010621	44171010621 - N	4417.196	4417.149			

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SKAPS

Product : **TN 350-2-6**
Project : **Ameren Venice Plant, Venice, IL**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010595 - N	GOCX058601	0.9563				
44171010596 - N	GOCX058601	0.9563				
44171010597 - N	GOCX058601	0.9563				
44171010598 - N	GOCX058601	0.9563				
44171010599 - N	GOCX058601	0.9563				
44171010600 - N	GOCX058601	0.9563	380	2.51	119	
44171010601 - N	GOCX058601	0.9563				
44171010602 - N	GOCX058601	0.9563				
44171010603 - N	GOCX058601	0.9563				
44171010604 - N	GOCX058601	0.9563				
44171010605 - N	GOCX058601	0.9563				
44171010606 - N	GOCX058601	0.9563				
44171010607 - N	GOCX058601	0.9563				
44171010608 - N	GOCX058601	0.9563				
44171010609 - N	GOCX058601	0.9563				
44171010610 - N	GOCX058601	0.9563				
44171010611 - N	GOCX058601	0.9563				
44171010612 - N	GOCX058601	0.9563				
44171010613 - N	GOCX058601	0.9563				
44171010614 - N	GOCX058601	0.9563				
44171010615 - N	GOCX058601	0.9563				
44171010616 - N	GOCX058601	0.9563				
44171010617 - N	GOCX058601	0.9563				
44171010618 - N	GOCX058601	0.9563				
44171010619 - N	GOCX058601	0.9563				
44171010620 - N	GOCX058601	0.9563	382	2.65	115	
44171010621 - N	GOCX058601	0.9563				

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
622	44171010622	44171010622 - N	4417.196	4417.149			
623	44171010623	44171010623 - N	4417.196	4417.149			
624	44171010624	44171010624 - N	4417.196	4417.149			
625	44171010625	44171010625 - N	4417.196	4417.149			
626	44171010626	44171010626 - N	4417.196	4417.149			
627	44171010627	44171010627 - N	4417.196	4417.149			
628	44171010628	44171010628 - N	4417.196	4417.149			
629	44171010629	44171010629 - N	4417.196	4417.149			
630	44171010630	44171010630 - N	4417.196	4417.149			
631	44171010631	44171010631 - N	4417.040	4417.153			
632	44171010632	44171010632 - N	4417.040	4417.153			
633	44171010633	44171010633 - N	4417.040	4417.153			
634	44171010634	44171010634 - N	4417.040	4417.153			
635	44171010635	44171010635 - N	4417.040	4417.153			
636	44171010636	44171010636 - N	4417.040	4417.153			
637	44171010637	44171010637 - N	4417.040	4417.153			
638	44171010638	44171010638 - N	4417.040	4417.153			
639	44171010639	44171010639 - N	4417.040	4417.153			
640	44171010640	44171010640 - N	4417.040	4417.153	1.33	2.37	
641	44171010641	44171010641 - N	4417.090	4417.200			
642	44171010642	44171010642 - N	4417.090	4417.200			
643	44171010643	44171010643 - N	4417.090	4417.200			
644	44171010644	44171010644 - N	4417.090	4417.200			
645	44171010645	44171010645 - N	4417.090	4417.200			
646	44171010646	44171010646 - N	4417.090	4417.200			
647	44171010647	44171010647 - N	4417.090	4417.200			
648	44171010648	44171010648 - N	4417.090	4417.200			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010622 - N	GOCX058601	0.9563				
44171010623 - N	GOCX058601	0.9563				
44171010624 - N	GOCX058601	0.9563				
44171010625 - N	GOCX058601	0.9563				
44171010626 - N	GOCX058601	0.9563				
44171010627 - N	GOCX058601	0.9563				
44171010628 - N	GOCX058601	0.9563				
44171010629 - N	GOCX058601	0.9563				
44171010630 - N	GOCX058601	0.9563				
44171010631 - N	GOCX058601	0.9563				
44171010632 - N	GOCX058601	0.9563				
44171010633 - N	GOCX058601	0.9563				
44171010634 - N	GOCX058601	0.9563				
44171010635 - N	GOCX058601	0.9563				
44171010636 - N	GOCX058601	0.9563				
44171010637 - N	GOCX058601	0.9563				
44171010638 - N	GOCX058601	0.9563				
44171010639 - N	GOCX058601	0.9563				
44171010640 - N	GOCX058601	0.9563	384	2.26	125	
44171010641 - N	GOCX058601	0.9563				
44171010642 - N	GOCX058601	0.9563				
44171010643 - N	GOCX058601	0.9563				
44171010644 - N	GOCX058601	0.9563				
44171010645 - N	GOCX058601	0.9563				
44171010646 - N	GOCX058601	0.9563				
44171010647 - N	GOCX058601	0.9563				
44171010648 - N	GOCX058601	0.9563				

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
649	44171010649	44171010649 - N	4417.090	4417.200			
650	44171010650	44171010650 - N	4417.090	4417.200			
651	44171010651	44171010651 - N	4417.050	4417.132			
652	44171010652	44171010652 - N	4417.050	4417.132			
653	44171010653	44171010653 - N	4417.050	4417.132			
654	44171010654	44171010654 - N	4417.050	4417.132			
655	44171010655	44171010655 - N	4417.050	4417.132			
656	44171010656	44171010656 - N	4417.050	4417.132			
657	44171010657	44171010657 - N	4417.050	4417.132			
658	44171010658	44171010658 - N	4417.050	4417.132			
659	44171010659	44171010659 - N	4417.050	4417.132			
660	44171010660	44171010660 - N	4417.050	4417.132	1.24	3.33	
661	44171010661	44171010661 - N	4417.130	4417.167			
662	44171010662	44171010662 - N	4417.130	4417.167			
663	44171010663	44171010663 - N	4417.130	4417.167			
664	44171010664	44171010664 - N	4417.130	4417.167			
665	44171010665	44171010665 - N	4417.130	4417.167			
666	44171010666	44171010666 - N	4417.130	4417.167			
667	44171010667	44171010667 - N	4417.130	4417.167			
668	44171010668	44171010668 - N	4417.130	4417.167			
669	44171010669	44171010669 - N	4417.130	4417.167			
670	44171010670	44171010670 - N	4417.130	4417.167			
671	44171010671	44171010671 - N	4417.226	4417.065			
672	44171010672	44171010672 - N	4417.226	4417.065			
673	44171010673	44171010673 - N	4417.226	4417.065			
674	44171010674	44171010674 - N	4417.226	4417.065			
675	44171010675	44171010675 - N	4417.226	4417.065			

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010649 - N	GOCX058601	0.9563				
44171010650 - N	GOCX058601	0.9563				
44171010651 - N	GOCX058601	0.9563				
44171010652 - N	GOCX058601	0.9563				
44171010653 - N	GOCX058601	0.9563				
44171010654 - N	GOCX058601	0.9563				
44171010655 - N	GOCX058601	0.9563				
44171010656 - N	GOCX058601	0.9563				
44171010657 - N	GOCX058601	0.9563				
44171010658 - N	GOCX058601	0.9563				
44171010659 - N	GOCX058601	0.9563				
44171010660 - N	GOCX058601	0.9563	380	2.70	118	
44171010661 - N	GOCX058601	0.9563				
44171010662 - N	GOCX058601	0.9563				
44171010663 - N	GOCX058601	0.9563				
44171010664 - N	GOCX058601	0.9563				
44171010665 - N	GOCX058601	0.9563				
44171010666 - N	GOCX058601	0.9563				
44171010667 - N	GOCX058601	0.9563				
44171010668 - N	GOCX058601	0.9563				
44171010669 - N	GOCX058601	0.9563				
44171010670 - N	GOCX058601	0.9563				
44171010671 - N	GOCX058601	0.9563				
44171010672 - N	GOCX058601	0.9563				
44171010673 - N	GOCX058601	0.9563				
44171010674 - N	GOCX058601	0.9563				
44171010675 - N	GOCX058601	0.9563				

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Product : **TN 350-2-6**
Project : **Ameren Venice Plant, Venice, IL**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
676	44171010676	44171010676 - N	4417.226	4417.065			
677	44171010677	44171010677 - N	4417.226	4417.065			
678	44171010678	44171010678 - N	4417.226	4417.065			
679	44171010679	44171010679 - N	4417.226	4417.065			
680	44171010680	44171010680 - N	4417.226	4417.065	1.87	2.89	
681	44171010681	44171010681 - N	4417.204	4417.097			
682	44171010682	44171010682 - N	4417.204	4417.097			
683	44171010683	44171010683 - N	4417.204	4417.097			
684	44171010684	44171010684 - N	4417.204	4417.097			
685	44171010685	44171010685 - N	4417.204	4417.097			
686	44171010686	44171010686 - N	4417.204	4417.097			
687	44171010687	44171010687 - N	4417.204	4417.097			
688	44171010688	44171010688 - N	4417.204	4417.097			
689	44171010689	44171010689 - N	4417.204	4417.097			
690	44171010690	44171010690 - N	4417.204	4417.097			
691	44171010691	44171010691 - N	4417.087	4417.044			
692	44171010692	44171010692 - N	4417.087	4417.044			
693	44171010693	44171010693 - N	4417.087	4417.044			
694	44171010694	44171010694 - N	4417.087	4417.044			
695	44171010695	44171010695 - N	4417.087	4417.044			
696	44171010696	44171010696 - N	4417.087	4417.044			
697	44171010697	44171010697 - N	4417.087	4417.044			
698	44171010698	44171010698 - N	4417.087	4417.044			
699	44171010699	44171010699 - N	4417.087	4417.044			
700	44171010700	44171010700 - N	4417.087	4417.044	1.67	3.40	
701	44171010701	44171010701 - N	4417.246	4417.118			
702	44171010702	44171010702 - N	4417.246	4417.118			

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SKAPS

Product : **TN 350-2-6**
Project : **Ameren Venice Plant, Venice, IL**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010676 - N	GOCX058601	0.9563				
44171010677 - N	GOCX058601	0.9563				
44171010678 - N	GOCX058601	0.9563				
44171010679 - N	GOCX058601	0.9563				
44171010680 - N	GOCX058601	0.9563	381	2.41	122	
44171010681 - N	GOCX058601	0.9563				
44171010682 - N	GOCX058601	0.9563				
44171010683 - N	GOCX058601	0.9563				
44171010684 - N	GOCX058601	0.9563				
44171010685 - N	GOCX058601	0.9563				
44171010686 - N	GOCX058601	0.9563				
44171010687 - N	GOCX058601	0.9563				
44171010688 - N	GOCX058601	0.9563				
44171010689 - N	GOCX058601	0.9563				
44171010690 - N	GOCX058601	0.9563				
44171010691 - N	GOCX058601	0.9563				
44171010692 - N	GOCX058601	0.9563				
44171010693 - N	GOCX058601	0.9563				
44171010694 - N	GOCX058601	0.9563				
44171010695 - N	GOCX058601	0.9563				
44171010696 - N	GOCX058601	0.9563				
44171010697 - N	GOCX058601	0.9563				
44171010698 - N	GOCX058601	0.9563				
44171010699 - N	GOCX058601	0.9563				
44171010700 - N	GOCX058601	0.9563	385	2.29	120	
44171010701 - N	GOCX058601	0.9563				
44171010702 - N	GOCX058601	0.9563				

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
703	44171010703	44171010703 - N	4417.246	4417.118			
704	44171010704	44171010704 - N	4417.246	4417.118			
705	44171010705	44171010705 - N	4417.246	4417.118			
706	44171010706	44171010706 - N	4417.246	4417.118			
707	44171010707	44171010707 - N	4417.246	4417.118			
708	44171010708	44171010708 - N	4417.246	4417.118			
709	44171010709	44171010709 - N	4417.246	4417.118			
710	44171010710	44171010710 - N	4417.246	4417.118			
711	44171010711	44171010711 - N	4417.266	4417.123			
712	44171010712	44171010712 - N	4417.266	4417.123			
713	44171010713	44171010713 - N	4417.266	4417.123			
714	44171010714	44171010714 - N	4417.266	4417.123			
715	44171010715	44171010715 - N	4417.266	4417.123			
716	44171010716	44171010716 - N	4417.266	4417.123			
717	44171010717	44171010717 - N	4417.266	4417.123			
718	44171010718	44171010718 - N	4417.266	4417.123			
719	44171010719	44171010719 - N	4417.266	4417.123			
720	44171010720	44171010720 - N	4417.266	4417.123	1.34	3.74	
721	44171010721	44171010721 - N	4417.257	4417.206			
722	44171010722	44171010722 - N	4417.257	4417.206			
723	44171010723	44171010723 - N	4417.257	4417.206			
724	44171010724	44171010724 - N	4417.257	4417.206			
725	44171010725	44171010725 - N	4417.257	4417.206			
726	44171010726	44171010726 - N	4417.257	4417.206			
727	44171010727	44171010727 - N	4417.257	4417.206			
728	44171010728	44171010728 - N	4417.257	4417.206			
729	44171010729	44171010729 - N	4417.257	4417.206			

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SKAPS

Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
44171010703 - N	GOCX058601	0.9563				
44171010704 - N	GOCX058601	0.9563				
44171010705 - N	GOCX058601	0.9563				
44171010706 - N	GOCX058601	0.9563				
44171010707 - N	GOCX058601	0.9563				
44171010708 - N	GOCX058601	0.9563				
44171010709 - N	GOCX058601	0.9563				
44171010710 - N	GOCX058601	0.9563				
44171010711 - N	GOCX058601	0.9563				
44171010712 - N	GOCX058601	0.9563				
44171010713 - N	GOCX058601	0.9563				
44171010714 - N	GOCX058601	0.9563				
44171010715 - N	GOCX058601	0.9563				
44171010716 - N	GOCX058601	0.9563				
44171010717 - N	GOCX058601	0.9563				
44171010718 - N	GOCX058601	0.9563				
44171010719 - N	GOCX058601	0.9563				
44171010720 - N	GOCX058601	0.9563	387	2.62	117	
44171010721 - N	GOCX058601	0.9563				
44171010722 - N	GOCX058601	0.9563				
44171010723 - N	GOCX058601	0.9563				
44171010724 - N	GOCX058601	0.9563				
44171010725 - N	GOCX058601	0.9563				
44171010726 - N	GOCX058601	0.9563				
44171010727 - N	GOCX058601	0.9563				
44171010728 - N	GOCX058601	0.9563				
44171010729 - N	GOCX058601	0.9563				

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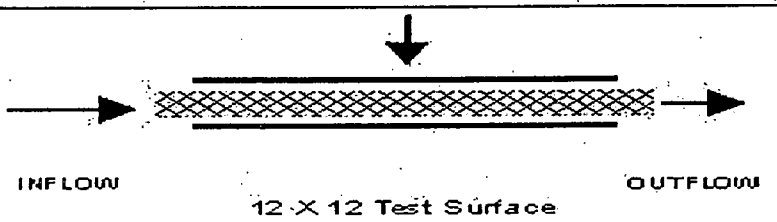
ASTM D 4716

Client:	Geo Synthetics LLC	**Job #**	4417
Project:	Ameren Venice Plant, Venice, IL		
Product:	TN 350-2-6		

Test Configuration:



Test Information:

Boundary Conditions:	Ottawa Sand Geocomposite Textured Liner	**Normal Load:** **Gradient:** **Seating Time:** **Flow Direction:**	1000 0.01 100 hours MD

Test Results:

Roll No.	Pressure, psf	Gradient	Transmissivity, m^2/sec
			100 hours
44171010510	1000	0.01	6.95×10^{-3}

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POLYETHYLENE RESIN CERTIFICATION

Customer Name : Geo Synthetics LLC
Project Name : Ameren Venice Plant, Venice, IL
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 350-2-6

We, the Geonet Manufacturer, hereby certify the following for the material delivered to the above referenced project:

Resin Supplier	Resin Production Plant	Resin Brand Name	Resin Lot Number	Property	Test Method	Units	Resin Supplier Value	Tested Value*
Chevron Phillips Chemical Company	Chevron, TX	HDPE	GOCX058601	Density	ASTM D1505	gm / cc	0.9500	0.9502
				Melt flow Index	ASTM D1238[(a)]	gm / 10 min	0.31	0.31

(a) Condition 190/2.16
* Data from SKAPS Quality Control

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Product : TN 350-2-6
Project : Ameren Venice Plant, Venice, IL

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

GEOCOMP ROLL#	FABRIC ROLL#	WEIGHT oz/sq yd	MD TENSILE lbs.	XMD TENSILE lbs.	PUNCTURE lbs.	AOS us sieve	WATER-FLOW gpm/sq ft	PERM-ABL cm/sec	PERM-ITY sec^{-1}
44171010520	4417.105	6.46	167	180	99	70	134	0.50	1.79
	4417.239	6.30	167	180	98	70	133	0.50	1.77
44171010560	4417.110	6.25	163	176	96	70	134	0.50	1.79
	4417.147	6.70	162	178	97	70	134	0.50	1.79
44171010600	4417.055	6.33	164	170	97	70	131	0.50	1.75
	4417.259	6.33	160	173	100	70	135	0.51	1.80
44171010640	4417.040	6.59	160	173	96	70	136	0.50	1.81
	4417.153	6.20	163	176	99	70	136	0.52	1.82
44171010680	4417.226	6.66	166	171	99	70	133	0.49	1.77
	4417.065	6.54	163	176	100	70	131	0.50	1.75
44171010720	4417.266	6.69	170	179	97	70	135	0.50	1.80
	4417.123	6.22	161	177	97	70	134	0.50	1.79

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GEOMEMBRANE LINER PANEL AS-BUILT DRAWING

SEE LARGE FORMAT MAP OR PLAN SHEET

DOCUMENT DESCRIPTION:

Tie #:	Batch # W0006192
Document ID #:	2929703
Site #:	W1191050002
Site Name:	Union Electric dba Ameren Missouri
Cat #:	06
Document Date:	11-7-2012
Permit #:	
Log #:	
Keyword:	
Comment:	

	Type or Description of Plan/Drawing	SEE COLOR	Date of Plan	Figure/Diagram
1.	Ameren Ash Ponds 2/3 - Material & Sheet Description	N	Unknown	Unknown
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

IL 532-2702
LPC 602 5/2008

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOMEMBRANE LINER PANEL PLACEMENT RECORDS

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/12/11	*0730*	*1*	*101162117*	*823*	22	*SOUTH END OF PROJECT 1ST PANEL*
09/12/11	*0800*	*2*	*101162115*	*858*	22	*NORTH OF PANEL 1*
09/12/11	*0830*	*3*	*101162167*	*866*	22	*NORTH OF PANEL 2*
09/12/11	*0845*	*4*	*101162196*	*860*	22	*NORTH OF PANEL 3*
09/12/11	*0900*	*5*	*101162199*	*860*	22	*NORTH OF PANEL 4*
09/12/11	*0915*	*6*	*101162101*	*867*	22	*NORTH OF PANEL 5*
09/12/11	*1030*	*7*	*101162160*	*870*	22	*NORTH OF PANEL 6*
09/12/11	*1100*	*8*	*101162168*	*870*	22	*NORTH OF PANEL 7*
09/12/11	*1130*	*9*	*101162147*	*870*	22	*NORTH OF PANEL 8*
09/12/11	*1230*	*10*	*101162169*	*870*	22	*NORTH OF PANEL 9*
09/12/11	*1315*	*11*	*101162161*	*870*	22	*NORTH OF PANEL 10*
09/12/11	*1330*	*12*	*101162088*	*868*	22	*NORTH OF PANEL 11*
09/12/11	*1345*	*13*	*101162182*	*870*	22	*NORTH OF PANEL 12*
09/12/11	*1430*	*14*	*101162143*	*870*	22	*NORTH OF PANEL 13*
09/12/11	*1515*	*15*	*101162171*	*870*	22	*NORTH OF PANEL 14*
09/12/11	*1545*	*16*	*101162172*	*870*	22	*NORTH OF PANEL 15*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/13/11	0730	17	101162102	676	22	NORTH OF PANEL 16
09/13/11	0800	18	101162104	658.5	22	NORTH OF PANEL 17
09/13/11	0830	19	101162109	640	22	NORTH OF PANEL 18
09/13/11	0915	20	101162121	625	22	NORTH OF PANEL 19
09/13/11	0945	21	101162190	619	22	NORTH OF PANEL 20
09/13/11	1030	22	101162181	611.5	22	NORTH OF PANEL 21
09/13/11	1100	23	101162130	594.5	22	NORTH OF PANEL 22
09/13/11	1130	24	101162194	583.5	22	NORTH OF PANEL 23
09/13/11	1250	25	101162198	574	22	NORTH OF PANEL 24
09/13/11	1300	26	101162195	563	22	NORTH OF PANEL 25
09/13/11	1330	27	101162114	548.5	22	NORTH OF PANEL 26
09/13/11	1355	28	101162095	537.5	22	NORTH OF PANEL 27
09/13/11	1423	29	101162200	532.5	22	NORTH OF PANEL 28
09/13/11	1440	30	101162197	523	22	NORTH OF PANEL 29
09/13/11	1500	31	101162091	511.5	22	NORTH OF PANEL 30
09/13/11	1517	32	101162092	500	22	NORTH OF PANEL 31
09/13/11	1550	33	101162119	488.5	22	NORTH OF PANEL 32
09/13/11	1605	34	101162126	478	22	NORTH OF PANEL 33
09/13/11	1630	35	101162145	467.5	22	NORTH OF PANEL 34
09/13/11	1645	36	101162128	458	22	NORTH OF PANEL 35

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Panel Placement Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/16/11	0810	37	101162108	445	22	EAST OF PANEL 1 AND SOUTH OF PANEL 38&39
09/16/11	0825	38	101162108	401	22	EAST OF PANEL 2 AND NORTH OF PANEL 37
09/16/11	0857	39	101162164	85	22	EAST OF PANEL 38 AND SOUTH OF PANEL 40
09/16/11	0840	40	101162164	392	22	EAST OF PANEL 38 AND NORTH OF PANEL 39
09/16/11	0920	41	101162572	387	22	NORTH OF PANEL 40 AND EAST OF PANEL 3
09/16/11	0910	42	101162164	128	22	EAST OF PANEL 3 AND NORTH OF PANEL 40
09/16/11	0950	43	101162595	144	22	NORTH OF PANEL 41 AND EAST OF PANEL 4
09/16/11	0930	44	101162572	449	22	NORTH OF PANEL 41&42 EAST OF PANEL 43
09/16/11	1015	45	101162595	613	22	NORTH OF PANEL 43&44 AND EAST OF PANEL 5
09/16/11	1025	46	101162595	103	22	NORTH OF PANEL 45 AND WEST OF PANEL 47
09/16/11	1040	47	101162594	515	22	SOUTH OF PANEL 48&49
09/16/11	1130	48	101162574	244	22	NORTH OF PANEL 47 AND WEST OF PANEL 49
09/16/11	1050	49	101162594	353	22	NORTH OF PANEL 47 AND EAST OF PANEL 48
09/16/11	1240	50	101162574	583	22	NORTH OF PANEL 48&49
09/16/11	1250	51	101162585	576	22	NORTH OF PANEL 50
09/16/11	1320	52	101162571	284	22	NORTH OF PANEL 51 AND WEST OF PANEL 53
09/16/11	1300	53	101162585	280	22	NORTH OF PANEL 52
09/16/11	1330	54	101162571	548	22	SOUTH OF PANEL 55
09/16/11	1350	55	101162586	533	22	NORTH OF PANEL 54
09/16/11	1425	56	101162166	209	22	WEST OF PANEL 57 AND NORTH OF PANEL 55

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Panel Placement Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/16/11	1400	57	101162586	315	22	EAST OF PANEL 56 AND SOUTH OF PANEL 58
09/16/11	1410	58	101162166	514	22	NORTH OF PANEL 56&57
09/16/11	1508	59	101162155	372	22	NORTH OF PANEL 58 AND WEST OF PANEL 60
09/16/11	1450	60	101162166	135	22	EAST OF PANEL 59 AND NORTH OF PANEL 58

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/20/11	*1230*	*61*	*101162155*	*490*	17	*NORTH OF PANEL 60 AND EAST SIDE OF PROJECT*
09/20/11	*1245*	*62*	*101162093*	*491*	22	*NORTH OF PANEL 60 AND WEST OF PANEL 61*
09/20/11	*1300*	*63*	*101162093*	*377*	22	*NORTH OF PANEL 60 AND WEST OF PANEL 62*
09/20/11	*1315*	*64*	*101162141*	*121*	22	*NORTH OF PANEL 63 AND WEST OF PANEL 62*
09/20/11	*1330*	*65*	*101162141*	*495*	22	*NORTH OF PANEL 64 AND WEST OF PANEL 63*
09/20/11	*1345*	*66*	*101162141*	*252*	22	*NORTH OF PANEL 60 AND WEST OF PANEL 65*
09/20/11	*1400*	*67*	*101162124*	*112*	22	*NORTH OF PANEL 66 AND WEST OF PANEL 65*
09/20/11	*1415*	*68*	*101162124*	*359*	22	*NORTH OF PANEL 60 AND WEST OF PANEL 66&67*
09/20/11	*1430*	*69*	*101162124*	*360*	22	*NORTH OF PANEL 59 AND WEST OF PANEL 68*
09/20/11	*1445*	*70*	*101162124*	*31*	22	*NORTH OF PANEL 59 AND WEST OF PANEL 69*
09/20/11	*1500*	*71*	*101162140*	*321*	22	*NORTH OF PANEL 70 AND WEST OF PANEL 69*
09/20/11	*1515*	*72*	*101162140*	*351*	22	*NORTH OF PANEL 59 AND WEST OF PANEL 70&71*
09/20/11	*1530*	*73*	*101162140*	*186*	22	*NORTH OF PANEL 59 AND WEST OF PANEL 72*
09/20/11	*1545*	*74*	*101162100*	*167*	22	*NORTH OF PANEL 73 AND WEST OF PANEL 72*
09/20/11	*1600*	*75*	*101162100*	*350*	22	*NORTH OF PANEL 59 AND WEST OF PANEL 73/74*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/21/11	*0745*	*76*	*101162573*	*456*	22	*NORTH OF PANEL 36*
09/21/11	*0800*	*77*	*101162575*	*448*	22	*NORTH OF PANEL 76*
09/21/11	*0830*	*78*	*101162592*	*443*	22	*NORTH OF PANEL 77*
09/21/11	*0845*	*79*	*101162097*	*437*	22	*NORTH OF PANEL 78*
09/21/11	*0900*	*80*	*101162118*	*481*	22	*NORTH OF PANEL 79*
09/21/11	*0930*	*81*	*101162588*	*433*	22	*NORTH OF PANEL 80*
09/21/11	*1045*	*82*	*101162596*	*425*	22	*NORTH OF PANEL 81*
09/21/11	*1100*	*83*	*101162590*	*420*	22	*NORTH OF PANEL 82*
09/21/11	*1115*	*84*	*101162589*	*417*	22	*NORTH OF PANEL 83*
09/21/11	*1125*	*85*	*101162593*	*418*	22	*NORTH OF PANEL 84*
09/21/11	*1135*	*86*	*101162132*	*420*	22	*NORTH OF PANEL 85*
09/21/11	*1230*	*87*	*101162165*	*412*	22	*NORTH OF PANEL 86*
09/21/11	*1245*	*88*	*101162149*	*414*	22	*NORTH OF PANEL 87*
09/21/11	*1300*	*89*	*101162582*	*416*	22	*NORTH OF PANEL 88*
09/21/11	*1315*	*90*	*101162106*	*418*	22	*NORTH OF PANEL 89*
09/21/11	*1330*	*91*	*101162098*	*420*	22	*NORTH OF PANEL 90*
09/21/11	*1345*	*92*	*101162086*	*419*	22	*NORTH OF PANEL 91*
09/21/11	*1444*	*93*	*101162570*	*426*	22	*NORTH OF PANEL 92*
09/21/11	*1500*	*94*	*101162087*	*430*	22	*NORTH OF PANEL 93*
09/21/11	*1515*	*95*	*101162123*	*435.5*	22	*NORTH OF PANEL 94*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/21/11	*1540*	*96*	*101162568*	*440.5*	22	*NORTH OF PANEL 95*
09/21/11	*1600*	*97*	*101162576*	*439*	22	*NORTH OF PANEL 96*
09/21/11	*1611*	*98*	*101162581*	*441.5*	22	*NORTH OF PANEL 97*
09/21/11	*1634*	*99*	*101162580*	*446*	22	*NORTH OF PANEL 98*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/22/11	*0750*	*100*	*101162583*	*146*	17	*NORTH OF PANEL 61*
09/22/11	*0755*	*101*	*101162583*	*148*	22	*NORTH OF PANEL 62 AND WEST OF PANEL 100*
09/22/11	*0800*	*102*	*101162583*	*146*	22	*NORTH OF PANEL 64 AND WEST OF PANEL 101*
09/22/11	*0810*	*103*	*101162578*	*506*	22	*NORTH OF PANEL 65 AND WEST OF PANEL 102*
09/22/11	*0829*	*104*	*101162578*	*318*	22	*EAST OF PANEL 103*
09/22/11	*0835*	*105*	*101162583*	*318*	22	*EAST OF PANEL 104*
09/22/11	*0845*	*106*	*101162577*	*696*	22	*WEST OF PANEL 65 AND WEST OF PANEL 103*
09/22/11	*0901*	*107*	*101162579*	*690*	22	*WEST OF PANEL 106*
09/22/11	*0923*	*108*	*101162587*	*689*	22	*WEST OF PANEL 107*
09/22/11	*0942*	*109*	*101162584*	*684*	22	*WEST OF PANEL 108*
09/22/11	*0955*	*110*	*101162129*	*682*	22	*WEST OF PANEL 109*
09/22/11	*1015*	*111*	*101162159*	*680*	22	*WEST OF PANEL 110*
09/22/11	*1030*	*112*	*101162163*	*679*	22	*WEST OF PANEL 111*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Josh Allen*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/23/11	*0728*	*113*	*101162120*	*858*	22	*WEST OF PANELS 112&75 AND NORTH OF PANEL 59*
09/23/11	*0740*	*114*	*101162100*	*160*	22	*WEST OF PANEL 112 AND NORTH OF PANEL 113*
09/23/11	*0751*	*115*	*101162566*	*865*	22	*WEST OF PANEL 113 AND NORTH OF PANEL 59*
09/23/11	*0800*	*116*	*101162560*	*156*	22	*WEST OF PANEL 114 AND NORTH OF PANEL 115*
09/23/11	*0815*	*117*	*101162560*	*703*	22	*WEST OF PANEL 115 AND NORTH OF PANEL 59*
09/23/11	*0830*	*118*	*101162569*	*310*	22	*WEST OF PANELS 115&116 AND NORTH OF PANEL 117*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/26/11	*0900*	*119*	*101162569*	*560*	22	*WEST OF PANEL 117 AND NORTH OF PANEL 59*
09/26/11	*0910*	*120*	*101162564*	*345*	22	*WEST OF PANELS 117&118 AND NORTH OF PANEL 119*
09/26/11	*0920*	*121*	*101162564*	*393*	22	*WEST OF PANEL 119 AND NORTH OF PANEL 59*
09/26/11	*0940*	*122*	*101162563*	*615*	22	*WEST OF PANELS 119&120 AND NORTH OF PANEL 121*
09/26/11	*1015*	*123*	*101162563*	*247*	22	*WEST OF PANEL 121 AND NORTH OF PANEL 59*
09/26/11	*1045*	*124*	*101162105*	*766*	22	*WEST OF PANELS 121&122 AND NORTH OF PANEL 123*
09/26/11	*1115*	*125*	*101162105*	*102*	22	*WEST OF PANEL 123 AND NORTH OF PANEL 59*
09/26/11	*1145*	*126*	*101162564*	*126*	22	*NORTH OF PANEL 120 AND WEST OF PANEL 118*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/26/11	*0730*	*1C*	*101162104*	*167*	4	*SOUTH OF PANEL-1*
09/26/11	*0800*	*1B*	*101162104*	*91*	6	*SOUTH OF PANEL-2*
09/26/11	*0815*	*1A*	*101162583*	*154*	6	*SOUTH OF PANEL-2*
09/23/11	*0800*	*1D*	*101162104*	*181*	6	*SOUTH OF PANEL-1*
09/26/11	*0815*	*1E*	*101162104*	*154*	6	*WEST OF PANELS-4 & 11*
09/26/11	*0820*	*1F*	*101162104*	*44*	6	*WEST OF PANELS-11 & 13*
09/26/11	*0830*	*1G*	*101162104*	*110*	6	*WEST OF PANELS-13 & 18*
09/26/11	*0840*	*1H*	*101162102*	*22*	6	*WEST OF PANELS-18 & 19*
09/26/11	*0850*	*1I*	*101162102*	*110*	6	*WEST OF PANELS-19 & 24*
09/26/11	*0900*	*1J*	*101162102*	*154*	6	*WEST OF PANELS-24 & 31*
09/26/11	*0915*	*1K*	*101162102*	*122*	6	*WEST OF PANELS-31 & 36*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/28/11	*0747*	*99A*	*101162580*	*100*	22	*EAST OF PANEL 99*
09/28/11	*0759*	*98A*	*101162581*	*102*	22	*EAST OF PANEL 98 AND SOUTH OF PANEL 99A*
09/28/11	*0803*	*97A*	*101162576*	*107*	22	*EAST OF PANEL 97 AND SOUTH OF PANEL 98A*
09/28/11	*0815*	*96A*	*101162568*	*111*	22	*EAST OF PANEL 96 AND SOUTH OF PANEL 97A*
09/28/11	*0819*	*95A*	*101162123*	*116*	22	*EAST OF PANEL 95 AND SOUTH OF PANEL 96A*
09/28/11	*0823*	*94A*	*101162087*	*125*	22	*EAST OF PANEL 94 AND SOUTH OF PANEL 95A*
09/28/11	*0828*	*93A*	*101162570*	*136*	22	*EAST OF PANEL 93 AND SOUTH OF PANEL 4A*
09/28/11	*0834*	*92A*	*101162086*	*144*	22	*EAST OF PANEL 92 AND SOUTH OF PANEL 93A*
09/28/11	*0839*	*91A*	*101162098*	*148*	22	*EAST OF PANEL 91 AND SOUTH OF PANEL 92A*
09/28/11	*0845*	*90A*	*101162106*	*154*	22	*EAST OF PANEL 90 AND SOUTH OF PANEL 91A*
09/28/11	*0850*	*89A*	*101162582*	*157*	22	*EAST OF PANEL 89 AND SOUTH OF PANEL 90A*
09/28/11	*0855*	*88A*	*101162149*	*162*	22	*EAST OF PANEL 88 AND SOUTH OF PANEL 89A*
09/28/11	*0900*	*87A*	*101162165*	*169*	22	*EAST OF PANEL 87 AND SOUTH OF PANEL 88A*
09/28/11	*0906*	*86A*	*101162132*	*177*	22	*EAST OF PANEL 86 AND SOUTH OF PANEL 87A*
09/28/11	*0913*	*85A*	*101162593*	*180*	22	*EAST OF PANEL 85 AND SOUTH OF PANEL 86A*
09/28/11	*0918*	*84A*	*101162589*	*186*	22	*EAST OF PANEL 84 AND SOUTH OF PANEL 85A*
09/28/11	*0923*	*83A*	*101162590*	*187*	22	*EAST OF PANEL 83 AND SOUTH OF PANEL 84A*
09/28/11	*0930*	*82A*	*101162596*	*194*	22	*EAST OF PANEL 82 AND SOUTH OF PANEL 83A*
09/28/11	*0941*	*81A*	*101162588*	*198*	22	*EAST OF PANEL 81 AND SOUTH OF PANEL 82A*
09/28/11	*0946*	*80A*	*101162118*	*202*	22	*EAST OF PANEL 80 AND SOUTH OF PANEL 81A*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
09/28/11	*1015*	*79A*	*101162097*	*211*	22	*EAST OF PANEL 79 AND SOUTH OF PANEL 80A*
09/28/11	*1020*	*78A*	*101162592*	*217*	22	*EAST OF PANEL 78 AND SOUTH OF PANEL 79A*
09/28/11	*1025*	*77A*	*101162575*	*218*	22	*EAST OF PANEL 77 AND SOUTH OF PANEL 78A*
09/28/11	*1030*	*76A*	*101162573*	*221*	22	*EAST OF PANEL 76 AND SOUTH OF PANEL 77A*
09/28/11	*1047*	*36A*	*101162128*	*223*	22	*EAST OF PANEL 36 AND SOUTH OF PANEL 76A*
09/28/11	*1055*	*35A*	*101162145*	*226*	22	*EAST OF PANEL 35 AND SOUTH OF PANEL 36A*
09/28/11	*1348*	*34A*	*101162126*	*239*	22	*EAST OF PANEL 34 AND SOUTH OF PANEL 35*
09/28/11	*1355*	*33A*	*101162119*	*240*	22	*EAST OF PANEL 33 AND SOUTH OF PANEL 34*
09/28/11	*1410*	*32A*	*101162092*	*244*	22	*EAST OF PANEL 32 AND SOUTH OF PANEL 33*
09/28/11	*1425*	*31A*	*101162091*	*248*	22	*EAST OF PANEL 31 AND SOUTH OF PANEL 32*
09/28/11	*1435*	*30A*	*101162197*	*250*	22	*EAST OF PANEL 30 AND SOUTH OF PANEL 31*
09/28/11	*1445*	*29A*	*101162200*	*248*	22	*EAST OF PANEL 29 AND SOUTH OF PANEL 30*
09/28/11	*1455*	*28A*	*101162095*	*261*	22	*EAST OF PANEL 28 AND SOUTH OF PANEL 29*
09/28/11	*1505*	*27A*	*101162114*	*264*	22	*EAST OF PANEL 27 AND SOUTH OF PANEL 28*
09/28/11	*1515*	*26A*	*101162195*	*269*	22	*EAST OF PANEL 26 AND SOUTH OF PANEL 27*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson/Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/01/11	0725	25A	101162198	266	22	EAST OF PANEL 25 AND SOUTH OF PANEL 26A
10/01/11	0738	24A	101162194	268	22	EAST OF PANEL 24 AND SOUTH OF PANEL 25A
10/01/11	0744	23A	101162130	261	22	EAST OF PANEL 23 AND SOUTH OF PANEL 24A
10/01/11	0747	22A	101162181	252	22	EAST OF PANEL 22 AND SOUTH OF PANEL 23A
10/01/11	0810	21A	101162190	243	22	EAST OF PANEL 21 AND SOUTH OF PANEL 22A
10/01/11	0815	20A	101162121	229	22	EAST OF PANEL 20 AND SOUTH OF PANEL 21A
10/01/11	0825	19A	101162109	210	22	EAST OF PANEL 19 AND SOUTH OF PANEL 20A
10/01/11	0845	127	101162132	251	22	EAST OF PANEL 18 AND SOUTH OF PANEL 19A
10/01/11	0900	128	101162593	252	22	EAST OF PANEL 17 AND SOUTH OF PANEL 127
10/01/11	0910	129	101162165	62	22	EAST OF PANEL 19A AND WEST OF PANEL 125
10/01/11	0914	130	101162165	44	22	EAST OF PANELS 128&127 AND NORTH OF PANEL 59
10/01/11	0939	131	101162165	45	22	EAST OF PANEL 20A AND NORTH OF PANEL 129
10/01/11	0945	132	101162165	55	22	EAST OF PANEL 21A AND NORTH OF PANEL 131
10/01/11	0956	133	101162165	41	22	EAST OF PANEL 22A AND NORTH OF PANEL 132
10/01/11	1020	134	101162096	802	22	NORTH OF PANEL 125 AND WEST OF PANELS 123&124
10/01/11	1045	135	101162165	4	22	WEST OF PANELS 134 AND NORTH OF PANEL 133

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/03/11	*0730*	*136*	*101162583*	*98*	22	*NORTH OF PANEL 105 AND SOUTH OF PANEL 137*
10/03/11	*0745*	*137*	*101162116*	*393*	22	*NORTH OF PANEL 136 AND EAST OF PANEL 138*
10/03/11	*0800*	*104A*	*101162578*	*30*	22	*NORTH OF PANEL 104 AND EAST OF PANEL 139*
10/03/11	*0810*	*138*	*101162116*	*479*	22	*NORTH OF PANEL 104A AND EAST OF PANEL 139*
10/03/11	*0825*	*139*	*101162099*	*512*	22	*NORTH OF PANEL 103 AND EAST OF PANEL 140&106A*
10/03/11	*0835*	*106A*	*101162577*	*169*	22	*NORTH OF PANEL 106 AND EAST OF PANEL 107A*
10/03/11	*0840*	*107A*	*101162579*	*170*	22	*NORTH OF PANEL 107 AND EAST OF PANEL 108A*
10/03/11	*0845*	*108A*	*101162587*	*172*	22	*NORTH OF PANEL 108 AND EAST OF PANEL 109*
10/03/11	*0850*	*109A*	*101162584*	*174*	22	*NORTH OF PANEL 109 AND EAST OF PANEL 110A*
10/03/11	*0855*	*110A*	*101162129*	*173*	22	*NORTH OF PANEL 110 AND EAST OF PANEL 111A*
10/03/11	*0900*	*111A*	*101162159*	*182*	22	*NORTH OF PANEL 111 AND EAST OF PANEL 112A*
10/03/11	*0905*	*112A*	*101162163*	*185*	22	*NORTH OF PANEL 112 AND EAST OF PANEL 114A*
10/03/11	*0910*	*114A*	*101162100*	*181*	22	*NORTH OF PANEL 114 AND WEST OF PANEL 112A*
10/03/11	*0915*	*140*	*101162099*	*280*	22	*NORTH OF PANEL 106A AND EAST OF PANEL 141*
10/03/11	*0920*	*141*	*101162099*	*69*	22	*NORTH OF PANEL 107A AND SOUTH OF PANEL 142*
10/03/11	*0930*	*142*	*101162559*	*210*	22	*NORTH OF PANEL 141 AND EAST OF PANEL 143*
10/03/11	*0935*	*143*	*101162559*	*281*	22	*NORTH OF PANEL 108A AND EAST OF PANEL 144*
10/03/11	*0940*	*144*	*101162559*	*278*	22	*NORTH OF PANEL 109A AND EAST OF PANELS 145-147*
10/03/11	*0945*	*145*	*101162559*	*96*	22	*NORTH OF PANEL 110A AND EAST OF PANEL 148*
10/03/11	*0950*	*146*	*101162119*	*122*	22	*NORTH OF PANEL 145 AND EAST OF PANEL 148*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/03/11	*1015*	*147*	*101162095*	*64*	22	*NORTH OF PANEL 146 AND EAST OF PANEL 148*
10/03/11	*1020*	*148*	*101162565*	*271*	22	*NORTH OF PANEL 111A AND EAST OF PANEL 149*
10/03/11	*1025*	*149*	*101162565*	*266*	22	*NORTH OF PANEL 112A AND EAST OF PANEL 150*
10/03/11	*1030*	*150*	*101162565*	*269*	22	*NORTH OF PANEL 114A AND WEST OF PANEL 149*
10/03/11	*1045*	*151*	*101162565*	*60*	22	*NORTH OF PANEL 116 AND SOUTH OF PANEL 152*
10/03/11	*1100*	*152*	*101162567*	*393*	22	*NORTH OF PANEL 151 AND WEST OF PANEL 114A/150*
10/03/11	*1110*	*153*	*101162567*	*478*	22	*NORTH OF PANEL 118 AND WEST OF PANEL 151/152*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/03/11	*0730*	*154*	*101162200*	*54*	22	*NORTH OF PANEL 100/101&102 AND EAST OF PANEL 103*
10/03/11	*0745*	*155*	*101162197*	*54*	22	*NORTH OF PANEL 154 AND EAST OF PANEL 103*
10/03/11	*0750*	*156*	*101162197*	*45*	11	*NORTH OF PANEL 155 AND EAST OF PANEL 105*
10/03/11	*0755*	*157*	*101162096*	*45*	10	*NORTH OF PANEL 156 AND EAST OF PANEL 105*
10/03/11	*0800*	*102A*	*101162096*	*21*	2	*NORTH OF PANEL 102 AND SOUTH OF PANEL 154*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/10/11	0800	158	101162118	217	22	NORTH OF PANEL 126 AND WEST OF PANEL 153
10/10/11	0810	159	101162588	231	22	NORTH OF PANEL 158 AND WEST OF PANEL 153
10/10/11	0815	160	101162596	239	22	NORTH OF PANEL 122 AND WEST OF PANELS 158&159
10/10/11	0820	161	101162590	249	22	NORTH OF PANEL 160 AND WEST OF PANEL 159
10/10/11	0825	162	101162149	287	22	NORTH OF PANEL 124 AND WEST OF PANEL 160
10/10/11	0830	163	101162582	200	22	NORTH OF PANEL 162 AND WEST OF PANEL 161
10/10/11	0835	164	101162582	91	22	NORTH OF PANEL 134 AND WEST OF PANEL 162
10/10/11	0840	165	101162106	293	22	NORTH OF PANEL 164 AND WEST OF PANEL 163
10/10/11	0845	166	101162126	117	22	NORTH OF PANEL 165 AND WEST OF PANEL 163
10/10/11	0900	167	101162098	297	22	NORTH OF PANEL 134 AND WEST OF PANELS 164&165
10/10/11	0905	168	101162086	210	22	NORTH OF PANEL 167 AND WEST OF PANELS 165&166
10/10/11	0910	169	101162086	88	22	NORTH OF PANEL 99A AND WEST OF PANEL 164
10/10/11	0915	170	101162570	298	22	NORTH OF PANEL 169 AND WEST OF PANELS 167&168
10/10/11	0920	171	101162145	115	22	NORTH OF PANEL 170 AND WEST OF PANEL 168
10/10/11	0925	172	101162145	27	22	NORTH OF PANEL 99A AND WEST OF PANEL 169
10/10/11	0930	173	101162087	301	22	NORTH OF PANEL 172 AND WEST OF PANELS 169&170
10/10/11	0935	174	101162091	104	22	NORTH OF PANEL 173 AND WEST OF PANEL 170
10/10/11	0940	175	101162128	62	22	NORTH OF PANEL 174 AND WEST OF PANEL 170
10/10/11	1035	176	101162128	107	22	NORTH OF PANEL 99A AND WEST OF PANEL 173
10/10/11	1040	177	101162107	208	22	NORTH OF PANEL 176 AND WEST OF PANEL 173

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/10/11	1045	178	101162589	179	22	NORTH OF PANEL 177 AND WEST OF PANELS 174&175
10/10/11	1050	179	101162589	82	22	NORTH OF PANEL 99A AND WEST OF PANEL 176
10/10/11	1055	180	101162592	204	22	NORTH OF PANEL 179 AND WEST OF PANELS 176&177
10/10/11	1100	181	101162575	191	22	NORTH OF PANEL 180 AND WEST OF PANELS 177&178
10/10/11	1105	182	101162573	177	22	NORTH OF PANEL 99A AND WEST OF PANELS 179&180
10/10/11	1110	183	101162123	305	22	NORTH OF PANEL 182 AND WEST OF PANELS 180&181
10/10/11	1115	184	101162568	312	22	NORTH OF PANEL 99 AND WEST OF PANEL 182&183
10/10/11	1120	185	101162576	169	22	NORTH OF PANEL 184 AND WEST OF PANEL 183
10/10/11	1235	186	101162576	150	22	NORTH OF PANEL 99 AND WEST OF PANEL 184
10/10/11	1240	187	101162581	317	22	NORTH OF PANEL 186 AND WEST OF PANELS 184&185
10/10/11	1245	188	101162580	319	22	NORTH OF PANEL 99 AND WEST OF PANELS 186&187
10/10/11	1250	189	101162090	142	22	NORTH OF PANEL 188 AND WEST OF PANEL 187
10/10/11	1300	190	101162090	460	22	NORTH OF PANEL 99 AND WEST OF PANELS 188&189
10/10/11	1305	191	101162090	261	22	NORTH OF PANEL 99 AND WEST OF PANEL 190
10/10/11	1310	192	101162094	193	22	NORTH OF PANEL 191 AND WEST OF PANEL 190
10/10/11	1440	193	101162094	446	22	NORTH OF PANEL 99 AND WEST OF PANELS 191&192
10/10/11	1445	194	101162094	222	22	NORTH OF PANEL 99 AND WEST OF PANEL 193
10/10/11	1450	195	101162089	223	22	NORTH OF PANEL 194 AND WEST OF PANEL 193
10/10/11	1500	196	101162089	439	22	NORTH OF PANEL 99 AND WEST OF PANELS 194&195
10/10/11	1510	197	101162089	199	22	NORTH OF PANEL 99 AND WEST OF PANEL 196

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/10/11	*1520*	*198*	*101162127*	*235*	22	*NORTH OF PANEL 197 AND WEST OF PANEL 196*
10/10/11	*1530*	*199*	*101162127*	*431*	22	*NORTH OF PANEL 99 AND WEST OF PANELS 197&198*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/11/11	*0730*	*200*	*101162127*	*176*	22	*NORTH OF PANEL 99 AND WEST OF PANEL 199*
10/11/11	*0735*	*201*	*101162184*	*245*	22	*NORTH OF PANEL 200 AND WEST OF PANELS 199*
10/11/11	*0740*	*202*	*101162184*	*424*	22	*NORTH OF PANEL 99 AND WEST OF PANELS 200/201*
10/11/11	*0745*	*203*	*101162184*	*186*	22	*NORTH OF PANEL 99 AND WEST OF PANEL 200*
10/11/11	*0800*	*204*	*101162189*	*233*	22	*NORTH OF PANEL 203 AND WEST OF PANEL 202*
10/11/11	*0805*	*205*	*101162189*	*411*	22	*NORTH OF PANEL 99 AND WEST OF PANELS 203/204*
10/11/11	*0810*	*206*	*101162189*	*218*	22	*NORTH OF PANEL 99 AND WEST OF PANEL 205*
10/11/11	*0830*	*207*	*101162139*	*197*	22	*NORTH OF PANEL 206 AND WEST OF PANEL 205*
10/11/11	*0835*	*208*	*101162139*	*298*	22	*NORTH OF PANEL 99 AND WEST OF PANELS 206/207*
10/11/11	*0845*	*209*	*101162139*	*46*	22	*NORTH OF PANEL 99 AND WEST OF PANEL 208*
10/11/11	*0900*	*210*	*101162139*	*84*	22	*NORTH OF PANEL 209 AND WEST OF PANEL 208*
10/11/11	*0905*	*211*	*101162139*	*36*	16	*NORTH OF PANEL 99 AND EAST OF THE LEVEE ROAD*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/14/11	*0800*	*212*	*101162193*	*374*	22	*NORTH OF PANEL 137*
10/14/11	*0810*	*213*	*101162193*	*142*	22	*NORTH OF PANEL 212*
10/14/11	*0835*	*214*	*101162193*	*343*	22	*WESTOF PANEL 212*
10/14/11	*0848*	*215*	*101162139*	*151*	22	*NORTH OF PANEL 214 AND WEST OF PANEL 213*
10/14/11	*0859*	*216*	*101162173*	*490*	22	*NORTH OF PANEL 139 AND WEST OF PANEL 214*
10/14/11	*0920*	*217*	*101162173*	*371*	22	*NORTH OF PANEL 140 AND WEST OF PANEL 216*
10/14/11	*0930*	*218*	*101162103*	*118*	22	*NORTH OF PANEL 217 AND WEST OF PANEL 216*
10/14/11	*0940*	*219*	*101162103*	*488*	22	*NORTH OF PANEL 142 AND WEST OF PANELS 217&218*
10/14/11	*1015*	*220*	*101162103*	*250*	22	*NORTH OF PANEL 143 AND WEST OF PANEL 219*
10/14/11	*1028*	*221*	*101162183*	*239*	22	*NORTH OF PANEL 220 AND WEST OF PANEL 219*
10/14/11	*1041*	*222*	*101162183*	*495*	22	*NORTH OF PANEL 144 AND WEST OF PANELS 220&221*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/17/11	*0750*	*223*	*101162183*	*130*	22	*NORTH OF PANEL 147 AND WEST OF PANEL 222*
10/17/11	*0754*	*224*	*101162157*	*361*	22	*NORTH OF PANEL 223 AND WEST OF PANEL 222*
10/17/11	*0800*	*225*	*101162157*	*498*	22	*NORTH OF PANEL 148 AND WEST OF PANELS 223&224*
10/17/11	*0815*	*226*	*101162158*	*496*	22	*NORTH OF PANEL 149 AND WEST OF PANEL 225*
10/17/11	*0900*	*227*	*101162158*	*362*	22	*WEST OF PANEL 226*
10/17/11	*0905*	*228*	*101162133*	*131*	22	*NORTH OF PANEL 227 AND WEST OF PANEL 226*
10/17/11	*0914*	*229*	*101162133*	*495*	22	*WEST OF PANELS 227&228*
10/17/11	*0928*	*230*	*101162133*	*227*	22	*WEST OF PANEL 229*
10/17/11	*0935*	*231*	*101162135*	*246*	22	*NORTH OF PANEL 230 AND WEST OF PANEL 229*
10/17/11	*1010*	*232*	*101162135*	*495*	22	*NORTH OF PANEL 159 AND WEST OF PANEL 230&231*
10/17/11	*1022*	*233*	*101162135*	*117*	22	*NORTH OF PANEL 161 AND WEST OF PANEL 232*
10/17/11	*1030*	*234*	*101162178*	*336*	22	*NORTH OF PANEL 233 AND WEST OF PANEL 232*
10/17/11	*1038*	*235*	*101162178*	*455*	22	*NORTH OF PANEL 163 AND WEST OF PANELS 233&234*
10/17/11	*1100*	*236*	*101162178*	*70*	22	*NORTH OF PANEL 166 AND WEST OF PANEL 235*
10/17/11	*1105*	*237*	*101162179*	*388*	22	*NORTH OF PANEL 236 AND WEST OF PANEL 235*
10/17/11	*1115*	*238*	*101162179*	*453*	22	*NORTH OF PANEL 168 AND WEST OF PANELS 236&237*

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/21/11	0730	239	101162131	583	22	NORTH OF PANEL 207
10/21/11	0745	240	101162131	272	22	NORTH OF PANEL 205 AND EAST OF PANEL 239
10/21/11	0831	241	101162151	315	22	NORTH OF PANEL 240 AND EAST OF PANEL 239
10/21/11	0838	242	101162151	538	22	NORTH OF PANEL 204 AND EAST OF PANELS 240&241
10/21/11	0855	243	101162142	43	22	NORTH OF PANEL 242 AND EAST OF PANEL 241
10/21/11	0900	244	101162142	578	22	NORTH OF PANEL 202 AND EAST OF PANELS 242&243
10/21/11	0916	245	101162142	234	22	NORTH OF PANEL 201 AND EAST OF PANEL 244
10/21/11	0925	246	101162110	336	22	NORTH OF PANEL 245 AND EAST OF PANEL 244
10/21/11	0940	247	101162110	522	22	NORTH OF PANEL 199 AND EAST OF PANELS 245&246
10/21/11	0950	248	101162176	51	22	NORTH OF PANEL 247 AND EAST OF PANEL 246
10/21/11	1015	249	101162176	563	22	NORTH OF PANEL 198 AND EAST OF PANELS 247&248
10/21/11	1039	250	101162176	240	22	NORTH OF PANEL 196 AND EAST OF PANEL 249
10/21/11	1055	251	101162138	331	22	NORTH OF PANEL 250 AND EAST OF PANEL 249
10/21/11	1122	252	101162138	231	22	NORTH OF PANEL 193 AND EAST OF PANEL 250
10/21/11	1133	253	101162138	228	22	NORTH OF PANEL 192 AND EAST OF PANEL 252
10/21/11	1246	254	101162138	72	22	NORTH OF PANEL 192 AND EAST OF PANEL 253
10/21/11	1255	255	101162175	156	22	NORTH OF PANEL 254 AND EAST OF PANEL 253
10/21/11	1300	256	101162175	224	22	NORTH OF PANEL 190 AND EAST OF PANELS 254&255
10/21/11	1317	257	101162175	225	22	NORTH OF PANELS 187 AND EAST OF PANEL 256
10/21/11	1325	258	101162175	225	22	NORTH OF PANEL 187 AND EAST OF PANEL 257

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/21/11	*1340*	*259*	*101162154*	*214*	22	*NORTH OF PANEL 185 AND EAST OF PANE 258*
10/21/11	*1350*	*260*	*101162154*	*223*	22	*NORTH OF PANEL 183 AND EAST OF PANEL 259*
10/21/11	*1405*	*261*	*101162154*	*223*	22	*NORTH OF PANEL 181 AND EAST OF PANEL 260*
10/21/11	*1430*	*262*	*101162154*	*192*	22	*NORTH OF PANEL 178 AND EAST OF PANEL 261*
10/21/11	*1440*	*263*	*101162122*	*207*	22	*NORTH OF PANEL 175 AND EAST OF PANEL 262*
10/21/11	*1455*	*264*	*101162122*	*93*	11	*NORTH OF PANEL 171 AND EAST OF PANEL 263*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Ryan Ayers*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/24/11	0730	265	101162122	210	22	NORTH OF PANEL 239 AND EAST OF LEVEE
10/24/11	0735	266	101162122	211	22	NORTH OF PANEL 241 AND EAST OF PANEL 265
10/24/11	0740	267	101162122	232	22	NORTH OF PANEL 243 AND EAST OF PANEL 266
10/24/11	0815	268	101162191	228	22	NORTH OF PANEL 244 AND EAST OF PANEL 267
10/24/11	0825	269	101162191	230	22	NORTH OF PANEL 246 AND EAST OF PANEL 268
10/24/11	0840	270	101162191	213	22	NORTH OF PANEL 248 AND EAST OF PANEL 269
10/24/11	0900	271	101162111	32	22	NORTH OF PANEL 249 AND EAST OF PANEL 270
10/24/11	0905	272	101162191	187	22	NORTH OF PANEL 271 AND EAST OF PANEL 270
10/24/11	0915	273	101162111	224	22	NORTH OF PANEL 251 AND EAST OF PANELS 271&272
10/24/11	0925	274	101162111	541	22	NORTH OF PANEL 252 AND EAST OF PANELS 251&273
10/24/11	1000	275	101162111	56	22	NORTH OF PANEL 276 AND EAST OF PANEL 274
10/24/11	1005	276	101162192	490	22	NORTH OF PANEL 257 AND EAST OF PANEL 274
10/24/11	1015	277	101162192	339	22	NORTH OF PANEL 278 AND EAST OF PANELS 275&276
10/24/11	1025	278	101162174	198	22	NORTH OF PANEL 255 AND EAST OF PANEL 276
10/24/11	1035	279	101162174	528	22	NORTH OF PANEL 256 AND EAST OF PANEL 278
10/24/11	1045	280	101162174	132	22	NORTH OF PANEL 257 AND EAST OF PANEL 279
10/24/11	1100	281	101162177	388	22	NORTH OF PANEL 280 AND EAST OF PANEL 279
10/24/11	1120	282	101162177	468	22	NORTH OF PANEL 258 AND EAST OF PANELS 280&281
10/24/11	1250	283	101162150	505	22	NORTH OF PANEL 259 AND EAST OF PANEL 282
10/24/11	1300	284	101162150	45	22	NORTH OF PANEL 282 AND EAST OF PANEL 281

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Panel Placement Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, Illinois*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Ryan Ayers*

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/24/11	*1350*	*285*	*101162150*	*233*	22	*NORTH OF PUMP STATION AND EAST OF PANEL 283*
10/24/11	*1400*	*286*	*101162144*	*230*	22	*NORTH OF PANEL 285 AND EAST OF PANEL 283*
10/24/11	*1405*	*287*	*101162144*	*496*	22	*NORTH OF PANEL 261 AND EAST OF PANELS 285&286*
10/24/11	*1330*	*288*	*101162150*	*22*	22	*NORTH OF PANEL 260 AND EAST OF PANEL 283*
10/24/11	*1415*	*289*	*101162144*	*87*	22	*NORTH OF PANEL 262 AND EAST OF PANELS 287&261*
10/24/11	*1425*	*290*	*101162153*	*436*	22	*NORTH OF PANEL 289 AND EAST OF PANEL 287*
10/24/11	*1430*	*291*	*101162153*	*87*	22	*NORTH OF PANEL 263 AND EAST OF PANEL 289*
10/24/11	*1445*	*292*	*101162153*	*35*	22	*NORTH OF PANEL 293 AND EAST OF PANEL 287*
10/24/11	*1500*	*293*	*101162153*	*222*	22	*NORTH OF PANEL 238 AND EAST OF PANEL 287*
10/24/11	*1515*	*294*	*101162153*	*252*	22	*NORTH OF PANEL 237 AND EAST OF PANEL 293*
10/24/11	*1530*	*295*	*101162170*	*100*	22	*NORTH OF PANEL 235 AND EAST OF PANEL 294*
10/24/11	*1545*	*296*	*101162170*	*149*	22	*NORTH OF PANEL 295 AND EAST OF PANEL 294*
10/24/11	*1400*	*297*	*101162170*	*254*	22	*NORTH OF PANEL 234 AND EAST OF PANEL 295*

Electronic Filing: Received, Clerk's Office 09/28/2020

Panel Placement Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Ryan Ayers

Date	Time	Panel Number	Roll Number	Panel Length (ft)	Panel Width (ft)	Panel Location/Comments
10/25/11	0730	298	101162170	258	22	NORTH OF PANEL 232 AND EAST OF PANEL 297
10/25/11	0740	299	101162162	18	22	NORTH OF PANEL 231 AND EAST OF PANEL 298
10/25/11	0750	300	101162170	236	22	NORTH OF PANEL 299 AND EAST OF PANEL 298
10/25/11	0800	301	101162162	252	22	NORTH OF PANEL 229 AND EAST OF PANEL 300
10/25/11	0810	302	101162162	247	22	NORTH OF PANEL 228 AND EAST OF PANEL 301
10/25/11	0820	303	101162162	241	22	NORTH OF PANEL 226 AND EAST OF PANEL 302
10/25/11	0830	304	101162162	97	22	NORTH OF PANEL 305 AND EAST OF PANEL 303
10/25/11	0835	305	101162180	150	22	NORTH OF PANEL 225 AND EAST OF PANEL 303
10/25/11	0840	306	101162180	251	22	NORTH OF PANEL 224 AND EAST OF PANELS 304&305
10/25/11	0850	307	101162180	285	22	NORTH OF PANEL 222 AND EAST OF PANEL 306
10/25/11	0900	308	101162137	155	22	NORTH OF PANEL 221 AND EAST OF PANEL 307
10/25/11	0905	309	101162180	142	22	NORTH OF PANEL 308 AND EAST OF PANEL 307
10/25/11	0920	310	101162137	298	22	NORTH OF PANEL 219 AND EAST OF PANELS 308&309
10/25/11	0935	311	101162137	286	22	NORTH OF PANEL 218 AND EAST OF PANEL 310
10/25/11	0950	312	101162136	215	22	NORTH OF PANEL 216 AND EAST OF PANEL 311
10/25/11	1030	313	101162137	87	22	NORTH OF PANEL 215 AND EAST OF PANEL 312
10/25/11	1120	314	101162137	44	8	NORTH OF PANEL 313 AND EAST OF PANEL 312
10/25/11	1140	315	101162137	50	10	NORTH OF PANEL 213 AND EAST OF PANEL 313

Electronic Filing: Received, Clerk's Office 09/28/2020

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GEOMEMBRANE LINER TRIAL WELD RECORDS

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	09/12/11	0810	65°	SAS	80	750/100	F	S/S	P 68 71 72 80 62 67 S 68 67 76	P	40 MIL
2	09/12/11	0815	65°	XM	65	750/4.0	F	S/S	P 66 63 66 61 67 63 S 67 69 65	P	40 MIL
3	09/12/11	0835	65°	VS	92	750/11.9	F	S/S	P 66 67 68 71 65 67 S 69 67 69	P	40 MIL
4	09/12/11	1250	85°	SAS	80	750/5.0	F	S/S	P 54 56 57 57 51 53 S 67 68 70	P	40 MIL
5	09/12/11	1252	85°	XM	65	800/50	F	S/S	P 60 67 53 64 63 62 S 60 65 64	P	40 MIL
6	09/12/11	1300	85°	VS	92	750/12	F	S/S	P 58 54 65 65 69 68 S 70 71 68	P	40 MIL
7	09/12/11	1311	85°	SS	56	204/100	EXT	S/S	P 53 58 60 S 60 61 62	P	40 MIL
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	09/13/11	0755	70°	VS	92	750/11.9	F	S/S	P 86 77 82 84 78 77 S 84 89 80	P	40 MIL
2	09/13/11	0755	70°	XM	65	750/5.0	F	S/S	P 71 77 77 78 74 74 S 78 80 81	P	40 MIL
3	09/13/11	0809	70°	SAS	80	750/124	F	S/S	P 75 75 76 72 73 76 S 78 81 82	P	40 MIL
4	09/13/11	0826	70°	SS	56	265/25	EXT	S/S	P 55 65 63 S 70 63 65	P	40 MIL
5	09/13/11	1255	90°	SAS	80	750/13.6	F	S/S	P 68 63 62 68 66 69 S 69 64 64	P	40 MIL
6	09/13/11	1255	90°	VS	92	750/14.0	F	S/S	P 68 69 67 65 70 69 S 67 63 62	P	40 MIL
7	09/13/11	1300	90°	XM	65	780/50	F	S/S	P 59 56 56 58 58 58 S 64 68 64	P	40 MIL
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	09/16/11	820	50°	VS	92	750/12.0	F	S/S	P 84 83 84 86 82 83 S 88 87 85	P	40 MIL
2	09/16/11	824	50°	XM	65	750/12.8	F	S/S	P 74 73 73 73 74 74 S 74 73 76	P	40 MIL
3	09/16/11	827	50°	SAS	80	750/12.7	F	S/S	P 82 75 88 89 90 93 S 85 84 87	P	40 MIL
5	09/16/11	1244	70°	SAS	80	750/14.0	F	S/S	P 77 74 78 74 77 77 S 78 74 76	P	40 MIL
6	09/16/11	1245	70°	XM	65	750/13.0	F	S/S	P 67 69 72 69 68 69 S 75 76 78	P	40 MIL
7	09/16/11	1245	70°	VS	92	750/13.0	F	S/S	P 66 66 65 63 68 68 S 80 74 70	P	40 MIL
8	09/16/11	1335	70°	SS	56	265/245	EXT	S/S	P 72 73 74 S 76 74 71	P	40 MIL
4	09/16/11	0837	50°	SS	56	265/245	EXT	S/S	P 65 68 63 S 63 65 60	P	40 MIL
									P S		
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	09/17/11	0740	60°	TN	17	230/250	EXT	S/S	P	79	82	84				P	40 MIL
									S	86	87	80					
2	09/17/11	0745	60°	RR	51	250/200	EXT	S/S	P	70	75	70				P	40 MIL
									S	79	80	78					
3	09/17/11	0800	60°	LR	53	250/275	EXT	S/S	P	86	87	80				P	40 MIL
									S	70	71	68					
4	09/17/11	0801	60°	SS	56	265/245	EXT	S/S	P	75	80	78				P	40 MIL
									S	82	80	78					
5	09/17/11	0832	60°	XM	55	230/120	EXT	S/S	P	70	55	69				P	40 MIL
									S	80	81	83					
6	09/17/11	1240	80°	TN	17	255/230	EXT	S/S	P	60	64	64				P	40 MIL
									S	69	70	69					
7	09/17/11	1240	80°	RR	51	250/200	EXT	S/S	P	63	64	63				P	40 MIL
									S	65	68	67					
8	09/17/11	1242	80°	XM	55	230/120	EXT	S/S	P	68	67	68				P	40 MIL
									S	75	70	74					
9	09/17/11	1248	80°	SS	55	265/245	EXT	S/S	P	74	73	72				P	40 MIL
									S	70	68	70					
									P								
									S								
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch								Pass/ Fail	Comments
1	09/19/11	0800	55°	XM	55	230/120	EXT	S/S	P	71		65		69				P	40 MIL
									S	75		76		74					
2	09/19/11	0802	55°	SS	56	264/245	EXT	S/S	P	75		70		75				P	40 MIL
									S	74		75		76					
3	09/19/11	1250	70°	XM	55	230/120	EXT	S/S	P	68		68		67				P	40 MIL
									S	67		70		67					
4	09/19/11	1257	70°	SS	56	265/245	EXT	S/S	P	71		74		72				P	40 MIL
									S	75		76		70					
									P										
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	09/20/11	0800	60°	SS	56	265/245	EXT	S/S	P 69 78 80 S 87 85 86	P	40 MIL
2	09/20/11	0825	60°	XM	55	250/200	EXT	S/S	P 77 75 79 S 82 81 80	P	40 MIL
3	09/20/11	1303	85°	SS	56	265/245	EXT	S/S	P 60 62 60 S 66 65 66	P	40 MIL
4	09/20/11	1305	85°	VS	94	750/11	F	S/S	P 56 54 53 52 53 54 S 65 63 62	P	40 MIL
5	09/20/11	1312	85°	SAS	80	750/124	F	S/S	P 65 62 68 64 66 64 S 72 80 68	P	40 MIL
6	09/20/11	1315	85°	XM	102	750/12	F	S/S	P 60 63 56 57 64 62 S 66 65 66	P	40 MIL
									P S		
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch										Pass/ Fail	Comments
1	09/21/11	0800	60°	SAS	80	750/140	F	S/S	P	70	73	71	72	72	71					P	40 MIL
									S	71		70		73						
2	09/21/11	0800	60°	VS	94	750/140	F	S/S	P	64	66	68	68	66	66					P	40 MIL
									S	66		68		70						
3	09/21/11	0800	60°	XM	73	750/120	F	S/S	P	73	70	72	72	73	72					P	40 MIL
									S	77		78		76						
4	09/21/11	0805	60°	SS	24	265/245	EXT	S/S	P	64		65		66						P	40 MIL
									S	67		68		67						
5	09/21/11	1251	70°	SAS	80	750/140	F	S/S	P	62	65	70	73	72	73					P	40 MIL
									S	78		70		75						
6	09/21/11	1251	70°	VS	94	750/140	F	S/S	P	70	71	68	66	72	72					P	40 MIL
									S	78		79		74						
7	09/21/11	1251	70°	XM	73	750/120	F	S/S	P	64	64	66	65	65	67					P	40 MIL
									S	71		70		71						
8	09/21/11	1251	70°	SS	24	265/245	EXT	S/S	P	63		60		60						P	40 MIL
									S	64		65		64						
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch										Pass/ Fail	Comments
1	09/22/11	0800	50°	VS	94	750/11	F	S/S	P	84	83	71	70	83	79					P	40 MIL
									S	86		83		80						
2	09/22/11	0803	50°	SAS	80	750/118	F	S/S	P	84	84	86	87	86	84					P	40 MIL
									S	84		85		85						
3	09/22/11	0805	50°	XM	102	750/13	F	S/S	P	75	73	74	72	73	75					P	40 MIL
									S	75		78		74						
4	09/22/11	0811	50°	SS	56	265/245	EXT	S/S	P	76		84		70						P	40 MIL
									S	88		86		80						
									P											
									S											
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Josh Allen
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch								Pass/ Fail	Comments
1	09/23/11	0735	50°	XM	102	750/120	F	S/S	P	95	95	98	100	95	87			P	
									S	100		104		103					
2	09/23/11	0740	50°	VS	94	750/108	F	S/S	P	96	95	96	97	92	95			P	
									S	99		101		98					
3	09/23/11	0744	50°	SAS	80	750/102	F	S/S	P	94	93	96	94	96	95			P	
									S	94		97		98					
4	09/23/11	0758	50°	SS	56	265/245	EXT	S/S	P	92		93		92				P	EXTRUSION
									S	96		92		95					
5	09/23/11	1300	70°	XM	102	750/120	F	S/S	P	83	84	86	84	85	84			P	
									S	90		91		90					
6	09/23/11	1319	70°	SS	56	265/245	EXT	S/S	P	67		61		74				P	
									S	75		71		70					
									P										
									S										
									P										
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AQUATERRA

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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch										Pass/ Fail	Comments
1	09/26/11	0742	55°	SS	56	265/245	EXT	40 MIL	P	78		73		85						P	
									S	98		96		98							
2	09/26/11	0745	55°	XM	102	750/120	F	40 MIL	P	76	78	77	78	77	79					P	
									S	86		81		90							
3	09/26/11	0909	60°	SAS	80	750/99	F	40 MIL	P	70	71	72	74	71	74					P	
									S	74		76		77							
4	09/26/11	0910	60°	VS	94	750/105	F	40 MIL	P	83	80	87	85	84	78					P	
									S	87		84		86							
5	09/26/11	0920	60°	XM	59	250/200	EXT	40 MIL	P	67		63		66						P	
									S	67		70		64							
6	09/26/11	1015	60°	VS	73	750/120	F	40 MIL	P	71	82	75	82	82	72					P	
									S	87		86		80							
7	09/26/11	1245	67°	XM	102	750/130	F	40 MIL	P	74	77	73	75	74	76					P	
									S	79		77		74							
8	09/26/11	1248	67°	SS	56	265/245	EXT	40 MIL	P	78		75		77						P	
									S	77		74		80							
									P												
									S												
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Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch						Pass/ Fail	Comments
1	09/27/11	0735	50°	LR	17	265/230	EXT	S/S	P	65	65	66			P	40 MIL
									S	75	76	78				
2	09/27/11	0'740	50°	XM	51	220/200	EXT	S/S	P	71	71	70			P	40 MIL
									S	74	70	76				
3	09/27/11	0'744	50°	SS	56	275/245	EXT	S/S	P	80	87	85			P	40 MIL
									S	88	88	88				
4	09/27/11	1250	65°	SS	56	275/245	EXT	S/S	P	82	83	79			P	40 MIL
									S	82	80	81				
5	09/27/11	1250	65°	LR	17	265/230	EXT	S/S	P	75	78	76			P	40 MIL
									S	79	77	80				
6	09/27/11	1300	65°	XM	51	220/200	EXT	S/S	P	67	68	68			P	40 MIL
									S	73	75	70				
									P							
									S							
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Project Location: Venice, Illinois
Pond 3
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Specifications: 40 mil

	Wedge	Extrusion
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Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	09/28/11	0744	50°	SS	56	265/245	EXT	S/S	P	72		79		79		P	40 MIL
									S	86		84		80			
2	09/28/11	0800	50°	XM	102	750/120	F	S/S	P	85	86	87	88	88	85	P	40 MIL
									S	88		89		90			
3	09/28/11	0803	50°	SAS	80	750/120	F	S/S	P	86	88	83	82	87	86	P	40 MIL
									S	86		87		88			
4	09/28/11	0840	50°	VS	73	750/110	F	S/S	P	78	83	87	79	82	85	P	40 MIL
									S	91		88		86			
5	09/28/11	1246	72°	SS	56	265/245	EXT	S/S	P	55		57		58		P	40 MIL
									S	65		64		64			
6	09/28/11	1300	72°	SAS	80	750/130	F	S/S	P	64	61	65	63	69	61	P	40 MIL
									S	64		65		64			
7	09/28/11	1310	72°	VS	73	750/120	F	S/S	P	62	61	63	60	62	62	P	40 MIL
									S	67		68		64			
8	09/28/11	1320	72°	XM	51	250/200	EXT	S/S	P	67		68		63		P	40 MIL
									S	68		65		64			
9	09/28/11	1340	72°	LR	17	265/230	EXT	S/S	P	61		58		64		P	40 MIL
									S	64		63		65			
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	09/29/11	0740	70°	SS	56	265/245	EXT	S/S	P 69 68 70 S 68 70 69	P	40 MIL
2	09/29/11	0750	70°	XM	102	750/110	F	S/S	P 75 76 76 76 75 79 S 76 75 74	P	40 MIL
3	09/29/11	1230	75°	XM	51	250/200	EXT	S/S	P 72 71 68 S 73 70 72	P	40 MIL
4	09/29/11	1247	75°	SS	56	265/245	EXT	S/S	P 67 69 67 S 70 70 71	P	40 MIL
5	09/29/11	1300	75°	VS	73	750/130	F	S/S	P 63 61 60 62 63 63 S 67 68 64	P	40 MIL
6	09/29/11	1520	75°	LR	17	265/230	EXT	S/S	P 61 61 60 S 68 62 69	P	40 MIL
									P S		
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch						Pass/ Fail	Comments
1	09/30/11	0730	60°	LR	17	265/230	EXT	S/S	P	75	78	80			P	40 MIL
									S	81	86	87				
2	09/30/11	0735	60°	XM	51	250/200	EXT	S/S	P	83	84	80			P	40 MIL
									S	85	86	87				
3	09/30/11	0744	60°	SS	56	265/245	EXT	S/S	P	79	88	89			P	40 MIL
									S	73	90	91				
4	09/30/11	1230	70°	LR	17	260/230	EXT	S/S	P	61	62	62			P	40 MIL
									S	62	68	67				
5	09/30/11	1245	70°	SS	56	265/245	EXT	S/S	P	66	63	66			P	40 MIL
									S	73	70	65				
6	09/30/11	1250	70°	XM	51	250/200	EXT	S/S	P	63	61	62			P	40 MIL
									S	64	66	64				
									P							
									S							
									P							
									S							
									P							
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AQUATERRA

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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch										Pass/ Fail	Comments
1	10/01/11	0742	45°	VS	94	750/115	F	S/S	P	83	87	89	85	86	89					P	40 MIL
									S	97		92		90						
2	10/01/11	0746	45°	SAS	80	750/116	F	S/S	P	92	88	93	86	91	86					P	40 MIL
									S	96		96		97						
3	10/01/11	0753	45°	XM	73	750/120	F	S/S	P	80	71	77	66	79	69					P	40 MIL
									S	92		89		90						
4	10/01/11	0755	45°	SS	56	265/245	EXT	S/S	P	85		85		87						P	40 MIL
									S	91		90		90						
5	10/01/11	1250	63°	XM	73	750/130	F	S/S	P	69	72	68	70	69	73					P	40 MIL
									S	69		70		74						
6	10/01/11	1300	63°	VS	94	750/120	F	S/S	P	74	73	77	70	79	72					P	40 MIL
									S	81		80		81						
7	10/01/11	1300	63°	SS	56	265/245	EXT	S/S	P	70		66		70						P	40 MIL
									S	72		70		70						
8	10/01/11	1300	63°	LR	77	260/230	EXT	S/S	P	66		64		64						P	40 MIL
									S	70		71		72						
									P											
									S											
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch												Pass/ Fail	Comments
1	10/03/11	0730	50°	LR	17	260/230	EXT	S/S	P	83		83		86							P	40 MIL
									S	90		88		91								
2	10/03/11	0746	50°	SS	56	265/245	EXT	S/S	P	83		80		81							P	40 MIL
									S	85		90		87								
3	10/03/11	0750	50°	VS	94	750/105	F	S/S	P	82	89	87	91	91	92						P	40 MIL
									S	96		97		98								
4	10/03/11	0750	50°	SAS	80	750/99	F	S/S	P	84	91	94	95	91	91						P	40 MIL
									S	95		94		94								
5	10/03/11	0750	50°	XM	102	750/90	F	S/S	P	87	88	85	84	90	91						P	40 MIL
									S	86		88		93								
6	10/03/11	1245	73°	LR	17	260/230	EXT	S/S	P	57		55		58							P	40 MIL
									S	64		65		63								
7	10/03/11	1248	73°	SS	56	265/245	EXT	S/S	P	56		58		57							P	40 MIL
									S	64		64		63								
8	10/03/11	1250	73°	VS	94	750/130	F	S/S	P	69	72	68	70	72	70						P	40 MIL
									S	70		72		70								
9	10/03/11	1250	73°	XM	102	750/100	F	S/S	P	68	69	69	67	66	68						P	40 MIL
									S	72		71		70								
									P													
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	10/04/11	0740	50°	LR	17	260/230	EXT	S/S	P	73		78		73		P	40 MIL
									S	78		80		87			
2	10/04/11	0750	50°	XM	51	250/200	EXT	S/S	P	84		60		77		P	40 MIL
									S	80		81		84			
3	10/04/11	0800	50°	SS	80	750/80	F	S/S	P	83	83	80	78	80	75	P	40 MIL
									S	82		80		86			
4	10/04/11	0747	60°	SS	56	265/245	EXT	S/S	P	70		68		69		P	40 MIL
									S	75		74		70			
5	10/04/11	1245	80°	SS	56	265/245	EXT	S/S	P	56		57		60		P	40 MIL
									S	67		63		64			
6	10/04/11	1245	80°	LR	17	260/230	EXT	S/S	P	63		66		68		P	40 MIL
									S	65		61		63			
7	10/04/11	1248	80°	XM	51	250/200	EXT	S/S	P	63		60		61		P	40 MIL
									S	68		70		66			
									P								
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Tim Pool
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch								Pass/ Fail	Comments
1	10/06/11	0739	55°	SS	56	265/245	EXT	S/S	P	79		82		81				P	40 MIL
									S	80		82		86					
2	10/06/11	0745	55°	XM	51	250/200	EXT	S/S	P	66		67		64				P	40 MIL
									S	67		70		68					
3	10/06/11	1240	80°	SS	56	265/245	EXT	S/S	P	60		67		64				P	40 MIL
									S	68		65		67					
4	10/06/11	1300	80°	XM	51	250/260	EXT	S/S	P	64		63		64				P	40 MIL
									S	65		68		66					
									P										
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOR

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	10/07/11	0730	50°	SS	56	250/200	EXT	S/S	P	82	68	86				P	40 MIL
									S	89	92	90					
2	10/07/11	0738	50°	XM	51	265/245	EXT	S/S	P	77	76	78				P	40 MIL
									S	76	79	80					
3	10/07/11	1245	80°	SS	56	250/200	EXT	S/S	P	70	68	70				P	40 MIL
									S	75	74	70					
4	10/07/11	1445	80°	XM	51	265/245	EXT	S/S	P	63	66	65				P	40 MIL
									S	68	68	69					
									P								
									S								
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch								Pass/ Fail	Comments
1	10/08/11	0740	50°	XM	51	250/200	EXT	S/S	P	75		74		78				P	40 MIL
									S	86		84		86					
2	10/08/11	0750	50°	SS	56	265/245	EXT	S/S	P	63		60		60				P	40 MIL
									S	79		80		79					
3	10/08/11	0952	60°	SS	17	265/245	EXT	S/S	P	72		60		72				P	40 MIL
									S	74		75		76					
4	10/08/11	1238	80°	SS	17	265/245	EXT	S/S	P	69		67		66				P	40 MIL
									S	74		70		71					
									P										
									S										
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch										Pass/ Fail	Comments
1	10/10/11	0745	50°	XM	102	750/90	F	S/S	P	77	78	86	82	87	86					P	40 MIL
									S	81		79		82							
2	10/10/11	0745	50°	VS	94	750/94	F	S/S	P	78	76	80	87	79	80					P	40 MIL
									S	80		82		81							
3	10/10/11	0745	50°	SAS	80	750/94	F	S/S	P	78	77	79	79	80	78					P	40 MIL
									S	79		80		81							
4	10/10/11	1240	85°	VS	94	750/130	F	S/S	P	64	63	62	66	65	66					P	40 MIL
									S	67		63		65							
5	10/10/11	1244	85°	XM	102	750/100	F	S/S	P	65	66	68	68	63	65					P	40 MIL
									S	67		68		69							
6	10/10/11	1254	85°	SAS	80	750/104	F	S/S	P	62	61	58	61	60	60					P	40 MIL
									S	69		64		63							
7	10/10/11	1257	85°	SS	17	265/245	EXT	S/S	P	50		50		56						P	40 MIL
									S	68		62		61							
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									S												
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Trial Weld Record

Client Name: Ameren UE
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Project Location: Venice, Illinois
Pond 2
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Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	10/11/11	0725	50°	XM	102	750/90	F	S/S	P: 82 80 | 77 79 | 85 80 S: 81 | 88 | 83	P	40 MIL
2	10/11/11	0726	50°	VS	94	750/110	F	S/S	P: 79 81 | 76 79 | 81 81 S: 86 | 85 | 86	P	40 MIL
3	10/11/11	0729	50°	SS	51	265/245	EXT	S/S	P: 76 | 77 | 74 S: 86 | 91 | 90	P	40 MIL
4	10/11/11	0750	50°	LR	17	260/230	EXT	S/S	P: 72 | 73 | 76 S: 77 | 80 | 79	P	40 MIL
5	10/11/11	0900	50°	XM	80	710/110	F	S/S	P: 67 70 | 69 73 | 70 71 S: 79 | 75 | 80	P	40 MIL
6	10/11/11	1245	80°	LR	17	260/230	EXT	S/S	P: 66 | 68 | 69 S: 70 | 70 | 71	P	40 MIL
7	10/11/11	1250	80°	VS	94	750/120	F	S/S	P: 60 58 | 61 60 | 60 57 S: 63 | 64 | 65	P	40 MIL
8	10/11/11	1253	80°	SS	51	265/245	EXT	S/S	P: 66 | 67 | 64 S: 62 | 64 | 63	P	40 MIL
9	10/11/11	1310	80°	XM	55	240/120	EXT	S/S	P: 65 | 61 | 63 S: 65 | 66 | 64	P	40 MIL
									P S		
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
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Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch								Pass/ Fail	Comments
1	10/12/11	1300	60°	JC	55	250/200	EXT	S/S	P	70		69		68				P	40 MIL
									S	71		61		70					
									P										
									S										
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Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	10/13/11	0830	55°	JC	55	250/200	EXT	S/S	P	73	75	79				P	40 MIL
									S	75	74	71					
									P								
									S								
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	10/14/11	0750	50°	VS	94	750/100	W	S/S	P 90 89 93 92 92 90 S 94 90 93	P	40 MIL
2	10/14/11	0800	50°	SAS	80	750/99	W	S/S	P 85 86 87 87 90 89 S 86 87 88	P	40 MIL
3	10/14/11	0800	50°	SS	55	265/245	EXT	S/S	P 76 74 71 S 81 79 80	P	40 MIL
4	10/14/11	0940	50°	XM	102	750/100	W	S/S	P 75 70 74 72 75 72 S 85 86 87	P	40 MIL
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch	Pass/ Fail	Comments
1	10/17/11	0745	48°	VS	94	750/100	W	S/S	P: 97 96 96 96 96 93 S: 98 97 96	P	40 MIL
2	10/17/11	0750	48°	XM	102	750/80	W	S/S	P: 93 90 90 91 91 94 S: 109 96 100	P	40 MIL
3	10/17/11	0755	48°	SAS	80	750/96	W	S/S	P: 72 88 83 90 92 82 S: 93 95 96	P	40 MIL
4	10/17/11	0755	48°	SS	51	265/245	EXT	S/S	P: 80 81 86 S: 88 90 87	P	40 MIL
5	10/17/11	1240	60°	VS	94	750/120	W	S/S	P: 76 77 74 74 79 76 S: 79 78 80	P	40 MIL
6	10/17/11	1247	60°	SS	51	265/245	EXT	S/S	P: 66 66 64 S: 66 65 66	P	40 MIL
7	10/17/11	1300	60°	XM	55	250/200	EXT	S/S	P: 65 66 68 S: 76 78 75	P	40 MIL
									P S		
									P S		
									P S		
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AQUATERRA

Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch				Pass/ Fail	Comments
1	10/19/11	0900	45°	SS	56	265/245	EXT	S/S	P	83	86	81		P	40 MIL
									S	88	86	84			
									P						
									S						
									P						
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	10/20/11	0745	42°	SS	56	264/245	EXT	S/S	P	92	81	74				P	40 MIL
									S	94	94	94					
2	10/20/11	0750	42°	XM	55	250/200	EXT	S/S	P	92	92	91				P	40 MIL
									S	93	94	93					
3	10/20/11	0752	42°	LR	17	265/235	EXT	S/S	P	92	91	90				P	40 MIL
									S	97	96	97					
4	10/20/11	1235	50°	LR	17	265/235	EXT	S/S	P	89	83	80				P	40 MIL
									S	91	90	87					
5	10/20/11	1245	50°	XM	55	250/200	EXT	S/S	P	78	77	77				P	40 MIL
									S	79	80	76					
6	10/20/11	1250	50°	SS	56	265/245	EXT	S/S	P	71	74	74				P	40 MIL
									S	77	78	78					
									P								
									S								
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Tim Pool
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch										Pass/ Fail	Comments
1	10/21/11	0730	40°	SAS	73	750/118	W	S/S	P	87	84	86	83	90	87					P	40 MIL
									S	94		94		96						
2	10/21/11	0740	40°	VS	94	750/119	W	S/S	P	86	89	86	91	90	88					P	40 MIL
									S	94		91		93						
3	10/21/11	0740	40°	XM	102	750/80	W	S/S	P	82	84	84	85	85	84					P	40 MIL
									S	86		87		86						
4	10/21/11	1020	40°	KP	56	265/245	EXT	S/S	P	72		70		71						P	40 MIL
									S	74		70		73						
5	10/21/11	1245	50°	VS	94	750/130	W	S/S	P	64	68	69	67	70	67					P	40 MIL
									S	78		80		76						
6	10/21/11	1251	50°	SAS	73	750/119	W	S/S	P	75	73	74	73	72	69					P	40 MIL
									S	80		76		77						
7	10/21/11	1252	50°	XM	102	750/130	W	S/S	P	72	69	65	72	71	70					P	40 MIL
									S	72		70		74						
8	10/21/11	1253	50°	KP	56	265/245	EXT	S/S	P	73		69		68						P	40 MIL
									S	70		72		70						
9	10/21/11	1255	50°	LR	17	260/230	EXT	S/S	P	71		71		73						P	40 MIL
									S	70		72		73						
									P											
									S											
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch												Pass/ Fail	Comments
1	10/24/11	0739	50°	XM	102	750/80	F	S/S	P	89	88	89	89	89	87							P	40 MIL
									S	89		88		90									
2	10/24/11	0742	50°	SAS	73	750/105	F	S/S	P	80	81	83	84	82	83							P	40 MIL
									S	87		88		89									
3	10/24/11	0745	50°	VS	94	750/110	F	S/S	P	74	75	74	74	74	73							P	40 MIL
									S	79		80		79									
4	10/24/11	0750	50°	JC	56	285/245	EXT	S/S	P	60		64		65								P	40 MIL
									S	68		70		70									
5	10/24/11	0750	50°	LR	17	260/230	EXT	S/S	P	88		91		91								P	40 MIL
									S	86		90		93									
6	10/24/11	1243	70°	SAS	73	750/110	F	S/S	P	60	61	61	64	66	65							P	40 MIL
									S	70		71		72									
7	10/24/11	1245	70°	VS	94	750/130	F	S/S	P	62	62	63	61	65	65							P	40 MIL
									S	65		62		64									
8	10/24/11	1245	70°	XM	102	750/130	F	S/S	P	57	59	61	61	62	62							P	40 MIL
									S	65		66		64									
9	10/24/11	1245	70°	LR	17	255/230	EXT	S/S	P	67		69		69								P	40 MIL
									S	75		76		70									
10	10/24/11	1250	70°	JC	56	280/240	EXT	S/S	P	60		59		62								P	40 MIL
									S	66		67		68									
									P														
									S														
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch								Pass/ Fail	Comments
1	10/25/11	0735	60°	SAS	73	750/99	F	S/S	P	78	78	79	73	77	74			P	40 MIL
									S	82		80		83					
2	10/25/11	0735	60°	VS	94	750/118	F	S/S	P	76	78	78	81	80	78			P	40 MIL
									S	83		82		83					
3	10/25/11	0740	60°	XM	56	280/245	EXT	S/S	P	72		70		70				P	40 MIL
									S	86		84		86					
4	10/25/11	0750	60°	LR	17	260/230	EXT	S/S	P	76		81		82				P	40 MIL
									S	85		86		84					
5	10/25/11	1250	75°	LR	17	255/230	EXT	S/S	P	62		60		64				P	40 MIL
									S	65		70		68					
6	10/25/11	1250	75°	XM	56	285/245	EXT	S/S	P	58		60		58				P	40 MIL
									S	63		65		65					
7	10/25/11	1250	75°	VS	94	250/130	F	S/S	P	55	60	62	64	59	54			P	40 MIL
									S	65		66		68					
8	10/25/11	1250	75°	KK	55	250/210	EXT	S/S	P	57		58		56				P	40 MIL
									S	65		64		63					
									P										
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AQUATERRA

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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch						Pass/ Fail	Comments
1	10/26/11	0820	60°	LR	17	260/230	EXT	S/S	P	72	73	71			P	40 MIL
									S	77	78	77				
2	10/26/11	0740	60°	XM	56	245/280	EXT	S/S	P	81	80	79			P	40 MIL
									S	86	87	86				
									P							
									S							
									P							
									S							
									P							
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch						Pass/ Fail	Comments
1	10/27/11	0925	45°	LR	17	265/230	EXT	S/S	P	92	91	90			P	40 MIL
									S	93	95	94				
2	10/27/11	1100	50°	XM	56	280/245	EXT	S/S	P						P	40 MIL
									S							
3	10/27/11	1240	50°	LR	17	265/230	EXT	S/S	P	72	73	75			P	40 MIL
									S	76	77	76				
									P							
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									P							
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Ryan Ayers
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	10/28/11	0748	50°	XM	56	260/280	EXT	S/S	P	69	87	84				P	40 MIL
									S	88	90	94					
2	10/28/11	1300	65°	XM	56	245/280	EXT	S/S	P	59	55	58				P	40 MIL
									S	60	62	61					
									P								
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	10/31/11	0747	43°	XM	56	245/280	EXT	S/S	P	86	83	83				P	40 MIL
									S	87	86	87					
									P								
									S								
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Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 2
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material		Test Values lbs/inch						Pass/ Fail	Comments
1	11/01/11	0752	40°	XM	56	245/280	EXT	S/S	P	83	83	84				P	40 MIL
									S	86	84	85					
2	11/01/11	1305	65°	XM	56	245/280	EXT	S/S	P	58	63	61				P	40 MIL
									S	64	62	64					
									P								
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: TOK

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch						Pass/ Fail	Comments
1	11/28/11	0930	35°	EN	39	280/250	EXT	S/S	P	98	87	86			P	40 MIL
									S	100	101	100				
									P							
									S							
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Electronic Filing: Received, Clerk's Office 09/28/2020

Trial Weld Record

Client Name: Ameren UE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, Illinois
Pond 3
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel(P)	50	44
Shear(S)	60	60

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel:

Trial Weld Number	Date	Time	Weather	Seamer Initials	Machine Number	Machine Properties	Weld Type	Type of Material	Test Values lbs/inch						Pass/ Fail	Comments
1	03/01/12	0:00	61°	DV	53	250/200	EXT	S/S	P	76	72	68	75		P	40 MIL
									S	79	79	77	77			
									P							
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GEOMEMBRANE LINER SEAM/NON-DESTRUCTIVE TESTING RECORDS

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/12/11	0825	1/2	844	SAS	80	1	W-E	65°F	1&2	S/S	9/12/11	1-7	KS	25	23	-2	0940	0945	P	-	WEOS-R202
9/12/11	0841	2/3	860	XM	65	2	W-E	65°F	3&4	S/S	9/12/11	8	KS	25	25	0	1030	1035	P	-	WEOS-R11
9/12/11	0855	3/4	860	VS	92	3	W-E	65°F	25&26	S/S	9/12/11	9-34	KS	25	24	-1	1055	1100	P	-	WEOS-R41
9/12/11	0959	4/5	860	SAS	80	1	W-E	65°F	7&12	S/S	9/12/11	35-39	KS	25	24	-1	1423	1428	P	-	EEOS-R46
9/12/11	1019	5/6	860	XM	65	2	W-E	70°F	8&9	S/S	9/12/11	40-42	KS	25	23	-2	1430	1435	P	-	WEOS-R67
9/12/11	1105	6/7	854	VS	92	3	W-E	75°F	10&11	S/S	9/12/11	43-54	KS	25	24	-1	1528	1533	P	-	EEOS-R80
9/12/11	1125	7/8	854	SAS	80	1	W-E	75°F	13&14	S/S	9/12/11	55-59	KS	25	25	0	1702	1707	P	-	WEOS-R87
9/12/11	1253	8/9	859	VS	92	6	W-E	85°F	15&16	S/S	9/12/11	60-72	KS	25	24	-1	1755	1800	P	-	WEOS-R94
9/12/11	1338	9/10	857	SAS	80	4	W-E	85°F	17&18	S/S	9/13/11	73-93	KP	25	23	-2	1040	1045	P	-	EEOS-R109
9/12/11	1342	10/11	861	VS	92	6	W-E	85°F	19&20	S/S	9/13/11	94-103	KS	25	23	-2	1100	1105	P	-	WEOS-R129
9/12/11	1422	11/12	855	XM	65	5	W-E	85°F	21&22	S/S	9/13/11	104	KP	25	23	-2	1136	1141	P	-	WEOS-R144
9/12/11	1524	12/13	863	SAS	80	4	W-E	85°F	23&24	S/S	9/13/11	105-114	KP	25	23	-2	1335	1340	P	-	WEOS-R146
9/12/11	1522	13/14	860	VS	92	6	W-E	85°F	27&28	S/S	9/14/11	115-134	KP	25	25	0	0907	0912	P	-	WEOS-R158
9/12/11	1550	14/15	856	XM	65	5	W-E	85°F	31&32	S/S	9/15/11	146-165	KP	25	23	-2	0852	0857	P	-	WEOS-R181
9/12/11	1456	15/16	864	SAS	80	4	W-E	85°F	29&30	S/S	9/15/11	135-145	KP	25	25	0	1036	1041	P	-	WEOS-R202

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/13/11	0815	16/17	682	VS	92	1	W-E	70°F	33&34	S/S	9/15/11	166-172	KP	25	24	-1	1122	1127	P	-	WEOS-R213
9/13/11	0825	17/18	670	XM	65	2	W-E	70°F	35&36	S/S	9/15/11	172	KP	25	23	-2	1237	1242	P	-	WEOS-R410
9/13/11	0855	18/19	647	SAS	80	3	W-E	70°F	37&38	S/S	9/15/11	173-174	KP	25	23	-2	1252	1257	P	-	WEOS-R412
9/13/11	0928	19/20	633	VS	92	1	W-E	70°F	39&40	S/S	9/15/11	175-180	KP	25	25	0	1310	1315	P	-	WEOS-R416
9/13/11	1005	20/21	617	XM	65	2	W-E	76°F	41&42	S/S	9/15/11	181-186	KP	25	23	-2	1333	1338	P	-	WEOS-R425
9/13/11	1035	21/22	621	SAS	80	3	W-E	76°F	43&44	S/S	9/15/11	187-195	KP	25	25	0	1346	1351	P	-	WEOS-R526
9/13/11	1105	22/23	602	VS	92	1	W-E	76°F	45&46	S/S	9/15/11	196-206	KP	25	24	-1	1415	1420	P	-	WEOS-R541
9/13/11	1115	23/24	587	XM	65	2	W-E	76°F	47&48	S/S	9/15/11	208-228	KP	25	24	-1	1452	1457	P	-	WEOS-R547
9/13/11	1306	24/25	580	SAS	80	5	W-E	90°F	49&50	S/S	9/16/11	229-236	KP	25	25	0	0835	0840	P	-	WEOS-R570
9/13/11	1310	25/26	568	VS	92	6	W-E	90°F	51	S/S	9/16/11	237-243	KP	25	25	0	0907	0912	P	-	WEOS-R586
9/13/11	1403	26/27	558	SAS	80	5	W-E	90°F	52	S/S	9/16/11	244-255	KP	25	25	0	0927	0932	P	-	WEOS-R595
9/13/11	1405	27/28	539	XM	65	7	W-E	90°F	53	S/S	9/16/11	256-260	KP	25	25	0	0953	0958	P	-	WEOS-R735
9/13/11	1420	28/29	536	VS	92	6	W-E	90°F	54	S/S	9/16/11	261-265	KP	25	25	0	1008	1013	P	-	WEOS-R750
9/13/11	1505	29/30	529	SAS	80	5	W-E	90°F	55	S/S	9/16/11	266-268	KP	25	25	0	1024	1029	P	-	WEOS-R756
9/13/11	1505	30/31	517	XM	65	7	W-E	90°F	56	S/S	9/16/11	269-284	KP	25	25	0	1028	1033	P	-	WEOS-R804
9/13/11	1530	31/32	506	VS	92	6	W-E	90°F	57	S/S	9/16/11	285-286	KP	25	25	0	1054	1059	P	-	WEOS-R775
9/13/11	1602	32/33	494	SAS	80	5	W-E	90°F	58	S/S	9/16/11	287-290	KP	25	25	0	1104	1109	P	-	WEOS-R778
9/13/11	1620	33/34	483	XM	65	7	W-E	90°F	-	S/S	9/16/11	291-296	KP	25	23	-2	1120	1125	P	-	WEOS-R782
9/13/11	1635	34/35	473	VS	92	6	W-E	90°F	-	S/S	9/16/11	297	KP	25	25	0	1130	1135	P	-	WEOS-R787
9/13/11	1652	35/36	462	SAS	80	5	W-E	90°F	-	S/S	9/16/11	-	KP	25	23	-2	1151	1156	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/16/11	0830	37/38	404	VS	92	1	W-E	65°F	59	S/S	9/17/11	299	KP	25	25	0	0725	0730	P	-	WEOS-R231
9/16/11	0847	38/40	388	SAS	80	3	W-E	65°F	60	S/S	9/17/11	300-303	KP	25	25	0	0735	0740	P	-	EEOS-R233
9/16/11	0915	38/39	22	VS	92	1	S-N	65°F	-	EXT.	9/17/11	-	-	-	-	-	-	-	-	P	EOS-EOS
9/16/11	0920	37/39	41	VS	92	1	W-E	65°F	-	S/S	9/17/11	-	KP	25	24	-1	0728	0733	P	-	EOS-EOS
9/16/11	0923	39/40	107	SAS	80	3	W-E	65°F	-	S/S	9/17/11	-	KP	25	25	-2	0735	0740	P	-	EOS-EOS
9/16/11	0925	40/41	389	XM	65	2	W-E	65°F	61	S/S	9/17/11	305/310-313	SAS	25	25	0	0816	0821	P	-	WEOS-R238
9/16/11	0930	41/42	22	VS	92	1	S-N	65°F	-	S/S	9/17/11	-	SAS	25	24	-1	1415	1420	P	-	EOS-EOS
9/16/11	1000	43/44	22	SAS	80	3	S-N	65°F	-	S/S	9/17/11	-	SAS	25	25	0	0857	0902	P	-	EOS-EOS
9/16/11	0955	41/43	144	VS	92	1	W-E	65°F	62	S/S	9/17/11	307	SAS	25	25	0	0822	0827	P	-	WEOS-R279
9/16/11	1015	41/44	243	VS	92	1	W-E	65°F	-	S/S	9/17/11	308	SAS	25	25	0	0859	0904	P	-	WEOS-R247
9/16/11	1040	42/44	185	VS	92	1	W-E	65°F	-	S/S	9/17/11	-	SAS	25	25	0	0941	0946	P	-	EOS-EOS
9/16/11	1030	43/45	135	SAS	80	3	W-E	65°F	63	S/S	9/17/11	-	SAS	25	25	0	0837	0842	P	-	EOS-EOS
9/16/11	1042	44/45	470	SAS	80	3	W-E	65°F	-	S/S	9/17/11	-	SAS	25	25	0	0959	1004	P	-	EOS-EOS
9/16/11	1050	45/46	101	XM	65	2	W-E	65°F	64	S/S	9/17/11	-	SAS	25	25	0	1112	1117	P	-	EOS-EOS
9/16/11	1100	45/47	502	XM	65	2	W-E	65°F	-	S/S	9/17/11	314-317	SAS	25	25	0	1112	1117	P	-	WEOS-R255
9/16/11	1045	46/47	22	XM	65	2	S-N	65°F	-	S/S	9/17/11	-	SAS	25	25	0	1109	1114	P	-	EOS-EOS
9/16/11	1148	48/49	22	SAS	80	3	S-N	65°F	-	S/S	9/17/11	-	SAS	25	25	0	1037	1042	P	-	EOS-EOS
9/16/11	1108	47/49	346	VS	92	1	W-E	65°F	-	S/S	9/17/11	324-325	SAS	25	25	0	1011	1016	P	-	WEOS-R262
9/16/11	1255	46/48	87	SAS	80	5	W-E	75°F	65	S/S	9/17/11	-	SAS	25	25	0	1110	1115	P	-	EOS-EOS
9/16/11	1302	47/48	164	SAS	80	5	W-E	75°F	-	S/S	9/17/11	326	SAS	25	25	0	1042	1047	P	-	WEOS-R260

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/16/11	1257	48/50	241	XM	65	6	W-E	75°F	66	S/S	9/17/11	318-323	SAS	25	25	0	1102	1107	P	-	WEOS-R266
9/16/11	1305	49/50	355	XM	65	6	W-E	75°F	-	S/S	9/17/11	327-331	SAS	25	25	0	1039	1044	P	-	WEOS-R273
9/16/11	1300	50/51	574	VS	92	7	W-E	75°F	67	S/S	9/17/11	332-333	SAS	25	23	-2	1136	1141	P	-	WEOS-R280
9/16/11	1336	51/52	286	SAS	80	5	W-E	75°F	68	S/S	9/17/11	-	SAS	25	25	0	1141	1146	P	-	EOS-EOS
9/16/11	1402	51/53	278	SAS	80	5	W-E	75°F	-	S/S	9/17/11	334-340	SAS	25	24	-1	1255	1300	P	-	WEOS-R284
9/16/11	1345	52/53	22	XM	65	6	S-N	75°F	-	S/S	9/17/11	-	SAS	25	25	0	1259	1304	P	-	EOS-EOS
9/16/11	1400	52/54	279	XM	65	6	W-E	75°F	69	S/S	9/17/11	341	SAS	25	23	-2	1449	1454	P	-	WEOS-R293
9/16/11	1420	53/54	281	XM	65	6	W-E	75°F	74	S/S	9/17/11	342-346	SAS	25	24	-1	1303	1308	P	-	WEOS-R295
9/16/11	1400	54/55	540	VS	92	7	W-E	75°F	70	S/S	9/17/11	347-350	SAS	25	25	0	1440	1445	P	-	WEOS-R302
9/16/11	1446	55/56	213	SAS	80	5	W-E	75°F	71	S/S	9/17/11	351-353	SAS	25	25	0	1438	1443	P	-	WEOS-R308
9/16/11	1514	55/57	315	SAS	80	5	W-E	75°F	75	S/S	9/17/11	354	SAS	25	24	-1	1350	1355	P	-	WEOS-R312
9/16/11	1439	56/57	22	SAS	80	5	N-S	75°F	-	S/S	9/17/11	-	SAS	25	24	-1	1413	1418	P	-	EOS-EOS
9/16/11	1450	56/58	204	XM	65	6	W-E	75°F	72	S/S	9/17/11	355	SAS	25	24	-1	1416	1421	P	-	WEOS-R315
9/16/11	1510	57/58	314	XM	65	6	W-E	75°F	-	S/S	9/17/11	356-358	SAS	25	25	0	1414	1419	P	-	WEOS-R317
9/16/11	1515	58/59	375	VS	92	7	W-E	75°F	73	S/S	9/17/11	-	SAS	25	24	-1	1501	1506	P	-	EOS-EOS
9/16/11	1550	58/60	134	VS	92	7	W-E	75°F	-	S/S	9/17/11	-	SAS	25	24	-1	1356	1401	P	-	EOS-EOS
9/16/11	1545	59/60	22	XM	65	6	N-S	75°F	76	S/S	9/17/11	-	SAS	25	25	0	1359	1404	P	-	EOS-EOS
9/16/11	1005	40/42	151	XM	65	6	N-S	75°F	-	S/S	9/17/11	-	SAS	25	25	0	0946	0951	P	-	EOS-EOS

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Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/16/11	1657	1/37	19	XM	65	6	N-S	75°F	-	S/S	9/17/11	298	KP	25	24	-1	0715	0720	P	-	SEOS-R56
9/16/11	1652	1/38	2	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1647	2/38	22	XM	65	6	N-S	75°F	-	S/S	9/17/11	-	KP	25	24	-1	0718	0723	P	-	EOS-EOS
9/16/11	1645	2/40	3	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1641	3/40	21	XM	65	6	N-S	75°F	-	S/S	9/17/11	303-304	KP	25	25	0	0822	0827	P	-	SEOS-R59
9/16/11	1638	4/41	22	XM	65	6	N-S	75°F	-	S/S	9/17/11	305	SAS	25	25	0	0827	0832	P	-	EOS-EOS
9/16/11	1637	4/43	3	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1634	5/43	22	XM	65	6	N-S	75°F	-	S/S	9/17/11	-	SAS	25	24	-1	0836	0841	P	-	EOS-EOS
9/16/11	1630	6/45	22	XM	65	6	N-S	75°F	-	S/S	9/17/11	-	SAS	25	25	0	0838	0843	P	-	EOS-EOS
9/16/11	1631	5/45	3	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1627	6/46	2	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1625	7/46	24	XM	65	6	N-S	75°F	-	S/S	9/17/11	-	SAS	25	24	-1	1122	1127	P	-	EOS-EOS
9/16/11	1623	7/48	2	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1620	8/48	23	XM	65	6	N-S	75°F	-	S/S	9/17/11	-	SAS	25	24	-1	1123	1128	P	-	EOS-EOS
9/16/11	1618	8/50	2	XM	65	6	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1645	9/50	22	SAS	80	5	N-S	75°F	-	S/S	9/17/11	-	SAS	25	25	0	1125	1130	P	-	EOS-EOS
9/16/11	1643	9/50	4	SAS	80	5	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1640	9/51	1	SAS	80	5	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-
9/16/11	1635	10/51	24	SAS	80	5	N-S	75°F	-	S/S	9/17/11	309	SAS	25	25	0	1131	1136	P	-	SEOS-R222
9/16/11	1633	10/52	1	SAS	80	5	N-S	75°F	-	PATCH	-	-	-	-	-	-	-	-	-	P	-

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
9/16/11	1630	11/52	24	SAS	80	5	N-S	75°F	-	S/S	9/17/11	-	SAS	25	23	-2	1448	1453	P	-	EOS-EOS
9/16/11	1625	12/54	28	SAS	80	5	N-S	75°F	-	S/S	9/17/11	-	SAS	25	25	0	1450	1455	P	-	EOS-EOS
9/16/11	1620	13/55	22	SAS	80	5	N-S	75°F	-	S/S	9/17/11	52	SAS	25	24	-1	1452	1457	P	-	SEOS-R228
9/16/11	1615	14/56	20	SAS	80	5	N-S	75°F	-	S/S	9/17/11	-	SAS	25	25	0	1457	1502	P	-	EOS-EOS
9/16/11	1610	15/58	25	SAS	80	5	N-S	75°F	-	CAP	-	-	-	-	-	-	-	-	-	P	EOS-EOS
9/16/11	1605	16/59	23	SAS	80	5	N-S	75°F	-	S/S	9/17/11	-	SAS	25	25	0	1501	1506	P	-	EOS-EOS

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Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/17/11	0835	3/4	5	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R4-R52
9/17/11	0832	3/4	14	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R52-R42
9/17/11	0835	3/4	61	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R42-R43
9/17/11	0847	3/4	2	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R43-R55
9/17/11	0848	3/4	22	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R55-R44
9/17/11	0855	3/4	10	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R44-R40
9/17/11	0900	3/4	11	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R40-R13
9/17/11	0905	3/4	9	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R13-R14
9/17/11	0908	3/4	13	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R14-R39
9/17/11	0930	3/4	6	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R39-R25
9/17/11	0935	3/4	47	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R25-R38
9/17/11	0950	3/4	37	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R38-R24
9/17/11	0952	3/4	8	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R24-R15
9/17/11	1010	3/4	56	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R15-R37
9/17/11	1012	3/4	11	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R37-R16
9/17/11	1020	3/4	2	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R16-R17
9/17/11	1022	3/4	30	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R17-R26
9/17/11	1030	3/4	27	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R26-R27
9/17/11	1038	3/4	8	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R27-R28
9/17/11	1040	3/4	17	SS	56	4	W-E	65°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R28-R29

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/17/11	1045	3/4	27	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R29-R18
9/17/11	1100	3/4	24	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R18-R19
9/17/11	1105	3/4	22	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R19-R30
9/17/11	1112	3/4	56	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R30-R32
9/17/11	1123	3/4	5	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R32-R31
9/17/11	1125	3/4	16	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R31-R20
9/17/11	1130	3/4	56	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R20-R21
9/17/11	1145	3/4	6	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R21-R33
9/17/11	1157	3/4	23	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R33-R34
9/17/11	1200	3/4	18	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R34-R36
9/17/11	1205	3/4	5	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R36-R22
9/17/11	1210	3/4	45	SS	56	4	W-E	70°F	-	EXT.	9/19/11	-	LR	-	-	-	-	-	-	P	R22-EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/20/11	1316	61/62	489	SAS	80	5	S-N	70°F	77	S/S	9/20/11	359-367	KP	25	23	-2	1315	1320	P	-	SEOS-R329
9/20/11	1320	62/63	375	VS	94	4	S-N	70°F	78	S/S	9/20/11	368-374	KP	25	23	-2	1340	1345	P	-	SEOS-R340
9/20/11	1410	62/64	119	VS	94	4	S-N	70°F	-	S/S	9/20/11	-	KP	25	25	0	1440	1445	P	-	EOS-EOS
9/20/11	1405	63/64	22	VS	94	4	E-W	70°F	-	S/S	9/20/11	-	KP	25	23	-2	1550	1555	P	-	EOS-EOS
9/20/11	1505	64/65	119	XM	102	6	S-N	70°F	79	S/S	9/20/11	376-380	KP	25	23	-2	1550	1555	P	-	SEOS-R347
9/20/11	1400	63/65	375	XM	102	6	S-N	70°F	80	S/S	9/20/11	381-384	KP	25	23	-2	1505	1510	P	-	SEOS-R353
9/20/11	1436	65/66	248	SAS	80	5	S-N	70°F	-	S/S	9/20/11	385-387	KP	25	25	0	1610	1615	P	-	SEOS-R325
9/20/11	1501	66/67	22	SAS	80	5	E-W	70°F	-	S/S	9/20/11	388	KP	25	25	0	1620	1625	P	-	EEOS-R361
9/20/11	1506	65/67	110	SAS	80	5	E-W	70°F	81	S/S	9/20/11	-	KP	25	24	-1	1620	1625	P	-	EOS-EOS
9/20/11	1430	66/68	247	VS	94	4	S-N	70°F	-	S/S	9/20/11	389-393	KP	25	25	0	1625	1630	P	-	SEOS-R363
9/20/11	1520	67/68	110	VS	94	4	S-N	70°F	82	S/S	9/20/11	394-396	KP	25	25	0	1645	1650	P	-	SEOS-R368
9/20/11	1522	68/69	354	SAS	80	5	S-N	70°F	-	S/S	9/21/11	397-398	KP	25	23	-2	0730	0735	P	-	SEOS-R373
9/20/11	1535	69/70	31	VS	94	4	S-N	70°F	83	S/S	9/21/11	-	KP	25	24	-1	0840	0845	P	-	EOS-EOS
9/20/11	1530	70/71	22	VS	94	4	W-E	70°F	-	S/S	9/21/11	-	KP	25	23	-2	0840	0845	P	-	EOS-EOS
9/20/11	1540	69/71	320	VS	94	4	S-N	70°F	84	S/S	9/21/11	399-401	KP	25	23	-2	0840	0845	P	-	EEOS-R378
9/20/11	1530	70/72	31	XM	102	6	S-N	70°F	-	S/S	9/21/11	-	KP	25	23	-2	0855	0900	P	-	EOS-EOS
9/20/11	1540	71/72	320	XM	102	6	S-N	70°F	-	S/S	9/21/11	404-411	KP	25	23	-2	0900	0905	P	-	SEOS-R384
9/20/11	1600	72/73	183	SAS	80	5	S-N	70°F	-	S/S	9/21/11	412-414	KP	25	24	-1	0955	1000	P	-	SEOS-R391
9/20/11	1627	72/74	166	SAS	80	5	S-N	70°F	-	S/S	9/21/11	415-416	KP	25	23	-2	1005	1010	P	-	SEOS-R400
9/20/11	1623	73/74	22	SAS	80	5	E-W	70°F	-	S/S	9/21/11	-	KP	25	23	-2	1005	1010	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
9/20/11	1515	73/75	180	VS	94	4	S-N	70°F	-	S/S	9/21/11	-	KP	25	23	-2	1020	1025	P	-	EOS-EOS
9/20/11	1630	74/75	166	VS	94	4	S-N	70°F	-	S/S	9/21/11	417	KP	25	23	-2	1020	1025	P	-	SEOS-R399
9/20/11	1620	59/75	21	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	24	-1	0725	0730	P	-	EOS-EOS
9/20/11	1623	59/73	22	XM	102	6	W-E	70°F	-	S/S	9/21/11	402-403	KP	25	24	-1	0720	0725	P	-	EEOS-R398
9/20/11	1635	59/72	22	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	23	-2	0715	0720	P	-	EOS-EOS
9/20/11	1640	59/70	22	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	25	0	0715	0720	P	-	EOS-EOS
9/20/11	1645	59/69	19	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	25	0	0715	0720	P	-	EOS-EOS
9/20/11	1650	60/69	2	XM	102	6	W-E	70°F	-	PATCH	9/21/11	-	-	-	-	-	-	-	-	P	EOS-EOS
9/20/11	1655	60/68	22	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	24	-1	0710	0715	P	-	EOS-EOS
9/20/11	1700	60/66	22	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	24	-1	0710	0715	P	-	EOS-EOS
9/20/11	1705	60/65	22	XM	102	6	W-E	70°F	-	S/S	9/21/11	-	KP	25	24	-1	0705	0710	P	-	EOS-EOS
9/20/11	1656	60/63	22	SAS	80	5	W-E	70°F	-	S/S	9/21/11	-	KP	25	23	-2	0705	0710	P	-	EOS-EOS
9/20/11	1701	60/62	22	SAS	80	5	W-E	70°F	-	S/S	9/21/11	-	KP	25	25	0	0700	0705	P	-	EOS-EOS
9/20/11	1706	60/61	16	SAS	80	5	W-E	70°F	-	S/S	9/21/11	-	KP	25	24	-1	0700	0705	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/21/11	0844	76/77	455	SAS	80	1	E-W	60°F	86	S/S	9/21/11	-	KP	25	23	-2	1300	1305	P	-	EOS-EOS
9/21/11	0845	77/78	445	VS	94	2	E-W	60°F	87	S/S	9/21/11	-	KP	25	23	-2	1305	1310	P	-	EOS-EOS
9/21/11	0945	36/76	448	XM	102	3	E-W	60°F	85	S/S	9/21/11	418-427	KP	25	25	0	1135	1140	P	-	WEOS-R797
9/21/11	0950	78/79	442	SAS	80	1	E-W	60°F	88	S/S	9/21/11	428	KP	25	23	-2	1330	1335	P	-	WEOS-R844
9/21/11	0930	79/80	428	VS	94	2	E-W	60°F	89	S/S	9/21/11	-	KP	25	24	-1	1325	1330	P	-	EOS-EOS
9/21/11	1010	80/81	429	VS	94	2	E-W	60°F	90	S/S	9/21/11	429	KP	25	23	-2	1325	1330	P	-	WEOS-R951
9/21/11	1054	81/82	427	SAS	80	1	E-W	60°F	91	S/S	9/21/11	430-434	KP	25	25	0	1355	1400	P	-	WEOS-R887
9/21/11	1105	82/83	418	XM	102	3	E-W	60°F	92	S/S	9/21/11	435-440	KP	25	25	0	1415	1420	P	-	WEOS-R894
9/21/11	1115	83/84	415	VS	94	2	E-W	60°F	93	S/S	9/22/11	441-443	KP	25	25	0	0710	0715	P	-	WEOS-R903
9/21/11	1258	84/85	416	SAS	80	5	E-W	70°F	94	S/S	9/22/11	444-449	KP	25	25	0	0725	0730	P	-	WEOS-R908
9/21/11	1300	85/86	417	XM	102	7	E-W	70°F	95	S/S	9/22/11	450-457	KP	25	24	-1	0740	0745	P	-	WEOS-R917
9/21/11	1300	86/87	410	VS	94	6	E-W	70°F	96	S/S	9/22/11	458-462	KP	25	24	-1	0800	0805	P	-	WEOS-R926
9/21/11	1345	87/88	411	XM	102	7	E-W	70°F	97	S/S	9/22/11	463-473	KP	25	24	-1	0820	0825	P	-	WEOS-R933
9/21/11	1354	88/89	414	SAS	80	5	E-W	70°F	98	S/S	9/22/11	474	KP	25	25	0	0910	0915	P	-	WEOS-R946
9/21/11	1432	89/90	416	SAS	80	5	E-W	70°F	99	S/S	9/22/11	475	KP	25	23	-2	0920	0925	P	-	WEOS-R952
9/21/11	1432	90/91	417	VS	94	6	E-W	70°F	100	S/S	9/22/11	476-478	KP	25	25	0	0930	0935	P	-	WEOS-R955
9/21/11	1445	91/92	418	XM	102	7	E-W	70°F	101	S/S	9/22/11	479-480	KP	25	23	-2	0945	0950	P	-	WEOS-R963
9/21/11	1513	92/93	422	VS	94	6	E-W	70°F	102	S/S	9/22/11	481-484	KP	25	25	0	1000	1005	P	-	WEOS-R965
9/21/11	1526	93/94	430	SAS	80	5	E-W	70°F	103	S/S	9/22/11	485-487	KP	25	25	0	1030	1035	P	-	WEOS-R975
9/21/11	1530	94/95	430	XM	102	7	E-W	70°F	104	S/S	9/22/11	488-489	KP	25	23	-2	1055	1100	P	-	WEOS-R979

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/21/11	1555	95/96	441	VS	94	6	E-W	70°F	105	S/S	9/22/11	490-493	KP	25	25	0	1130	1135	P	-	WEOS-R978
9/21/11	1603	96/97	440	SAS	80	5	E-W	70°F	-	S/S	9/22/11	494-495	KP	25	24	-1	1145	1150	P	-	WEOS-R989
9/21/11	1615	97/98	438	XM	73	7	E-W	70°F	-	S/S	9/22/11	496	KP	25	23	-2	1155	1200	P	-	WEOS-R990
9/21/11	1640	98/99	445	VS	94	6	E-W	70°F	-	S/S	9/22/11	497	KP	25	24	-1	1200	1205	P	-	WEOS-R991

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/22/11	0815	100/101	144	VS	94	1	S-N	57°F	106	S/S	9/23/11	498	KP	25	25	0	0700	0705	P	-	SEOS-R452
9/22/11	0814	101/102	145	SAS	80	2	S-N	57°F	107	S/S	9/23/11	-	KP	25	24	-1	0705	0710	P	-	EOS-EOS
9/22/11	0820	102/103	143	XM	102	3	S-N	57°F	108	S/S	9/23/11	503	KP	25	24	-1	0710	0715	P	-	SEOS-R462
9/22/11	0846	103/104	316	SAS	80	2	S-N	57°F	111	S/S	9/23/11	506-508	KP	25	23	-2	0720	0725	P	-	SEOS-R519
9/22/11	0845	104/105	318	VS	94	1	S-N	57°F	110	S/S	9/23/11	505	KP	25	25	0	0715	0720	P	-	SEOS-R517
9/22/11	0950	106/65	124	XM	102	3	S-N	57°F	112	S/S	9/23/11	-	KP	25	24	-1	0725	0730	P	-	NEOS-R464
9/22/11	0950	106/103	500	XM	102	3	S-N	57°F	109	S/S	9/23/11	504	KP	25	23	-2	0730	0735	P	-	SEOS-R467
9/22/11	0925	106/107	690	VS	94	1	S-N	57°F	113	S/S	9/23/11	510-511	KP	25	23	-2	0735	0740	P	-	SEOS-R514
9/22/11	0937	107/108	688	SAS	80	2	S-N	57°F	114	S/S	9/23/11	-	KP	25	24	-1	0740	0745	P	-	EOS-EOS
9/22/11	1010	108/109	794	XM	102	3	S-N	57°F	115	S/S	9/23/11	512-513	KP	25	23	-2	0745	0750	P	-	SEOS-R484
9/22/11	1045	109/110	681	VS	94	1	S-N	57°F	116	S/S	9/23/11	514-515	KP	25	24	-1	0755	0800	P	-	SEOS-R489
9/22/11	1100	110/111	678	SAS	80	2	S-N	57°F	117	S/S	9/23/11	516-517	KP	25	24	-1	0805	0810	P	-	SEOS-R500
9/22/11	1130	111/112	213	XM	102	3	N-S	57°F	118	S/S	9/23/11	518	KP	25	23	-2	0900	0905	P	-	SEOS-R507

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Joshua Allen

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/23/11	1100	75/113	334	VS	94	2	N-S	57°F	120&124	S/S	9/23/11	522	KP	25	23	-2	0924	0929	P	-	SEOS-R508
9/23/11	0925	112/113	515	VS	94	2	N-S	57°F	119	S/S	9/23/11	519	KP	25	23	-2	0925	0930	P	-	SEOS-R512
9/23/11	0905	112/114	157	VS	94	2	N-S	57°F	-	S/S	9/23/11	-	KP	25	23	-2	0935	0940	P	-	SEOS-R1061
9/23/11	0911	113/114	22	SAS	80	3	W-E	57°F	-	S/S	9/23/11	520	KP	25	25	0	0935	0940	P	-	EEOS-R445
9/23/11	0912	114/115	6	SAS	80	3	N-S	57°F	125	S/S	9/23/11	-	KP	25	25	0	0957	1002	P	-	EOS-EOS
9/23/11	0918	113/115	861	SAS	80	3	N-S	57°F	-	S/S	9/23/11	523-525	KP	25	25	0	0957	1002	P	-	SEOS-R434
9/23/11	0829	114/116	148	SAS	80	3	N-S	57°F	121	S/S	9/23/11	-	KP	25	23	-2	1036	1041	P	-	EOS-EOS
9/23/11	0856	115/116	22	SAS	80	3	W-E	57°F	-	S/S	9/23/11	-	KP	25	25	0	1033	1038	P	-	EOS-EOS
9/23/11	1030	115/117	696	XM	102	1	N-S	57°F	123	S/S	9/23/11	527	KP	25	25	0	1055	1100	P	-	NEOS-R524
9/23/11	1020	115/118	161	XM	102	1	N-S	57°F	-	S/S	9/23/11	-	KP	25	24	-1	1100	1105	P	-	EOS-EOS
9/23/11	1000	116/118	152	XM	102	1	N-S	57°F	122	S/S	9/23/11	-	KP	25	23	-2	1100	1105	P	-	EOS-EOS
9/23/11	0945	117/118	22	XM	102	1	E-W	57°F	-	S/S	9/23/11	526	KP	25	25	0	1057	1102	P	-	WEOS-R714
9/23/11	1143	59/113	22	XM	102	1	W-E	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1620	1625	P	-	EOS-EOS
9/23/11	1141	59/115	22	SAS	80	3	W-E	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1620	1625	P	-	EOS-EOS
9/23/11	1139	59/117	21	SAS	80	3	W-E	57°F	-	S/S	9/23/11	-	KP	25	25	0	1620	1625	P	-	EOS-EOS
9/23/11	1345	111/74	21	XM	102	5	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1420	1425	P	-	EOS-EOS
9/23/11	1335	110/72	21	XM	102	5	E-W	57°F	-	EXT	9/23/11	-	LR	-	-	-	-	-	-	P	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Joshua Allen

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/23/11	1325	109/71	21	XM	102	5	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1415	1420	P	-	EOS-EOS
9/23/11	1315	108/69	19	XM	102	5	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1410	1415	P	-	EOS-EOS
9/23/11	1145	107/68	20	XM	102	1	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1405	1410	P	-	EEOS-R404
9/23/11	1120	106/67	18	XM	102	1	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1400	1405	P	-	EOS-EOS
9/23/11	1355	112/75	20	XM	102	5	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1425	1430	P	-	EOS-EOS
9/23/11	1435	61/100	15	XM	102	5	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1450	1455	P	-	EOS-EOS
9/23/11	1445	62/101	22	XM	102	5	E-W	57°F	-	S/S	9/23/11	-	KP	25	23	-2	1500	1505	P	-	EOS-EOS
9/23/11	1455	64/102	22	XM	102	5	E-W	57°F	-	S/S	9/23/11	499/500	KP	25	23	-2	1500	1505	P	-	EEOS-R455
9/23/11	1505	65/103	22	XM	102	5	E-W	57°F	-	S/S	9/23/11	501/502	KP	25	24	-1	1510	1515	P	-	EEOS-R458
									-												

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Pool

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/26/11	0927	117/119	556	SAS	80	3	S-N	50°F	-	S/S	9/29/11	548-552	KP	25	25	0	0720	0725	P	-	SEOS-R475
9/26/11	0930	119/121	91	VS	94	4	S-N	50°F	-	S/S	9/29/11	534	KP	25	24	-1	0810	0815	P	-	SEOS-R5342
9/26/11	1030	119/121	302	VS	73	6	S-N	50°F	-	S/S	9/29/11	535	KP	25	24	-1	0815	0820	P	-	R532-R535
9/26/11	1030	119/120	22	SAS	80	3	E-W	50°F	-	S/S	9/29/11	-	KP	25	25	0	0830	0835	P	-	EOS-EOS
9/26/11	1037	117/120	150	SAS	80	3	S-N	50°F	-	S/S	9/29/11	547	KP	25	24	-1	0735	0740	P	-	SEOS-R721
9/26/11	1100	121/122	22	VS	73	6	E-W	50°F	-	S/S	9/29/11	553-554	KP	25	25	0	0823	0828	P	-	EEOS-R537A
9/26/11	1105	119/122	150	VS	73	6	S-N	50°F	-	S/S	9/29/11	536	KP	25	25	0	0820	0825	P	-	SEOS-R540
9/28/11	1407	120/122	340	VS	73	7	N-S	73°F	-	S/S	9/29/11	537-543	KP	25	25	0	0830	0835	P	-	SEOS-R541
9/26/11	1116	118/126	125	SAS	80	3	N-S	50°F	-	S/S	9/29/11	544A-545	KP	25	25	0	0745	0750	P	-	SEOS-R728
9/28/11	1330	122/126	125	VS	73	7	N-S	69°F	-	S/S	9/29/11	-	KP	25	25	0	0905	0910	P	-	EOS-EOS
9/28/11	1326	118/120	190	SAS	80	6	N-S	69°F	-	S/S	9/29/11	546	KP	25	24	-1	0740	0745	P	-	SEOS-R722
9/29/11	0840	59/119	22	XM	102	2	W-E	69°F	-	S/S	9/29/11	-	KP	25	25	0	1050	1055	P	-	EOS-EOS
9/29/11	0837	59/121	22	XM	102	2	W-E	69°F	-	S/S	9/29/11	-	KP	25	25	0	1050	1055	P	-	EOS-EOS
9/29/11	0830	59/125	22	XM	102	2	W-E	69°F	-	S/S	9/29/11	-	KP	25	25	0	1045	1050	P	-	EOS-EOS
9/29/11	0835	123/125	102	XM	102	2	S-N	69°F	149	S/S	9/29/11	-	KP	25	25	0	1045	1050	P	-	EOS-EOS
9/29/11	0837	121/123	246	XM	102	2	S-N	69°F	-	S/S	9/29/11	555	KP	25	23	-2	1000	1005	P	-	SEOS-R545
9/28/11	1515	121/124	148	SAS	80	6	N-S	73°F	-	S/S	9/29/11	550-552	KP	25	25	0	1010	1015	P	-	SEOS-R547
9/28/11	1404	122/124	618	SAS	80	6	N-S	73°F	-	S/S	9/29/11	558-564	KP	25	25	0	1020	1025	P	-	SEOS-R549
9/28/11	1345	120/126	22	VS	73	7	E-W	69°F	-	S/S	9/29/11	637	KP	25	25	0	0747	0752	P	-	WEOS-R726
9/29/11	833	59/123	22	XM	102	2	W-E	69°F	-	S/S	9/29/11	-	KP	25	25	0	1045	1050	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Pool

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
9/28/11	1543	123/124	22	SAS	80	6	E-W	73°F	-	S/S	9/29/11	-	KP	25	25	0	1006	1011	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
9/26/11	0715	1A/1	6	XM	102	2	N-S	60°F	-	S/S	9/26/11	-	KP	25	25	0	0815	820	P	-	EOS-EOS
9/26/11	0730	1A/1	154	XM	102	2	W-E	60°F	-	S/S	9/26/11	-	KP	25	23	-2	0820	825	P	-	EOS-EOS
9/26/11	0735	1A/1B	6	XM	102	2	N-S	60°F	-	S/S	9/26/11	-	KP	25	25	0	0825	830	P	-	EOS-EOS
9/26/11	0740	1B/1	91	XM	102	2	W-E	60°F	-	S/S	9/26/11	-	KP	25	23	-2	0825	830	P	-	EOS-EOS
9/26/11	0750	1B/1C	6	XM	102	2	N-S	60°F	-	S/S	9/26/11	-	KP	25	25	0	0840	845	P	-	EOS-EOS
9/26/11	0800	1C/1	167	XM	102	2	W-E	60°F	-	S/S	9/26/11	-	KP	25	23	-2	0840	845	P	-	EOS-EOS
9/23/11	1500	1C/1D	4	XM	102	5	W-E	60°F	-	S/S	9/27/11	-	KP	25	25	0	0710	715	P	-	EOS-EOS
9/23/11	1510	1D/1	181	XM	102	5	W-E	60°F	-	S/S	9/27/11	-	KP	25	24	-1	0710	715	P	-	EOS-EOS
9/27/11	0830	1E/4	6	XM	51	2	E-W	60°F	-	S/S	9/27/11	-	KP	25	25	0	0715	720	P	-	EOS-EOS
9/27/11	0845	1E/4	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	23	-2	0715	720	P	-	EOS-EOS
9/27/11	0900	1E/5	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	25	0	0720	725	P	-	EOS-EOS
9/27/11	0905	1E/6	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	24	-1	0725	730	P	-	EOS-EOS
9/27/11	0910	1E/7	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	23	-2	0730	735	P	-	EOS-EOS
9/27/11	0915	1E/8	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	23	-2	0735	740	P	-	EOS-EOS
9/27/11	0920	1E/9	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	24	-1	0740	745	P	-	EOS-EOS
9/27/11	0925	1E/10	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	23	-2	0745	750	P	-	EOS-EOS
9/27/11	0930	1E/11	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	25	0	750	755	P	-	EOS-EOS
9/27/11	0935	1F/12	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	24	-1	800	805	P	-	EOS-EOS
9/27/11	0940	1F/13	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	23	-2	810	815	P	-	EOS-EOS
9/27/11	945	1F/14	22	XM	51	2	N-S	60°F	-	S/S	9/27/11	-	KP	25	24	-1	815	820	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/26/11	1000	1F/15	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	0920	0925	P	-	EOS-EOS
9/26/11	1005	1F/16	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	9025	0930	P	-	EOS-EOS
9/26/11	1010	1G/17	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	9030	0935	P	-	EOS-EOS
9/26/11	1015	1G/18	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	0935	0940	P	-	EOS-EOS
9/26/11	1020	1G/1H	6	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	9040	0945	P	-	EOS-EOS
9/26/11	1025	1H/18	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	9045	0950	P	-	EOS-EOS
9/26/11	1030	1H/19	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	9045	0950	P	-	EOS-EOS
9/26/11	1035	1H/1I	6	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	9050	0955	P	-	EOS-EOS
9/26/11	1040	1I/19	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	9055	1000	P	-	EOS-EOS
9/26/11	1045	1I/20	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	1000	1005	P	-	EOS-EOS
9/26/11	1050	1I/21	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	9040	0945	P	-	EOS-EOS
9/26/11	1055	1I/22	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	9045	0950	P	-	EOS-EOS
9/26/11	1100	1I/23	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	9055	1000	P	-	EOS-EOS
9/26/11	1105	1I/24	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1005	1010	P	-	EOS-EOS
9/26/11	1110	1I/1J	6	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	1010	1015	P	-	EOS-EOS
9/26/11	1115	1J/25	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1015	1020	P	-	EOS-EOS
9/26/11	1120	1J/26	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1020	1025	P	-	EOS-EOS
9/26/11	1125	1J/27	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1025	1030	P	-	EOS-EOS
9/26/11	1130	1J/28	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1030	1035	P	-	EOS-EOS
9/26/11	1135	1J/29	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	1040	1045	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
9/26/11	1135	1J/30	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	1045	1050	P	-	EOS-EOS
9/26/11	1140	1J/31	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1055	1100	P	-	EOS-EOS
9/26/11	1145	1J/1K	6	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	1100	1105	P	-	EOS-EOS
9/26/11	1147	1K/31	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	1100	1105	P	-	EOS-EOS
9/26/11	1149	1K/32	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	24	-1	1100	1105	P	-	EOS-EOS
9/26/11	1151	1K/33	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	1105	1110	P	-	EOS-EOS
9/26/11	1155	1K/34	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1110	1115	P	-	EOS-EOS
9/26/11	1157	1K/35	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	23	-2	1120	1125	P	-	EOS-EOS
9/26/11	1200	1K/36	22	XM	102	2	N-S	65°F	-	S/S	9/27/11	-	KP	25	25	0	1125	1130	P	-	EOS-EOS
9/26/11	1205	1K/76	6	XM	102	2	E-W	65°F	-	S/S	9/27/11	-	KP	25	24	-1	1130	1135	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/28/11	0820	98A/99A	99	SAS	80	3	E-W	60°F	126	S/S	9/28/11	-	KP	25	23	-2	1235	1240	P	-	EOS-EOS
9/28/11	0845	97A/98A	105	VS	73	4	E-W	60°F	-	S/S	9/28/11	-	KP	25	24	-1	1240	1245	P	-	EOS-EOS
9/28/11	0840	96A/97A	107	XM	102	2	E-W	60°F	127	S/S	9/28/11	-	KP	25	24	-1	1245	1250	P	-	EOS-EOS
9/28/11	0834	95A/96A	113	SAS	80	3	E-W	60°F	-	S/S	9/28/11	-	KP	25	24	-1	1250	1255	P	-	EOS-EOS
9/28/11	0847	94A/95A	125	SAS	80	3	E-W	60°F	-	S/S	9/28/11	-	KP	25	25	0	1255	1300	P	-	EOS-EOS
9/28/11	0855	93A/94A	132	XM	102	2	E-W	60°F	128	S/S	9/28/11	-	KP	25	25	0	1257	1302	P	-	EOS-EOS
9/28/11	0903	92A/93A	139	SAS	80	3	E-W	60°F	-	S/S	9/28/11	-	KP	25	24	-1	1300	1305	P	-	EOS-EOS
9/28/11	0900	91A/92A	134	VS	73	4	E-W	60°F	129	S/S	9/28/11	-	KP	25	23	-2	1305	1310	P	-	EOS-EOS
9/28/11	0918	90A/91A	153	SAS	80	3	E-W	60°F	130	S/S	9/28/11	-	KP	25	25	0	1310	1315	P	-	EOS-EOS
9/28/11	0920	89A/90A	155	XM	102	2	E-W	60°F	-	S/S	9/28/11	-	KP	25	25	0	1320	1325	P	-	EOS-EOS
9/28/11	0920	88A/89A	158	VS	73	4	E-W	60°F	131	S/S	9/28/11	-	KP	25	23	-2	1330	1335	P	-	EOS-EOS
9/28/11	0939	87A/88A	166	SAS	80	3	E-W	60°F	132	S/S	9/28/11	-	KP	25	25	0	1340	1345	P	-	EOS-EOS
9/28/11	0945	86A/87A	175	XM	102	2	E-W	60°F	-	S/S	9/28/11	-	KP	25	24	-1	1355	1400	P	-	EOS-EOS
9/28/11	0947	85A/86A	177	VS	73	4	E-W	60°F	133	S/S	9/28/11	-	KP	25	25	0	1400	1405	P	-	EOS-EOS
9/28/11	1000	84A/85A	183	SAS	80	3	E-W	60°F	-	S/S	9/28/11	528	KP	25	25	0	1410	1415	P	-	EEOS-R884
9/28/11	1005	83A/84A	189	XM	102	2	E-W	60°F	134	S/S	9/28/11	-	KP	25	23	-2	1415	1420	P	-	EOS-EOS
9/28/11	1007	82A/83A	193	VS	73	4	E-W	60°F	-	S/S	9/28/11	-	KP	25	25	0	1420	1425	P	-	EOS-EOS
9/28/11	1024	81A/82A	197	SAS	80	3	E-W	60°F	135	S/S	9/28/11	529	KP	25	23	-2	1425	1430	P	-	EEOS-R853
9/28/11	1035	80A/81A	207	XM	102	2	E-W	60°F	-	S/S	9/28/11	530	KP	25	25	0	1430	1435	P	-	EEOS-R885
9/28/11	1030	79A/80A	213	VS	73	4	E-W	60°F	136	S/S	9/28/11	-	KP	25	24	-1	1430	1435	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Timothy Pool*

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
9/28/11	1050	78A/79A	215	SAS	80	3	E-W	60°F	-	S/S	9/28/11	-	KP	25	23	-2	1435	1440	P	-	EOS-EOS
9/28/11	1100	77A/78A	217	XM	102	2	E-W	60°F	137	S/S	9/28/11	-	KP	25	24	-1	1440	1445	P	-	EOS-EOS
9/28/11	1100	76A/77A	221	VS	73	4	E-W	60°F	-	S/S	9/28/11	-	KP	25	23	-2	1445	1450	P	-	EOS-EOS
9/28/11	1113	36A/76A	223	SAS	80	3	E-W	60°F	138	S/S	9/28/11	531-532	KP	25	24	-1	1450	1455	P	-	EEOS-R704
9/28/11	1125	35A/36A	225	XM	102	2	E-W	60°F	139	S/S	9/28/11	-	KP	25	23	-2	1500	1505	P	-	EOS-EOS
9/28/11	1450	34A/35A	228	VS	73	7	E-W	73°F	140	S/S	9/28/11	-	KP	25	24	-1	1505	1510	P	-	EOS-EOS
9/28/11	1522	33A/34A	234	VS	73	7	E-W	73°F	141	S/S	9/28/11	-	KP	25	23	-2	1510	1515	P	-	EOS-EOS
9/28/11	1530	32A/33A	235	VS	73	7	E-W	73°F	142	S/S	9/28/11	-	KP	25	24	-1	1615	1620	P	-	EOS-EOS
9/28/11	1615	31A/32A	238	VS	73	7	E-W	73°F	143	S/S	9/28/11	565	KP	25	24	-1	1525	1530	P	-	EEOS-R695
9/28/11	1650	30A/31A	243	VS	73	7	E-W	73°F	144	S/S	9/29/11	-	KP	25	24	-1	1100	1105	P	-	EOS-EOS
9/29/11	1707	29A/30A	244	XM	102	2	E-W	73°F	145	S/S	9/29/11	-	KP	25	25	0	1105	1110	P	-	EOS-EOS
9/29/11	0900	28A/29A	255	SAS	80	1	E-W	73°F	146	S/S	9/29/11	569-575	KP	25	24	-1	1330	1335	P	-	EEOS-R623
9/28/11	1707	27A/28A	260	SAS	80	6	E-W	73°F	147	S/S	9/29/11	566-568	KP	25	23	-2	1110	1115	P	-	EEOS-R690
9/28/11	1638	26A/27A	258	SAS	80	6	E-W	73°F	148	S/S	9/29/11	576-580	KP	25	23	-2	1130	1135	P	-	EEOS-R685

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/1/11	0810	25A/26A	264	XM	73	3	E-W	48°F	150	S/S	10/1/11	566	KP	25	23	-2	1030	1035	P	-	EEOS-R661
10/1/11	0755	24A/25A	264	VS	94	1	E-W	48°F	151	S/S	10/1/11	-	KP	25	23	-2	1045	1050	P	-	EOS-EOS
10/1/11	0805	23A/24A	265	SAS	80	2	E-W	48°F	152	S/S	10/1/11	-	KP	25	23	-2	1055	1100	P	-	EOS-EOS
10/1/11	0825	22A/23A	250	VS	94	1	E-W	48°F	153	S/S	10/1/11	567	KP	25	24	-1	1100	1105	P	-	EEOS-R660
10/1/11	0845	21A/22A	242	XM	73	3	E-W	52°F	154	S/S	10/1/11	568-569	KP	25	24	-1	1125	1130	P	-	EEOS-R658
10/1/11	0853	20A/21A	68	SAS	80	2	E-W	52°F	155	S/S	10/1/11	-	KP	25	23	-2	1140	1145	P	-	EEOS-R532A
10/1/11	0900	20A/21A	118	VS	94	1	E-W	52°F	-	S/S	10/1/11	-	KP	25	25	0	1146	1151	P	-	R532A-WEOS
10/1/11	0907	19A/20A	216	SAS	80	2	E-W	52°F	-	S/S	10/1/11	570	KP	25	25	0	1231	1236	P	-	EEOS-R657
10/1/11	0945	19A/127	209	XM	73	3	E-W	52°F	-	S/S	10/1/11	572-574	KP	25	25	0	1306	1311	P	-	EEOS-R655
10/1/11	0920	127/128	250	VS	94	1	E-W	52°F	-	S/S	10/1/11	575	KP	25	25	0	1300	1305	P	-	EEOS-R706
10/1/11	0925	19A/129	22	XM	73	3	S-N	52°F	-	S/S	10/1/11	-	KP	25	24	-1	1231	1236	P	-	EOS-EOS
10/1/11	1005	19A/131	13	VS	94	1	E-W	52°F	-	S/S	10/1/11	576	KP	25	25	0	1230	1235	P	-	EEOS-R444
10/1/11	0939	127/129	41	XM	73	3	E-W	52°F	-	S/S	10/1/11	571	KP	25	25	0	1248	1253	P	-	EEOS-R654
10/1/11	0935	129/130	22	XM	73	3	E-W	52°F	-	S/S	10/1/11	-	KP	25	25	0	1242	1247	P	-	EOS-EOS
10/1/11	1010	20A/131	22	VS	94	1	S-N	52°F	-	S/S	10/1/11	-	KP	25	25	0	1145	1150	P	-	EOS-EOS
10/1/11	1004	127/130	22	SAS	80	2	S-N	52°F	-	S/S	10/1/11	-	KP	25	24	-1	1254	1259	P	-	EOS-EOS
10/1/11	1001	128/130	22	SAS	80	2	S-N	52°F	-	S/S	10/1/11	-	KP	25	25	0	1300	1305	P	-	EOS-EOS
10/1/11	1400	59/120	79	VS	94	6	E-W	63°F	-	S/S	10/1/11	58	KP	25	24	-1	1430	1435	P	-	EEOS-R603
10/1/11	1020	59/130	22	XM	73	3	N	52°F	-	S/S	10/1/11	577	KP	25	25	0	1305	1310	P	-	WEOS-R601
10/1/11	1040	130/125	44	XM	73	3	S-N	52°F	-	S/S	10/1/11	578	KP	25	24	-1	1310	1315	P	-	SEOS-R649

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Timothy Pool*

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/1/11	1440	17/128	22	VS	94	6	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0710	0715	P	-	EOS-EOS
10/1/11	1140	24A/134	22	XM	73	3	S-N	53°F	-	S/S	10/3/11	-	KP	25	25	0	0725	0730	P	-	EOS-EOS
10/1/11	1150	25A/134	22	XM	73	3	S-N	53°F	-	S/S	10/3/11	-	KP	25	25	0	0725	0730	P	-	EOS-EOS
10/1/11	1155	26A/134	22	XM	73	3	S-N	53°F	-	S/S	10/3/11	-	KP	25	25	0	0730	0735	P	-	EOS-EOS
10/1/11	1300	27A/134	22	XM	73	5	S-N	53°F	-	S/S	10/3/11	-	KP	25	24	-1	0730	0735	P	-	EOS-EOS
10/1/11	1305	28A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	23	-2	0740	0745	P	-	EOS-EOS
10/1/11	1310	29A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	584A	KP	25	25	0	0740	0745	P	-	SEOS-R670
10/1/11	1325	30A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0746	0751	P	-	EOS-EOS
10/1/11	1330	31A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0747	0752	P	-	EOS-EOS
10/1/11	1335	32A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	627	KP	25	25	0	0753	0758	P	-	SEOS-R707
10/1/11	1340	33A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	631	KP	25	25	0	0800	0805	P	-	SEOS-R710
10/1/11	1345	34A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0807	0812	P	-	EOS-EOS
10/1/11	1350	35A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	632	KP	25	25	0	0807	0812	P	-	SEOS-R749
10/1/11	1355	36A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	633	KP	25	25	0	0814	0819	P	-	SEOS-R790
10/1/11	1400	76A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0820	0825	P	-	EOS-EOS
10/1/11	1405	77A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	634	KP	25	25	0	0825	0830	P	-	SEOS-R715
10/1/11	1410	78A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0830	0835	P	-	EOS-EOS
10/1/11	1415	79A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0830	0835	P	-	EOS-EOS
10/1/11	1420	80A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	635	KP	25	25	0	0835	0840	P	-	SEOS-R849
10/1/11	1425	81A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	636	KP	25	25	0	0840	0845	P	-	SEOS-R851

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/1/11	0955	129/131	45	VS	94	1	E-W	53°F	-	S/S	10/1/11	-	KP	25	25	0	1155	1200	P	-	EOS-EOS
10/1/11	1045	125/129	22	XM	73	3	S-N	53°F	-	S/S	10/1/11	579	KP	25	25	0	1315	1320	P	-	SEOS-R645
10/1/11	1056	125/131	22	XM	73	3	S-N	53°F	-	S/S	10/1/11	-	KP	25	25	0	1320	1325	P	-	EOS-EOS
10/1/11	1019	125/132	22	SAS	80	2	E-W	53°F	-	S/S	10/1/11	-	KP	25	24	-1	1325	1330	P	-	EOS-EOS
10/1/11	1044	123/132	22	SAS	80	2	S-N	53°F	-	S/S	10/1/11	-	KP	25	25	0	1325	1330	P	-	EOS-EOS
10/1/11	1048	123/133	22	SAS	80	2	S-N	53°F	-	S/S	10/1/11	-	KP	25	23	-2	1331	1336	P	-	EOS-EOS
10/1/11	1026	131/132	34	SAS	80	2	E-W	53°F	-	S/S	10/1/11	-	KP	25	25	0	1150	1155	P	-	EOS-EOS
10/1/11	1031	21A/131	8	SAS	80	2	E-W	53°F	-	S/S	10/1/11	-	KP	-	-	-	-	-	-	P	EOS-EOS
10/1/11	1015	21A/132	22	VS	94	1	S-N	53°F	-	S/S	10/1/11	-	KP	25	23	-2	1355	1400	P	-	EOS-EOS
10/1/11	1035	22A/132	11	VS	94	1	E-W	53°F	-	S/S	10/1/11	-	KP	25	25	0	1349	1354	P	-	EOS-EOS
10/1/11	1030	132/133	41	VS	94	1	E-W	53°F	-	S/S	10/1/11	-	KP	25	25	0	1330	1335	P	-	EOS-EOS
10/1/11	1022	22A/133	22	VS	94	1	S-N	53°F	-	S/S	10/1/11	565	KP	25	25	0	1105	1110	P	-	NEOS-R642
10/1/11	1046	123/133	22	SAS	80	2	S-N	53°F	-	S/S	10/1/11	-	KP	25	23	-2	1331	1336	P	-	EOS-EOS
10/1/11	1057	133/134	22	SAS	80	2	E-W	53°F	-	S/S	10/1/11	-	KP	25	23	-2	1337	1342	P	-	EOS-EOS
10/1/11	1125	23A/135	23	XM	73	3	S-N	53°F	-	S/S	10/1/11	583	KP	25	25	0	1343	1348	P	-	NEOS-R623
10/1/11	1115	134/135	23	XM	73	3	S-N	53°F	-	S/S	10/1/11	-	KP	25	25	0	1345	1350	P	-	EOS-EOS
10/1/11	1135	133/135	5	XM	73	3	E-W	53°F	-	S/S	10/1/11	-	KP	25	25	0	1343	1348	P	-	EOS-EOS
10/1/11	1000	18/19A	7	XM	73	3	E-W	53°F	-	S/S	10/1/11	-	KP	25	25	0	1319	1324	P	-	EOS-EOS
10/1/11	1445	18/127	22	VS	94	6	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0715	0720	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/1/11	1415	16/128	170	VS	94	6	E-W	63°F	-	S/S	10/1/11	581-582	KP	25	25	0	1435	1440	P	-	EEOS-R606
10/1/11	1430	82A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0845	0850	P	-	EOS-EOS
10/1/11	1435	83A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0845	0850	P	-	EOS-EOS
10/1/11	1440	84A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0850	0855	P	-	EOS-EOS
10/1/11	1443	85A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0850	0855	P	-	EOS-EOS
10/1/11	1445	86A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0855	0900	P	-	EOS-EOS
10/1/11	1448	87A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	637	KP	25	25	0	0855	0900	P	-	SEOS-R861
10/1/11	1451	88A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0900	0905	P	-	EOS-EOS
10/1/11	1454	89A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0905	0910	P	-	EOS-EOS
10/1/11	1500	90A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	24	-1	0905	0910	P	-	EOS-EOS
10/1/11	1505	91A/134	22	XM	73	5	S-N	63°F	-	S/S	10/3/11	-	KP	25	25	0	0910	0915	P	-	EOS-EOS
10/3/11	0820	92A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	24	-1	0910	0915	P	-	EOS-EOS
10/3/11	0825	93A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	24	-1	0915	0920	P	-	EOS-EOS
10/3/11	0830	94A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	24	-1	0915	0920	P	-	EOS-EOS
10/3/11	0833	95A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	24	-1	0920	0925	P	-	EOS-EOS
10/3/11	0836	96A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	25	0	0921	0926	P	-	EOS-EOS
10/3/11	0837	97A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	25	0	0925	0930	P	-	EOS-EOS
10/3/11	0842	98A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	638	KP	25	23	-2	0925	0930	P	-	SEOS-R881
10/3/11	0845	99A/134	22	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	25	0	0930	0935	P	-	EOS-EOS
10/1/11	1056	123/124	104	VS	94	1	N-S	55°F	-	S/S	10/1/11	-	KP	25	23	-2	1355	1400	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.1*

Aquaterra CQA Technician: *Timothy Pool*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/1/11	1345	124/134	261	VS	94	6	N-S	63°F	-	S/S	10/1/11	628-630	KP	25	25	0	1401	1406	P	-	SEOS-R712
10/1/11	1100	124/134	491	VS	94	1	N-S	53°F	-	S/S	10/1/11	-	KP	25	23	-2	1409	1414	P	-	SR743-R744

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/3/11	1605	101/154	18	XM	102	9	W-E	70°F	-	S/S	10/4/11	616	KP	25	25	0	0736	0741	P	-	WEOS-R813
10/3/11	1630	R810/154	20	XM	102	9	W-E	70°F	-	S/S	10/4/11	-	KP	25	24	-1	0735	0740	P	-	EOS-EOS
10/4/11	0800	101/R810	2	SS	56	4	S-N	55°F	-	EXT.	10/7/11	-	JC	-	-	-	-	-	-	P	EOS-EOS
10/3/11	1645	102/R810	20	XM	102	9	W-E	70°F	-	S/S	10/4/11	617	KP	25	25	0	0737	0742	P	-	EOS-EOS
10/4/11	0805	102A/R810	2	SS	56	4	S-N	55°F	-	EXT.	10/7/11	-	JC	-	-	-	-	-	-	P	EOS-EOS
10/4/11	0920	103/R810	20	SS	80	3	S-N	55°F	-	S/S	10/4/11	-	KP	25	25	0	0939	0944	P	-	EOS-EOS
10/4/11	0931	103/R810	20	SS	80	3	N-S	55°F	-	S/S	10/4/11	618	KP	25	23	-2	0939	0944	P	-	NEOS-PATCH
10/3/11	1620	103/154	21	XM	102	9	N-S	70°F	-	S/S	10/4/11	-	KP	25	24	-1	0729	0734	-	P	EOS-EOS
10/3/11	1615	103/155	21	XM	102	9	N-S	70°F	-	S/S	10/4/11	-	KP	25	24	-1	0729	0734	P	-	EOS-EOS
10/3/11	1550	154/155	7	XM	102	9	W-E	70°F	-	S/S	10/4/11	619-621	KP	25	25	0	0730	0735	P	-	WEOS-R817
10/3/11	1530	104/155	21	XM	102	9	W-E	70°F	-	S/S	10/4/11	622	KP	25	25	0	0727	0732	P	-	WEOS-R823
10/4/11	1000	155/156	10	SS	56	4	W-E	55°F	-	EXT.	10/7/11	-	JC	-	-	-	-	-	-	P	EOS-EOS
10/4/11	0830	105/156	44	SS	80	3	S-N	55°F	-	S/S	10/4/11	-	KP	25	25	0	0926	0931	P	-	EOS-EOS
10/4/11	0840	156/157	10	SS	80	3	E-W	55°F	-	S/S	10/4/11	-	KP	25	25	0	0926	0931	P	-	EOS-EOS
10/4/11	0845	105/157	44	SS	80	3	S-N	55°F	-	S/S	10/4/11	626	KP	25	23	-2	0930	0935	P	-	SEOS-R829
10/3/11	1535	105/155	22	XM	102	9	W-E	70°F	-	S/S	10/4/11	623-625	KP	25	25	0	0726	0731	P	-	WEOS-R821

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Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/3/11	0814	105/136	22	SAS	80	4	E-W	50°F	156	S/S	10/3/11	-	KP	25	23	-2	0935	0940	P	-	EOS-EOS
10/3/11	0825	104/136	29	SAS	80	4	S-N	50°F	157	S/S	10/3/11	-	KP	25	25	0	0935	0940	P	-	EOS-EOS
10/3/11	0828	136/138	68	SAS	80	4	S-N	50°F	-	S/S	10/3/11	-	KP	25	24	-1	0941	0946	P	-	EOS-EOS
10/3/11	0840	136/137	22	SAS	80	4	E-W	55°F	-	S/S	10/3/11	-	KP	25	23	-2	0947	0952	P	-	EOS-EOS
10/3/11	0851	137/138	392	SAS	80	4	S-N	55°F	158	S/S	10/3/11	584/585	KP	25	25	0	0947	0952	P	-	SEOS-R1004
10/3/11	0850	104/139	29	VS	94	3	S-N	55°F	-	S/S	10/3/11	-	KP	25	25	0	1105	1110	P	-	EOS-EOS
10/3/11	0850	106/139	58	XM	102	5	S-N	55°F	160	S/S	10/3/11	-	KP	25	24	-1	1127	1132	P	-	EOS-EOS
10/3/11	0815	104/138	22	VS	94	3	E-W	55°F	-	S/S	10/3/11	-	KP	25	23	-2	0940	0945	P	-	WEOS-R997
10/3/11	0915	138/139	478	VS	94	3	S-N	55°F	159	S/S	10/3/11	586-588	KP	25	25	0	1110	1115	P	-	SEOS-R1000
10/3/11	0855	106A/139	168	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	25	0	1133	1138	P	-	SEOS-R1010
10/3/11	0930	106A/140	22	XM	102	5	E-W	55°F	-	S/S	10/3/11	-	KP	25	25	0	1145	1150	P	-	EOS-EOS
10/3/11	0940	139/140	279	XM	102	5	S-N	55°F	-	S/S	10/3/11	-	KP	25	23	-2	1145	1150	P	-	EOS-EOS
10/3/11	0949	140/142	209	SAS	80	4	N-S	55°F	-	S/S	10/3/11	-	KP	25	25	0	1243	1248	P	-	EOS-EOS
10/3/11	1005	142/143	209	VS	94	3	N-S	55°F	-	S/S	10/3/11	592/593	KP	25	25	0	1305	1310	P	-	SEOS-R1012
10/3/11	1015	143/144	278	XM	102	5	N-S	55°F	170	S/S	10/3/11	-	KP	25	23	-2	1327	1333	P	-	EOS-EOS
10/3/11	0840	103/139	22	VS	94	3	E-W	55°F	-	S/S	10/3/11	-	KP	25	25	0	1105	1110	P	-	EOS-EOS
10/3/11	1021	140/141	68	SAS	80	4	N-S	60°F	-	S/S	10/3/11	-	KP	25	23	-2	1236	1241	P	-	EOS-EOS
10/3/11	1026	107A/141	22	SAS	80	4	E-W	60°F	-	S/S	10/3/11	-	KP	25	25	0	1235	1240	P	-	EOS-EOS
10/3/11	1014	141/142	22	SAS	80	4	E-W	60°F	-	S/S	10/3/11	594	KP	25	25	0	1242	1247	P	-	EEOS-R1021
10/3/11	1032	06A/107	168	SAS	80	4	S-N	60°F	161	S/S	10/3/11	-	KP	25	23	-2	1155	1200	P		EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/3/11	1040	107A/108A	170	VS	94	3	N-S	60°F	162	S/S	10/3/11	-	KP	25	25	0	1253	1258	P	-	EOS-EOS
10/3/11	1025	141/143	68	VS	94	3	N-S	60°F	-	S/S	10/3/11	595	KP	25	24	-1	1300	1305	P	-	SEOS-R1023
10/3/11	1030	108A/143	22	VS	94	3	E-W	60°F	-	S/S	10/3/11	-	KP	25	25	0	1259	1304	P	-	EOS-EOS
10/3/11	1110	109A/144	22	VS	94	3	E-W	60°F	-	S/S	10/3/11	-	KP	25	25	0	1343	1348	P	-	EOS-EOS
10/3/11	1045	108A/109A	172	XM	102	5	N-S	60°F	163	S/S	10/3/11	596	KP	25	24	-1	1321	1326	P	-	SEOS-R1033
10/3/11	1115	110A/145	22	VS	94	3	E-W	60°F	-	S/S	10/3/11	597	KP	25	25	0	1344	1349	P	-	EEOS-R1034
10/3/11	1120	145/146	22	VS	94	3	E-W	60°F	-	S/S	10/3/11	598	KP	25	25	0	1352	1357	P	-	EEOS-R1040
10/3/11	1125	146/147	22	VS	94	3	E-W	60°F	-	S/S	10/3/11	-	KP	25	24	-1	1358	1403	P	-	EOS-EOS
10/3/11	1115	148/149	265	XM	102	5	N-S	60°F	173	S/S	10/3/11	-	KP	25	23	-2	1453	1458	P	-	EOS-EOS
10/3/11	1300	109A/110A	175	VS	94	8	N-S	73°F	164	S/S	10/3/11	-	KP	25	24	-1	1337	1342	P	-	EOS-EOS
10/3/11	1109	110A/111A	174	SAS	80	4	S-N	60°F	165	S/S	10/3/11	600	KP	25	24	-1	1410	1415	P	-	SEOS-R1068
10/3/11	1250	111A/112A	179	XM	102	9	N-S	73°F	166	S/S	10/3/11	601-604	KP	25	25	0	1440	1445	P	-	SEOS-R1050
10/3/11	1320	112A/149	19	VS	94	8	E-W	73°F	-	S/S	10/3/11	-	KP	25	25	0	1453	1458	P	-	EOS-EOS
10/3/11	1325	114A/150	22	VS	94	8	E-W	73°F	-	S/S	10/3/11	-	KP	25	24	-1	1511	1516	P	-	EOS-EOS
10/3/11	1130	144/147	66	VS	94	3	N-S	73°F	-	S/S	10/3/11	-	KP	25	23	-2	1359	1404	P	-	EOS-EOS
10/3/11	1135	144/146	121	VS	94	3	N-S	73°F	-	S/S	10/3/11	-	KP	25	23	-2	1351	1356	P	-	EOS-EOS
10/3/11	1310	147/148	66	XM	102	5	S-N	73°F	-	S/S	10/3/11	-	KP	25	24	-1	1429	1434	P	-	EOS-EOS
10/3/11	1147	146/148	121	SAS	80	4	S-N	73°F	-	S/S	10/3/11	-	KP	25	23	-2	1423	1428	P	-	EOS-EOS
10/3/11	1150	144/145	95	VS	94	3	S-N	73°F	171	S/S	10/3/11	605	KP	25	23	-2	1345	1350	P	-	SEOS-R1042
10/3/11	1132	111A/148	22	SAS	80	4	E-W	73°F	-	S/S	10/3/11	-	KP	25	25	0	1417	1422	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/3/11	1139	145/148	95	SAS	80	4	S-N	73°F	172	S/S	10/3/11	-	KP	25	23	-2	1417	1422	P	-	EOS-EOS
10/3/11	1400	112A/114A	183	XM	102	9	N-S	73°F	167	S/S	10/3/11	-	KP	25	24	-1	1505	1510	P	-	EOS-EOS
10/3/11	1325	149/150	267	XM	102	9	N-S	73°F	174	S/S	10/3/11	606-610	KP	25	25	0	1512	1517	P	-	SEOS-R1070
10/3/11	1332	150/152	268	VS	94	8	N-S	73°F	-	S/S	10/3/11	611-613	KP	25	23	-2	1558	1603	P	-	SEOS-R1079
10/3/11	1420	152/153	392	XM	102	9	N-S	73°F	-	S/S	10/3/11	614-615	KP	25	23	-2	1628	1633	P	-	SEOS-R1078
10/3/11	1400	114A/152	180	VS	94	8	N-S	73°F	-	S/S	10/3/11	-	KP	25	24	-1	1545	1550	P	-	EOS-EOS
10/3/11	1415	151/152	22	VS	94	8	E-W	73°F	-	S/S	10/3/11	-	KP	25	24	-1	1551	1556	P	-	EOS-EOS
10/3/11	1420	114A/151	59	VS	94	8	N-S	73°F	168	S/S	10/3/11	-	KP	25	24	-1	1545	1550	P	-	EOS-EOS
10/3/11	1430	116/151	22	VS	94	8	E-W	73°F	-	S/S	10/3/11	-	KP	25	25	0	1545	1550	P	-	EOS-EOS
10/3/11	1440	151/153	59	VS	94	8	N-S	73°F	169	S/S	10/3/11	-	KP	25	23	-2	1620	1625	P	-	EOS-EOS
10/3/11	1450	118/153	22	VS	94	8	E-W	73°F	-	S/S	10/3/11	599	KP	25	25	0	1620	1625	P	-	EEOS-R1067

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/10/11	0815	126/158	22	VS	94	2	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1235	1240	P	-	EOS-EOS
10/10/11	0845	153/158	216	XM	102	1	S-N	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1000	1005	P	-	EOS-EOS
10/10/11	0906	153/159	231	XM	102	1	S-N	60°F	175	S/S	10/10/11	1,2	KP	25	23	-2	1005	1010	P	-	SEOS-R1092
10/10/11	0833	158/159	22	XM	102	1	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1005	1010	P	-	EOS-EOS
10/10/11	0820	158/160	214	VS	94	2	S-N	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1020	1025	P	-	EOS-EOS
10/10/11	0840	159/160	25	SAS	80	3	S-N	60°F	-	S/S	10/10/11	-	KP	25	25	0	1025	1030	P	-	EOS-EOS
10/10/11	0848	160/161	22	VS	94	2	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1025	1030	P	-	EOS-EOS
10/10/11	0853	159/161	205	VS	94	2	S-N	60°F	176	S/S	10/10/11	-	KP	25	23	-2	1026	1031	P	-	EOS-EOS
10/10/11	0836	160/162	239	SAS	80	3	S-N	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1035	1040	P	-	EOS-EOS
10/10/11	0907	161/162	49	SAS	80	3	S-N	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1040	1045	P	-	EOS-EOS
10/10/11	0919	162/163	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1040	1045	P	-	EOS-EOS
10/10/11	0930	161/163	200	SAS	80	3	S-N	60°F	177	S/S	10/10/11	-	KP	25	23	-2	1041	1046	P	-	EOS-EOS
10/10/11	0817	122/160	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1235	1240	P	-	EOS-EOS
10/10/11	0830	124/162	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1241	1246	P	-	EOS-EOS
10/10/11	1030	134/164	22	VS	94	2	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1246	1251	P	-	EOS-EOS
10/10/11	1053	99A/167	22	XM	102	1	E-W	60°F	-	S/S	10/10/11	4	KP	25	25	0	1252	1257	P	-	EEOS-R1128
10/10/11	1050	99A/169	22	VS	94	2	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1258	1303	P	-	EOS-EOS
10/10/11	0915	163/166	116	VS	94	2	N-S	60°F	178	S/S	10/10/11	-	KP	25	23	-2	1116	1121	P	-	EOS-EOS
10/10/11	0935	165/166	22	VS	94	2	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1115	1120	P	-	EOS-EOS
10/10/11	0940	163/165	85	VS	94	2	E-W	60°F	-	S/S	10/10/11	3	KP	25	24	-1	1110	1115	P	-	SEOS-R1108

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/10/11	0938	166/168	116	XM	102	1	N-S	60°F	179	S/S	10/10/11	-	KP	25	25	0	1351	1356	P	-	EOS-EOS
10/10/11	0945	165/168	91	XM	102	1	N-S	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1346	1351	P	-	EOS-EOS
10/10/11	0950	162/165	292	VS	94	2	N-S	60°F	-	S/S	10/10/11	5	KP	25	24	-1	1105	1110	P	-	NEOS-R1100
10/10/11	1015	162/164	78	VS	94	2	N-S	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1050	1055	P	-	EOS-EOS
10/10/11	1037	164/167	90	XM	102	1	N-S	60°F	-	S/S	10/10/11	6	KP	25	25	0	1340	1345	P	-	SEOS-R1125
10/10/11	1051	167/169	97	SAS	80	3	N-S	60°F	-	S/S	10/10/11	-	KP	25	25	0	1055	1100	P	-	EOS-EOS
10/10/11	1010	164/165	22	VS	94	2	W-E	60°F	-	S/S	10/10/11	-	KP	25	25	0	1055	1100	P	-	EOS-EOS
10/10/11	1019	167/170	200	SAS	80	3	S-N	60°F	-	S/S	10/10/11	7	KP	25	25	0	1325	1330	P	-	SEOS-R1107
10/10/11	1015	167/168	22	XM	102	1	E-W	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1345	1350	P	-	EOS-EOS
10/10/11	1016	165/167	201	XM	102	1	N-S	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1346	1351	P	-	EOS-EOS
10/10/11	1008	168/170	98	SAS	80	3	N-S	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1325	1330	P	-	EOS-EOS
10/10/11	0951	168/171	113	SAS	80	3	N-S	60°F	180	S/S	10/10/11	-	KP	25	23	-2	1330	1335	P	-	EOS-EOS
10/10/11	1006	170/171	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1330	1335	P	-	EOS-EOS
10/10/11	1255	174/175	22	VS	94	4	E-W	80°F	-	S/S	10/10/11	8	KP	25	25	0	1530	1535	P	-	EEOS-R1143
10/10/11	1250	171/174	52	VS	94	4	S-N	80°F	-	S/S	10/10/11	9	KP	25	25	0	1525	1530	P	-	SEOS-R1113
10/10/11	1145	170/174	51	VS	94	2	S-N	60°F	-	S/S	10/10/11	10,11	KP	25	25	0	1520	1525	P	-	SEOS-R1115
10/10/11	1140	173/174	22	VS	94	2	W-E	60°F	-	S/S	10/10/11	-	KP	25	25	0	1445	1450	P	-	EOS-EOS
10/10/11	1105	170/173	247	VS	94	2	S-N	60°F	-	S/S	10/10/11	12,14	KP	25	25	0	1510	1515	P	-	SEOS-R1136
10/10/11	1103	169/173	54	VS	94	2	S-N	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1415	1420	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.1

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/10/11	1100	169/172	26	VS	94	2	S-N	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1400	1405	P	-	EOS-EOS
10/10/11	1040	172/173	22	VS	94	2	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1410	1415	P	-	EOS-EOS
10/10/11	1150	173/178	16	XM	102	1	S-N	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1435	1440	P	-	EOS-EOS
10/10/11	1251	174/178	102	XM	102	5	S-N	60°F	-	S/S	10/10/11	15	KP	25	23	-2	1445	1450	P	-	SEOS-R1145
10/10/11	1300	175/178	58	XM	102	5	S-N	80°F	182	S/S	10/10/11	16,17	KP	25	25	0	1451	1456	P	-	SEOS-R1141
10/10/11	1304	178/181	164	SAS	80	6	S-N	80°F	183	S/S	10/10/11	18	KP	25	24	-1	1620	1625	P	-	NEOS-R1146
10/10/11	1145	177/181	22	XM	102	1	E-W	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1435	1440	P	-	EOS-EOS
10/10/11	1301	177/178	24	SAS	80	6	S-N	80°F	-	S/S	10/10/11	-	KP	25	25	0	1614	1619	P	-	EOS-EOS
10/10/11	1257	180/181	22	SAS	80	6	E-W	80°F	-	S/S	10/10/11	-	KP	25	25	0	1614	1619	P	-	WEOS-CAP
10/10/11	1308	181/183	190	XM	102	5	N-S	80°F	184	S/S	10/10/11	-	KP	25	24	-1	1635	1640	P	-	EOS-EOS
10/10/11	1327	180/183	96	XM	102	5	N-S	80°F	-	S/S	10/10/11	-	KP	25	23	-2	1629	1634	P	-	EOS-EOS
10/10/11	1330	124/164	10	SS	17	7	N-S	80°F	-	EXT.	10/10/11	-	KP	-	-	-	-	-	-	P	EOS-EOS
10/10/11	1341	182/183	22	XM	102	5	E-W	80°F	-	S/S	10/10/11	-	KP	25	25	0	1628	1633	P	-	EOS-EOS
10/10/11	1348	180/182	100	XM	102	5	S-N	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1628	1633	P	-	EOS-EOS
10/10/11	1127	179/180	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1601	1606	P	-	EOS-EOS
10/10/11	1400	179/182	81	XM	102	5	N-S	60°F	-	S/S	10/10/11	-	KP	25	24	-1	1624	1629	P	-	EOS-EOS
10/10/11	1108	99A/172	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1304	1309	P	-	EOS-EOS
10/10/11	1111	99A/176	22	SAS	80	3	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1310	1315	P	-	EOS-EOS
10/10/11	1430	99A/179	22	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1541	1546	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/10/11	1350	182/184	172	VS	94	4	N-S	80°F	-	S/S	10/10/11	-	KP	25	23	-2	1642	1647	P	-	EOS-EOS
10/10/11	1337	183/184	133	VS	94	4	N-S	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1643	1648	P	-	EOS-EOS
10/10/11	1310	183/185	167	VS	94	4	N-S	80°F	185	S/S	10/10/11	-	KP	25	24	-1	1644	1649	P	-	EOS-EOS
10/10/11	1330	184/185	22	VS	94	4	E-W	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1643	1648	P	-	EOS-EOS
10/10/11	1427	185/187	160	SAS	80	6	S-N	80°F	186	S/S	10/10/11	19	KP	25	24	-1	1655	1700	P	-	SEOS-R1183
10/10/11	1404	184/187	157	SAS	80	6	S-N	80°F	-	S/S	10/10/11	20	KP	25	23	-2	1655	1700	P	-	NEOS-R1167
10/10/11	1342	184/186	144	SAS	80	6	S-N	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1650	1655	P	-	EOS-EOS
10/10/11	1425	99/182	22	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1547	1553	P	-	EOS-EOS
10/10/11	1415	99/186	22	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1552	1557	P	-	EOS-EOS
10/10/11	1420	99/184	22	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1547	1552	P	-	EOS-EOS
10/10/11	1411	186/188	140	XM	102	5	S-N	80°F	-	S/S	10/10/11	21	KP	25	24	-1	1705	1710	P	-	SEOS-R1187
10/10/11	1400	186/187	22	SAS	80	6	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1651	1656	P	-	EOS-EOS
10/10/11	1430	187/188	177	XM	102	5	S-N	80°F	-	S/S	10/10/11	-	KP	25	23	-2	1706	1711	P	-	EOS-EOS
10/10/11	1438	188/189	22	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1712	1717	P	-	EOS-EOS
10/10/11	1451	187/189	139	XM	102	5	S-N	80°F	187	S/S	10/10/11	-	KP	25	23	-2	1718	1723	P	-	EOS-EOS
10/10/11	1440	189/190	140	VS	94	4	N-S	80°F	188	S/S	10/11/11	-	KP	25	23	-2	0825	0830	P	-	EOS-EOS
10/10/11	1450	188/190	313	VS	94	4	N-S	80°F	-	S/S	10/11/11	22,23	KP	25	25	0	0815	0820	P	-	SEOS-R1180
10/10/11	1548	99/188	23	VS	94	4	W-E	80°F	-	S/S	10/11/11	-	KP	25	25	0	0935	0940	P	-	EOS-EOS
10/10/11	1545	99/190	23	VS	94	4	W-E	80°F	-	S/S	10/11/11	-	KP	25	25	0	0937	942	P	-	EOS-EOS
10/10/11	1602	99/191	23	SAS	80	6	W-E	80°F	-	S/S	10/11/11	-	KP	25	24	-1	0939	0944	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
10/10/11	1520	190/191	258	SAS	80	6	N-S	80°F	-	S/S	10/11/11	25	KP	25	24	-1	0835	0840	P	-	NEOS-R1182
10/10/11	1517	191/192	22	SAS	80	6	W-E	80°F	-	S/S	10/11/11	-	KP	25	25	0	0836	0841	P	-	EOS-EOS
10/10/11	1449	190/192	189	SAS	80	6	N-S	80°F	189	S/S	10/11/11	-	KP	25	23	-2	0836	0841	P	-	EOS-EOS
10/10/11	0820	99/193	23	VS	94	2	W-E	60°F	-	S/S	10/11/11	-	KP	25	25	0	0940	0945	P	-	EOS-EOS
10/10/11	0818	99/194	23'	VS	94	2	W-E	60°F	-	S/S	10/11/11	-	KP	25	25	0	0942	0947	P	-	EOS-EOS
10/10/11	0815	99/196	23	VS	94	2	W-E	60°F	-	S/S	10/11/11	-	KP	25	24	-1	0944	0949	P	-	EOS-EOS
10/10/11	1532	191/193	260	XM	102	5	N-S	80°F	-	S/S	10/11/11	-	KP	25	23	-2	0845	0850	P	-	EOS-EOS
10/10/11	1510	192/193	187	XM	102	5	N-S	80°F	190	S/S	10/11/11	26	KP	25	23	-2	0850	0855	P	-	SEOS-R1181
10/10/11	1555	193/194	221	VS	94	4	N-S	80°F	-	S/S	10/11/11	-	KP	25	23	-2	0855	0900	P	-	EOS-EOS
10/10/11	1620	194/195	22	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	0900	0905	P	-	EOS-EOS
10/10/11	1555	193/195	222	VS	94	4	N-S	80°F	191	S/S	10/10/11	27	KP	25	25	0	0900	0905	P	-	SEOS-R1199
10/10/11	1300	171/175	57	VS	94	4	S-N	80°F	181	S/S	10/10/11	-	KP	25	23	-2	1530	1535	P	-	EOS-EOS
10/10/11	1100	172/176	25	XM	102	1	S-N	60°F	-	S/S	10/10/11	-	KP	25	25	0	1420	1425	P	-	EOS-EOS
10/10/11	1104	173/176	82	XM	102	1	S-N	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1420	1425	P	-	EOS-EOS
10/10/11	1107	176/177	22	XM	102	1	E-W	60°F	-	S/S	10/10/11	-	KP	25	25	0	1425	1430	P	-	EOS-EOS
10/10/11	1122	173/177	205	XM	102	1	S-N	60°F	-	S/S	10/10/11	-	KP	25	23	-2	1425	1430	P	-	EOS-EOS
10/10/11	0810	99/197	23	VS	94	2	W-E	60°F	-	S/S	10/11/11	-	KP	25	23	-2	0946	0951	P	-	EOS-EOS
10/10/11	1613	195/196	222	XM	102	5	S-N	80°F	192	S/S	10/11/11	-	KP	25	23	-2	0909	0914	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
10/10/11	1637	196/198	234	SAS	80	6	S-N	80°F	193	S/S	10/11/11	-	KP	25	23	-2	0913	0918	P	-	EOS-EOS
10/10/11	1710	198/199	234	VS	94	4	S-N	80°F	194	S/S	10/11/11	28,29	KP	25	24	-1	0920	0925	P	-	SEOS-R1226
10/10/11	1608	196/197	198	SAS	80	6	S-N	80°F	-	S/S	10/11/11	-	KP	25	24	-1	0911	0916	P	-	EOS-EOS
10/10/11	1634	197/198	22	SAS	80	6	W-E	80°F	-	S/S	10/11/11	-	KP	25	25	0	0913	0918	P	-	EOS-EOS
10/10/11	1650	197/199	198	VS	94	4	S-N	80°F	-	S/S	10/11/11	-	KP	25	25	0	0915	0920	P	-	EOS-EOS
10/10/11	0805	99/199	23	VS	94	2	W-E	60°F	-	S/S	10/11/11	24	KP	25	25	0	0950	0955	P	-	WEOS-R1201
10/10/11	0935	199/201	244	XM	102	1	S-N	60°F	195	S/S	10/11/11	-	KP	25	24	-1	0956	1001	P	-	EOS-EOS
10/10/11	0750	200/201	22	XM	102	1	W-E	60°F	-	S/S	10/11/11	-	KP	25	23	-2	0955	1000	P	-	EOS-EOS
10/10/11	0915	199/200	175	XM	102	1	S-N	60°F	-	S/S	10/11/11	-	KP	25	24	-1	0930	935	P	-	EOS-EOS
10/10/11	0825	200/202	175	VS	94	2	S-N	60°F	-	S/S	10/11/11	-	KP	25	23	-2	1000	1005	P	-	EOS-EOS
10/10/11	0840	201/202	244	VS	94	2	S-N	60°F	196	S/S	10/11/11	-	KP	25	23	-2	1020	1025	P	-	EOS-EOS
10/10/11	1325	99/200	23	VS	94	4	W-E	80°F	-	S/S	10/11/11	-	KP	25	25	0	1400	1405	P	-	EOS-EOS
10/10/11	0905	202/204	232	VS	94	2	N-S	60°F	197	S/S	10/11/11	32	KP	25	24	-1	1036	1041	P	-	SEOS-R1229
10/10/11	0930	203/204	22	VS	94	2	E-W	60°F	-	S/S	10/11/11	-	KP	25	23	-2	1035	1040	P	-	EOS-EOS
10/10/11	0935	202/203	185	VS	94	2	N-S	60°F	-	S/S	10/11/11	-	KP	25	23	-2	1030	1035	P	-	EOS-EOS
10/10/11	1000	204/025	232	VS	94	2	S-N	60°F	198	S/S	10/11/11	33	KP	25	23	-2	1105	1110	P	-	SEOS-R1236
10/10/11	1025	203/205	185	VS	94	2	S-N	60°F	-	S/S	10/11/11	34-36	KP	25	25	0	1050	1055	P	-	SEOS-1205
10/10/11	1040	205/206	217	XM	102	1	N-S	60°F	-	S/S	10/11/11	37	KP	25	25	0	1235	1240	P	-	SEOS-R1206
10/10/11	1050	206/207	22	XM	102	1	W-E	60°F	-	S/S	10/11/11	-	KP	25	25	0	1240	1245	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/11/11	1020	205/207	196	XM	102	1	N-S	60°F	199	S/S	10/11/11	38-42	KP	25	25	0	1240	1245	P	-	SEOS-R1241
10/11/11	1105	206/208	217	VS	94	2	N-S	60°F	-	S/S	10/11/11	43	KP	25	23	-2	1315	1320	P	-	SEOS-R1249
10/11/11	1050	207/208	147	VS	94	2	N-S	60°F	200	S/S	10/11/11	44-46	KP	25	24	-1	1320	1325	P	-	SEOS-R1244
10/11/11	1140	208/210	125	XM	102	1	S-N	60°F	-	S/S	10/11/11	47	KP	25	25	0	1335	1340	P	-	SEOS-R1216
10/11/11	1130	208/209	45	XM	102	1	S-N	60°F	-	S/S	10/11/11	-	KP	25	24	-1	1333	1338	P	-	EOS-EOS
10/11/11	1130	209/210	22	VS	94	2	W-E	60°F	-	S/S	10/11/11	-	KP	25	25	0	1335	1340	P	-	EOS-EOS
10/11/11	1135	210/211	8	VS	94	2	N-S	60°F	-	S/S	10/11/11	-	KP	25	25	0	1345	1350	P	-	EOS-EOS
10/11/11	1137	209/211	43	VS	94	2	N-S	60°F	-	S/S	10/11/11	48,49	KP	25	24	-1	1342	1347	P	-	SEOS-R1212
10/11/11	1300	99/209	23	VS	94	4	W-E	80°F	-	S/S	10/11/11	30	KP	25	25	0	1420	1425	P	-	WEOS-R1210
10/11/11	1310	99/211	23	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1415	1420	P	-	EOS-EOS
10/11/11	1315	99/208	23	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1415	1420	P	-	EOS-EOS
10/11/11	1318	99/206	23	VS	94	4	W-E	80°F	-	S/S	10/10/11	31	KP	25	24	-1	1410	1415	P	-	WEOS-R1207
10/11/11	1321	99/205	23	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1405	1410	P	-	EOS-EOS
10/11/11	1322	99/203	23	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	24	-1	1405	1410	P	-	EOS-EOS
10/11/11	1323	99/202	23	VS	94	4	W-E	80°F	-	S/S	10/10/11	-	KP	25	25	0	1400	1405	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
10/14/11	0841	137/212	22	SAS	80	2	W-E	50°F	201	S/S	10/14/11	-	KP	25	25	0	1040	1045	P	-	EOS-EOS
10/14/11	0845	212/214	337	VS	94	1	N-S	50°F	202	S/S	10/14/11	-	KP	25	23	-2	1041	1046	P	-	EOS-EOS
10/17/11	1300	138/212	12	SS	51	6	S-N	60°F	-	EXT.	10/17/11	-	-	-	-	-	-	-	-	-	EOS-EOS
10/14/11	1127	138/214	22	SAS	80	2	W-E	50°F	-	S/S	10/14/11	-	KP	25	25	0	0800	0805	P	-	EOS-EOS
10/14/11	0855	214/215	22	SAS	80	2	E-W	50°F	-	S/S	10/14/11	50	KP	25	25	0	1050	1055	P	-	EEOS-R1263
10/14/11	0950	214/216	337	VS	94	1	N-S	50°F	203	S/S	10/14/11	-	KP	25	23	-2	1050	1055	P	-	EOS-EOS
10/14/11	0930	215/216	150	VS	94	1	N-S	50°F	-	S/S	10/14/11	51	KP	25	24	-1	1051	1056	P	-	SEOS-R1277
10/14/11	0904	213/215	138	SAS	80	2	N-S	50°F	-	S/S	10/17/11	-	KP	25	23	-2	1046	1051	P	-	EOS-EOS
10/14/11	1123	139/216	22	SAS	80	2	W-E	50°F	-	S/S	10/14/11	-	KP	25	25	0	0801	0806	P	-	EOS-EOS
10/14/11	0934	212/213	22	SAS	80	2	E-W	50°F	-	S/S	10/14/11	52/53	KP	25	24	-1	1044	1049	P	-	WEOS-R1267
10/14/11	0957	216/217	371	SAS	80	2	E-W	50°F	204	S/S	10/17/11	54	KP	25	24	-1	1055	1100	P	-	SEOS-R1283
10/14/11	0940	216/218	117	SAS	80	2	N-S	50°F	-	S/S	10/17/11	-	KP	25	24	-1	1028	1033	P	-	EOS-EOS
10/14/11	1125	140/217	22	SAS	80	2	W-E	50°F	-	S/S	10/17/11	55	KP	25	25	0	0801	0806	P	-	WEOS-R1278
10/14/11	0950	142/219	22	SAS	80	2	E-W	50°F	-	S/S	10/17/11	56	KP	25	25	0	0803	0808	P	-	WEOS-R1291
10/14/11	0950	217/218	22	SAS	80	2	E-W	50°F	-	S/S	10/17/11	-	KP	25	25	0	0728	0733	P	-	EOS-EOS
10/14/11	0950	218/219	117	XM	102	4	N-S	50°F	-	S/S	10/17/11	-	KP	25	23	-2	0729	0734	P	-	EOS-EOS
10/14/11	1005	217/219	371	XM	102	4	N-S	50°F	205	S/S	10/17/11	57-65	KP	25	25	0	0720	0725	P	-	SEOS-R1294
10/14/11	1130	143/220	22	SAS	80	2	W-E	50°F	-	S/S	10/17/11	-	KP	25	24	-1	0804	0809	P	-	EOS-EOS
10/14/11	1108	219/220	249	VS	94	1	E-W	50°F	206	S/S	10/17/11	67	KP	25	25	0	0737	0742	P	-	SEOS-R1259

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Timothy Wayne Pool*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
10/14/11	1057	220/221	22	VS	94	1	E-W	50°F	-	S/S	10/17/11	-	KP	25	25	0	0740	0745	P	-	EOS-EOS
10/14/11	1030	219/221	239	VS	94	1	S-N	50°F	-	S/S	10/17/11	-	KP	25	23	-2	0740	0745	P	-	EOS-EOS
10/14/11	1141	144/222	22	SAS	80	2	E-W	50°F	-	S/S	10/17/11	-	KP	25	25	0	0805	0810	P	-	EOS-EOS
10/14/11	1120	220/222	249	XM	102	4	S-N	50°F	207	S/S	10/17/11	68-72	KP	25	25	0	0743	0748	P	-	SEOS-R1260
10/14/11	1100	221/222	238	XM	102	4	S-N	50°F	-	S/S	10/17/11	66	KP	25	24	-1	0748	0753	P	-	SEOS-R1304
10/14/11	0924	212/215	12	SAS	80	2	N-S	50°F	-	S/S	10/14/11	-	KP	25	25	0	1043	1048	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/17/11	1440	147/226	22	VS	94	5	W-E	48°F	-	S/S	10/20/11	-	KS	25	25	0	0752	0757	P	-	EOS-EOS
10/17/11	0820	222/223	129	XM	102	2	S-N	48°F	208	S/S	10/17/11	-	KP	25	24	-1	1000	1005	P	-	EOS-EOS
10/17/11	0810	223/224	22	XM	102	2	W-E	48°F	-	S/S	10/17/11	-	KP	25	23	-2	1002	1007	P	-	EOS-EOS
10/17/11	0835	222/224	360	XM	102	2	S-N	48°F	-	S/S	10/17/11	-	KP	25	23	-2	1002	1007	P	-	EOS-EOS
10/17/11	1435	148/225	22	VS	94	5	W-E	48°F	-	S/S	10/20/11	-	KS	25	25	0	0752	0757	P	-	EOS-EOS
10/17/11	0820	223/225	129	VS	94	1	S-N	48°F	209	S/S	10/17/11	-	KP	25	23	-2	1004	1009	P	-	EOS-EOS
10/17/11	0835	224/225	360	VS	94	1	N-S	48°F	-	S/S	10/17/11	73-75	KP	25	25	0	1007	1012	P	-	NEOS-R1338
10/17/11	1430	149/226	22	VS	94	5	W-E	48°F	-	S/S	10/20/11	-	KS	25	25	0	0750	0755	P	-	EOS-EOS
10/17/11	0825	225/226	496	SAS	80	3	S-N	48°F	210	S/S	10/17/11	76	KP	25	23	-2	1008	1013	P	-	SEOS-R1341
10/17/11	1428	150/227	22	VS	94	5	W-E	48°F	-	S/S	10/20/11	-	KS	25	23	-2	0750	0755	P	-	EOS-EOS
10/17/11	0912	226/227	361	XM	102	2	N-S	50°F	211	S/S	10/17/11	78-79	KP	25	24	-1	1012	1017	P	-	SEOS-R1342
10/17/11	0940	227/228	22	VS	94	1	W-E	50°F	-	S/S	10/17/11	-	KP	25	25	0	1012	1017	P	-	EOS-EOS
10/17/11	0915	226/228	130	XM	102	2	N-S	50°F	-	S/S	10/17/11	77	KP	25	24	-1	1012	1017	P	-	NEOS-R1344
10/17/11	1425	152/229	22	VS	94	5	W-E	50°F	-	S/S	10/20/11	-	KS	25	24	-1	0747	0752	P	-	EOS-EOS
10/17/11	0936	227/229	361	VS	94	2	N-S	50°F	212	S/S	10/17/11	80	KP	25	23	-2	1015	1020	P	-	SEOS-R1345
10/17/11	0920	228/229	130	VS	94	2	N-S	50°F	-	S/S	10/17/11	-	KP	25	24	-1	1017	1022	P	-	EOS-EOS
10/17/11	1410	153/230	22	VS	94	5	W-E	50°F	-	S/S	10/17/11	-	KP	25	24	-1	1425	1430	P	-	EOS-EOS
10/17/11	0948	229/230	226	SAS	80	3	N-S	50°F	213	S/S	10/17/11	81	KP	25	24	-1	1025	1030	P	-	SEOS-R1348
10/17/11	0945	230/231	22	SAS	80	3	E-W	50°F	-	S/S	10/17/11	-	KP	25	24	-1	1158	1203	P	-	EOS-EOS
10/17/11	0938	229/231	245	SAS	80	3	N-S	50°F	-	S/S	10/17/11	82-83	KS	25	23	-2	1152	1157	P	-	SEOS-R1351

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/17/11	1340	159/232	22	VS	94	5	E-W	50°F	-	S/S	10/17/11	-	KP	25	24	-1	1418	1423	P	-	EOS-EOS
10/17/11	1020	230/232	226	XM	102	2	S-N	50°F	214	S/S	10/17/11	84	KS	25	24	-1	1201	1206	P	-	SEOS-R1354
10/17/11	1050	231/232	245	XM	102	2	S-N	50°F	-	S/S	10/17/11	85/86	KS	25	25	0	1203	1208	P	-	SEOS-R1355
10/17/11	1332	161/232	41	VS	94	5	N-S	60°F	-	S/S	10/17/11	-	KP	25	23	-2	1419	1424	P	-	EOS-EOS
10/17/11	1400	153/232A	18	VS	94	5	S-N	60°F	-	S/S	10/17/11	-	KP	25	25	0	1420	1425	P	-	EOS-EOS
10/17/11	1326	161/233	22	VS	94	5	W-E	60°F	-	S/S	10/17/11	-	KP	25	25	0	1418	1423	P	-	EOS-EOS
10/17/11	1025	232/233	117	VS	94	1	S-N	50°F	215	S/S	10/17/11	-	KP	25	24	-1	1230	1235	P	-	EOS-EOS
10/17/11	1045	233/234	22	VS	94	1	W-E	50°F	-	S/S	10/17/11	-	KP	25	25	0	1231	1236	P	-	EOS-EOS
10/17/11	1048	232/234	335	VS	94	1	S-N	50°F	-	S/S	10/17/11	-	KP	25	23	-2	1232	1237	P	-	EOS-EOS
10/17/11	1323	163/235	22	VS	94	5	W-E	60°F	-	S/S	10/17/11	-	KP	25	24	-1	1417	1422	P	-	EOS-EOS
10/17/11	1044	233/235	117	SAS	80	3	S-N	50°F	216	S/S	10/17/11	87	KP	25	25	0	1300	1305	P	-	SEOS-R1359
10/17/11	1100	234/235	358	SAS	80	3	S-N	50°F	-	S/S	10/17/11	88-92	KP	25	24	-1	1305	1310	P	-	SEOS-R1360
10/17/11	1320	166/236	22	VS	94	5	W-E	60°F	-	S/S	10/17/11	-	KP	25	24	-1	1416	1421	P	-	EOS-EOS
10/17/11	1255	235/236	69	XM	102	2	N-S	50°F	217	S/S	10/17/11	93	KP	25	23	-2	1320	1325	P	-	SEOS-R1321
10/17/11	1115	235/237	387	XM	102	2	N-S	50°F	-	S/S	10/17/11	94-98	KP	25	24	-1	1322	1327	P	-	SEOS-R1367
10/17/11	1115	236/237	22	XM	102	2	E-W	50°F	-	S/S	10/17/11	-	KP	25	24	-1	1322	1327	P	-	EOS-EOS
10/17/11	1315	168/238	22	VS	94	5	W-E	60°F	-	S/S	10/17/11	-	KP	25	24	-1	1515	1520	P	-	EOS-EOS
10/17/11	1140	236/238	69	VS	94	1	N-S	50°F	218	S/S	10/17/11	-	KP	25	23	-2	1330	1335	P	-	EOS-EOS
10/17/11	1120	237/238	387	VS	94	1	N-S	50°F	-	S/S	10/17/11	99/100	KP	25	25	0	1331	1336	P	-	SEOS-R1372

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/21/11	0806	207/239	22	KP	56	8	W-E	40°F	-	S/S	10/21/11	-	-	-	-	-	-	-	-	P	EOS-EOS
10/21/11	1100	205/240	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	24	-1	1120	1125	P	-	EOS-EOS
10/21/11	0806	239/240	271	SAS	73	1	S-N	40°F	-	S/S	10/21/11	101	KS	25	25	0	0912	0917	P	-	SEOS-R1374
10/21/11	0840	240/241	22	SAS	73	1	E-W	40°F	-	S/S	10/21/11	102	KS	25	23	-2	0922	0927	P	-	EEOS-R1376
10/21/11	0848	239/241	314	SAS	73	1	S-N	40°F	-	S/S	10/21/11	-	KS	25	25	0	0920	0925	P	-	EOS-EOS
10/21/11	1105	204/242	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	25	0	1126	1131	P	-	EOS-EOS
10/21/11	0845	240/242	271	VS	94	2	S-N	40°F	-	S/S	10/21/11	-	KS	25	25	0	0924	0929	P	-	EOS-EOS
10/21/11	0910	241/242	276	VS	94	2	S-N	40°F	-	S/S	10/21/11	-	KS	25	25	0	0939	0944	P	-	EOS-EOS
10/21/11	0920	242/243	22	SAS	73	1	E-W	40°F	-	S/S	10/21/11	-	KS	25	25	0	0945	0950	P	-	EOS-EOS
10/21/11	0935	241/243	42	VS	94	2	S-N	40°F	-	S/S	10/21/11	-	KS	25	25	0	0944	0949	P	-	EOS-EOS
10/21/11	1110	202/244	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	104/105	KS	25	24	-1	1127	1132	P	-	WEOS-R1388
10/21/11	0905	242/244	537	XM	102	3	S-N	40°F	-	S/S	10/21/11	103	KS	25	25	0	1014	1019	P	-	NEOS-R1379
10/21/11	0949	243/244	42	XM	102	3	S-N	40°F	-	S/S	10/21/11	-	KS	25	25	0	1015	1020	P	-	EOS-EOS
10/21/11	1115	201/245	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	25	0	1133	1138	P	-	EOS-EOS
10/21/11	1015	244/245	232	SAS	73	1	N-S	40°F	-	S/S	10/21/11	-	KS	25	24	-1	1044	1049	P	-	EOS-EOS
10/21/11	1012	245/246	22	SAS	73	1	E-W	40°F	-	S/S	10/21/11	-	KS	25	23	-2	1046	1051	P	-	EOS-EOS
10/21/11	0939	244/246	335	SAS	73	1	N-S	40°F	233	S/S	10/21/11	-	KS	25	24	-1	1044	1049	P	-	EOS-EOS
10/21/11	1118	199/247	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	25	0	1133	1138	P	-	EOS-EOS
10/21/11	1030	245/247	233	VS	94	2	N-S	40°F	-	S/S	10/21/11	-	KS	25	24	-1	1110	1115	P	-	EOS-EOS
10/21/11	1005	246/247	285	VS	94	2	N-S	40°F	-	S/S	10/21/11	-	KS	25	25	0	1110	1115	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/21/11	0950	247/248	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	25	0	1113	1118	P	-	EOS-EOS
10/21/11	1000	246/248	50	VS	94	2	N-S	40°F	232	S/S	10/21/11	-	KS	25	25	0	1113	1118	P	-	EOS-EOS
10/21/11	1120	198/249	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	25	0	1138	1143	P	-	EOS-EOS
10/21/11	1035	247/249	522	XM	102	3	N-S	40°F	-	S/S	10/21/11	-	KS	25	24	-1	1117	1122	P	-	EOS-EOS
10/21/11	1025	248/249	45	XM	102	3	N-S	40°F	231	S/S	10/21/11	-	KS	25	25	0	1117	1122	P	-	EOS-EOS
10/21/11	1123	196/250	22	VS	94	2	W-E	40°F	-	S/S	10/21/11	-	KS	25	24	-1	1139	1144	P	-	EOS-EOS
10/21/11	1048	249/250	234	SAS	73	1	S-N	40°F	-	S/S	10/21/11	106/107	KS	25	23	-2	1141	1146	P	-	SEOS-R1408
10/21/11	1135	249/251	330	XM	102	3	S-N	40°F	230	S/S	10/21/11	108	KS	25	24	-1	1244	1249	P	-	SEOS-R1394
10/21/11	1130	250/251	22	XM	102	3	W-E	45°F	-	S/S	10/21/11	-	KS	25	25	0	1318	1323	P	-	EOS-EOS
10/21/11	1350	195/252	22	XM	102	7	W-E	45°F	-	S/S	10/24/11	109	KS	25	25	0	0738	0743	P	-	WEOS-R1398
10/21/11	1143	250/252	231	VS	94	2	N-S	45°F	229	S/S	10/21/11	112	KS	25	25	0	1327	1322	P	-	SEOS-R1411
10/21/11	1352	193/253	22	XM	102	7	W-E	45°F	-	S/S	10/24/11	110/111	KS	25	25	0	0740	0745	P	-	WEOS-R1402
10/21/11	1300	252/253	229	SAS	73	6	N-S	54°F	228	S/S	10/21/11	-	KS	25	25	0	1329	1334	P	-	EOS-EOS
10/21/11	1355	192/254	22	XM	102	7	W-E	54°F	-	S/S	10/24/11	-	KS	25	25	0	0743	0748	P	-	EOS-EOS
10/21/11	1325	253/254	70	VS	94	5	N-S	54°F	-	S/S	10/21/11	-	KS	25	24	-1	1335	1340	P	-	EOS-EOS
10/21/11	1300	254/255	22	VS	94	5	E-W	54°F	-	S/S	10/21/11	-	KS	25	23	-2	1337	1342	P	-	EOS-EOS
10/21/11	1305	253/255	155	VS	94	5	N-S	54°F	227	S/S	10/21/11	-	KS	25	24	-1	1335	1340	P	-	EOS-EOS
10/21/11	1415	190/256	22	XM	102	7	W-E	54°F	-	S/S	10/24/11	-	KS	25	24	-1	0744	0749	P	-	EOS-EOS
10/21/11	1316	254/256	67	XM	102	7	N-S	54°F	-	S/S	10/21/11	-	KS	25	24	-1	1344	1349	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/21/11	1315	255/256	155	XM	102	7	N-S	54°F	226	S/S	10/21/11	113	KS	25	23	-2	1350	1355	P	-	SEOS-R1414
10/21/11	1417	189/257	15	XM	102	7	W-E	54°F	-	S/S	10/24/11	-	KS	25	25	0	745	750	P	-	EOS-EOS
10/21/11	1327	256/257	223	SAS	73	6	N-S	54°F	225	S/S	10/21/11	-	KS	25	25	0	1415	1420	P	-	EOS-EOS
10/21/11	1420	187/258	15	XM	102	7	W-E	54°F	-	S/S	10/24/11	114/115	KS	25	24	-1	1525	1530	P	-	WEOS-R1418
10/21/11	1334	257/258	223	VS	94	5	N-S	54°F	224	S/S	10/21/11	-	KS	25	25	0	1416	1421	P	-	EOS-EOS
10/21/11	1435	185/259	15	VS	94	5	W-E	54°F	-	S/S	10/24/11	-	KS	25	25	0	830	835	P	-	EOS-EOS
10/21/11	1400	258/259	210	SAS	73	6	N-S	54°F	223	S/S	10/24/11	-	KS	25	25	0	829	834	P	-	EOS-EOS
10/21/11	1445	183/260	18	VS	94	5	W-E	54°F	-	S/S	10/24/11	-	KS	25	25	0	832	837	P	-	EOS-EOS
10/21/11	1420	259/260	215	VS	94	5	N-S	54°F	222	S/S	10/24/11	-	KS	25	25	0	831	836	P	-	EOS-EOS
10/24/11	1022	181/261	17	XM	102	1	W-E	60°F	-	S/S	10/24/11	121	KS	25	23	-2	1144	1149	P	-	WEOS-R1447
10/21/11	1430	260/261	223	SAS	73	6	N-S	54°F	221	S/S	10/24/11	116/117	KS	25	25	0	833	838	P	-	SEOS-R1426
10/24/11	0949	178/262	14	XM	94	1	E-W	60°F	-	S/S	10/24/11	122/123	KS	25	25	0	1147	1152	P	-	WEOS-R1450
10/21/11	1435	261/262	189	XM	102	7	N-S	54°F	220	S/S	10/24/11	118-120	KS	25	25	0	842	847	P	-	SEOS-R1428
10/24/11	1704	175/263	14	XM	102	1	W-E	60°F	-	S/S	10/24/11	-	KS	25	25	0	1151	1156	P	-	EOS-EOS
10/24/11	0806	262/263	192	XM	102	1	N-S	54°F	219	S/S	10/24/11	-	KS	25	24	-1	1150	1155	P	-	EOS-EOS
10/21/11	1418	187/257	7	XM	102	7	W-E	54°F	-	S/S	10/24/11	-	KS	25	24	-1	825	830	P	-	EOS-EOS
10/21/11	1437	185/258	10	VS	94	5	W-E	54°F	-	S/S	10/24/11	-	KS	25	25	0	828	833	P	-	EOS-EOS
10/24/11	1020	181/260	5	XM	102	1	E-W	60°F	-	S/S	10/24/11	-	KS	25	23	-2	1144	1149	P	-	EOS-EOS
10/24/11	1013	178/261	16	XM	102	1	E-W	60°F	-	S/S	10/24/11	-	KS	25	24	-1	1146	1151	P	-	EOS-EOS
10/24/11	1000	175/262	7	XM	102	1	E-W	60°F	-	S/S	10/24/11	-	KS	25	25	0	1149	1154	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Timothy Wayne Pool

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
10/24/11	1005	171/263	7	XM	102	1	W-E	60°F	-	S/S	10/24/11	-	KS	25	25	0	1151	1156	P	-	EOS-EOS
10/24/11	1008	171/264A	16	XM	102	1	W-E	60°F	-	S/S	10/24/11	124	KS	25	24	-1	1152	1157	P	-	WEOS-R1456
10/24/11	0932	263/264A	15	XM	102	1	S-N	60°F	-	S/S	10/24/11	-	KS	25	25	0	1153	1158	P	-	EOS-EOS
10/24/11	0939	264/264A	10	XM	102	1	W-E	60°F	-	S/S	10/24/11	125	KS	25	25	0	1156	1201	P	-	WEOS-R1459
10/24/11	0945	238/264A	15	XM	102	1	S-N	60°F	-	S/S	10/24/11	-	KS	25	25	0	1159	1204	P	-	EOS-EOS
10/24/11	0839	263/264	77	XM	102	1	S-N	60°F	-	S/S	10/24/11	127	KS	25	25	0	1154	1159	P	-	SEOS-R1462
10/24/11	0944	238/264	77	XM	102	1	S-N	60°F	-	S/S	10/24/11	128	KS	25	25	0	1159	1204	P	-	SEOS-R1461
10/24/11	0905	238/263	106	XM	102	1	S-N	60°F	-	S/S	10/24/11	129	KS	25	25	0	1201	1206	P	-	SEOS-R1464

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Ryan Ayers/Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/24/11	0754	265/266	207	SAS	73	2	S-N	55°F	234	S/S	10/24/11	-	KS	25	23	-2	1444	1449	P	-	EOS-EOS
10/24/11	0800	266/267	208	VS	94	3	S-N	55°F	235	S/S	10/24/11	-	KS	25	24	-1	1445	1450	P	-	EOS-EOS
10/24/11	0825	267/268	225	SAS	73	2	S-N	55°F	236	S/S	10/24/11	130/131	KS	25	25	0	1500	1505	P	-	SEOS-R1498
10/24/11	0830	268/269	228	VS	94	3	S-N	55°F	237	S/S	10/24/11	-	KS	25	25	0	1502	1507	P	-	EOS-EOS
10/24/11	0856	269/270	213	SAS	73	2	S-N	55°F	238	S/S	10/24/11	-	KS	25	24	-1	1503	1508	P	-	EOS-EOS
10/24/11	0925	270/271	22	VS	94	3	S-N	55°F	239	S/S	10/24/11	-	KS	25	23	-2	1506	1511	P	-	EOS-EOS
10/24/11	0855	270/272	185	VS	94	3	S-N	55°F	-	S/S	10/24/11	-	KS	25	24	-1	1506	1511	P	-	EOS-EOS
10/24/11	0920	271/272	22	VS	94	3	W-E	55°F	-	S/S	10/24/11	-	KS	25	24	-1	1506	1511	P	-	EOS-EOS
10/24/11	0938	272/273	186	SAS	73	2	N-S	55°F	-	S/S	10/24/11	-	KS	25	25	0	1508	1513	P	-	EOS-EOS
10/24/11	0950	271/273	26	SAS	73	2	N-S	55°F	240	S/S	10/24/11	-	KS	25	25	0	1508	1513	P	-	EOS-EOS
10/24/11	0935	273/274	210	VS	94	3	N-S	55°F	241	S/S	10/24/11	-	KS	25	25	0	1549	1554	P	-	EOS-EOS
10/24/11	1004	275/276	27	SAS	73	2	W-E	55°F	-	S/S	10/24/11	132	KS	25	25	0	1557	1602	P	-	WEOS-R1501
10/24/11	1015	251/274	325	VS	94	3	N-S	55°F	242	S/S	10/24/11	134	KS	25	23	-2	1547	1552	P	-	SEOS-R1520
10/24/11	1016	274/275	55	SAS	73	2	N-S	55°F	-	S/S	10/24/11	-	KS	25	25	0	1555	1600	P	-	EOS-EOS
10/24/11	1021	274/276	485	SAS	73	2	N-S	55°F	243	S/S	10/24/11	133	KS	25	24	-1	1552	1557	P	-	SEOS-R1503
10/24/11	1100	275/277	28	XM	102	1	N-S	55°F	-	S/S	10/24/11	-	KS	25	23	-2	1621	1626	P	-	EOS-EOS
10/24/11	1105	276/277	298	XM	102	1	N-S	55°F	-	S/S	10/24/11	137	KS	25	25	0	1619	1624	P	-	SEOS-R1525
10/24/11	1052	277/278	22	XM	102	1	W-E	55°F	-	S/S	10/24/11	-	KS	25	25	0	1625	1630	P	-	EOS-EOS
10/24/11	1130	276/278	196	XM	102	1	N-S	55°F	244	S/S	10/24/11	135/136	KS	25	24	-1	1612	1617	P	-	SEOS-R1521
10/24/11	1124	279/281	386	SAS	73	2	N-S	55°F	-	S/S	10/24/11	138	KS	25	24	-1	1637	1642	P	-	SEOS-R1526

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Ryan Ayers/Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/24/11	1100	277/279	326	VS	94	3	N-S	55°F	-	S/S	10/24/11	140	KS	25	24	-1	1629	1634	P	-	SEOS-R1528
10/24/11	1130	278/279	197	VS	94	3	N-S	55°F	245	S/S	10/24/11	-	KS	25	25	0	1629	1634	P	-	EOS-EOS
10/24/11	1151	280/281	22	XM	102	1	E-W	55°F	-	S/S	10/24/11	139	KS	25	25	0	1638	1643	P	-	WEOS-R1527
10/24/11	1245	279/280	127	SAS	73	6	N-S	55°F	246	S/S	10/24/11	-	KS	25	25	0	1634	1639	P	-	EOS-EOS
10/24/11	1300	252/274	22	VS	94	7	W-E	65°F	-	S/S	10/24/11	-	KS	25	25	0	1529	1534	P	-	EOS-EOS
10/24/11	1305	253/276	22	VS	94	7	W-E	65°F	-	S/S	10/24/11	141-142	KS	25	25	0	1630	1635	P	-	WEOS-R1507
10/24/11	1310	255/278	22	VS	94	7	W-E	65°F	-	S/S	10/24/11	-	KS	25	24	-1	1531	1536	P	-	EOS-EOS
10/24/11	1315	256/279	22	VS	94	7	W-E	65°F	-	S/S	10/24/11	-	KS	25	25	0	1532	1537	P	-	EOS-EOS
10/24/11	1317	282/284	27	SAS	73	6	W-E	65°F	-	S/S	10/24/11	-	KS	25	23	-2	1651	1656	P	-	EOS-EOS
10/24/11	1325	281/284	43	SAS	73	6	N-S	65°F	-	S/S	10/24/11	143	KS	25	25	0	1650	1655	P	-	SEOS-R1542
10/24/11	1317	281/282	338	XM	102	8	N-S	65°F	-	S/S	10/24/11	146	KS	25	25	0	1647	1652	P	-	SEOS-R1543
10/24/11	1330	280/282	119	XM	102	8	N-S	65°F	247	S/S	10/24/11	147-149	KS	25	25	0	1643	1648	P	-	SEOS-R1544
10/24/11	1334	283/284	35	SAS	73	6	N-S	65°F	-	S/S	10/24/11	144-145	JC	25	24	-1	1714	1719	P	-	SEOS-R1540
10/24/11	1340	282/283	473	SAS	73	6	N-S	65°F	-	EXT.	10/24/11	150-154	-	-	-	-	-	-	-	P	SEOS-R1514
10/24/11	1338	283/288	20	XM	102	8	S-N	65°F	-	S/S	10/25/11	155	KS	25	24	-1	0733	0738	P	-	SEOS-R1516
10/24/11	1358	287/288	20	XM	102	8	S-N	65°F	-	S/S	10/25/11	156	KS	25	25	0	0734	0739	P	-	SEOS-R1517
10/24/11	1413	259/283	20	XM	102	8	W-E	65°F	-	S/S	10/25/11	-	KS	25	25	0	1534	1539	P	-	EOS-EOS
10/24/11	1420	260/288	20	XM	102	8	W-E	65°F	-	S/S	10/25/11	-	KS	25	25	0	1536	1541	P	-	EOS-EOS
10/24/11	1425	261/287	20	XM	102	8	W-E	65°F	-	S/S	10/25/11	157-158	KS	25	25	0	1537	1542	P	-	WEOS-R1519
10/24/11	1432	286/287	226	XM	102	8	N-S	65°F	-	S/S	10/25/11	-	KS	25	23	-2	0727	0732	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Ryan Ayers/Collin Carson*

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/24/11	1500	285/287	225	XM	102	8	S-N	65°F	-	S/S	10/25/11	172-174	KS	25	25	0	0725	0730	P	-	SEOS-R1586
10/24/11	1410	283/286	236	VS	94	7	N-S	65°F	-	S/S	10/25/11	-	KS	25	25	0	0742	0747	P	-	EOS-EOS
10/24/11	1515	238/291	80	VS	94	7	S-N	65°F	-	S/S	10/25/11	-	KS	25	25	0	0805	0810	P	-	EOS-EOS
10/24/11	1528	261/289	14	SAS	73	6	S-N	65°F	-	S/S	10/25/11	-	KS	25	25	0	0735	0740	P	-	EOS-EOS
10/24/11	1532	287/289	69	SAS	73	6	S-N	65°F	-	S/S	10/25/11	-	KS	25	24	-1	0737	0742	P	-	EOS-EOS
10/24/11	1516	289/290	20	SAS	73	6	W-E	65°F	-	S/S	10/25/11	159-161	KS	25	24	-1	0802	0807	P	-	EEOS-R1559
10/24/11	1539	287/290	175	SAS	73	6	S-N	65°F	249	S/S	10/25/11	175	KS	25	25	0	0753	0758	P	-	SEOS-R1564
10/24/11	1444	287/292	25	SAS	73	6	N-S	65°F	-	S/S	10/25/11	-	KS	25	23	-2	1316	1321	P	-	EOS-EOS
10/24/11	1435	292/293	26	SAS	73	6	W-E	65°F	-	S/S	10/25/11	-	SAS	25	25	0	1316	1321	P	-	EOS-EOS
10/24/11	1447	287/293	231	SAS	73	6	N-S	65°F	-	S/S	10/25/11	162	SAS	25	25	0	1256	1301	P	-	SEOS-R1567
10/24/11	1531	293/294	215	XM	102	8	S-N	65°F	-	S/S	10/25/11	165/166	SAS	25	23	-2	1311	1316	P	-	NEOS-R1572
10/24/11	1559	294/295	99	SAS	73	6	S-N	65°F	-	S/S	10/25/11	168	SAS	25	24	-1	1348	1353	P	-	SEOS-R1579
10/24/11	1609	294/296	241	SAS	73	6	S-N	65°F	-	S/S	10/25/11	169	SAS	25	24	-1	1340	1345	P	-	SEOS-R1582
10/24/11	1552	292/294	36	XM	102	8	S-N	65°F	-	EXT.	10/25/11	164	SAS	25	23	-2	1317	1322	-	-	SEOS-R1571
10/24/11	1625	295/296	20	SAS	73	6	W-E	65°F	-	S/S	10/25/11	-	SAS	25	25	0	1345	1340	P	-	EOS-EOS
10/24/11	1557	295/297	96	XM	102	8	S-N	65°F	-	S/S	10/25/11	-	SAS	25	25	0	1351	1356	P	-	EOS-EOS
10/24/11	1630	296/297	154	SAS	73	6	S-N	65°F	-	S/S	10/25/11	170	SAS	25	25	0	1413	1418	P	-	NEOS-R1583
10/24/11	1625	234/297	22	VS	94	7	E-W	65°F	-	S/S	10/25/11	-	SAS	25	25	0	1351	1356	P	-	EOS-EOS
10/24/11	1628	235/295	20	VS	94	7	E-W	65°F	-	S/S	10/25/11	-	SAS	25	24	-1	1351	1356	P	-	EOS-EOS
10/24/11	1631	237/294	20	VS	94	7	E-W	65°F	-	S/S	10/25/11	167	SAS	25	25	0	1306	1311	P	-	EEOS-R1575

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Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Ryan Ayers/Collin Carson*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/ Comments
														Start	End	+/-	Start	End			
10/24/11	1634	238/293	20	VS	94	7	E-W	65°F	-	S/S	10/25/11	-	SAS	25	24	-1	1250	1255	P	-	EOS-EOS
10/24/11	1605	238/290	170	VS	94	7	S-N	65°F	-	S/S	10/25/11	171	KS	25	25	0	0756	0801	P	-	NEOS-R1563
10/24/11	1515	238/291	78	VS	94	7	S-N	65°F	248	S/S	10/25/11	-	KS	25	25	0	0805	0810	P	-	EOS-EOS
10/24/11	1547	262/289	22	VS	94	7	W-E	65°F	-	S/S	10/25/11	-	KS	25	25	0	0736	0741	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Ryan Ayers/Collin Carson

Seaming Information											Non-Destructive Testing Information										
														Pressure			Time				
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
10/24/11	1340	239/265	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	25	0	1418	1423	P	-	EOS-EOS
10/24/11	1343	239/266	4	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	24	-1	1418	1423	P	-	EOS-EOS
10/24/11	1344	241/266	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	23	-2	1419	1424	P	-	EOS-EOS
10/24/11	1345	241/267	4	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	25	0	1419	1424	P	-	EOS-EOS
10/24/11	1346	243/267	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	25	0	1420	1425	P	-	EOS-EOS
10/24/11	1348	243/268	4	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	24	-1	1421	1426	P	-	EOS-EOS
10/24/11	1349	244/268	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	25	0	1421	1426	P	-	EOS-EOS
10/24/11	1351	244/269	4	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	23	-2	1422	1427	P	-	EOS-EOS
10/24/11	1352	246/269	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	25	0	1422	1427	P	-	EOS-EOS
10/24/11	1354	246/270	4	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	23	-2	1423	1428	P	-	EOS-EOS
10/24/11	1355	248/270	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	24	-1	1423	1428	P	-	EOS-EOS
10/24/11	1356	248/271	4	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	23	-2	1424	1429	P	-	EOS-EOS
10/24/11	1357	249/271	18	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	24	-1	1424	1429	P	-	EOS-EOS
10/24/11	1400	251/273	21	VS	94	7	W-E	70°F	-	S/S	10/24/11	-	KS	25	25	0	1425	1430	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Seam/Non-Destructive Test Record

Client Name: AmerenUE
Aquaterra Project Name: Fly Ash Closure CQA
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Ryan Ayers

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/25/11	0827	297/298	256	SAS	73	1	S-N	50°F	-	S/S	10/25/11	186	SAS	25	23	-2	1400	1405	P	-	SEOS-R1620
10/25/11	0745	299/300	20	SAS	73	1	E-W	50°F	-	S/S	10/25/11	-	SAS	25	23	-2	1438	1443	P	-	EOS-EOS
10/25/11	0754	299/301	17	SAS	73	1	S-N	50°F	-	S/S	10/25/11	-	SAS	25	24	-1	1438	1443	P	-	EOS-EOS
10/25/11	0745	298/299	17	VS	94	2	S-N	50°F	-	S/S	10/25/11	-	SAS	25	25	0	1423	1428	P	-	EOS-EOS
10/25/11	0750	298/300	234	VS	94	2	S-N	50°F	-	S/S	10/25/11	-	SAS	25	25	0	1420	1425	P	-	EOS-EOS
10/25/11	0757	300/301	235	SAS	73	1	S-N	50°F	-	S/S	10/25/11	185	SAS	25	25	0	1439	1444	P	-	SEOS-R1619
10/25/11	0815	301/302	245	VS	94	2	S-N	50°F	-	S/S	10/25/11	-	SAS	25	25	0	1449	1454	P	-	EOS-EOS
10/25/11	0845	302/303	238	VS	94	2	S-N	50°F	-	S/S	10/25/11	184	SAS	25	24	-1	1502	1507	P	-	SEOS-R1611
10/25/11	0908	303/305	148	SAS	73	1	S-N	50°F	-	S/S	10/25/11	-	SAS	25	23	-2	1514	1519	P	-	EOS-EOS
10/25/11	0915	304/305	20	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	25	0	1513	1518	P	-	EOS-EOS
10/25/11	0920	305/306	148	VS	94	2	S-N	60°F	256	S/S	10/25/11	183	SAS	25	24	-1	1520	1525	P	-	SEOS-R1608
10/25/11	0922	303/304	96	SAS	73	1	S-N	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	1515	1520	P	-	EOS-EOS
10/25/11	0935	304/306	96	VS	94	2	S-N	60°F	-	S/S	10/25/11	-	SAS	25	24	-1	1519	1524	P	-	EOS-EOS
10/25/11	0935	306/307	249	SAS	73	1	S-N	60°F	255	S/S	10/25/11	-	SAS	25	23	-2	1529	1534	P	-	EOS-EOS
10/25/11	0955	308/309	20	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	0814	0819	P	-	EOS-EOS
10/25/11	1000	307/309	140	VS	94	2	N-S	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	0832	0837	P	-	EOS-EOS
10/25/11	1002	309/310	140	SAS	73	1	N-S	60°F	-	S/S	10/25/11	180/181	SAS	25	23	-2	0828	0833	P	-	NEOS-R1599
10/25/11	1010	307/308	153	VS	94	2	N-S	60°F	254	S/S	10/25/11	-	SAS	25	24	-1	0	0741	P	-	EOS-EOS
10/25/11	1022	308/310	153	SAS	73	1	N-S	60°F	253	S/S	10/25/11	182	SAS	25	23	-2	0813	0818	P	-	NEOS-R1603
10/25/11	1035	310/311	284	VS	94	2	N-S	60°F	252	S/S	10/25/11	179	SAS	25	23	-2	0	0755	P	-	SEOS-R1598

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Seam/Non-Destructive Test Record

Client Name: *AmerenUE*
Aquaterra Project Name: *Fly Ash Closure CQA*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Ryan Ayers*

Seaming Information											Non-Destructive Testing Information										
Date	Time	Seam Number	Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Weather/ Temp	Destruct Number	Comments	Date Tested	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
10/25/11	1054	311/312	213	SAS	73	1	N-S	60°F	251	S/S	10/26/11	177/178	SAS	25	23	-2	752	757	P	-	SEOS-R1530
10/25/11	1119	312/313	85	SAS	73	1	N-S	60°F	250	S/S	10/26/11	176	SAS	25	23	-2	805	810	P	-	SEOS-R1529
10/25/11	1135	313/314	8	SAS	73	1	W-E	60°F	-	S/S	10/26/11	-	SAS	25	24	-1	810	815	P	-	EOS-EOS
10/25/11	1150	312/314	42	SAS	73	1	N-S	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	810	815	P	-	EOS-EOS
10/25/11	1202	313/315	48	SAS	73	1	S-N	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	809	814	P	-	EOS-EOS
10/25/11	1125	232/298	22	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	1422	1427	P	-	EOS-EOS
10/25/11	1130	231/299	22	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	24	-1	1432	1437	P	-	EOS-EOS
10/25/11	1135	229/301	22	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	25	0	1433	1438	P	-	EOS-EOS
10/25/11	1140	228/302	22	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	1451	1456	P	-	EOS-EOS
10/25/11	1150	226/303	22	VS	94	2	W-E	60°F	-	S/S	10/25/11	-	SAS	25	25	0	1500	1505	P	-	EOS-EOS
10/25/11	1255	225/305	22	VS	94	7	W-E	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	1521	1526	P	-	EOS-EOS
10/25/11	1257	224/306	22	VS	94	7	W-E	60°F	-	S/S	10/25/11	-	SAS	25	23	-2	1527	1532	P	-	EOS-EOS
10/25/11	1305	222/307	22	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	0735	0740	P	-	EOS-EOS
10/25/11	1310	221/308	22	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	24	-1	0739	0744	P	-	EOS-EOS
10/25/11	1315	219/310	22	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	0751	0756	P	-	EOS-EOS
10/25/11	1320	218/311	22	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	0753	0758	P	-	EOS-EOS
10/25/11	1328	216/312	22	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	0801	0806	P	-	EOS-EOS
10/25/11	1335	215/313	22	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	0807	0812	P	-	EOS-EOS
10/25/11	1345	213/315	12	VS	94	7	W-E	60°F	-	S/S	10/26/11	-	SAS	25	23	-2	0808	0813	P	-	EOS-EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

GEOMEMBRANE LINER ADDITIONAL NON-DESTRUCTIVE TEST RECORDS

Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/12/11	1	1-2	KS	30	28	-2	0945	0950	P		R-2 - R-3
09/12/11	2	1-2	KS	30	30	0	0958	1003	P		R-3 - R-4
09/12/11	3	1-2	KS	35	35	0	0959	1004	P		R-4 - R-5
09/12/11	4	1-2	KS	30	28	-2	1001	1006	P		R-5 - R-6
09/12/11	5	1-2	KS	30	28	-2	1009	1014	P		R-6 - R-7
09/12/11	6	1-2	KS	30	30	0	1014	1019	P		R-7 - R-8
09/12/11	7	1-2	KS	30	28	-2	1016	1021	P		R-8 - EEOS
09/12/11	8	2-3	KS	30	30	0	1030	1035	P		R-11 - EEOS
09/12/11	9	3-4	KS	30	28	-2	1059	1104	P		R-41 - R-43
09/12/11	10	3-4	KS	30	30	0	1105	1110	P		R-43 - R-44
09/12/11	11	3-4	KS	35	35	0	1105	1110	P		R-44 - R-40
09/12/11	12	3-4	KS	30	30	0	1110	1115	P		R-40 - R-13
09/12/11	13	3-4	KS	30	30	0	1110	1115	P		R-13 - R-14
09/12/11	14	3-4	KS	30	29	-1	1114	1119	P		R-14 - R-39
09/12/11	15	3-4	KS	30	30	0	1117	1122	P		R-39 - R-25
09/12/11	16	3-4	KS	30	30	0	1119	1124	P		R-25 - R-38
09/12/11	17	3-4	KS	30	28	-2	1119	1124	P		R-38 - R-15
09/12/11	18	3-4	KS	30	30	0	1125	1130	P		R-15 - R-23
09/12/11	19	3-4	KS	25	23	-2	1125	1130	P		R-23 - R-16
09/12/11	20	3-4	KS	26	24	-2	1133	1138	P		R-16 - R-26

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/12/11	21	3-4	KS	25	23	-2	1153	1158	P		R-26 - R27
09/12/11	22	3-4	KS	25	24	-1	1155	1200	P		R-27 - R-28
09/12/11	23	3-4	KS	25	24	-1	1155	1200	P		R-28 - R-29
09/12/11	24	3-4	KS	25	25	0	1200	1205	P		R-29 - R-18
09/12/11	25	3-4	KS	25	24	-1	1201	1206	P		R-18 - R-19
09/12/11	26	3-4	KS	25	23	-2	1252	1257	P		R-19 - R-30
09/12/11	27	3-4	KS	26	26	0	1253	1258	P		R-30 - R-32
09/12/11	28	3-4	KS	25	24	-1	1253	1258	P		R-32 - R-31
09/12/11	28	3-4	KS	25	25	0	1253	1258	P		R-31 - R-20
09/12/11	29	3-4	KS	24	23	-1	1328	1333	P		R-20 - R-21
09/12/11	30	3-4	KS	25	23	-2	1331	1336	P		R-21 - R-33
09/12/11	31	3-4	KS	25	23	-2	1337	1342	P		R-33 - R-34
09/12/11	32	3-4	KS	25	23	-2	1144	1149	P		R-34 - R-36
09/12/11	33	3-4	KS	25	25	0	1355	1400	P		R-36 - R-35
09/12/11	34	3-4	KS	25	25	0	1355	1400	P		R-35 - EEOS
09/12/11	35	4-5	KS	26	26	0	1421	1426	P		R46 - R47
09/12/11	36	4-5	KS	27	26	-1	1418	1423	P		R47 - R48
09/12/11	37	4-5	KS	25	23	-2	1416	1421	P		R48 - R50
09/12/11	38	4-5	KS	25	25	0	1410	1415	P		R50 - R49
09/12/11	39	4-5	KS	25	24	-1	1410	1415	P		R49 - WEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/12/11	40	5-6	KS	25	25	0	1435	1440	P		R67 - R66
09/12/11	41	5-6	KS	25	24	-1	1435	1440	P		R66 - R65
09/12/11	42	5-6	KS	25	25	0	1450	1455	P		R65 - EEOS
09/12/11	43	6-7	KS	25	25	0	1526	1531	P		R80 - R79
09/12/11	44	6-7	KS	25	25	0	1525	1530	P		R79 - R78
09/12/11	45	6-7	KS	25	25	0	1522	1527	P		R78 - R77
09/12/11	46	6-7	KS	25	24	-1	1521	1526	P		R77 - R76
09/12/11	47	6-7	KS	25	24	-1	1520	1525	P		R76 - R75
09/12/11	48	6-7	KS	25	25	0	1520	1525	P		R75 - R74
09/12/11	49	6-7	KS	25	24	-1	1507	1512	P		R74 - R72
09/12/11	50	6-7	KS	25	24	-1	1502	1507	P		R72 - R71
09/12/11	51	6-7	KS	27	27	0	1502	1507	P		R71 - R70
09/12/11	52	6-7	KS	25	25	0	1500	1505	P		R70 - R69
09/12/11	53	6-7	KS	27	25	-2	1457	1502	P		R69 - R54
09/12/11	54	6-7	KS	25	25	0	1456	1501	P		R54 - WEOS
09/12/11	55	7-8	KS	25	25	0	1702	1707	P		R87 - R88
09/12/11	56	7-8	KS	25	25	0	1721	1726	P		R88 - R89
09/12/11	57	7-8	KS	25	25	0	1723	1728	P		R89 - R90
09/12/11	58	7-8	KS	25	24	-1	1725	1730	P		R90 - R92
09/12/11	59	7-8	KS	25	24	-1	1730	1735	P		R92 - EEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/12/11	60	8-9	KS	25	25	0	1756	1801	P		R94 - R95
09/12/11	61	8-9	KS	25	24	-1	1758	1803	P		R95 - R96
09/12/11	62	8-9	KS	25	25	0	1800	1805	P		R96 - R97
09/12/11	63	8-9	KS	25	25	0	1800	1805	P		R97 - R98
09/12/11	64	8-9	KS	25	24	-1	1801	1806	P		R98 - R99
09/12/11	65	8-9	KS	25	24	-1	1801	1806	P		R99 - R100
09/12/11	66	8-9	KS	25	25	0	1805	1810	P		R100 - R101
09/13/11	67	8-9	KS	25	25	0	0840	0845	P		R101 - R102
09/13/11	68	8-9	KP	25	24	-1	0841	0846	P		R102 - R103
09/13/11	69	8-9	KP	25	23	-2	0842	0847	P		R103 - R104
09/13/11	70	8-9	KP	25	25	0	0843	0848	P		R104 - R105
09/13/11	71	8-9	KP	25	25	0	0850	0855	P		R105 - R106
09/13/11	72	8-9	KP	25	24	-1	0852	0857	P		R106 - EEOS
09/13/11	73	9-10	KP	25	23	-2	1035	1040	P		R109 - R52
09/13/11	74	9-10	KP	25	24	-1	1032	1037	P		R52 - R127
09/13/11	75	9-10	KP	25	25	0	1030	1035	P		R127 - R126
09/13/11	76	9-10	KP	25	23	-2	1030	1035	P		R126 - R125
09/13/11	77	9-10	KP	25	23	-2	1025	1030	P		R125 - R123
09/13/11	78	9-10	KP	25	24	-1	1025	1030	P		R123 - R122
09/13/11	79	9-10	KP	25	24	-1	1023	1028	P		R122 - R121

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/13/11	80	9-10	KS	25	23	-2	1020	1025	P		R121 - R120
09/13/11	81	9-10	KS	25	25	0	1020	1025	P		R120
09/13/11	82	9-10	KS	25	23	-2	0933	0938	P		R120 - R119
09/13/11	83	9-10	KS	25	23	-2	0920	0925	P		R119 - R118
09/13/11	84	9-10	KS	25	23	-2	0920	0925	P		R118 - R117
09/13/11	85	9-10	KS	25	23	-2	0918	0923	P		R117 - R116
09/13/11	86	9-10	KS	25	24	-1	0917	0922	P		R116 - R115
09/13/11	87	9-10	KS	25	25	0	0917	0922	P		R115 - R114
09/13/11	88	9-10	KS	25	24	-1	0912	0917	P		R114 - R112
09/13/11	89	9-10	KS	25	23	-2	0911	0916	P		R112 - R111
09/13/11	90	9-10	KS	25	25	0	0911	0916	P		R111 - R110
09/13/11	91	9-10	KS	25	25	0	0900	0905	P		R110 - R128
09/13/11	92	9-10	KS	25	23	-2	0900	0905	P		R128 - R108
09/13/11	93	9-10	KS	25	24	-1	0900	0905	P		R108 - WEOS
09/13/11	94	10-11	KS	25	25	0	1100	1105	P		R129 - R130
09/13/11	95	10-11	KP	25	24	-1	1100	1105	P		R130 - R131
09/13/11	96	10-11	KP	25	24	-1	1100	1105	P		R131 - R132
09/13/11	97	10-11	KP	25	23	-2	1102	1107	P		R132 - R134
09/13/11	98	10-11	KP	25	25	0	1112	1117	P		R134 - R135
09/13/11	99	10-11	KP	25	25	0	1112	1117	P		R135 - R136

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Additional Non-Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/13/11	100	10-11	KP	25	25	0	1113	1118	P		R136 - R137
09/13/11	101	10-11	KP	25	23	-2	1113	1118	P		R137 - R138
09/13/11	102	10-11	KP	25	25	0	1115	1120	P		R138 - R139
09/13/11	103	10-11	KP	25	24	-1	1125	1130	P		R139 - EEOS
09/13/11	104	11-12	KP	25	23	-2	1136	1141	P		R144 - EEOS
09/13/11	105	12-13	KP	25	23	-2	1337	1342	P		R146 - R148
09/13/11	106	12-13	KP	25	24	-1	1338	1343	P		R148 - R149
09/13/11	107	12-13	KP	25	25	0	1355	1400	P		R149 - R150
09/13/11	108	12-13	KP	25	24	-1	1355	1400	P		R150 - R151
09/13/11	109	12-13	KP	25	25	0	1623	1628	P		R151 - R152
09/13/11	110	12-13	KP	25	23	-2	1624	1629	P		R152 - R153
09/13/11	111	12-13	KP	25	25	0	1650	1655	P		R153 - R154
09/13/11	112	12-13	KP	25	25	0	1655	1700	P		R154 - R156
09/13/11	113	12-13	KP	25	23	-2	1656	1701	P		R156 - R157
09/13/11	114	12-13	KP	25	24	-1	1712	1717	P		R157 - EEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/14/11	115	13-14	KP	25	25	0	0915	0920	P		R158 - R159
09/14/11	116	13-14	KP	25	24	-1	0938	0943	P		R159 - R160
09/14/11	117	13-14	KP	25	25	0	0940	0945	P		R160 - R161
09/14/11	118	13-14	KP	25	25	0	0948	0953	P		R161 - R163
09/14/11	119	13-14	KP	25	25	0	0948	0953	P		R163 - R164
09/14/11	120	13-14	KP	25	23	-2	0951	0956	P		R164 - R165
09/14/11	121	13-14	KP	25	24	-1	0955	1000	P		R165 - R166
09/14/11	122	13-14	KP	25	25	0	0958	1003	P		R166 - R167
09/14/11	123	13-14	KP	25	25	0	1102	1107	P		R167 - R168
09/14/11	124	13-14	KP	25	23	-2	1103	1108	P		R168 - R169
09/14/11	125	13-14	KP	25	23	-2	1113	1118	P		R169 - R171
09/14/11	126	13-14	KP	25	25	0	1115	1120	P		R171 - R172
09/14/11	127	13-14	KP	25	25	0	1118	1123	P		R172 - R173
09/14/11	128	13-14	KP	25	24	-1	1124	1129	P		R173 - R174
09/15/11	129	13-14	KP	25	25	0	0754	0759	P		R174 - R175
09/15/11	130	13-14	KP	25	25	0	0805	0810	P		R175 - R176
09/15/11	131	13-14	KP	25	25	0	0805	0810	P		R176 - R177
09/15/11	132	13-14	KP	25	23	-2	0830	0835	P		R177 - R178
09/15/11	133	13-14	KP	25	23	-2	0831	0836	P		R178 - R179
09/15/11	134	13-14	KP	25	23	-2	0832	0837	P		R179 - EEOS

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Additional Non-Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/15/11	135	15-16	KP	25	25	0	1036	1041	P		WEOS - R202
09/15/11	136	15-16	KP	25	25	0	1050	1055	P		R202 - R203
09/15/11	137	15-16	KP	25	23	-2	1050	1055	P		R203 - R204
09/15/11	138	15-16	KP	25	24	-1	1052	1057	P		R204 - R205
09/15/11	139	15-16	KP	25	23	-2	1052	1057	P		R205 - R207
09/15/11	140	15-16	KP	25	23	-2	1055	1100	P		R207 - R208
09/15/11	141	15-16	KP	25	23	-2	1055	1100	P		R208 - R209
09/15/11	142	15-16	KP	25	25	0	1057	1102	P		R209 - R210
09/15/11	143	15-16	KP	25	25	0	1057	1103	P		R210-R212
09/15/11	144	15-16	KP	CAP		CAP		CAP		P	
09/15/11	145	15-16	KP	25	25	0	1100	1105	P		R212 - EEOS
09/15/11	146	14-15	KP	25	23	-2	0852	0857	P		WEOS - R182
09/15/11	147	14-15	KP	25	23	-2	0854	0859	P		R182-R183
09/15/11	148	14-15	KP	25	23	-2	0908	0913	P		R183-R184
09/15/11	149	14-15	KP	25	23	-2	0912	0917	P		R184-R185
09/15/11	150	14-15	KP	25	23	-2	0914	0919	P		R185-R186
09/15/11	151	14-15	KP	25	25	0	0916	0921	P		R186-R187
09/15/11	152	14-15	KP	25	25	0	0918	0923	P		R187-R188
09/15/11	153	14-15	KP	25	24	-1	0918	0923	P		R188-R189
09/15/11	154	14-15	KP	25	25	0	0920	0925	P		R189-R190

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/15/11	155	14-15	KP	25	23	-2	0936	0941	P		R190-R191
09/15/11	156	14-15	KP	25	23	-2	0940	0945	P		R191-R192
09/15/11	157	14-15	KP	25	25	0	0942	0947	P		R192-R193
09/15/11	158	14-15	KP	25	24	-1	0951	0956	P		R193-R195
09/15/11	159	14-15	KP	25	23	-2	1002	1007	P		R195-R196
09/15/11	160	14-15	KP	25	23	-2	1006	1011	P		R196-R197
09/15/11	161	14-15	KP	25	25	0	1014	1019	P		R197-R198
09/15/11	162	14-15	KP	25	24	-1	1015	1020	P		R198-R199
09/15/11	163	14-15	KP	25	24	-1	1018	1023	P		R199-R200
09/15/11	164	14-15	KP	25	24	-1	1018	1023	P		R200-R201
09/15/11	165	14-15	KP	25	25	0	1020	1025	P		R201-EEOS
09/15/11	166	16-17	KP	25	24	-1	1122	1127	P		R213-R214
09/15/11	167	16-17	KP	25	24	-1	1124	1129	P		R214-R216
09/15/11	168	16-17	KP	25	24	-1	1130	1135	P		R216-R217
09/15/11	169	16-17	KP	25	24	-1	1131	1136	P		R217-R218
09/15/11	170	16-17	KP	25	24	-1	1140	1145	P		R218-R219
09/15/11	171	16-17	KP	25	24	-1	1232	1237	P		R219-R221
09/15/11	172	17-18	KP	25	23	-2	1237	1242	P		R410-EEOS
09/15/11	173	18-19	KP	25	24	-1	1257	1302	P		R412-R414
09/15/11	174	18-19	KP	25	25	0	1300	1305	P		R414-EEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/15/11	175	19-20	KP	25	25	0	1312	1317	P		R416-R417
09/15/11	176	19-20	KP	25	24	-1	1312	1317	P		R417-R418
09/15/11	177	19-20	KP	25	24	-1	1313	1318	P		R418-R419
09/15/11	178	19-20	KP	25	25	0	1317	1322	P		R419-R420
09/15/11	179	19-20	KP	25	25	0	1321	1326	P		R420-R421
09/15/11	180	19-20	KP	25	23	-2	1325	1330	P		R421-R611
09/15/11	181	20-21	KP	25	23	-2	1337	1342	P		R425-R426
09/15/11	182	20-21	KP	25	25	0	1341	1346	P		R426-R427
09/15/11	183	20-21	KP	25	24	-1	1343	1348	P		R427-R429
09/15/11	184	20-21	KP	25	25	0	1344	1349	P		R429-R537
09/15/11	185	20-21	KP	25	24	-1	1344	1349	P		R537-R538
09/15/11	186	20-21	KP	25	25	0	1345	1350	P		R538-R612
09/15/11	187	21-22	KP	25	24	-1	1346	1351	P		R526-R527
09/15/11	188	21-22	KP	25	25	0	1351	1356	P		R527-R528
09/15/11	189	21-22	KP	25	25	0	1352	1357	P		R528-R529
09/15/11	190	21-22	KP	25	25	0	1358	1403	P		R529-R530
09/15/11	191	21-22	KP	25	25	0	1401	1406	P		R530-R531
09/15/11	192	21-22	KP	25	24	-1	1401	1406	P		R531-R533
09/15/11	193	21-22	KP	25	24	-1	1407	1412	P		R533-R534
09/15/11	194	21-22	KP	25	23	-2	1407	1412	P		R534-R536

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/15/11	195	21-22	KP	25	25	0	1410	1415	P		R536-R613
09/15/11	196	22-23	KP	25	24	-1	1426	1431	P		R541-R542
09/15/11	197	22-23	KP	25	24	-1	1429	1434	P		R542-R543
09/15/11	198	22-23	KP	25	25	0	1432	1437	P		R543-R544
09/15/11	199	22-23	KP	25	25	0	1433	1438	P		R544-R545
09/15/11	200	22-23	KP	25	24	-1	1434	1439	P		R545-R571
09/15/11	201	22-23	KP	25	25	0	1437	1442	P		R571-R572
09/15/11	202	22-23	KP	25	25	0	1438	1443	P		R572-R465
09/15/11	203	22-23	KP	25	24	-1	1440	1445	P		R465-R573
09/15/11	204	22-23	KP	25	24	-1	1440	1445	P		R573-R574
09/15/11	205	22-23	KP	25	25	0	1441	1446	P		R574-R575
09/15/11	206	22-23	KP	25	25	0	1443	1448	P		R575-R615
	207										NOT USED
09/15/11	208	23-24	KP	25	24	-1	1453	1458	P		R547-R548
09/15/11	209	23-24	KP	25	25	0	1453	1458	P		R548-R549
09/15/11	210	23-24	KP	25	24	-1	1455	1500	P		R549-R550
09/15/11	211	23-24	KP	25	25	0	1455	1500	P		R550-R551
09/15/11	212	23-24	KP	25	25	0	1456	1501	P		R551-R576
09/15/11	213	23-24	KP	25	25	0	1457	1502	P		R576-R553
09/15/11	214	23-24	KP	25	25	0	1457	1502	P		R553-R554

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/15/11	215	23-24	KP	25	25	0	1458	1503	P		R554-R555
09/15/11	216	23-24	KP	25	25	0	1459	1504	P		R555-R556
09/15/11	217	23-24	KP	25	25	0	1500	1505	P		R556-R557
09/15/11	218	23-24	KP	25	24	-1	1500	1505	P		R557-R558
09/15/11	219	23-24	KP	25	25	0	1501	1506	P		R558-R559
09/15/11	220	23-24	KP	25	25	0	1502	1507	P		R559-R560
09/15/11	221	23-24	KP	25	25	0	1503	1508	P		R560-R561
09/15/11	222	23-24	KP	25	25	0	1503	1508	P		R561-R562
09/15/11	223	23-24	KP	25	25	0	1505	1510	P		R562-R563
09/15/11	224	23-24	KP	25	25	0	1505	1510	P		R563-R564
09/15/11	225	23-24	KP	25	24	-1	1506	1511	P		R564-R565
09/15/11	226	23-24	KP	25	25	0	1507	1512	P		R565-R567
09/15/11	227	23-24	KP	25	24	-1	1508	1513	P		R567-R568
09/15/11	228	23-24	KP	25	25	0	1510	1515	P		R568-R617
09/16/11	229	24-25	KP	25	25	0	0835	0840	P		R570-R578
09/16/11	230	24-25	KP	25	23	-2	0835	0840	P		R578-R579
09/16/11	231	24-25	KP	25	25	0	0837	0842	P		R579-R580
09/16/11	232	24-25	KP	25	24	-1	0837	0842	P		R580-R581
09/16/11	233	24-25	KP	25	23	-2	0852	0857	P		R581-R582
09/16/11	234	24-25	KP	25	24	-1	0852	0857	P		R582-R583

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/16/11	235	24-25	KP	25	25	0	0855	0900	P	-	R583-R584
09/16/11	236	24-25	KP	25	25	0	0855	0900	P	-	R584-R618
09/16/11	237	25-26	KP	25	25	0	0907	0912	P	-	R586-R587
09/16/11	238	25-26	KP	25	25	0	0908	0913	P	-	R587-R588
09/16/11	239	25-26	KP	25	25	0	0909	0914	P	-	R588-R590
09/16/11	240	25-26	KP	25	24	-1	0910	0915	P	-	R590-R589
09/16/11	241	25-26	KP	25	25	0	0912	0917	P	-	R589-R592
09/16/11	242	25-26	KP	25	24	-1	0914	0919	P	-	R592-R593
09/16/11	243	25-26	KP	25	24	-1	0914	0919	P	-	R593-R620
09/16/11	244	26-27	KP	25	25	0	0929	0934	P	-	R595-R596
09/16/11	245	26-27	KP	25	25	0	0931	0936	P	-	R596-R597
09/16/11	246	26-27	KP	25	25	0	0932	0937	P	-	R597-R598
09/16/11	247	26-27	KP	25	25	0	0932	0937	P	-	R598-R599
09/16/11	248	26-27	KP	25	25	0	0934	0939	P	-	R599-R800
09/16/11	249	26-27	KP	25	25	0	0934	0939	P	-	R800-R801
09/16/11	250	26-27	KP	25	25	0	0937	0942	P	-	R801-R802
09/16/11	251	26-27	KP	25	25	0	0938	0943	P	-	R802-R803
09/16/11	252	26-27	KP	25	25	0	0939	0944	P	-	R803-R805
09/16/11	253	26-27	KP	25	24	-1	0940	0945	P	-	R805-R806
09/16/11	254	26-27	KP	25	25	0	0941	0946	P	-	R806-R808

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/16/11	255	26-27	KP	25	24	-1	0942	0947	P		R808-R662
09/16/11	256	27-28	KP	25	23	-2	0953	0958	P		R735-R736
09/16/11	257	27-28	KP	25	25	0	0954	0959	P		R736-R737
09/16/11	258	27-28	KP	25	24	-1	0955	1000	P		R737-R738
09/16/11	259	27-28	KP	25	24	-1	0956	1001	P		R738-R740
09/16/11	260	27-28	KP	25	25	0	1000	1005	P		R740-R742
09/16/11	261	28-29	KP	25	25	0	1008	1013	P		R750-R751
09/16/11	262	28-29	KP	25	24	-1	1009	1014	P		R751-R752
09/16/11	263	28-29	KP	25	25	0	1011	1016	P		R752-R753
09/16/11	264	28-29	KP	25	23	-2	1012	1017	P		R753-R754
09/16/11	265	28-29	KP	25	23	-2	1018	1023	P		R754-R680
09/16/11	266	29-30	KP	25	25	0	1024	1029	P		R756-R757
09/16/11	267	29-30	KP	25	25	0	1026	1031	P		R757-R758
09/16/11	268	29-30	KP	25	24	-1	1027	1032	P		R758-R681
09/16/11	269	30-31	KP	25	25	0	1029	1034	P		R804-R759
09/16/11	270	30-31	KP	25	24	-1	1030	1035	P		R759-R760
09/16/11	271	30-31	KP	25	25	0	1031	1036	P		R760-R761
09/16/11	272	30-31	KP	25	25	0	1032	1037	P		R761-R762
09/16/11	273	30-31	KP	25	23	-2	1033	1038	P		R762-R763
09/16/11	274	30-31	KP	25	25	0	1034	1039	P		R763-R763

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/16/11	275	30-31	KP	25	25	0	1034	1039	P		R767-R763
09/16/11	276	30-31	KP	25	25	0	1038	1043	P		R763-R767
09/16/11	277	30-31	KP	25	24	-1	1038	1043	P		R767-R764
09/16/11	278	30-31	KP	25	24	-1	1041	1046	P		R764-R765
09/16/11	279	30-31	KP	25	24	-1	1042	1047	P		R765-R766
09/16/11	280	30-31	KP	25	25	0	1045	1100	P		R766-R769
09/16/11	281	30-31	KP	25	25	0	1046	1051	P		R769-R770
09/16/11	282	30-31	KP	25	24	-1	1047	1052	P		R770-R771
09/16/11	283	30-31	KP	25	25	0	1047	1052	P		R771-R773
09/16/11	284	30-31	KP	25	23	-2	1048	1053	P		R773-R696
09/16/11	285	31-32	KP	25	25	0	1055	1100	P		R775-R776
09/16/11	286	31-32	KP	25	25	0	1056	1101	P		R776-R697
09/16/11	287	32-33	KP	25	23	-2	1105	1110	P		R778-R779
09/16/11	288	32-33	KP	25	24	-1	1106	1111	P		R779-R780
09/16/11	289	32-33	KP	25	24	-1	1108	1113	P		R780-R781
09/16/11	290	32-33	KP	25	25	0	1114	1119	P		R781-R698
09/16/11	291	33-34	KP	25	25	0	1121	1126	P		R782-R783
09/16/11	292	33-34	KP	25	23	-2	1121	1126	P		R783-R784
09/16/11	293	33-34	KP	CAP		CAP		CAP		P	R784
09/16/11	294	33-34	KP	25	25	0	1126	1131	P		R784-R785

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/16/11	295	33-34	KP	25	23	-2	1127	1132	P		R785-R786
09/16/11	296	33-34	KP	25	25	0	1128	1133	P		R786-R699
09/16/11	297	34-35	KP	25	23	-2	1149	1154	P		R787-R700
09/17/11	298	1-37	KP	25	24	-1	0715	0720	P		R56-NEOS
09/17/11	299	37-38	KP	25	25	0	0726	0731	P		R231-NEOS OF INT 37/38/39
09/17/11	300	38-40	SAS	25	25	0	0805	0810	P		R233-R234
09/17/11	301	38-40	SAS	25	25	0	0805	0810	P		R234-R235
09/17/11	302	38-40	KP	25	25	0	0745	0750	P		R235-WEOS
09/17/11	303	3-40	SAS	25	25	0	0833	0838	P		R59
09/17/11	304	3-40	SAS	25	25	0	0824	0829	P		R59-NEOS
09/17/11	305	40-41	SAS	25	25	0	0816	0821	P		R238-R239
09/17/11	306	4-41	SAS	PATCH		PATCH		PATCH		P	R50-SEOS
09/17/11	307	41-43	SAS	25	25	0	0839	0844	P		R279-EEOS
09/17/11	308	41-44	SAS	25	25	0	0902	0907	P		R247-EEOS
09/17/11	309	10-51	SAS	25	25	0	1139	1144	P		R222-R223
09/17/11	310	40-41	SAS	25	25	0	0904	0909	P		R239-R240
09/17/11	311	40-41	SAS	25	25	0	0926	0931	P		R240-R241
09/17/11	312	40-41	SAS	25	25	0	0928	0933	P		R241-R242
09/17/11	313	40-41	SAS	25	25	0	0929	0934	P		R243- WEOS OF INT 40/41/42

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/17/11	314	45-47	SAS	25	25	0	1005	1010	P		R255-R256
09/17/11	315	45-47	SAS	25	25	0	1003	1008	P		R256-R257
09/17/11	316	45-47	SAS	25	25	0	1001	1006	P		R257-R258
09/17/11	317	45-47	SAS	25	25	0	1000	1005	P		R258-EEOS
09/17/11	318	48-50	SAS	25	25	0	1051	1056	P		R266-R267
09/17/11	319	48-50	SAS	25	25	0	1049	1054	P		R267-R268
09/17/11	320	48-50	SAS	25	25	0	1048	1053	P		R268-R269
09/17/11	321	48-50	SAS	25	25	0	1043	1048	P		R269-R270
09/17/11	322	48-50	SAS	25	25	0	1042	1047	P		R270-R271
09/17/11	323	48-50	SAS	25	25	0	1039	1044	P		R271-EEOS
09/17/11	324	47-49	SAS	25	25	0	1112	1117	P		R262-R263
09/17/11	325	47-49	SAS	25	25	0	1015	1020	P		R263-EEOS
09/17/11	326	47-48	SAS	25	25	0	1037	1042	P		R260-WEOS 47/48/49
09/17/11	327	49-50	SAS	25	25	0	1030	1035	P		R273-R274
09/17/11	328	49-50	SAS	25	25	0	1023	1028	P		R274-R275
09/17/11	329	49-50	SAS	25	25	0	1023	1028	P		R275-R276
09/17/11	330	49-50	SAS	25	25	0	1021	1026	P		R276-R277
09/17/11	331	49-50	SAS	25	25	0	1020	1025	P		R277-EEOS
09/17/11	332	50-51	SAS	25	23	-2	1245	1250	P		R280-R281
09/17/11	333	50-51	SAS	25	25	0	1244	1249	P		R281-EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/17/11	334	51-53	SAS	25	25	0	1321	1326	P		R284-R285
09/17/11	335	51-53	SAS	25	23	-2	1322	1327	P		R285-R286
09/17/11	336	51-53	SAS	25	25	0	1328	1333	P		R286-R287
09/17/11	337	51-53	SAS	25	24	-1	1329	1334	P		R287-R288
09/17/11	338	51-53	SAS	25	25	0	1332	1337	P		R288-R290
09/17/11	339	51-53	SAS	25	25	0	1338	1343	P		R290-R291
09/17/11	340	51-53	SAS	25	25	0	1337	1342	P		R291-EEOS
09/17/11	341	52-54	SAS	25	25	0	1307	1312	P		R293-EEOS
09/17/11	342	53-54	SAS	25	24	-1	1318	1323	P		R295-R296
09/17/11	343	53-54	SAS	25	25	0	1319	1324	P		R296-R297
09/17/11	344	53-54	SAS	25	25	0	1323	1328	P		R297-R298
09/17/11	345	53-54	SAS	25	24	-1	1330	1335	P		R298-R300
09/17/11	346	53-54	SAS	25	25	0	1340	1345	P		R300-EEOS
09/17/11	347	54-55	SAS	25	23	-2	1422	1427	P		R302-R303
09/17/11	348	54-55	SAS	25	25	0	1426	1431	P		R303-R304
09/17/11	349	54-55	SAS	25	25	0	1345	1350	P		R304-R305
09/17/11	350	54-55	SAS	25	24	-1	1344	1349	P		R305-EEOS
09/17/11	351	55-56	SAS	25	25	0	1432	1437	P		R308-R309
09/17/11	352	55-56	SAS	25	25	0	1432	1437	P		R309-R310
09/17/11	353	55-56	SAS	25	24	-1	1413	1418	P		R310-EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/17/11	*354*	*55-57*	*SAS*	*25*	*24*	*-1*	*1349*	*1354*	*P*		*R312-EEOS*
09/17/11	*355*	*56-58*	*SAS*	*25*	*25*	*0*	*1415*	*1420*	*P*		*R315-EEOS*
09/17/11	*356*	*57-58*	*SAS*	*25*	*24*	*-1*	*1353*	*1358*	*P*		*R317-R318*
09/17/11	*357*	*57-58*	*SAS*	*25*	*25*	*0*	*1348*	*1353*	*P*		*R318-R319*
09/17/11	*358*	*57-58*	*SAS*	*25*	*23*	*-2*	*1347*	*1352*	*P*		*R319-EEOS*
09/17/11	*521*	*13-56*	*SAS*	*25*	*23*	*-2*	*1454*	*1459*	*P*		*R228-NEOS*

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/20/11	359	61-62	KP	25	24	-1	1320	1325	P		R329-R330
09/20/11	360	61-62	KP	25	23	-2	1340	1345	P		R330-R331
09/20/11	361	61-62	KP	25	25	0	1340	1345	P		R331-R332
09/20/11	362	61-62	KP	25	25	0	1425	1430	P		R332-R333
09/20/11	363	61-62	KP	25	24	-1	1425	1430	P		R333-R334
09/20/11	364	61-62	KP	25	25	0	1430	1435	P		R334-R335
09/20/11	365	61-62	KP	25	25	0	1430	1435	P		R335-R336
09/20/11	366	61-62	KP	25	24	-1	1440	1445	P		R336-R337
09/20/11	367	61-62	KP	25	23	-2	1440	1445	P		R337-NEOS
09/20/11	368	62-63	KP	25	24	-1	1440	1445	P		R340-R341
09/20/11	369	62-63	KP	25	24	-1	1425	1430	P		R341-R342
09/20/11	370	62-63	KP	25	24	-1	1425	1430	P		R342-R343
09/20/11	371	62-63	KP	25	23	-2	1430	1435	P		R343-R344
09/20/11	372	62-63	KP	25	23	-2	1430	1435	P		R344-R345
09/20/11	373	62-63	KP	25	25	0	1435	1440	P		R345
09/20/11	374	62-63	KP	25	25	0	1435	1440	P		R345-NEOS
	375										NOT USED
09/20/11	376	64-65	KP	25	25	0	1555	1600	P		R347
09/20/11	377	64-65	KP	25	24	-1	1555	1600	P		R347-R348
09/20/11	378	64-65	KP	25	25	0	1600	1605	P		R348-R349

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/20/11	379	64-65	KP	25	25	0	1600	1605	P		R349-R350
09/20/11	380	64-65	KP	25	25	0	1600	1605	P		R350-NEOS
09/20/11	381	63-65	KP	25	25	0	1515	1520	P		R353-R354
09/20/11	382	63-65	KP	25	23	-2	1515	1520	P		R354-R355
09/20/11	383	63-65	KP	25	23	-2	1545	1550	P		R355-R356
09/20/11	384	63-65	KP	25	24	-1	1545	1550	P		R356-NEOS
09/20/11	385	65-66	KP	25	25	0	1610	1615	P		R325-R326
09/20/11	386	65-66	KP	25	25	0	1615	1620	P		R326-R358
09/20/11	387	65-66	KP	25	24	-1	1615	1620	P		R358-NEOS
09/20/11	388	66-67	KP	25	23	-2	1620	1625	P		R361-WEOS
09/20/11	389	66-68	KP	25	23	-2	1625	1630	P		R363-R364
09/20/11	390	66-68	KP	25	25	0	1630	1635	P		R364-R365
09/20/11	391	66-68	KP	25	25	0	1630	1635	P		R365-R366
09/20/11	392	66-68	KP	25	24	-1	1635	1640	P		R366-R367
09/20/11	393	66-68	KP	25	23	-2	1635	1640	P		R367-NEOS
09/20/11	394	67-68	KP	25	24	-1	1645	1650	P		R368-R369
09/20/11	395	67-68	KP	25	24	-1	1650	1655	P		R369-R370
09/20/11	396	67-68	KP	25	23	-2	1650	1655	P		R370-NEOS
09/21/11	397	68-69	KP	25	25	0	0740	0745	P		R373-R374
09/21/11	398	68-69	KP	25	23	-2	0740	0745	P		R374-NEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/21/11	399	69-71	KP	25	23	-2	0845	0850	P		R378-R379
09/21/11	400	69-71	KP	25	23	-2	0850	0855	P		R379-R380
09/21/11	401	69-71	KP	25	23	-2	0850	0855	P		R380-NEOS
09/21/11	402	59-73	KP	25	24	-1	0720	0725	P		R396-R398
09/21/11	403	59-73	KP	25	23	-2	0720	0725	P		R398-WEOS
09/21/11	404	71-72	KP	25	23	-2	0900	0905	P		R384-R385
09/21/11	405	71-72	KP	25	24	-1	0900	0905	P		R385-R386
09/21/11	406	71-72	KP	25	23	-2	0900	0905	P		R386-R387
09/21/11	407	71-72	KP	25	23	-2	0920	0925	P		R387-R388
09/21/11	408	71-72	KP	25	23	-2	0920	0925	P		R388-R389
09/21/11	409	71-72	KP	25	24	-1	0925	0930	P		R389-R390
09/21/11	410	71-72	KP	25	23	-2	0925	0930	P		R390-R390
09/21/11	411	71-72	KP	25	24	-1	0925	0930	P		R390-NEOS
09/21/11	412	72-73	KP	25	23	-2	0955	1000	P		R391-R392
09/21/11	413	72-73	KP	25	23	-2	1000	1005	P		R392-R393
09/21/11	414	72-73	KP	25	23	-2	1000	1005	P		R393-NEOS
09/21/11	415	72-74	KP	25	23	-2	1005	1010	P		R400-R401
09/21/11	416	72-74	KP	25	25	0	1005	1010	P		R401-NEOS
09/21/11	417	74-75	KP	25	23	-2	1020	1025	P		R399-NEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/21/11	418	36-76	KP	25	25	0	1135	1140	P		R796-R797
09/21/11	419	36-76	KP	25	25	0	1135	1140	P		R797-R798
09/21/11	420	36-76	KP	25	23	-2	1140	1145	P		R798-R799
09/21/11	421	36-76	KP	25	25	0	1140	1145	P		R799-R831
09/21/11	422	36-76	KP	25	23	-2	1230	1235	P		R831-R832
09/21/11	423	36-76	KP	25	23	-2	1230	1235	P		R832-R833
09/21/11	424	36-76	KP	25	23	-2	1235	1240	P		R833-R834
09/21/11	425	36-76	KP	25	24	-1	1235	1240	P		R834-R835
09/21/11	426	36-76	KP	25	23	-2	1235	1240	P		R835-R836
09/21/11	427	36-76	KP	25	23	-2	1235	1240	P		R835-R702
09/21/11	428	78-79	KP	25	23	-2	1320	1325	P		R844-R841
09/21/11	429	80-81	KP	25	23	-2	1330	1335	P		R951-R900
09/21/11	430	81-82	KP	25	24	-1	1355	1400	P		R887-R888
09/21/11	431	81-82	KP	25	25	0	1355	1400	P		R888-R889
09/21/11	432	81-82	KP	25	25	0	1355	1400	P		R889-R890
09/21/11	433	81-82	KP	25	25	0	1400	1405	P		R890-R891
09/21/11	434	81-82	KP	25	23	-2	1400	1405	P		R891-R892
09/21/11	435	82-83	KP	25	24	-1	1415	1420	P		R894-R895
09/21/11	436	82-83	KP	25	25	0	1420	1425	P		R895-R896
09/21/11	437	82-83	KP	25	24	-1	1420	1425	P		R896-R897

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/21/11	438	82-83	KP	25	24	-1	1425	1430	P		R897-R898
09/21/11	439	82-83	KP	25	24	-1	1425	1430	P		R898-R899
09/21/11	440	82-83	KP	25	23	-2	1430	1435	P		R899-R901
09/22/11	441	83-84	KP	25	23	-2	0710	0715	P		R903-R904
09/22/11	442	83-84	KP	25	23	-2	0720	0725	P		R904-R905
09/22/11	443	83-84	KP	25	25	0	0720	0725	P		R905-R906
09/22/11	444	84-85	KP	25	23	-2	0725	0730	P		R908-R910
09/22/11	445	84-85	KP	25	23	-2	0730	0735	P		R910-R911
09/22/11	446	84-85	KP	25	25	0	0730	0735	P		R911-R912
09/22/11	447	84-85	KP	25	25	0	0730	0735	P		R912-R913
09/22/11	448	84-85	KP	25	24	-1	0735	0740	P		R913-R914
09/22/11	449	84-85	KP	25	25	0	0730	0735	P		R914-R915
09/22/11	450	85-86	KP	25	24	-1	0735	0740	P		R917-R918
09/22/11	451	85-86	KP	25	23	-2	0735	0740	P		R918-R919
09/22/11	452	85-86	KP	25	23	-2	0740	0745	P		R919-R920
09/22/11	453	85-86	KP	25	24	-1	0740	0745	P		R920-R921
09/22/11	454	85-86	KP	25	25	0	0745	0750	P		R921-R922
09/22/11	455	85-86	KP	25	24	-1	0745	0750	P		R922-R923
09/22/11	456	85-86	KP	25	25	0	0750	0755	P		R923-R924
09/22/11	457	85-86	KP	25	23	-2	0750	0755	P		R924-R925

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Additional Non-Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Tim Pool

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/22/11	458	86-87	KP	25	24	-1	0800	0805	P		R926-R927
09/22/11	459	86-87	KP	25	23	-2	0805	0810	P		R927-R928
09/22/11	460	86-87	KP	25	24	-1	0805	0810	P		R928-R929
09/22/11	461	86-87	KP	25	24	-1	0810	0815	P		R929-R930
09/22/11	462	86-87	KP	25	23	-2	0810	0815	P		R930-R931
09/22/11	463	87-88	KP	25	25	0	0820	0825	P		R933-R934
09/22/11	464	87-88	KP	25	23	-2	0825	0830	P		R934-R936
09/22/11	465	87-88	KP	25	24	-1	0825	0830	P		R936-R937
09/22/11	466	87-88	KP	25	24	-1	0835	0840	P		R937-R938
09/22/11	467	87-88	KP	25	24	-1	0835	0840	P		R938-R939
09/22/11	468	87-88	KP	25	25	0	0840	0845	P		R939-R940
09/22/11	469	87-88	KP	25	23	-2	0840	085	P		R940-R941
09/22/11	470	87-88	KP	25	24	-1	0845	0850	P		R941-R942
09/22/11	471	87-88	KP	25	25	0	0845	0850	P		R942-R943
09/22/11	472	87-88	KP	25	24	-1	0850	0855	P		R943-R944
09/22/11	473	87-88	KP	25	23	-2	0910	0915	P		R944-R945
09/22/11	474	88-89	KP	25	23	-2	0910	0915	P		R946-R948
09/22/11	475	89-90	KP	25	25	0	0920	0925	P		R952-R953
09/22/11	476	90-91	KP	25	25	0	0930	0935	P		R955-R956
09/22/11	477	90-91	KP	25	24	0	0935	0940	P		R956-R958

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/22/11	478	90-91	KP	25	23	-2	0935	0940	P		R958-R959
09/22/11	479	91-92	KP	25	24	-1	0945	0950	P		R963-R962
09/22/11	480	91-92	KP	25	25	0	0945	0950	P		R962-R960
09/22/11	481	92-93	KP	25	23	-2	1000	1005	P		R965-R967
09/22/11	482	92-93	KP	25	24	-1	1005	1010	P		R967-R968
09/22/11	483	92-93	KP	25	25	0	1005	1010	P		R968-R969
09/22/11	484	92-93	KP	25	25	0	1010	1015	P		R969-R970
09/22/11	485	93-94	KP	25	24	-1	1030	1035	P		R975-R973
09/22/11	486	93-94	KP	25	25	0	1035	1040	P		R973-R972
09/22/11	487	93-94	KP	25	24	-1	1035	1040	P		R972-R971
09/22/11	488	94-95	KP	25	23	-2	1105	1110	P		R979-R980
09/22/11	489	94-95	KP	25	25	0	1110	1115	P		R980-R981
09/22/11	490	95-96	KP	25	25	0	1130	1135	P		R978-CAP
09/22/11	491	95-96	KP	25	23	-2	1130	1135	P		R978-R987
09/22/11	492	95-96	KP	25	25	0	1135	1140	P		R987-R983
09/22/11	493	95-96	KP	25	25	0	1135	1140	P		R983-R982
09/22/11	494	96-97	KP	25	25	0	1150	1155	P		R989-R988
09/22/11	495	96-97	KP	25	23	-2	1150	1155	P		R988-R984
09/22/11	496	97-98	KP	25	24	-1	1155	1200	P		R990-R985
09/22/11	497	98-99	KP	25	24	-1	1200	1205	P		R991-R986

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/23/11	498	100-101	KP	25	24	-1	0700	0705	P		R452-NEOS
09/23/11	499	64-102	KP	25	25	0	1505	1510	P		R455-R456
09/23/11	500	65-103	KP	25	25	0	1510	1515	P		R458-R460
09/23/11	501	65-103	KP	25	24	-1	1510	1515	P		R460-WEOS
09/23/11	502	64-102	KP	25	25	0	1505	1510	P		R456-WEOS
09/23/11	503	102-103	KP	25	25	0	0710	0715	P		R462-WEOS
09/23/11	504	106-103	KP	25	23	-2	0730	0735	P		R467-NEOS
09/23/11	505	104-105	KP	25	23	-2	0715	0720	P		R517-NEOS
09/23/11	506	103-104	KP	25	24	-1	0720	0725	P		R519-R520
09/23/11	507	103-104	KP	25	23	-2	0725	0730	P		R520-R521
09/23/11	508	103-104	KP	25	25	0	0725	0730	P		R521-NEOS
09/23/11	509	68-107	KP	25	23	-2	1405	1410	P		R403-WEOS
09/23/11	510	106-107	KP	25	25	0	0735	0740	P		R514-R515
09/23/11	511	106-107	KP	25	24	-1	0735	0740	P		R515-R1027
09/23/11	512	108-109	KP	25	24	-1	0745	0750	P		R484-R486
09/23/11	513	108-109	KP	25	23	-2	0750	0755	P		R486-R1029
09/23/11	514	109-110	KP	25	25	0	0755	0800	P		R492-R494
09/23/11	515	109-110	KP	25	25	0	0800	0805	P		R494-R1031
09/23/11	516	110-111	KP	25	23	-2	0805	0810	P		R500-R501
09/23/11	517	110-111	KP	25	25	0	0810	0815	P		R501-R1056

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/23/11	518	111-112	KP	25	24	-1	0915	0920	P		R507-R1058
09/23/11	519	112-113	KP	25	23	-2	0930	0935	P		R512-NEOS
09/23/11	520	113-114	KP	25	25	0	0936	0941	P		R445-WEOS
09/23/11	522	75-113	KP	25	24	-1	0924	0929	P		R508-NEOS
09/23/11	523	113-115	KP	25	23	-2	1000	1005	P		R434-R437
09/23/11	524	113-115	KP	25	24	-1	1000	1005	P		R437-R440
09/23/11	525	113-115	KP	25	23	-2	1020	1025	P		R440-NEOS
09/23/11	526	117-118	KP	25	24	-1	1056	1101	P		R714-EEOS
09/23/11	527	115-117	KP	25	23	-2	1050	1055	P		R513A-SEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/28/11	528	84A-85A	KP	25	25	0	1410	1415	P		R884-WEOS
09/28/11	529	81A-82A	KP	25	24	-1	1425	1430	P		R853-WEOS
09/28/11	530	80A-81A	KP	25	25	0	1437	1442	P		R885-WEOS
09/28/11	531	36A-76A	KP	25	24	-1	1450	1455	P		R704-R703
09/28/11	532	36A-76A	KP	25	24	-1	1500	1505	P		R703-WEOS
09/29/11	565	31A-32A	KP	25	25	0	1425	1430	P		R695-WEOS
09/29/11	566	27A-28A	KP	25	24	-1	1115	1120	P		R690-R689
09/29/11	567	27A-28A	KP	25	25	0	1115	1120	P		R689-R688
09/29/11	568	27A-28A	KP	25	25	0	1117	1122	P		R688-WEOS
09/29/11	569	28A-29A	KP	25	25	0	1335	1340	P		R673-R674
09/29/11	570	28A-29A	KP	25	25	0	1335	1340	P		R674-R675
09/29/11	571	28A-29A	KP	25	25	0	1340	1345	P		R675-R676
09/29/11	572	28A-29A	KP	25	24	-1	1341	1346	P		R676-R678
09/29/11	573	28A-29A	KP	25	24	-1	1350	1355	P		R678-R677
09/29/11	574	28A-29A	KP	25	23	-2	1350	1355	P		R677-R679
09/29/11	575	28A-29A	KP	25	23	-2	1355	1400	P		R679-WEOS
09/29/11	576	26A-27A	KP	25	25	0	1135	1140	P		R685-R684
09/29/11	577	26A-27A	KP	25	23	-2	1135	1140	P		R684-R683
09/29/11	578	26A-27A	KP	25	25	0	1140	1145	P		R683-R664
	579										NOT USED

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/29/11	580	26A-27A	KP	25	25	0	1145	1150	P		R664-WEOS
09/29/11	534	119-121	KP	25	24	-1	0815	0820	P		R532-R535
09/29/11	535	119-121	KP	25	25	0	0820	0825	P		R535-NEOS
09/29/11	536	119-122	KP	25	25	0	0830	0835	P		R540-NEOS
09/29/11	537	120-122	KP	25	24	-1	0840	0845	P		R541-R542
09/29/11	538	120-122	KP	25	25	0	0840	0845	P		R542-R543
09/29/11	539	120-122	KP	25	25	0	0845	0850	P		R543-R544
09/29/11	540	120-122	KP	25	23	-2	0845	0850	P		R544-R723
09/29/11	541	120-122	KP	25	25	0	0855	0900	P		R723-R724
09/29/11	542	120-122	KP	25	25	0	0855	0900	P		R724-R725
09/29/11	543	120-122	KP	25	25	0	0905	0910	P		R725-NEOS
09/29/11	544	120-126	KP	25	25	0	0747	0752	P		R726-EEOS
09/29/11	544A	118-126	KP	25	25	0	0755	0800	P		R728-R729
09/29/11	545	118-126	KP	25	25	0	0755	0800	P		R729-NEOS
09/29/11	546	118-120	KP	25	23	-2	0745	0750	P		R722-NEOS
09/29/11	547	117-120	KP	25	24	-1	0740	0745	P		R721-NEOS
09/29/11	548	117-119	KP	25	24	-1	0725	0730	P		R475-R525
09/29/11	549	117-119	KP	25	25	0	0725	0730	P		R525-R526
09/29/11	550	117-119	KP	25	24	-1	0730	0735	P		R526-R527
09/29/11	551	117-119	KP	25	23	-2	0730	0735	P		R527-R529

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
09/29/11	552	117-119	KP	25	24	-1	0735	0740	P		R529-NEOS
09/29/11	553	121-122	KP	25	25	0	0822	0827	P		R537A-R538A
09/29/11	554	121-122	KP	25	25	0	0821	0826	P		R538A-WEOS
09/29/11	555	121-123	KP	25	23	-2	1005	1010	P		R545-NEOS
09/29/11	556	121-124	KP	25	25	0	1015	1020	P		R547-R548
09/29/11	557	121-124	KP	25	24	-1	1015	1020	P		R548-NEOS
09/29/11	558	122-124	KP	25	25	0	1020	1025	P		R549-R550
09/29/11	559	122-124	KP	25	23	-2	1025	1030	P		R550-R551
09/29/11	560	122-124	KP	25	25	0	1025	1030	P		R551-R552
09/29/11	561	122-124	KP	25	25	0	1030	1035	P		R552-R718
09/29/11	562	122-124	KP	25	23	-2	1035	1035	P		R718-R719
09/29/11	563	122-124	KP	25	25	0	1040	1045	P		R719-R720
09/29/11	564	122-124	KP	25	25	0	1040	1045	P		R720-NEOS
09/29/11	637	120-128	KP	25	25	0	0747	0752	P		R726-EEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Tim Pool*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/01/11	565	22A-133	KP	25	25	0	1005	1010	P		R642-SEOS
10/01/11	566	26A-25A	KP	25	24	-1	1005	1010	P		R661-WEOS
10/01/11	567	23A-22A	KP	25	25	0	1120	1125	P		R660-WEOS
10/01/11	568	22A-21A	KP	25	25	0	1126	1131	P		R658-R659
10/01/11	569	22A-21A	KP	25	24	-1	1133	1138	P		R659-WEOS
10/01/11	570	20A-19A	KP	25	24	-1	1236	1241	P		R657-WEOS
10/01/11	571	127-129	KP	25	25	0	1300	1305	P		R654-WEOS
10/01/11	572	127-19A	KP	25	25	0	1312	1317	P		R655-R656
10/01/11	573	127-19A	KP	25	24	-1	1218	1323	P		R656-R703
10/01/11	574	127-19A	KP	25	25	0	1218	1323	P		R703-WEOS
10/01/11	575	127-128	KP	25	25	0	1310	1315	P		R706-WEOS
10/01/11	576	19A-131	KP	25	25	0	1230	1235	P		R444-WEOS
10/01/11	577	59-130	KP	25	25	0	1305	1310	P		R601-EEOS
10/01/11	578	130-125	KP	25	25	0	1315	1320	P		R649-NEOS
10/01/11	579	125-129	KP	25	25	0	1320	1325	P		R645-NEOS
10/01/11	580	59-128	KP	25	25	0	1430	1435	P		R603-WEOS
10/01/11	581	16-128	KP	25	24	-1	1435	1440	P		R606-R605
10/01/11	582	16-128	KP	25	23	-2	1440	1445	P		R605-WEOS
10/01/11	583	23A-135	KP	25	25	0	1344	1349	P		R623-SEOS
10/01/11	584A	29A-134	KP	25	24	-1	0741	0746	P		R670-NEOS

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Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/03/11	584	137-138	KP	25	25	0	0955	1000	P		R1004-R1005
10/03/11	585	137-138	KP	25	23	-2	0955	1000	P		R1005-NEOS
10/03/11	586	138-139	KP	25	25	0	1110	1115	P		R1000-R1001
10/03/11	587	138-139	KP	25	23	-2	1117	1122	P		R1001-R1006
10/03/11	588	138-139	KP	25	24	-1	1117	1122	P		R1006-NEOS
10/03/11	589	106A-139	KP	25	25	0	1133	1138	P		R1010-R1009
10/03/11	590	106A-139	KP	25	25	0	1139	1144	P		R1009-R1008
10/03/11	591	106A-139	KP	25	24	-1	1139	1144	P		R1008-NEOS
10/03/11	592	142-143	KP	25	24	-1	1311	1316	P		R1014-R1015
10/03/11	593	142-143	KP	25	23	-2	1311	1316	P		R1015-NEOS
10/03/11	594	141-142	KP	25	23	-2	1242	1247	P		R1021-WEOS
10/03/11	595	141-143	KP	25	24	-1	1300	1305	P		R1023-NEOS
10/03/11	596	108A-109A	KP	25	23	-2	1327	1332	P		R1033-NEOS
10/03/11	597	110A-145	KP	25	25	0	1344	1349	P		R1034-WEOS
10/03/11	598	145-146	KP	25	25	0	1352	1357	P		R1040-WEOS
10/03/11	599	118-153	KP	25	25	0	1621	1626	P		R1067-WEOS
10/03/11	600	110A-111A	KP	25	23	-2	1416	1421	P		R1068-NEOS
10/03/11	601	111A-112A	KP	25	23	-2	1440	1445	P		R1055-R1054
10/03/11	602	111A-112A	KP	25	25	0	1446	1451	P		R1054-R1053
10/03/11	603	111A-112A	KP	25	24	-1	1446	1451	P		R1053-R1050

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/03/11	*604*	*111A-112A*	*KP*	*25*	*24*	*-1*	*1452*	*1457*	*P*		*R1050-NEOS*
10/03/11	*605*	*144-145*	*KP*	*25*	*24*	*-1*	*1351*	*1356*	*P*		*R1042-NEOS*
10/03/11	*606*	*149-150*	*KP*	*25*	*24*	*-1*	*1523*	*1528*	*P*		*R1070-R1071*
10/03/11	*607*	*149-150*	*KP*	*25*	*24*	*-1*	*1523*	*1528*	*P*		*R1071-R1072*
10/03/11	*608*	*149-150*	*KP*	*25*	*24*	*-1*	*1529*	*1534*	*P*		*R1072-R1073*
10/03/11	*609*	*149-150*	*KP*	*25*	*23*	*-2*	*1529*	*1534*	*P*		*R1073-R1074*
10/03/11	*610*	*149-150*	*KP*	*25*	*23*	*-2*	*1535*	*1540*	*P*		*R1074-NEOS*
10/03/11	*611*	*150-152*	*KP*	*25*	*23*	*-2*	*1604*	*1609*	*P*		*R1079-R1075*
10/03/11	*612*	*150-152*	*KP*	*25*	*23*	*-2*	*1604*	*1609*	*P*		*R1075-R1076*
10/03/11	*613*	*150-152*	*KP*	*25*	*24*	*-1*	*1610*	*1615*	*P*		*R1076-NEOS*
10/03/11	*614*	*152-153*	*KP*	*25*	*24*	*-1*	*1629*	*1634*	*P*		*R1078-R1077*
10/03/11	*615*	*152-153*	*KP*	*25*	*24*	*-1*	*1635*	*1640*	*P*		*R1077-NEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/04/11	616	101-154	KP	25	25	0	0736	0741	P		R813-R811
	617										NOT USED
	618										NOT USED
10/04/11	619	154-155	KP	25	24	-1	0731	0736	P		R817-R818
10/04/11	620	154-155	KP	25	25	0	0731	0736	P		R818-R812
10/04/11	621	154-155	KP	25	24	-1	0732	0737	P		R812-EEOS
10/04/11	622	104-155	KP	25	25	0	0727	0732	P		R823-EEOS
10/04/11	623	105-155	KP	25	25	0	0726	0731	P		WEOS-R821
10/04/11	624	105-155	KP	25	25	0	0725	0730	P		R821-R820
10/04/11	625	105-155	KP	25	25	0	0725	0730	P		R820-EEOS
10/04/11	626	105-157	KP	25	25	0	0930	0935	P		R829-NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 3

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/03/11	627	32A-134	KP	25	25	0	0759	0804	P		R707-NEOS
10/01/11	628	124-134	KP	25	25	0	1408	1413	P		R712-R743
10/01/11	629	124-134	KP	25	24	-1	1420	1425	P		R744-R745
10/01/11	630	124-134	KP	25	23	-2	1421	1426	P		R745-NEOS
10/03/11	631	33A-134	KP	25	24	-1	0801	0806	P		R710-NEOS
10/03/11	632	35A-134	KP	25	24	-1	0813	0818	P		R749-NEOS
10/03/11	633	36A-134	KP	25	24	-1	0820	0825	P		R790-NEOS
10/03/11	634	77A-134	KP	25	25	0	0825	0830	P		R715-NEOS
10/03/11	635	80A-134	KP	25	25	0	0835	0840	P		R849-NEOS
10/03/11	636	81A-134	KP	25	25	0	0840	0845	P		R851-NEOS
10/03/11	637	87A-134	KP	25	25	0	0900	0905	P		R861-NEOS
10/03/11	638	98A-134	KP	25	24	-1	0930	0935	P		R881-NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/10/11	1	153-158	KP	25	25	0	1010	1015	P		R1092-R1093
10/10/11	2	153-158	KP	25	25	0	1010	1015	P		R1093-NEOS
10/10/11	3	163-165	KP	25	25	0	1115	1120	P		R1108-NEOS
10/10/11	4	99A-167	KP	25	25	0	1258	1303	P		R1128-WEOS
10/10/11	5	162-165	KP	25	25	0	1055	1100	P		R1100-SEOS
10/10/11	6	164-167	KP	25	24	-1	1340	1345	P		R1125-NEOS
10/10/11	7	167-170	KP	25	23	-2	1330	1335	P		R1107-NEOS
10/10/11	8	174-175	KP	25	25	0	1450	1455	P		R1143-WEOS
10/10/11	9	171-174	KP	25	24	-1	1530	1535	P		R1113-NEOS
10/10/11	10	170-174	KP	25	25	0	1520	1525	P		R1115-R1114
10/10/11	11	170-174	KP	25	25	0	1525	1530	P		R1114-NEOS
10/10/11	12	170-173	KP	25	24	-1	1510	1515	P		R1136-R1138
10/10/11	13	170-173	KP	25	25	0	1515	1520	P		R1138-R1117
10/10/11	14	170-173	KP	25	25	0	1515	1520	P		R1117-NEOS
10/10/11	15	174-178	KP	25	25	0	1450	1455	P		R1145-NEOS
10/10/11	16	175-178	KP	25	25	0	1500	1505	P		R1141-R1140
10/10/11	17	175-178	KP	25	25	0	1500	1505	P		R1140-NEOS
10/10/11	18	178-181	KP	25	24	-1	1620	1625	P		R1146-SEOS
10/10/11	19	185-187	KP	25	23	-2	1656	1701	P		R1183-NEOS
10/10/11	20	184-187	KP	25	23	-2	1651	1656	P		R1167-SEOS

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Additional Non-Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 2
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/10/11	21	186-188	KP	25	23	-2	1706	1711	P		R1187-NEOS
10/11/11	22	188-190	KP	25	25	0	0820	0825	P		R1180-R1186
10/11/11	23	188-190	KP	25	24	-1	0820	0825	P		R1186-NEOS
10/11/11	24	99-199	KP	25	25	0	0949	0954	P		R1201-EEOS
10/11/11	25	190-191	KP	25	25	0	0830	0835	P		R1182-SEOS
10/11/11	26	192-193	KP	25	24	-1	0850	0855	P		R1181-NEOS
10/11/11	27	193-195	KP	25	25	0	0902	0907	P		R1199-NEOS
10/11/11	28	198-199	KP	25	24	-1	0920	0925	P		R1226-R1225
10/11/11	29	198-199	KP	25	23	-2	0922	0927	P		R1225-NEOS
10/11/11	30	99-211	KP	25	25	0	1420	1425	P		R1210-EEOS
10/11/11	31	99-206	KP	25	25	0	1410	1415	P		R1207-EEOS
10/11/11	32	202-204	KP	25	24	-1	1043	1048	P		R1229-NEOS
10/11/11	33	204-205	KP	25	23	-2	1105	1110	P		R1236-NEOS
10/11/11	34	203-205	KP	25	24	-1	1050	1055	P		R1205-R1234
10/11/11	35	203-205	KP	25	23	-2	1100	1105	P		R1234-R1235
10/11/11	36	203-205	KP	25	24	-1	1055	1100	P		R1235-NEOS
10/11/11	37	205-206	KP	25	24	-1	1235	1240	P		R1206-NEOS
10/11/11	38	205-207	KP	25	25	0	1250	1255	P		R1241-R1240
10/11/11	39	205-207	KP	25	25	0	1250	1255	P		R1240-R1239
10/11/11	40	205-207	KP	25	25	0	1300	1305	P		R1239-R1238

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/11/11	*41*	*205-207*	*KP*	*25*	*24*	*-1*	*1300*	*1305*	*P*		*R1238-R1237*
10/11/11	*42*	*205-207*	*KP*	*25*	*24*	*-1*	*1310*	*1315*	*P*		*R1237-NEOS*
10/11/11	*43*	*206-208*	*KP*	*25*	*23*	*-2*	*1320*	*1325*	*P*		*R1249-NEOS*
10/11/11	*44*	*207-208*	*KP*	*25*	*23*	*-2*	*1325*	*1330*	*P*		*R1244-R1245*
10/11/11	*45*	*207-208*	*KP*	*25*	*25*	*0*	*1325*	*1330*	*P*		*R1245-R1246*
10/11/11	*46*	*207-208*	*KP*	*25*	*24*	*-1*	*1326*	*1321*	*P*		*R1246-NEOS*
10/11/11	*47*	*208-210*	*KP*	*25*	*23*	*-2*	*1336*	*1341*	*P*		*R1216-ELOS R-248*
10/11/11	*48*	*209-211*	*KP*	*25*	*23*	*-2*	*1343*	*1348*	*P*		*R1212-R1213*
10/11/11	*49*	*209-211*	*KP*	*25*	*25*	*0*	*1345*	*1350*	*P*		*R1213-NEOS*

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Additional Non-Destructive Test Record

Client Name: Ameren

Aquaterra Project Name: Fly Ash Closure

Project Location: Venice, IL
Pond 2

Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: Collin Carson

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/14/11	50	214-215	KP	25	25	0	1050	1055	P		R1263-WEOS
10/14/11	51	215-216	KP	25	24	-1	1053	1058	P		R1277-NEOS
10/14/11	52	212-213	KP	25	25	0	1045	1050	P		R1267-R1269
10/14/11	53	212-213	KP	25	25	0	1046	1051	P		R1269-EEOS
10/14/11	54	216-217	KP	25	24	-1	1055	1100	P		R1283-NEOS
10/17/11	55	140-217	KP	25	24	-1	0802	0807	P		R1278-EEOS
10/17/11	56	142-219	KP	25	24	-1	0803	0808	P		R1291-EEOS
10/17/11	57	217-219	KP	25	25	0	0720	0725	P		R1294-R1295
10/17/11	58	217-219	KP	25	25	0	0722	0727	P		R1295-R1296
10/17/11	59	217-219	KP	25	24	-1	0723	0728	P		R1296-R1297
10/17/11	60	217-219	KP	25	25	0	0724	0729	P		R1297-R1298
10/17/11	61	217-219	KP	25	24	-1	0724	0729	P		R1298-R1299
10/17/11	62	217-219	KP	25	24	-1	0725	0730	P		R1299-R1300
10/17/11	63	217-219	KP	25	24	-1	0725	0730	P		R1300-R1301
10/17/11	64	217-219	KP	25	25	0	0727	0732	P		R1301-R1286
10/17/11	65	217-219	KP	25	25	0	0727	0732	P		R1286-NEOS
10/17/11	66	221-222	KP	25	23	-2	0750	0755	P		R1304-NEOS
10/17/11	67	219-220	KP	25	23	-2	0737	0742	P		R1259-NEOS
10/17/11	68	220-222	KP	25	23	-2	0743	0748	P		R1260-R1305
10/17/11	69	220-222	KP	25	23	-2	0745	0750	P		R1305-R1306

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/17/11	*70*	*220-222*	*KP*	*25*	*25*	*0*	*0745*	*0750*	*P*		*R1306-R1307*
10/17/11	*71*	*220-222*	*KP*	*25*	*23*	*-2*	*0746*	*0751*	*P*		*R1307-R1308*
10/17/11	*72*	*220-222*	*KP*	*25*	*24*	*-1*	*0748*	*0753*	*P*		*R1308-NEOS*

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Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/17/11	73	224-225	KP	25	24	-1	1007	1012	P		R1338-R1339
10/17/11	74	224-225	KP	25	24	-1	1005	1010	P		R1339-R1340
10/17/11	75	224-225	KP	25	25	0	1005	1010	P		R1340-SEOS
10/17/11	76	225-226	KP	25	24	-1	1010	1015	P		R1341-NEOS
10/17/11	77	226-228	KP	25	24	-1	1011	1016	P		R1344-SEOS
10/17/11	78	226-227	KP	25	25	0	1010	1015	P		R1342-R1343
10/17/11	79	226-227	KP	25	25	0	1010	1015	P		R1343-NEOS
10/17/11	80	227-229	KP	25	25	0	1020	1025	P		R1345-NEOS
10/17/11	81	229-230	KP	25	25	0	1155	1200	P		R1348-NEOS
10/17/11	82	229-231	KP	25	25	0	1150	1155	P		R1351-R1352
10/17/11	83	229-231	KP	25	24	-1	1150	1155	P		R1352-NEOS
10/17/11	84	230-232	KP	25	24	-1	1201	1206	P		R1354-NEOS
10/17/11	85	231-232	KP	25	25	0	1203	1208	P		R1355-R1356
10/17/11	86	231-232	KP	25	25	0	1204	1209	P		R1356-NEOS
10/17/11	87	233-235	KP	25	24	-1	1302	1307	P		R1359-NEOS
10/17/11	88	234-235	KP	25	25	0	1304	1309	P		R1360-R1361
10/17/11	89	234-235	KP	25	24	-1	1304	1309	P		R1361-R1362
10/17/11	90	234-235	KP	25	25	0	1310	1315	P		R1362-R1363
10/17/11	91	234-235	KP	25	24	-1	1310	1315	P		R1363-R1364
10/17/11	92	234-235	KP	25	23	-2	1312	1317	P		R1364-NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/17/11	*93*	*235-236*	*KP*	*25*	*25*	*0*	*1321*	*1326*	*P*		*R1321-NEOS*
10/17/11	*94*	*235-237*	*KP*	*25*	*24*	*-1*	*1324*	*1329*	*P*		*R1367-R1368*
10/17/11	*95*	*235-237*	*KP*	*25*	*24*	*-1*	*1324*	*1329*	*P*		*R1368-R1369*
10/17/11	*96*	*235-237*	*KP*	*25*	*25*	*0*	*1325*	*1330*	*P*		*R1369-R1370*
10/17/11	*97*	*235-237*	*KP*	*25*	*24*	*-1*	*1326*	*1331*	*P*		*R1370-R1371*
10/17/11	*98*	*235-237*	*KP*	*25*	*23*	*-2*	*1327*	*1332*	*P*		*R1371-NEOS*
10/17/11	*99*	*237-238*	*KP*	*25*	*24*	*-1*	*1332*	*1337*	*P*		*R1372-R1373*
10/17/11	*100*	*237-238*	*KP*	*25*	*25*	*0*	*1330*	*1335*	*P*		*R1373-NEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/21/11	101	239-240	KS	25	25	0	0912	0917	P		R1374-NEOS
10/21/11	102	240-241	KS	25	23	-2	0922	0927	P		R1376-WEOS
10/21/11	103	242-244	KS	25	24	-1	1014	1019	P		R1379-SEOS
10/21/11	104	202-244	KS	25	25	0	1128	1133	P		R1388-R1389
10/21/11	105	202-244	KS	25	24	-1	1128	1133	P		R1389-EEOS
10/21/11	106	249-250	KS	25	25	0	1143	1148	P		R1408-R1409
10/21/11	107	249-250	KS	25	24	-1	1145	1150	P		R1409-NEOS
10/21/11	108	249-251	KS	25	25	0	1244	1249	P		R1394-NEOS
10/24/11	109	195-252	KS	25	24	-1	0738	0743	P		R1398-EEOS
10/24/11	110	193-253	KS	25	25	0	0741	0746	P		R1402-R1403
10/24/11	111	193-253	KS	25	25	0	0741	0746	P		R1403-EEOS
10/21/11	112	250-252	KS	25	24	-1	1327	1332	P		R1411-NEOS
10/21/11	113	255-256	KS	25	25	0	1350	1355	P		R1414-NEOS
10/24/11	114	187-258	KS	25	24	-1	0826	0831	P		R1419-R1420
10/24/11	115	187-258	KS	25	25	0	0826	0831	P		R1420-EEOS
10/24/11	116	260-261	KS	25	25	0	0838	0843	P		R1426-R1427
10/24/11	117	260-261	KS	25	25	0	0840	0845	P		R1427-NEOS
10/24/11	118	261-262	KS	25	24	-1	0843	0848	P		R1428-R1429
10/24/11	119	261-262	KS	25	25	0	0843	0848	P		R1429-R1430
10/24/11	120	261-262	KS	25	25	0	0844	0849	P		R1430-NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/24/11	*121*	*181-261*	*KS*	*25*	*25*	*0*	*1145*	*1150*	*P*		*R1447-EEOS*
10/24/11	*122*	*178-262*	*KS*	*25*	*25*	*0*	*1147*	*1152*	*P*		*R1450-R1451*
10/24/11	*123*	*178-262*	*KS*	*25*	*23*	*-2*	*1148*	*1153*	*P*		*R1451-EEOS*
10/24/11	*124*	*171-264A*	*KS*	*25*	*25*	*0*	*1152*	*1157*	*P*		*R1456-EEOS*
10/24/11	*125*	*264-264A*	*KS*	*25*	*24*	*-1*	*1156*	*1201*	*P*		*R1459-EEOS*
	126										*NOT USED*
10/24/11	*127*	*263-264*	*KS*	*25*	*25*	*0*	*1155*	*1200*	*P*		*R1462-NEOS*
10/24/11	*128*	*238-264*	*KS*	*25*	*24*	*-1*	*1200*	*1205*	*P*		*R1461-NEOS*
10/24/11	*129*	*238-263*	*KS*	*25*	*24*	*-1*	*1201*	*1206*	*P*		*R1464-NEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/24/11	130	267-268	KS	25	25	0	1500	1505	P		R1498-R1499
10/24/11	131	267-268	KS	25	25	0	1501	1506	P		R1499-NEOS
10/24/11	132	275-276	KS	25	25	0	1557	1402	P		R1501-EEOS
10/24/11	133	274-276	KS	25	25	0	1552	1557	P		R1503-NEOS
10/24/11	134	251-274	KS	25	25	0	1547	1552	P		R1520-NEOS
10/24/11	135	276-278	KS	25	25	0	1612	1617	P		R1521-R1522
10/24/11	136	276-278	KS	25	24	-1	1619	1624	P		R1522-NEOS
10/24/11	137	276-277	KS	25	25	0	1621	1626	P		R1525-NEOS
10/24/11	138	279-281	KS	25	24	-1	1637	1642	P		R1526-NEOS
10/24/11	139	280-281	KS	25	23	-2	1638	1643	P		R1527-EEOS
10/24/11	140	277-279	KS	25	25	0	1629	1634	P		R1528-NEOS
10/24/11	141	253-276	KS	25	24	-1	1530	1535	P		R1507-R1508
10/24/11	142	253-276	KS	25	25	0	1531	1536	P		R1508-EEOS
10/24/11	143	281-284	KS	25	25	0	1650	1655	P		R1542-NEOS
10/24/11	144	283-284	KS	25	25	0	1715	1720	P		R1540-R1541
10/24/11	145	283-284	KS	25	24	-1	1715	1720	P		R1541-NEOS
10/24/11	146	281-282	KS	25	24	-1	1649	1654	P		R1543-NEOS
10/24/11	147	280-282	KS	25	25	0	1643	1648	P		R1544-R1545
10/24/11	148	280-282	KS	25	24	-1	1645	1650	P		R1545-R1546
10/24/11	149	280-282	KS	25	23	-2	1645	1650	P		R1546-NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/24/11	150	282-283	KS	25	25	0	1707	1712	P		R1514-R1547
10/24/11	151	282-283	KS	25	24	-1	1708	1713	P		R1547-R1548
10/24/11	152	282-283	KS	25	25	0	1711	1716	P		R1548-R1549
10/24/11	153	282-283	KS	25	24	-1	1712	1717	P		R1549-R1550
10/24/11	154	282-283	KS	25	23	-2	1714	1719	P		R1550-NEOS
10/25/11	155	283-288	KS	25	24	-1	0733	0738	P		R1516-NEOS
10/25/11	156	288-287	KS	25	25	0	0734	0739	P		R1517-NEOS
10/25/11	157	261-287	KS	25	24	-1	1537	1542	P		R1519-R1551
10/25/11	158	261-287	KS	25	25	0	1540	1545	P		R1551-EEOS
10/25/11	159	289-290	KS	25	25	0	0803	0808	P		R1559-R1560
10/25/11	160	289-290	KS	25	23	-2	0803	0808	P		R1560-R1561
10/25/11	161	289-290	KS	25	23	-2	0803	0808	P		R1561-WEOS
10/25/11	162	287-293	SAS	25	24	-1	1310	1315	P		R1567-NEOS
	163										NOT USED
10/25/11	164	295-296	SAS	25	24	-1	1318	1323	P		R1571-NEOS
10/25/11	165	293-294	SAS	25	24	-1	1308	1313	P		R1572-R1573
10/25/11	166	293-294	SAS	25	23	-2	1305	1310	P		R1573-SEOS
10/25/11	167	237-294	SAS	25	23	-2	1352	1357	P		R1575-EEOS
10/25/11	168	294-295	SAS	25	24	-1	1345	1350	P		R1579-NEOS
10/25/11	169	294-296	SAS	25	23	-2	1340	1345	P		R1582-NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*

Aquaterra Project Name: *Fly Ash Closure*

Project Location: *Venice, IL*
Pond 2

Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/24/11	*170*	*296-297*	*SAS*	*25*	*25*	*0*	*1407*	*1412*	*P*		*R1583-SEOS*
10/24/11	*171*	*238-290*	*KS*	*25*	*25*	*0*	*0758*	*0803*	*P*		*R1563-SEOS*
10/24/11	*172*	*285-287*	*KS*	*25*	*25*	*0*	*0730*	*0735*	*P*		*R1586-R1589*
10/24/11	*173*	*285-287*	*KS*	*25*	*25*	*0*	*0729*	*0734*	*P*		*R1589-R1591*
10/24/11	*174*	*285-287*	*KS*	*25*	*25*	*0*	*0728*	*0733*	*P*		*R1591-NEOS*
10/24/11	*175*	*287-290*	*KS*	*25*	*25*	*0*	*0754*	*0759*	*P*		*R1564-NEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Additional Non-Destructive Test Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 2
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *Collin Carson*

Date	Test Number	Seam Number	Tester Initials	Pressure			Time		P/F	Vacuum Box P/F	Location/Comments
				Start	End	+/-	Start	End			
10/26/11	*176*	*312-313*	*SAS*	*25*	*23*	*-2*	*0806*	*0811*	*P*		*R1529-NEOS*
10/26/11	*177*	*311-312*	*SAS*	*25*	*23*	*-2*	*0759*	*0804*	*P*		*R1530-R1595*
10/26/11	*178*	*311-312*	*SAS*	*25*	*23*	*-2*	*0824*	*0829*	*P*		*R1595-NEOS*
10/26/11	*179*	*310-311*	*SAS*	*25*	*23*	*-2*	*0829*	*0834*	*P*		*R1598-NEOS*
10/26/11	*180*	*309-310*	*SAS*	*25*	*23*	*-2*	*0827*	*0832*	*P*		*R1599-R1600*
10/26/11	*181*	*309-310*	*SAS*	*25*	*23*	*-2*	*0813*	*0818*	*P*		*R1600-SEOS*
10/26/11	*182*	*308-310*	*SAS*	*25*	*23*	*-2*	*0745*	*0750*	*P*		*R1603-SEOS*
10/26/11	*183*	*305-306*	*SAS*	*25*	*25*	*0*	*1519*	*1524*	*P*		*R1608-NEOS*
10/26/11	*184*	*302-303*	*SAS*	*25*	*23*	*-2*	*1506*	*1511*	*P*		*R1611-NEOS*
10/26/11	*185*	*300-301*	*SAS*	*25*	*25*	*0*	*1439*	*1444*	*P*		*R1619-NEOS*
10/26/11	*186*	*297-298*	*SAS*	*25*	*23*	*-2*	*1412*	*1417*	*P*		*R1620-NEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

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GEOMEMBRANE LINER DESTRUCTIVE TEST RECORDS

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch					Pass / Fail Field	Pass / Fail Lab	Location
DS-1	09/12/11	1/2	SAS	80	F	P	73 67	74 70	75 67	64 60	66 63	P	P	10' EAST OF WEOS
						S	67	63	66	67	68			
DS-2	09/12/11	1/2	SAS	80	F	P	59 64	60 64	59 63	56 60	59 61	P	P	500' EAST OF WEOS
						S	64	65	70	69	65			
DS-3	09/12/11	2/3	XM	65	F	P	56 57	54 69	55 60	56 55	62 59	P	P	704' EAST OF WEOS
						S	63	62	65	66	62			
DS-4	09/12/11	2/3	XM	65	F	P	59 61	58 60	62 65	62 59	61 60	P	P	204' EAST OF WEOS
						S	65	64	65	66	67			
DS-5	09/12/11	3/4	VS	92	F	P	65 65	62 60	61 62	55 60	59 -	F		296' EAST OF WEOS
						S	-	-	-	-	-			
DS-6	09/12/11	3/4	VS	92	F	P	70 65	62 64	63 -	- -	- -	F		796' EAST OF WEOS
						S	-	-	-	-	-			
DS-7	09/12/11	4/5	SAS	80	F	P	64 60	61 64	62 63	59 64	65 64	P	P	466' WEST OF EEOS
						S	67	68	67	64	65			
DS-8	09/12/11	5/6	XM	65	F	P	58 53	63 59	62 59	60 58	64 56	P	P	206' EAST OF WEOS
						S	63	64	65	63	62			
DS-9	09/12/11	5/6	XM	65	F	P	56 55	58 59	53 58	55 59	57 60	P	P	706' EAST OF WEOS
						S	65	66	68	67	66			
DS-10	09/12/11	6/7	VS	92	F	P	56 53	59 59	57 57	54 58	61 58	P	P	346' WEST OF EEOS
						S	65	67	67	66	70			
DS-11	09/12/11	6/7	VS	92	F	P	53 55	53 60	58 58	60 57	56 57	P	P	846' WEST OF EEOS
						S	67	68	69	68	67			
DS-12	09/12/11	4/5	SAS	80	F	P	60 60	64 63	66 65	64 61	65 63	P	P	30' EAST OF WEOS
						S	68	64	63	65	63			
DS-13	09/12/11	7/8	SAS	80	F	P	54 55	56 55	55 55	55 55	56 56	P	P	35' EAST OF WEOS
						S	60	65	67	68	70			
DS-14	09/12/11	7/8	SAS	80	F	P	61 57	60 57	59 55	60 55	62 55	P	P	535' EAST OF WEOS
						S	64	64	68	71	72			
DS-15	09/13/11	8/9	VS	92	F	P	51 60	61 55	61 58	55 59	55 58	P	P	175' EAST OF WEOS
						S	65	65	66	67	66			
DS-16	09/13/11	8/9	VS	92	F	P	52 57	52 57	55 55	56 55	55 54	P	P	675' EAST OF WEOS
						S	64	61	62	61	63			
DS-17	09/13/11	9/10	SAS	80	F	P	54 59	54 51	54 59	58 56	55 60	P	P	200' WEST OF EEOS
						S	65	65	66	67	65			
DS-18	09/13/11	9/10	SAS	80	F	P	53 57	56 57	55 57	55 54	60 54	P	P	700' WEST OF EEOS
						S	64	65	68	67	64			
DS-19	09/13/11	10/11	VS	92	F	P	74 75	80 76	78 57	78 82	78 80	P	P	150' EAST OF WEOS
						S	80	77	80	82	79			
DS-20	09/13/11	10/11	VS	92	F	P	64 60	63 63	64 62	60 65	63 61	P	P	720' EAST OF WEOS
						S	68	70	69	71	72			
DS-21	09/13/11	11/12	XM	65	F	P	79 80	77 79	79 78	79 80	77 79	P	P	200' WEST OF EEOS
						S	80	84	79	80	82			

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type	Test Values lbs/inch	Pass / Fail Field	Pass / Fail Lab	Location
DS-22	09/13/11	11/12	XM	65	F	P 80 80 75 78 79 76 79 81 70 83 S 84 80 79 81 81	P	P	700' WEST OF EEOS
DS-23	09/13/11	12/13	SAS	80	F	P 83 84 84 86 83 85 82 84 86 82 S 87 91 80 80 78	P	P	150' EAST OF WEOS
DS-24	09/13/11	12/13	SAS	80	F	P 76 79 79 79 80 75 81 78 81 77 S 86 82 84 80 79	P	P	650' EAST OF WEOS
DS-25	09/13/11	3/4	SS	56	EXT.	P 51 50 50 51 50 S 63 64 63 65 67	P	P	800' EAST OF WEOS
DS-26	09/13/11	3/4	SS	56	EXT.	P 75 77 77 79 77 S 77 69 70 71 68	P	P	297' EAST OF WESO
DS-27	09/15/11	13/14	VS	92	F	P 64 65 67 67 66 65 68 69 71 71 S 78 80 82 83 80	P	P	150' EAST OF WEOS
DS-28	09/15/11	13/14	VS	92	F	P 66 60 68 67 66 66 65 64 63 60 S 69 70 73 78 76	P	P	650' EAST OF WEOS
DS-29	09/15/11	15/16	SAS	80	F	P 65 64 66 64 67 68 68 65 67 64 S 70 71 72 74 68	P	P	160' EAST OF WEOS
DS-30	09/15/11	15/16	SAS	80	F	P 62 65 69 65 67 70 68 71 66 70 S 69 70 71 73 76	P	P	660' EAST OF WEOS
DS-31	09/15/11	14/15	XM	65	F	P 66 69 70 66 70 68 65 68 69 67 S 70 69 68 71 70	P	P	30' EAST OF WEOS
DS-32	09/15/11	14/15	XM	65	F	P 67 64 66 68 66 68 66 67 66 65 S 74 71 75 76 70	P	P	530' EAST OF WEOS
DS-33	09/16/11	16/17	VS	92	F	P 57 66 68 66 70 71 69 64 65 58 S 70 73 71 70 72	P	P	155' EAST OF WEOS
DS-34	09/16/11	16/17	VS	92	F	P 66 67 68 70 68 72 69 70 65 63 S 75 74 70 73 75	P	P	655' EAST OF WEOS
DS-35	09/16/11	17/18	XM	65	F	P 72 73 75 72 72 74 73 70 74 73 S 78 79 70 76 77	P	P	50' EAST OF WEOS
DS-36	09/16/11	17/18	XM	65	F	P 74 65 74 74 77 61 74 65 70 71 S 78 79 80 81 84	P	P	550' EAST OF WEOS
DS-37	09/16/11	18/19	SAS	80	F	P 75 76 70 76 76 70 78 75 77 78 S 80 83 80 82 80	P	P	12' EAST OF WEOS
DS-38	09/16/11	18/19	SAS	80	F	P 65 67 69 68 71 75 73 77 72 71 S 80 84 83 78 81	P	P	519' EAST OF WEOS
DS-39	09/16/11	19/20	VS	92	F	P 75 71 71 73 71 71 70 72 71 71 S 79 80 84 85 80	P	P	16' EAST OF WEOS
DS-40	09/16/11	19/20	VS	92	F	P 74 70 71 72 71 68 75 78 79 70 S 78 76 80 80 79	P	P	516' EAST OF WEOS
DS-41	09/16/11	20/21	XM	65	F	P 69 75 74 75 71 76 74 77 75 70 S 76 74 79 80 76	P	P	10' EAST OF WEOS
DS-42	09/16/11	20/21	XM	65	F	P 70 65 76 71 69 71 73 75 77 72 S 82 83 84 80 82	P	P	510' EAST OF WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type	Test Values lbs/inch	Pass / Fail Field	Pass / Fail Lab	Location
DS-43	09/16/11	21/22	SAS	80	F	P 68 74 72 74 71 73 77 76 79 75 S 81 80 82 84 79	P	P	10' EAST OF WEOS
DS-44	09/16/11	21/22	SAS	80	F	P 75 70 73 72 73 70 75 71 75 72 S 80 80 83 85 77	P	P	510' EAST OF WEOS
DS-45	09/16/11	22/23	VS	92	F	P 74 70 69 67 69 74 69 70 72 65 S 72 70 74 76 77	P	P	13' EAST OF WEOS
DS-46	09/16/11	22/23	VS	92	F	P 73 69 65 66 73 71 70 73 71 73 S 72 73 75 70 76	P	P	515' EAST OF WEOS
DS-47	09/16/11	23/24	XM	65	F	P 72 72 75 70 75 65 71 74 74 76 S 80 76 77 78 80	P	P	20' EAST OF WEOS
DS-48	09/16/11	23/24	XM	65	F	P 67 76 76 74 76 76 75 77 77 74 S 81 80 82 81 80	P	P	520' EAST OF WEOS
DS-49	09/16/11	24/25	SAS	80	F	P 87 83 84 82 81 83 83 80 80 81 S 88 83 85 86 84	P	P	10' EAST OF WEOS
DS-50	09/16/11	24/25	SAS	80	F	P 89 91 89 93 87 85 89 74 76 77 S 79 76 79 80 81	P	P	470' EAST OF WEOS
DS-51	09/16/11	25/26	VS	92	F	P 81 79 78 81 79 81 83 80 83 83 S 87 83 84 85 87	P	P	10' EAST OF WEOS
DS-52	09/16/11	26/27	SAS	80	F	P 80 74 73 78 74 78 79 74 72 80 S 78 82 80 79 81	P	P	10' EAST OF WEOS
DS-53	09/16/11	27/28	XM	65	F	P 79 74 80 76 75 78 79 75 75 70 S 82 81 80 78 80	P	P	10' EAST OF WEOS
DS-54	09/16/11	28/29	VS	92	F	P 88 85 87 83 83 83 83 80 87 86 S 84 85 86 87 84	P	P	10' EAST OF WEOS
DS-55	09/16/11	29/30	SAS	80	F	P 80 83 84 80 84 80 85 84 83 84 S 90 87 89 91 89	P	P	10' EAST OF WEOS
DS-56	09/16/11	30/31	XM	65	F	P 76 71 78 65 82 79 75 80 74 78 S 79 80 81 78 79	P	P	10' EAST OF WEOS
DS-57	09/16/11	31/32	VS	92	F	P 77 81 85 78 70 76 77 79 80 74 S 80 83 85 80 80	P	P	10' EAST OF WEOS
DS-58	09/16/11	32/33	SAS	80	F	P 75 77 75 78 74 78 76 80 79 76 S 84 76 78 80 81	P	P	10' EAST OF WEOS
						P S			
						P S			
						P S			
						P S			
						P S			

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60
	5 of	5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type	Test Values lbs/inch	Pass / Fail Field	Pass / Fail Lab	Location
DS-59	09/17/11	37/38	VS	92	F	P 76 76 | 74 77 | 76 79 | 76 78 | 73 69 S 76 | 73 | 70 | 76 | 76	P	P	15' EAST OF WEOS
DS-60	09/17/11	38/40	SAS	80	F	P 73 70 | 72 70 | 72 71 | 70 71 | 70 69 S 76 | 77 | 74 | 70 | 74	P	P	15' EAST OF WEOS
DS-61	09/17/11	40/41	XM	65	F	P 71 73 | 72 73 | 71 71 | 72 72 | 72 72 S 70 | 71 | 73 | 74 | 70	P	P	15' EAST OF WEOS
DS-62	09/17/11	41/43	VS	92	F	P 72 79 | 71 65 | 73 70 | 73 79 | 80 84 S 86 | 87 | 79 | 80 | 85	P	P	15' EAST OF WEOS
DS-63	09/17/11	43/45	SAS	80	F	P 82 84 | 80 81 | 79 78 | 80 81 | 81 79 S 87 | 86 | 83 | 80 | 84	P	P	15' EAST OF WEOS
DS-64	09/17/11	45/46	XM	65	F	P 79 66 | 81 71 | 78 69 | 76 73 | 70 72 S 70 | 73 | 78 | 70 | 74	P	P	15' EAST OF WEOS
DS-65	09/17/11	46/48	SAS	80	F	P 82 79 | 82 78 | 79 80 | 82 78 | 79 80 S 89 | 84 | 85 | 80 | 80	P	P	15' EAST OF WEOS
DS-66	09/17/11	48/50	XM	65	F	P 75 76 | 78 78 | 80 73 | 73 78 | 77 80 S 79 | 88 | 87 | 83 | 80	P	P	15' EAST OF WEOS
DS-67	09/17/11	50/51	VS	92	F	P 74 82 | 78 79 | 75 79 | 78 80 | 75 79 S 77 | 76 | 79 | 75 | 79	P	P	15' EAST OF WEOS
DS-68	09/17/11	51/52	SAS	80	F	P 75 78 | 78 79 | 78 80 | 80 79 | 78 78 S 78 | 80 | 81 | 84 | 80	P	P	15' EAST OF WEOS
DS-69	09/17/11	52/54	XM	65	F	P 76 69 | 72 72 | 69 75 | 70 76 | 76 69 S 77 | 80 | 81 | 85 | 83	P	P	15' EAST OF WEOS
DS-70	09/17/11	54/55	VS	92	F	P 80 76 | 75 80 | 80 81 | 77 80 | 80 79 S 80 | 85 | 84 | 87 | 80	P	P	15' EAST OF WEOS
DS-71	09/17/11	55/56	SAS	80	F	P 75 74 | 70 74 | 75 74 | 76 74 | 75 73 S 75 | 75 | 75 | 74 | 70	P	P	15' EAST OF WEOS
DS-72	09/17/11	56/58	XM	65	F	P 71 71 | 69 71 | 71 71 | 72 71 | 71 72 S 76 | 78 | 77 | 78 | 89	P	P	15' EAST OF WEOS
DS-73	09/17/11	58/59	VS	92	F	P 63 60 | 65 70 | 72 68 | 69 65 | 70 69 S 75 | 74 | 70 | 78 | 70	P	P	20' EAST OF WEOS
DS-74	09/17/11	53/54	XM	65	F	P 62 70 | 67 74 | 74 72 | 74 70 | 68 65 S 76 | 75 | 74 | 76 | 70	P	P	25' WEST OF EEOS
DS-75	09/17/11	55/57	SAS	80	F	P 70 73 | 74 75 | 78 70 | 74 74 | 77 76 S 80 | 81 | 80 | 82 | 80	P	P	20' WEST OF EEOS
DS-76	09/17/11	59/60	XM	65	F	P 62 63 | 66 65 | 66 65 | 67 65 | 68 67 S 78 | 79 | 70 | 74 | 75	P	P	20' WEST OF EEOS
						P | | | | | S			
						P | | | | | S			
						P | | | | | S			

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.1

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60
	5 of	5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type	Test Values lbs/inch	Pass / Fail Field	Pass / Fail Lab	Location
DS-77	09/21/11	61/62	SAS	80	F	P 67 | 67 69 | 69 68 | 69 67 | 68 71 | 67 S 70 69 68 70 70	P	P	15' NORTH OF SEOS
DS-78	09/21/11	62/63	VS	94	F	P 68 | 70 72 | 70 69 | 72 73 | 79 70 | 72 S 73 70 68 70 69	P	P	15' NORTH OF SEOS
DS-79	09/21/11	63/65	XM	73	F	P 67 | 64 67 | 70 66 | 72 66 | 70 71 | 68 S 72 70 72 71 70	P	P	15' NORTH OF SEOS
DS-80	09/21/11	65/66	SAS	80	F	P 69 | 65 67 | 70 71 | 67 70 | 66 69 | 65 S 68 69 70 69 70	P	P	15' NORTH OF SEOS
DS-81	09/21/11	66/68	VS	94	F	P 62 | 63 66 | 63 66 | 63 60 | 64 67 | 64 S 70 64 65 69 64	P	P	15' NORTH OF SEOS
DS-82	09/21/11	68/69	SAS	80	F	P 64 | 63 66 | 62 66 | 64 60 | 65 61 | 62 S 66 64 60 63 65	P	P	15' NORTH OF SEOS
DS-83	09/21/11	69/71	VS	94	F	P 57 | 59 63 | 63 66 | 66 63 | 63 64 | 66 S 65 60 64 62 63	P	P	15' NORTH OF SEOS
DS-84	09/21/11	71/72	XM	73	F	P 60 | 63 64 | 65 65 | 67 67 | 65 67 | 68 S 66 67 68 69 66	P	P	15' NORTH OF SEOS
DS-85	09/21/11	36/76	XM	73	F	P 68 | 70 69 | 68 70 | 67 70 | 69 68 | 70 S 75 76 74 70 72	P	P	20' EAST OF WEOS
DS-86	09/21/11	76/77	SAS	80	F	P 66 | 71 69 | 69 70 | 70 71 | 69 71 | 70 S 74 73 70 71 74	P	P	20' EAST OF WEOS
DS-87	09/21/11	77/78	VS	94	F	P 68 | 72 69 | 70 68 | 70 70 | 72 72 | 72 S 78 71 70 76 71	P	P	20' EAST OF WEOS
DS-88	09/21/11	78/79	SAS	80	F	P 65 | 65 63 | 65 63 | 67 67 | 68 69 | 65 S 70 72 74 70 73	P	P	20' EAST OF WEOS
DS-89	09/21/11	79/80	VS	94	F	P 62 | 63 64 | 67 63 | 68 66 | 63 65 | 64 S 70 71 79 74 73	P	P	20' EAST OF WEOS
DS-90	09/21/11	80/81	VS	94	F	P 63 | 63 64 | 60 66 | 65 68 | 66 67 | 65 S 66 63 64 65 66	P	P	20' EAST OF WEOS
DS-91	09/21/11	81/82	SAS	80	F	P 67 | 65 69 | 68 68 | 68 71 | 69 72 | 69 S 76 70 74 74 76	P	P	20' EAST OF WEOS
DS-92	09/21/11	82/83	XM	73	F	P 68 | 67 68 | 68 69 | 70 69 | 68 70 | 69 S 75 76 70 75 74	P	P	20' EAST OF WEOS
DS-93	09/21/11	83/84	SAS	80	F	P 67 | 66 69 | 67 70 | 68 66 | 66 67 | 64 S 76 75 76 70 71	P	P	20' EAST OF WEOS
DS-94	09/21/11	84/85	SAS	80	F	P 69 | 67 65 | 71 71 | 68 65 | 62 74 | 70 S 72 70 74 76 72	P	P	20' EAST OF WEOS
DS-95	09/21/11	85/86	XM	73	F	P 67 | 65 69 | 65 69 | 64 67 | 64 63 | 68 S 71 64 68 70 71	P	P	20' EAST OF WEOS
DS-96	09/21/11	86/87	VS	94	F	P 71 | 74 72 | 74 72 | 73 73 | 71 70 | 74 S 78 77 80 79 80	P	P	20' EAST OF WEOS
DS-97	09/21/11	87/88	SAS	80	F	P 75 | 74 74 | 76 76 | 76 78 | 76 77 | 75 S 78 80 81 79 78	P	P	20' EAST OF WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch					Pass / Fail		Location
												Field	Lab	
DS-98	09/22/11	88/89	SAS	80	F	P	73 72	72 73	72 73	66 70	68 70	P	P	20' EAST OF WEOS
						S	78	75	76	73	74			
DS-99	09/22/11	89/90	SAS	80	F	P	70 66	71 72	73 76	71 74	74 70	P	P	20' EAST OF WEOS
						S	78	80	79	80	81			
DS-100	09/22/11	90/91	VS	94	F	P	82 80	82 83	82 82	80 80	80 79	P	P	20' EAST OF WEOS
						S	87	88	80	87	83			
DS-101	09/22/11	91/92	XM	102	F	P	84 83	85 88	84 84	84 82	80 84	P	P	20' EAST OF WEOS
						S	89	90	92	86	89			
DS-102	09/22/11	92/93	VS	94	F	P	83 79	85 83	85 84	85 85	85 84	P	P	20' EAST OF WEOS
						S	86	89	87	80	90			
DS-103	09/22/11	93/94	SAS	80	F	P	79 80	79 79	81 81	79 79	81 81	P	P	20' EAST OF WEOS
						S	87	88	80	81	86			
DS-104	09/22/11	94/95	XM	102	F	P	78 80	72 73	74 73	77 74	76 70	P	P	20' EAST OF WEOS
						S	81	83	86	84	80			
DS-105	09/22/11	95/96	VS	94	F	P	79 78	80 79	81 79	80 81	78 78	P	P	20' EAST OF WEOS
						S	83	80	78	83	84			
						P								
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Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch					Pass / Fail Field	Pass / Fail Lab	Location
DS-106	09/26/11	100/101	VS	94	F	P	82 79	85 85	85 85	85 86	82 82	P	P	15' NORTH OF SEOS
						S	86	83	85	87	80			
DS-107	09/26/11	101/102	SAS	80	F	P	79 84	80 78	87 81	82 78	79 82	P	P	15' NORTH OF SEOS
						S	87	91	85	90	89			
DS-108	09/26/11	102/103	XM	102	F	P	80 73	83 81	74 79	80 77	80 78	P	P	20' NORTH OF SEOS
						S	84	85	83	84	80			
DS-109	09/26/11	103/106	XM	102	F	P	66 69	69 71	69 68	68 66	67 64	P	P	20' NORTH OF SEOS
						S	81	82	81	83	84			
DS-110	09/26/11	104/105	VS	94	F	P	81 82	77 80	83 83	82 83	83 84	P	P	20' NORTH OF SEOS
						S	80	87	89	84	86			
DS-111	09/26/11	103/104	VS	94	F	P	74 71	74 77	79 79	75 77	79 77	P	P	20' NORTH OF SEOS
						S	86	78	80	79	81			
DS-112	09/26/11	65/106	XM	102	F	P	68 66	71 70	69 64	73 72	65 66	P	P	15' NORTH OF SEOS
						S	80	83	84	85	80			
DS-113	09/26/11	106/107	VS	94	F	P	78 73	76 80	76 80	78 79	77 80	P	P	15' NORTH OF SEOS
						S	80	82	84	80	81			
DS-114	09/26/11	107/108	SAS	80	F	P	81 81	78 82	78 78	82 81	80 81	P	P	15' NORTH OF SEOS
						S	88	81	80	84	85			
DS-115	09/26/11	108/109	XM	102	F	P	71 75	75 72	77 70	74 72	76 76	P	P	25' NORTH OFSEOS
						S	84	78	78	80	79			
DS-116	09/26/11	109/110	VS	94	F	P	70 75	72 77	77 72	76 71	71 76	P	P	15' NORTH OF SEOS
						S	80	73	75	80	78			
DS-117	09/26/11	110/111	SAS	80	F	P	71 64	68 71	71 71	71 72	72 70	P	P	15' NORTH OF SEOS
						S	84	87	80	83	84			
DS-118	09/26/11	111/112	XM	102	F	P	60 60	64 61	64 63	64 64	63 62	P	P	45' NORTH OF SEOS
						S	61	64	63	65	60			
DS-119	09/26/11	112/113	VS	94	F	P	64 63	62 63	64 63	63 64	64 62	P	P	15' NORTH OF SEOS
						S	65	66	68	70	64			
DS-120	09/26/11	75/113	VS	94	F	P	64 68	67 68	66 68	70 67	72 67	P	P	15' SOUTH OF NEOS
						S	80	82	84	79	76			
DS-121	09/26/11	114/116	SAS	80	F	P	70 67	66 69	70 69	69 69	67 69	P	P	5' NORTH OF SEOS
						S	70	75	80	79	80			
DS-122	09/26/11	116/118	XM	102	F	P	65 67	70 66	70 70	70 65	67 69	P	P	5' NORTH OF SEOS
						S	66	64	65	66	66			
DS-123	09/26/11	115/117	XM	102	F	P	69 69	69 70	63 68	71 70	68 69	P	P	15' SOUTH OF NEOS
						S	64	65	70	68	69			
DS-124	09/26/11	75/113	VS	94	F	P	86 81	82 87	81 84	84 89	83 84	P	P	15' NORTH OF SEOS
						S	87	92	90	89	88			
DS-125	09/26/11	113/115	SAS	80	F	P	85 85	86 86	87 88	85 85	88 86	P	P	5' NORTH OF SEOS
						S	68	70	73	69	68			
						P								
						S								

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type	Test Values lbs/inch	Pass / Fail Field	Pass / Fail Lab	Location
DS-126	09/28/11	98A/99A	SAS	80	F	P 74 | 70 — 70 | 73 — 76 | 71 — 75 | 71 — 74 | 69 S 66 — 69 — 70 — 65 — 64	P	P	15' WEST OF EEOS
DS-127	09/28/11	96A/97A	XM	102	F	P 67 | 66 — 69 | 68 — 69 | 67 — 69 | 65 — 70 | 66 S 76 — 64 — 66 — 65 — 64	P	P	5' WEST OF EEOS
DS-128	09/28/11	93A/94A	XM	102	F	P 66 | 63 — 67 | 67 — 68 | 66 — 68 | 68 — 66 | 66 S 64 — 67 — 68 — 69 — 64	P	P	5' WEST OF EEOS
DS-129	09/28/11	91A/92A	VS	73	F	P 68 | 80 — 66 | 80 — 67 | 81 — 78 | 76 — 72 | 75 S 84 — 80 — 83 — 86 — 84	P	P	5' WEST OF EEOS
DS-130	09/28/11	90A/91A	SAS	80	F	P 73 | 76 — 78 | 76 — 79 | 80 — 71 | 77 — 74 | 78 S 80 — 84 — 83 — 81 — 81	P	P	10' WEST OF EEOS
DS-131	09/28/11	88A/89A	VS	73	F	P 72 | 67 — 69 | 64 — 69 | 68 — 69 | 68 — 70 | 68 S 73 — 76 — 78 — 70 — 71	P	P	10' WEST OF EEOS
DS-132	09/28/11	87A/88A	SAS	80	F	P 65 | 64 — 63 | 62 — 62 | 63 — 64 | 63 — 60 | 64 S 75 — 70 — 69 — 70 — 68	P	P	10' WEST OF EEOS
DS-133	09/28/11	85A/86A	VS	73	F	P 66 | 65 — 65 | 67 — 66 | 65 — 70 | 68 — 70 | 65 S 73 — 70 — 72 — 75 — 76	P	P	15' WEST OF EEOS
DS-134	09/28/11	83A/84A	XM	102	F	P 72 | 74 — 70 | 74 — 71 | 73 — 75 | 72 — 73 | 70 S 71 — 73 — 70 — 72 — 71	P	P	5' WEST OF EEOS
DS-135	09/28/11	81A/82A	SAS	80	F	P 70 | 67 — 70 | 69 — 75 | 69 — 75 | 71 — 73 | 73 S 75 — 70 — 74 — 75 — 73	P	P	10' WEST OF EEOS
DS-136	09/28/11	79A/80A	VS	73	F	P 67 | 64 — 65 | 68 — 66 | 62 — 61 | 64 — 64 | 64 S 69 — 70 — 64 — 69 — 68	P	P	10' WEST OF EEOS
DS-137	09/28/11	77A/78A	XM	102	F	P 71 | 63 — 71 | 73 — 69 | 70 — 66 | 60 — 65 | 67 S 68 — 65 — 68 — 64 — 63	P	P	15' WEST OF EEOS
DS-138	09/28/11	36A/76A	SAS	80	F	P 66 | 67 — 64 | 67 — 69 | 68 — 70 | 69 — 70 | 67 S 69 — 70 — 71 — 68 — 65	P	P	10' WEST OF EEOS
DS-139	09/29/11	35A/36A	XM	102	F	P 64 | 60 — 61 | 63 — 63 | 64 — 64 | 60 — 64 | 61 S 63 — 63 — 66 — 65 — 60	P	P	10' WEST OF EEOS
DS-140	09/29/11	34A/35A	VS	73	F	P 60 | 60 — 61 | 60 — 63 | 60 — 60 | 58 — 61 | 64 S 67 — 68 — 64 — 63 — 67	P	P	5' WEST OF EEOS
DS-141	09/29/11	33A/34A	VS	73	F	P 62 | 63 — 61 | 60 — 60 | 63 — 62 | 61 — 62 | 63 S 69 — 70 — 68 — 69 — 67	P	P	10' WEST OF EEOS
DS-142	09/29/11	32A/33A	VS	73	F	P 61 | 58 — 60 | 59 — 62 | 60 — 64 | 61 — 60 | 60 S 68 — 69 — 64 — 63 — 61	P	P	10' WEST OF EEOS
DS-143	09/29/11	31A/32A	VS	73	F	P 65 | 65 — 64 | 65 — 66 | 67 — 66 | 64 — 65 | 65 S 68 — 67 — 69 — 63 — 64	P	P	10' WEST OF EEOS
DS-144	09/29/11	30A/31A	VS	73	F	P 68 | 68 — 65 | 70 — 66 | 70 — 66 | 65 — 68 | 65 S 72 — 70 — 73 — 68 — 69	P	P	10' WEST OF EEOS
DS-145	09/29/11	29A/30A	XM	102	F	P 69 | 66 — 70 | 70 — 71 | 69 — 70 | 69 — 71 | 69 S 70 — 68 — 70 — 69 — 70	P	P	10' WEST OF EEOS
DS-146	09/29/11	28A/29A	VS	73	F	P 65 | 60 — 68 | 64 — 65 | 70 — 64 | 63 — 66 | 66 S 70 — 68 — 69 — 70 — 71	P	P	10' WEST OF EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-147	09/29/11	27A/28A	SAS	80	F	P	63	65	66	65	65	64	64	64	65	63	P	P	10' WEST OF EEOS
						S	69		70		68		64		64				
DS-148	09/29/11	26A/27A	SAS	80	F	P	62	60	61	64	60	63	60	62	66	61	P	P	10' WEST OF EEOS
						S	70		67		64		65		69				
DS-149	09/29/11	123/125	XM	102	F	P	65	66	64	66	66	67	68	64	64	62	P	P	10' WEST OF EEOS
						S	70		71		73		70		68				
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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch					Pass / Fail Field	Pass / Fail Lab	Location
DS-150	10/01/11	25A/26A	XM	73	F	P	72 69	69 74	70 74	75 72	76 72	P	P	10' WEST OF EEOS
						S	82	81	80	83	78			
DS-151	10/01/11	24A/25A	VS	94	F	P	73 73	73 73	75 75	74 77	74 75	P	P	10' WEST OF EEOS
						S	78	80	79	78	80			
DS-152	10/01/11	23A/24A	SAS	80	F	P	66 69	69 69	70 71	70 71	71 71	P	P	35' WEST OF EEOS
						S	76	78	80	77	76			
DS-153	10/01/11	22A/23A	VS	94	F	P	68 64	69 66	65 70	65 69	68 69	P	P	10' WEST OF EEOS
						S	74	78	79	77	80			
DS-154	10/01/11	21A/22A	XM	73	F	P	63 67	65 67	69 74	66 68	65 68	P	P	10' WEST OF EEOS
						S	73	70	71	74	73			
DS-155	10/01/11	20A/21A	SAS	80	F	P	77 80	70 70	68 71	73 71	69 71	P	P	10' WEST OF EEOS
						S	80	70	79	76	77			
DS-156	10/04/11	105/136	SAS	80	F	P	70 70	73 71	72 70	72 71	71 70	P	P	15' WEST OF EEOS
						S	75	74	75	75	70			
DS-157	10/01/11	104A/136	SAS	80	F	P	69 70	70 68	70 69	69 67	68 68	P	P	10' NORTH OF SEOS
						S	71	70	68	69	68			
DS-158	10/01/11	137/138	SAS	80	F	P	64 62	64 64	63 62	63 62	62 63	P	P	10' NORTH OF SEOS
						S	66	69	68	67	65			
DS-159	10/01/11	138/139	VS	94	F	P	62 62	62 63	62 63	63 66	63 62	P	P	10' NORTH OF SEOS
						S	64	68	63	65	66			
DS-160	10/01/11	106/139	XM	102	F	P	68 69	67 66	66 66	66 67	67 69	P	P	10' NORTH OF SEOS
						S	71	70	69	68	67			
DS-161	10/01/11	106A/107A	SAS	80	F	P	68 70	70 70	69 71	71 70	71 71	P	P	10' NORTH OF SEOS
						S	75	70	73	74	70			
DS-162	10/01/11	107A/108A	VS	94	F	P	72 70	68 66	67 68	70 72	71 69	P	P	10' NORTH OF SEOS
						S	72	71	73	76	77			
DS-163	10/01/11	108A/109A	XM	102	F	P	69 67	70 71	66 71	66 64	69 66	P	P	10' NORTH OF SEOS
						S	72	71	70	71	73			
DS-164	10/01/11	109A/110A	VS	94	F	P	60 64	63 62	65 61	62 64	64 64	P	P	10' NORTH OF SEOS
						S	68	70	69	70	67			
DS-165	10/01/11	110A/111A	SAS	80	F	P	60 63	60 61	58 60	61 60	60 61	P	P	10' NORTH OF SEOS
						S	65	67	70	70	69			
DS-166	10/01/11	111A/112A	XM	102	F	P	62 60	57 60	60 60	60 60	62 60	P	P	15' NORTH OF SEOS
						S	64	61	64	63	64			
DS-167	10/01/11	112A/114A	XM	102	F	P	64 62	63 62	63 63	64 60	63 60	P	P	10' NORTH OF SEOS
						S	65	64	65	66	63			
DS-168	10/01/11	114A/151	VS	94	F	P	68 68	68 67	69 68	67 67	67 68	P	P	10' NORTH OF SEOS
						S	72	70	71	72	70			
DS-169	10/01/11	151/153	VS	94	F	P	67 70	67 70	68 69	69 69	70 69	P	P	10' NORTH OF SEOS
						S	76	77	72	70	68			
DS-170	10/01/11	143/144	XM	102	F	P	70 70	71 66	71 70	71 70	70 69	P	P	10' NORTH OF sEOS
						S	75	70	74	70	73			

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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-171	10/04/11	144/145	VS	94	F	P	69	71	69	68	69	69	67	69	70	69	P	P	10' NORTH OF SEOS
						S	76		77		74		76		76				
DS-172	10/04/11	145/148	SAS	80	F	P	70	72	72	68	71	78	70	70	68	70	P	P	10' NORTH OF SEOS
						S	77		76		77		74		75				
DS-173	10/04/11	148/149	XM	102	F	P	68	66	69	70	73	68	70	72	73	70	P	P	10' NORTH OF SEOS
						S	79		80		78		76		81				
DS-174	10/04/11	149/150	XM	102	F	P	64	67	67	68	69	63	68	72	69	69	P	P	10' NORTH OF SEOS
						S	80		77		82		80		79				
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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-175	10/10/11	153/159	XM	102	F	P	68	75	77	68	75	85	84	81	79	81	P	P	12' SOUTH OF NEOS
						S	85		89		84		85		84				
DS-176	10/10/11	159/161	VS	94	F	P	82	82	83	82	85	78	82	86	83	84	P	P	15' SOUTH OF NEOS
						S	92		90		91		92		90				
DS-177	10/10/11	161/163	SAS	80	F	P	85	85	85	85	83	86	86	85	87	83	P	F	18' SOUTH OF NEOS
						S	96		90		94		95		96				
DS-178	10/10/11	163/166	VS	94	F	P	86	80	84	83	85	80	80	82	88	79	P	P	15' SOUTH OF NEOS
						S	96		95		90		97		96				
DS-179	10/10/11	166/168	XM	102	F	P	76	79	81	81	77	80	77	81	78	79	P	P	15' SOUTH OF NEOS
						S	89		88		87		86		85				
DS-180	10/10/11	168/171	SAS	80	F	P	75	77	80	76	76	76	78	75	76	74	P	P	15' SOUTH OF NEOS
						S	85		86		87		85		80				
DS-181	10/10/11	171/175	VS	94	F	P	78	81	78	80	77	79	78	81	78	82	P	P	15' SOUTH OF NEOS
						S	83		85		84		83		80				
DS-182	10/10/11	175/178	XM	102	F	P	82	82	82	83	82	81	83	84	80	83	P	P	15' SOUTH OF NEOS
						S	87		88		86		87		88				
DS-183	10/10/11	178/181	SAS	80	F	P	84	84	83	76	83	84	84	84	75	85	P	F	15' SOUTH OF NEOS
						S	95		90		93		88		89				
DS-184	10/10/11	181/183	XM	102	F	P	77	76	82	77	77	83	82	77	77	82	P	P	15' SOUTH OF NEOS
						S	86		87		88		84		84				
DS-185	10/10/11	183/185	VS	94	F	P	81	82	80	82	80	82	81	82	83	81	P	P	15' SOUTH OF NEOS
						S	86		87		86		89		90				
DS-186	10/10/11	185/187	SAS	80	F	P	86	86	86	85	89	88	85	83	87	85	P	P	15' SOUTH OF NEOS
						S	91		90		79		84		80				
DS-187	10/10/11	187/189	XM	102	F	P	78	74	81	75	82	77	79	80	79	77	P	P	15' SOUTH OF NEOS
						S	87		88		90		86		89				
DS-188	10/10/11	189/190	VS	94	F	P	80	83	84	81	86	81	82	83	86	81	P	P	15' SOUTH OF NEOS
						S	89		90		87		89		88				
DS-189	10/10/11	190/192	SAS	80	F	P	83	83	83	85	84	82	81	80	83	82	P	P	15' SOUTH OF NEOS
						S	88		85		86		88		81				
DS-190	10/10/11	192/193	XM	102	F	P	76	79	78	84	76	76	78	81	84	69	P	P	15' SOUTH OF NEOS
						S	87		88		89		90		87				
DS-191	10/10/11	193/195	VS	94	F	P	85	80	82	81	80	84	81	84	81	84	P	P	15' SOUTH OF NEOS
						S	88		82		86		83		81				
DS-192	10/10/11	195/196	XM	102	F	P	76	82	76	76	79	82	80	80	72	81	P	P	15' SOUTH OF NEOS
						S	85		86		87		85		80				
DS-193	10/10/11	196/198	SAS	80	F	P	82	80	82	80	81	80	78	81	82	79	P	P	15' SOUTH OF NEOS
						S	88		89		90		87		88				
DS-194	10/10/11	198/199	VS	94	F	P	78	84	80	78	76	76	78	78	78	83	P	P	15' SOUTH OF NEOS
						S	82		86		88		83		81				
DS-195	10/11/11	199/201	XM	102	F	P	83	80	82	80	83	84	84	83	83	81	P	P	15' SOUTH OF NEOS
						S	87		88		86		87		84				

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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-196	10/11/11	201/202	VS	94	F	P	85	87	84	87	85	87	84	89	86	87	P	P	15' SOUTH OF NEOS
						S	90		91		92		89		87				
DS-197	10/11/11	202/204	VS	94	F	P	85	82	88	86	87	86	88	72	80	86	P	P	15' SOUTH OF NEOS
						S	87		88		89		88		87				
DS-198	10/11/11	204/205	VS	94	F	P	86	86	89	85	87	85	87	86	89	85	P	P	15' SOUTH OF NEOS
						S	89		90		87		88		89				
DS-199	10/11/11	205/207	XM	102	F	P	77	77	75	76	77	78	77	77	77	77	P	P	125' NORTH OF SEOS
						S	82		83		80		85		84				
DS-200	10/11/11	207/208	VS	94	F	P	77	70	77	78	76	78	76	78	79	76	P	P	15' SOUTH OF NEOS
						S	79		80		83		82		80				
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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-177A	10/14/11	161/163	SAS	80	F	P	94	96	93	96	94	98	95	100	93	99	P	P	5' SOUTH OF NEOS
						S	100		98		99		96		97				
DS-177B	10/14/11	161/163	SAS	80	F	P	85	95	100	99	94	89	88	91	86	94	P	P	20' SOUTH OF NEOS
						S	101		100		98		97		99				
DS-183A	10/14/11	178/181	SAS	80	F	P	79	85	84	90	89	86	77	80	81	83	P	P	5' SOUTH OF NEOS
						S	96		90		94		97		96				
DS-183B	10/14/11	178/181	SAS	80	F	P	76	80	82	84	86	75	89	90	83	87	P	P	20' SOUTH OF NEOS
						S	94		93		90		94		95				
DS-201	10/14/11	137/212	SAS	80	F	P	73	72	73	69	70	70	72	73	73	71	P	P	10' EAST OF WEOS
						S	80		81		78		79		80				
DS-202	10/14/11	212/214	VS	94	F	P	81	80	80	80	79	78	78	79	79	78	P	P	15' NORTH OF SEOS
						S	87		88		86		87		88				
DS-203	10/14/11	214/216	VS	94	F	P	74	71	73	70	72	69	77	73	74	72	P	P	15' NORTH OF SEOS
						S	80		83		84		82		80				
DS-204	10/14/11	216/217	SAS	80	F	P	74	68	72	68	72	70	70	71	73	68	P	P	15' NORTH OF SEOS
						S	80		78		79		80		81				
DS-205	10/14/11	217/219	XM	102	F	P	74	80	75	71	74	76	76	73	77	75	P	P	15' NORTH OF SEOS
						S	82		84		83		80		81				
DS-206	10/14/11	219/220	VS	94	F	P	75	74	77	75	76	76	76	77	76	73	P	P	15' NORTH OF SEOS
						S	85		86		87		86		87				
DS-207	10/14/11	220/222	XM	102	F	P	78	77	77	74	76	73	75	73	70	74	P	P	15' NORTH OF SEOS
						S	76		77		78		80		81				
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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
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Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-208	10/19/11	222/223	XM	102	F	P	105	94	91	100	101	93	105	94	96	104	P	P	15' NORTH OF SEOS
						S	103		104		105		103		104				
DS-209	10/19/11	223/225	VS	94	F	P	91	96	90	93	90	93	90	94	91	96	P	P	10' NORTH OF SEOS
						S	94		95		96		94		97				
DS-210	10/19/11	225/226	SAS	80	F	P	86	91	78	88	80	89	78	89	78	90	P	P	15' NORTH OF SEOS
						S	95		92		91		90		93				
DS-211	10/19/11	226/227	XM	102	F	P	88	89	88	88	87	87	87	90	88	86	P	P	15' NORTH OF SEOS
						S	100		96		99		100		98				
DS-212	10/19/11	227/229	VS	94	F	P	94	89	92	87	91	87	88	90	90	85	P	P	15' NORTH OF SEOS
						S	97		98		100		99		97				
DS-213	10/19/11	229/230	SAS	80	F	P	87	84	87	87	80	89	83	87	89	87	P	P	15' NORTH OF SEOS
						S	93		94		95		93		94				
DS-214	10/19/11	230/232	XM	102	F	P	87	87	87	86	89	85	89	85	87	89	P	P	25' NORTH OF SEOS
						S	89		91		90		89		87				
DS-215	10/19/11	232/233	VS	94	F	P	90	88	87	89	88	87	86	87	85	84	P	P	20' NORTH OF SEOS
						S	91		90		87		89		90				
DS-216	10/19/11	233/235	SAS	80	F	P	87	76	82	86	87	79	89	79	87	83	P	P	15' NORTH OF SEOS
						S	91		84		90		91		89				
DS-217	10/19/11	235/236	XM	102	F	P	83	83	83	84	84	80	84	81	81	83	P	P	30' NORTH OF SEOS
						S	86		87		86		85		88				
DS-218	10/19/11	236/238	VS	94	F	P	100	90	85	81	86	81	85	89	83	80	P	P	30' NORTH OF SEOS
						S	87		88		89		90		87				
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Destructive Test Record

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Project Location: Venice, IL
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Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type	Test Values lbs/inch										Pass / Fail		Location
																Field	Lab	
DS-219	10/21/11	262/263	XM	102	F	P	66	62	70	65	67	70	69	70	67	71	P	P	15' SOUTH OF NEOS
						S	76		77		80		71		70				
DS-220	10/21/11	261/262	XM	102	F	P	64	63	69	66	67	66	67	67	69	65	P	P	12' SOUTH OF NEOS
						S	70		73		71		72		70				
DS-221	10/21/11	260/261	XM	102	F	P	63	64	66	66	68	66	64	67	66	67	P	P	20' SOUTH OF NEOS
						S	73		74		75		70		70				
DS-222	10/21/11	259/260	VS	94	F	P	67	64	76	64	65	67	67	63	66	63	P	P	20' SOUTH OF NEOS
						P	70		70		70		72		71				
DS-223	10/21/11	258/259	SAS	73	F	P	64	63	68	64	68	63	62	64	61	70	P	P	18' SOUTH OF NEOS
						S	70		71		70		68		69				
DS-224	10/21/11	257/258	VS	94	F	P	78	81	81	79	79	82	81	82	83	80	P	P	15' SOUTH OF NEOS
						S	82		83		81		84		85				
DS-225	10/21/11	256/257	VS	94	F	P	80	83	81	82	82	81	81	83	80	80	P	P	15' SOUTH OF NEOS
						S	83		85		86		83		84				
DS-226	10/21/11	255/256	XM	102	F	P	81	82	81	80	81	81	83	80	80	81	P	P	18' SOUTH OF NEOS
						S	86		87		90		89		90				
DS-227	10/21/11	253/255	VS	94	F	P	85	82	80	82	84	81	81	80	83	80	P	P	18' SOUTH OF NEOS
						S	81		83		89		87		84				
DS-228	10/21/11	252/253	SAS	73	F	P	81	80	81	80	80	81	81	81	80	80	P	P	20' SOUTH OF NEOS
						S	90		91		87		90		89				
DS-229	10/21/11	250/252	VS	94	F	P	81	82	84	82	82	81	81	81	83	80	P	P	18' SOUTH OF NEOS
						S	81		83		85		84		81				
DS-230	10/21/11	249/251	XM	102	F	P	79	84	80	82	81	83	81	83	82	79	P	P	18' SOUTH OF NEOS
						S	85		86		84		83		86				
DS-231	10/21/11	248/249	XM	102	F	P	86	86	90	87	89	85	76	84	85	81	P	P	20' SOUTH OF NEOS
						S	86		87		90		85		86				
DS-232	10/21/11	246/248	VS	94	F	P	90	90	90	90	90	88	90	90	86	90	P	P	25' SOUTH OF NEOS
						S	89		86		89		90		87				
DS-233	10/21/11	244/246	SAS	73	F	P	74	82	88	73	77	85	87	82	79	87	P	P	25' SOUTH OF NEOS
						S	96		94		90		95		96				
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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-234	10/24/11	265/266	SAS	73	F	P	92	87	87	89	89	90	90	91	90	88	P	P	10' NORTH OF SEOS
						S	91		96		94		92		96				
DS-235	10/24/11	266/267	VS	94	F	P	85	90	85	90	90	86	87	90	90	86	P	P	10' NORTH OF SEOS
						S	90		94		92		93		90				
DS-236	10/24/11	267/268	SAS	73	F	P	89	85	88	88	90	86	84	86	84	89	P	P	10' NORTH OF SEOS
						S	94		93		90		92		90				
DS-237	10/24/11	268/269	VS	94	F	P	89	97	96	93	90	91	89	90	91	92	P	P	10' NORTH OF SEOS
						P	96		96		96		97		96				
DS-238	10/24/11	269/270	SAS	73	F	P	97	94	95	93	95	92	91	90	95	90	P	P	10' NORTH OF SEOS
						S	94		94		96		95		94				
DS-239	10/24/11	270/271	VS	94	F	P	94	84	91	92	84	92	88	93	96	91	P	P	10' NORTH OF SEOS
						S	94		95		94		95		91				
DS-240	10/24/11	271/273	SAS	73	F	P	84	87	92	91	89	92	82	89	89	92	P	P	10' NORTH OF SEOS
						S	91		94		90		93		94				
DS-241	10/24/11	273/274	VS	94	F	P	91	85	89	97	88	90	89	92	90	92	P	P	10' NORTH OF SEOS
						S	97		101		100		98		99				
DS-242	10/24/11	251/274	VS	94	F	P	79	78	78	80	77	80	79	80	80	79	P	P	10' NORTH OF SEOS
						S	80		87		79		75		80				
DS-243	10/24/11	274/276	SAS	73	F	P	86	85	85	89	88	87	91	85	88	82	P	P	10' NORTH OF SEOS
						S	90		89		81		90		87				
DS-244	10/24/11	276/278	XM	102	F	P	79	81	81	82	83	84	82	82	82	80	P	P	10' NORTH OF SEOS
						S	87		88		90		87		88				
DS-245	10/24/11	278/279	VS	94	F	P	80	83	82	80	79	81	80	80	81	78	P	P	10' NORTH OF SEOS
						S	85		86		80		83		86				
DS-246	10/24/11	279/280	SAS	73	F	P	80	82	82	86	83	81	81	82	82	80	P	P	7' NORTH OF SEOS
						S	87		90		91		86		89				
DS-247	10/24/11	280/282	XM	102	F	P	78	81	81	79	75	80	72	79	80	79	P	P	5' NORTH OF SEOS
						S	83		85		86		83		80				
DS-248	10/24/11	289/291	VS	94	F	P	81	81	80	81	81	80	80	80	79	80	P	P	12' NORTH OF SEOS
						S	83		84		85		83		84				
DS-249	10/24/11	287/290	SAS	73	F	P	79	80	81	81	80	83	80	81	80	87	P	P	5' NORTH OF SEOS
						S	85		86		85		84		86				
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Destructive Test Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Pond Closure
Project Location: Venice, IL
Aquaterra Project Number: 4923.10

Specifications: 40 mil

	Wedge	Extrusion
Peel (P)	≥ 50	≥ 44
Shear (S)	≥ 60	≥ 60

5 of 5 bones

Aquaterra CQA Technician: Collin Carson
Installing Company: GSI
QC Personnel: Tok Sisoumphou

Destruct ID	Date	Seam Number	Seamer Initials	Machine Number	Weld Type		Test Values lbs/inch										Pass / Fail Field	Pass / Fail Lab	Location
DS-250	10/25/11	312/313	SAS	73	F	P	80	81	81	79	80	80	80	80	81	82	P	P	15' NORTH OF SEOS
						S	85		84		86		87		84				
DS-251	10/25/11	311/312	SAS	73	F	P	82	81	81	83	79	80	84	80	84	80	P	P	21' NORTH OF SEOS
						S	84		86		87		90		88				
DS-252	10/25/11	310/311	VS	94	F	P	82	81	82	81	81	81	81	82	80	82	P	P	15' NORTH OF SEOS
						S	86		87		86		84		85				
DS-253	10/25/11	308/310	SAS	73	F	P	81	80	82	84	83	82	85	81	80	80	P	P	15' NORTH OF SEOS
						P	86		87		87		84		85				
DS-254	10/25/11	307/308	VS	94	F	P	83	80	78	77	89	86	78	85	81	85	P	P	15' NORTH OF SEOS
						S	94		90		78		90		79				
DS-255	10/25/11	306/307	SAS	73	F	P	84	79	81	81	82	81	82	82	83	82	P	P	15' NORTH OF SEOS
						S	85		86		84		86		84				
DS-256	10/25/11	305/306	VS	94	F	P	85	82	82	81	81	83	80	80	81	83	P	P	15' NORTH OF SEOS
						S	86		87		88		86		88				
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GEOMEMBRANE LINER DESTRUCTIVE LABORATORY TEST RESULTS

TRI/Environmental, Inc.
A Texas Research International Company

Date: 2011-09-15

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

Bill To:

Aquaterra Environmental Solution
4923.10

e-mail:ccarson@aquaterra-env.com

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6657**
Material(s) Tested:	(21) Heat Fusion Weld Seam(s) (2) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-1 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	70	77	70	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	74	72	76	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	79	73	82	72	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-2 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	73	78	71	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	69	70	76	76	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	75	81	80	70	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

The testing is based upon accepted industry practices as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claims as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-3 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	67	68	68	68	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	80	81	79	78	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	74	88	85	86	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-4 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	68	66	70	72	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	80	74	79	74	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	90	81	79	81	77	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-7 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	81	79	79	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	82	76	83	79	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	81	80	79	82	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-8 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	67	67	69	70	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	79	78	79	80	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	75	74	77	74	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-9 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	70	60	71	62	**66**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	76	77	86	75	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	75	76	76	76	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-10 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	75	72	74	73	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	73	72	72	77	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	74	72	73	74	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-11 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	72	73	74	75	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	68	70	67	71	69	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	73	75	72	74	81	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-12 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	78	80	83	80	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	81	81	85	82	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	79	78	86	82	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-13 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	68	68	65	68	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	81	72	69	81	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	83	86	75	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-14 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	68	74	72	70	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	70	76	72	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	79	80	79	80	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-15 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	69	67	68	66	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	75	75	74	71	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	78	78	82	79	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-16 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	65	68	66	65	68	**66**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	72	78	71	69	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	74	74	73	72	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-17 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	83	77	79	81	81	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	88	86	84	80	85	**85**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	69	74	78	85	74	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-18 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	82	71	83	84	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	71	76	79	86	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	76	86	78	84	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-19 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	66	66	70	69	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	72	70	70	71	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	86	78	86	91	86	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-21 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	70	71	71	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	71	71	74	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	71	72	75	75	72	**73**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-22 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	71	67	72	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	76	79	79	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	73	73	73	76	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-23 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	76	76	77	81	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	78	78	76	74	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	77	77	77	80	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-24 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	87	76	77	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	88	77	85	86	87	**85**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	75	76	80	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40 mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6657

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-25 | Weld: Single Extrusion							
Side: Peel						**Peel**	
Peel Strength (ppi)	60	69	83	72	64	**70**	44 min.
Peel Incursion (%)	<5%	<5%	<5%	<5%	<5%		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	73	80	74	77	80	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-26 | Weld: Single Extrusion							
Side: Peel						**Peel**	
Peel Strength (ppi)	80	80	70	78	85	**79**	44 min.
Peel Incursion (%)	<5%	<5%	<5%	<5%	<5%		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	80	75	84	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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Date: 2011-09-20

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

e-mail:ccarson@aquaterra-env.com

Bill To:

Aquaterra Environmental Solution
4923.10

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6704**
Material(s) Tested:	(47) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-20 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	79	79	80	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	76	78	78	77	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	87	85	87	89	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-27 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	81	82	79	76	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	73	82	75	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	87	85	85	84	89	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-28 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	80	80	78	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	73	81	73	77	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	88	85	83	87	88	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-29 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	70	69	75	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	88	83	85	84	81	**84**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	75	77	83	90	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-30 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	71	70	69	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	73	82	76	72	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	79	82	79	84	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-31 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	70	67	68	67	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	73	72	76	87	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	76	71	77	74	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-32 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	70	68	68	72	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	72	69	83	75	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	87	71	77	71	86	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-33 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	76	75	77	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	78	77	78	78	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	89	83	83	83	83	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-34 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	85	82	80	75	80	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	75	73	70	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	89	85	86	85	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-35 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	73	71	74	70	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	75	71	74	69	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	80	76	81	76	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-36 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	63	64	65	69	71	**66**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	74	72	75	82	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	78	76	75	76	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-37 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	74	72	76	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	75	75	72	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	80	77	73	81	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-38 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	68	65	69	68	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	68	70	69	72	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	80	74	78	77	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-39 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	73	72	74	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	69	72	70	69	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	80	78	79	83	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-40 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	76	74	75	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	73	72	75	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	81	79	79	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-41 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	77	77	79	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	86	83	80	89	85	**85**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	84	77	79	78	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-42 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	78	74	75	69	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	83	73	75	73	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	79	79	77	86	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-43 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	77	76	73	73	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	78	84	80	72	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	81	79	83	78	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-44 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	79	79	79	82	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	81	77	70	83	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	79	78	84	83	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-45 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	80	81	78	76	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	80	81	79	74	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	90	82	86	86	88	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-46 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	75	78	76	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	76	78	74	73	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	88	85	84	86	86	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-47 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	79	72	79	78	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	90	77	94	90	**86**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	81	83	77	81	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-48 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	76	75	78	72	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	93	81	90	91	90	**89**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	79	79	78	89	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-49 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	95	79	92	81	92	**88**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	81	84	91	94	**86**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	84	89	82	90	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-50 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	80	82	79	79	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	82	78	82	80	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	82	87	87	83	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-51 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	77	78	80	81	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	77	77	76	74	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	88	84	84	84	86	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-52 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	83	81	80	82	84	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	80	82	82	85	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	77	80	84	87	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-53 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	78	69	71	72	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	82	76	76	77	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	73	73	76	72	77	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-54 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	64	73	73	71	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	75	74	74	73	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	78	88	77	77	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-55 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	75	79	76	80	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	79	81	79	81	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	83	81	85	87	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-56 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	68	70	74	71	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	83	80	81	85	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	80	81	80	82	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-57 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	75	79	75	77	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	74	78	73	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	77	76	79	78	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-58 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	79	77	78	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	84	76	87	82	85	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	76	80	76	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-59 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	78	78	78	81	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	77	79	76	81	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	81	81	80	81	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-60 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	66	71	69	77	68	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	72	72	72	72	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	75	81	78	74	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-61 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	72	72	73	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	78	71	71	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	77	78	77	73	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-62 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	79	79	79	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	77	77	76	81	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	85	87	82	84	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-63 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	79	83	83	82	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	82	84	79	78	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	86	84	83	82	92	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-64 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	67	69	70	67	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	80	78	77	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	81	81	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-65 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	80	80	87	80	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	96	93	90	89	90	**92**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	86	83	82	84	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-66 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	76	73	76	69	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	77	78	84	79	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	81	81	81	82	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-67 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	79	80	80	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	69	77	78	77	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	83	79	79	79	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-68 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	80	73	81	78	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	78	90	79	93	**84**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	82	82	85	82	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-69 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	71	71	74	79	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	87	79	89	90	**85**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	78	78	79	84	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-70 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	77	83	80	80	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	80	79	81	73	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	82	82	81	81	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-71 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	78	74	73	72	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	75	82	80	77	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	83	77	76	78	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6704

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-72 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	70	67	72	70	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	81	70	72	82	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	91	87	78	69	95	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2011-09-23

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

Bill To:

Aquaterra Environmental Solution
4923.10

e-mail:ccarson@aquaterra-env.com

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6752**
Material(s) Tested:	(23) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-73 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	65	68	67	68	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	86	83	100	79	82	**86**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	80	81	83	83	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-74 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	68	64	71	66	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	91	91	85	86	90	**89**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	77	76	79	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-75 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	81	82	80	82	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	84	82	84	83	89	**84**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	82	83	85	87	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-76 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	76	72	76	72	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	79	75	76	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	92	80	81	89	91	**87**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-77 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	70	71	74	72	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	82	74	74	84	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	77	73	73	77	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-78 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	75	74	82	74	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	78	78	83	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	76	74	75	79	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-79 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	71	72	71	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	75	72	78	73	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	77	74	76	77	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-80 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	82	70	80	83	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	82	79	85	84	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	80	78	87	87	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-81 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	74	75	75	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	74	75	75	79	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	82	75	76	91	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-82 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	72	73	81	78	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	78	73	82	75	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	80	80	76	82	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-83 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	72	70	68	73	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	75	73	76	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	78	79	77	76	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-84 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	75	70	72	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	81	81	72	72	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	81	71	69	86	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-85 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	79	79	80	82	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	79	78	79	74	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	78	80	80	80	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-86 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	76	72	75	77	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	85	83	84	83	**84**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	82	83	83	81	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-87 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	82	72	82	84	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	80	78	77	80	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	81	81	81	79	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-88 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	72	70	77	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	78	85	78	75	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	78	81	79	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-89 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	77	76	76	80	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	80	77	79	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	74	72	73	79	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-90 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	78	74	76	79	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	81	79	78	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	79	79	78	78	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-91 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	74	83	76	77	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	83	81	83	81	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	81	82	85	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-92 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	78	85	80	80	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	82	81	71	26	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	80	81	81	81	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-93 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	81	83	83	82	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	79	81	80	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	80	87	80	79	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-94 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	79	77	76	79	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	79	78	79	75	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	83	81	80	81	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6752

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-95 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	72	79	76	73	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	81	80	74	72	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	78	78	78	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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Date: 2011-09-30

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

e-mail:ccarson@aquaterra-env.com

Bill To:

Aquaterra Environmental Solution
4923.10

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6820**
Material(s) Tested:	(54) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-96 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	74	71	72	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	74	77	68	76	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	77	77	77	80	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-97 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	71	68	71	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	72	68	70	68	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	79	76	69	82	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-98 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	74	77	76	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	89	74	89	90	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	78	80	83	81	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-99 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	74	74	75	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	84	83	82	82	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	80	79	81	82	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-100 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	79	73	76	70	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	76	77	77	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	81	78	83	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-101 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	74	79	77	76	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	77	75	78	75	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	78	77	80	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-102 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	80	83	80	79	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	76	79	77	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	79	79	79	83	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-103 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	77	76	76	76	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	82	78	75	86	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	78	80	82	77	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-104 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	71	72	72	70	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	84	71	79	74	78	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	94	87	84	84	84	**87**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-105 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	76	78	78	75	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	77	75	73	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	78	76	81	78	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-106 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	82	80	80	81	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	81	76	79	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	83	83	88	88	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-107 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	74	81	80	78	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	76	74	83	71	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	88	86	82	84	83	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-108 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	72	71	74	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	76	79	78	78	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	87	85	87	83	84	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-109 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	71	77	75	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	76	82	80	78	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	92	83	78	79	89	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-110 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	76	78	82	76	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	78	78	80	76	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	83	81	86	83	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-111 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	74	78	71	79	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	84	77	83	82	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	87	86	82	82	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-112 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	72	73	79	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	85	87	78	93	**84**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	87	85	86	83	83	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-113 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	80	80	79	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	77	76	77	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	86	84	82	81	82	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-114 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	80	79	80	84	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	73	76	80	77	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	87	82	83	83	81	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-115 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	69	70	72	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	76	72	75	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	83	84	92	81	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-116 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	76	75	73	70	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	76	78	75	73	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	78	74	75	79	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-117 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	72	69	69	72	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	71	72	73	74	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	72	73	73	73	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-118 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	70	71	76	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	67	70	67	71	66	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	82	72	73	67	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-119 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	72	70	76	73	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	71	69	72	71	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	76	79	78	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-120 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	76	74	79	80	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	72	75	73	69	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	87	81	76	76	85	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-121 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	78	82	77	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	77	76	79	74	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	77	78	80	82	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-122 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	66	68	73	73	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	71	77	79	81	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	69	71	72	72	75	**72**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-123 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	68	68	69	69	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	85	85	79	89	84	**84**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	89	80	81	82	93	**85**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-124 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	75	74	75	73	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	71	70	75	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	74	73	76	77	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-125 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	80	75	76	75	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	78	78	78	76	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	76	76	78	79	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-126 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	75	76	77	79	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	80	77	79	76	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	81	81	83	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-127 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	68	67	66	69	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	76	72	71	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	84	81	82	81	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

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TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-128 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	67	71	67	77	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	72	76	72	73	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	79	79	78	81	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-129 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	58	68	59	70	60	**63**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	76	78	77	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	79	78	78	78	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-130 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	72	72	78	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	75	73	78	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	78	76	77	75	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-131 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	70	72	74	77	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	74	75	77	77	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	75	79	77	88	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

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TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-132 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	70	71	74	70	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	68	69	71	69	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	77	74	75	77	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-133 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	74	69	71	73	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	86	82	74	83	73	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	77	78	79	78	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-134 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	70	65	68	70	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	81	76	76	75	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	82	81	81	78	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-135 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	81	77	82	77	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	75	74	78	78	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	80	80	81	83	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

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TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-136 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	66	69	68	71	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	90	80	84	80	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	74	72	75	74	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-137 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	67	71	71	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	72	72	72	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	91	87	87	81	83	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-138 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	76	75	78	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	78	77	77	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	76	80	79	85	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-139 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	72	75	78	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	69	69	71	72	68	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	82	78	81	79	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-140 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	71	73	74	74	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	77	86	78	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	82	79	74	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-141 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	69	69	72	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	84	88	71	87	83	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	80	78	77	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-142 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	62	68	65	65	**65**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	70	69	69	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	76	72	75	73	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-143 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	71	70	73	73	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	72	72	71	70	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	78	79	80	81	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-144 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	64	76	64	77	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	82	76	77	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	78	77	79	80	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-145 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	65	65	66	70	69	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	73	75	75	78	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	77	81	82	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-146 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	58	66	60	67	58	**62**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	72	71	71	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	73	76	78	79	79	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-147 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	72	69	72	77	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	76	74	77	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	76	75	77	78	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6820

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-148 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	75	74	78	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	79	76	78	74	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	80	76	78	75	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-149 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	79	78	81	80	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	78	76	80	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	84	78	82	79	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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Date: 2011-10-06

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

e-mail:ccarson@aquaterra-env.com

Bill To:

Aquaterra Environmental Solution
4923.10

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6887**
Material(s) Tested:	(14) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-150 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	73	70	66	68	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	95	96	84	92	77	**89**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	82	82	82	83	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-151 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	74	71	75	78	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	78	77	76	79	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	84	80	83	85	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-152 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	73	74	77	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	72	71	74	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	82	83	79	87	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-153 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	76	73	74	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	71	68	70	73	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	78	73	80	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-154 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	70	68	75	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	90	78	82	84	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	86	82	76	84	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-155 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	76	76	74	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	77	76	77	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	79	76	81	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-156 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	80	82	81	76	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	84	83	81	83	81	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	87	81	83	85	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-157 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	79	79	79	74	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	79	79	77	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	80	80	85	84	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-158 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	76	71	71	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	74	71	73	70	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	76	71	72	74	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-159 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	78	76	74	73	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	74	74	72	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	73	71	74	80	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-160 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	77	77	73	76	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	76	77	77	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	81	79	81	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-161 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	84	77	79	78	81	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	79	72	79	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	88	84	81	84	84	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6887

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-162 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	77	74	82	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	78	79	81	81	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	82	80	81	85	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-163 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	79	79	79	80	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	72	77	80	73	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	88	83	89	88	**86**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2011-10-07

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

e-mail:ccarson@aquaterra-env.com

Bill To:

Aquaterra Environmental Solution
4923.10

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6903**
Material(s) Tested:	(11) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6903

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-164 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	85	80	76	77	76	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	85	82	79	78	80	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	84	82	78	87	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-165 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	66	65	72	67	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	79	69	71	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	86	83	86	74	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6903

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-166 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	65	65	65	67	65	**65**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	71	72	72	70	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	80	85	86	75	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-167 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	69	80	69	72	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	70	68	70	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	72	72	74	83	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6903

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-168 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	74	73	72	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	76	73	69	75	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	75	79	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-169 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	79	77	80	79	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	82	75	78	73	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	79	85	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6903

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-170 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	84	80	82	79	80	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	82	77	80	77	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	79	84	80	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-171 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	86	88	87	89	89	**88**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	82	84	86	89	**85**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	80	83	80	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6903

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-172 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	87	76	77	84	75	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	93	87	85	90	84	**88**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	80	79	81	85	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-173 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	66	79	80	73	55	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	75	76	79	82	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	79	82	81	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6903

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-174 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	75	73	71	75	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	80	79	82	84	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	83	82	83	81	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2011-10-13

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

Bill To:

Aquaterra Environmental Solution
Project # : 4923.10

e-mail:ccarson@aquaterra-env.com

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**6982**
Material(s) Tested:	(26) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-175 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	79	77	79	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	78	77	82	75	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	79	80	83	77	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-176 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	77	76	78	77	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	73	75	77	77	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	80	80	83	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-177 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	83	80	79	82	79	**81**	50 min.
Peel Incursion (%)	80	100	<5	<5	<5		
Peel Locus Of Failure Code	AD-BRK	AD	SE	SE	SE		
Peel NSF Failure Code	FTB	NON-FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	80	78	78	75	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	81	78	84	79	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-178 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	77	76	78	81	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	76	78	75	76	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	79	79	76	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-179 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	70	73	73	70	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	73	72	74	72	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	77	76	79	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-180 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	76	73	70	75	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	87	70	70	72	69	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	76	74	75	77	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-181 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	82	76	74	80	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	84	81	81	84	79	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	79	73	77	76	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-182 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	76	74	80	78	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	76	76	80	76	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	80	86	81	77	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-183 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	81	81	82	84	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	40		
Peel Locus Of Failure Code	SE	SE	SE	SE	AD-BRK		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	69	76	71	76	73	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	84	82	81	85	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-184 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	71	77	75	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	68	80	74	76	78	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	77	76	74	76	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-185 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	73	74	77	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	74	75	78	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	77	76	77	80	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-186 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	81	80	80	81	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	79	80	79	80	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	82	78	80	85	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-187 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	73	73	73	76	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	67	70	66	71	71	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	76	77	87	88	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-188 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	84	79	74	76	77	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	73	74	73	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	85	78	79	78	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-189 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	75	71	73	75	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	76	74	75	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	80	74	75	77	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-190 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	73	70	74	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	69	73	71	72	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	78	75	76	78	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-191 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	85	84	77	81	86	**83**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	77	84	83	71	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	77	74	77	76	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-192 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	74	70	75	78	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	66	67	68	70	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	78	77	80	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-193 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	76	75	74	76	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	75	74	75	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	73	77	75	75	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-194 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	73	72	74	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	71	69	71	70	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	81	74	81	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-195 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	80	78	77	79	77	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	75	74	76	70	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	78	79	84	79	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-196 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	81	78	79	79	82	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	83	79	80	78	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	84	80	80	82	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-197 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	81	81	81	82	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	75	76	74	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	78	79	80	80	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-198 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	77	79	79	83	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	80	79	81	79	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	84	81	82	83	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 6982

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-199 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	74	72	76	75	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	73	78	77	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	75	74	73	73	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-200 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	70	71	81	69	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	67	78	68	76	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	80	71	85	84	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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Date: 2011-10-17

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Fairview Heights , IL , 62208

Bill To:

Aquaterra Environmental Solution
Project # : 4923.10

e-mail:ccarson@aquaterra-env.com

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**7010**
Material(s) Tested:	(11) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7010

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-177A | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	78	75	72	75	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	70	70	72	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	86	87	79	80	83	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-177B | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	71	71	72	70	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	72	74	70	75	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	82	78	77	86	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 7010

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-183A | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	71	68	72	68	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	69	69	70	69	70	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	84	82	82	84	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-183B | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	74	76	70	72	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	70	73	74	70	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	70	78	83	85	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 7010

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-201 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	71	72	73	75	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	78	78	69	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	77	75	85	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-202 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	77	76	81	82	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	72	74	77	75	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	82	81	81	83	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7010

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-203 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	75	75	74	72	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	70	77	72	69	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	77	78	80	78	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-204 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	75	72	72	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	70	69	71	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	76	71	89	80	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7010

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-205 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	75	71	74	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	73	71	79	81	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	79	77	76	75	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-206 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	71	71	72	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	74	71	74	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	82	79	78	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7010

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-207 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	76	76	80	78	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	71	72	74	70	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	81	80	80	79	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Fairview Heights , IL , 62208

e-mail:ccarson@aquaterra-env.com

Bill To:

Aquaterra Environmental Solution
Project # : 4923.10

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**7072**
Material(s) Tested:	(11) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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9063 Bee Caves Road / Austin, Tx. 78733 / 512.263.2101 / fax: 512.263.2558

TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7072

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-208 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	75	78	77	73	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	86	78	79	82	77	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	83	80	80	84	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-209 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	78	71	76	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	75	73	77	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	64	75	79	74	76	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7072

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-210 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	65	65	61	65	63	**64**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	69	68	66	67	67	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	67	74	70	76	70	**71**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-211 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	69	70	70	70	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	66	70	67	68	70	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	79	68	79	91	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7072

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-212 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	72	71	74	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	68	77	76	76	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	80	76	78	80	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-213 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	68	67	70	67	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	79	78	81	82	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	74	72	71	78	74	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7072

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-214 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	66	69	67	68	67	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	79	73	81	72	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	75	70	75	76	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-215 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	69	71	67	67	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	75	73	78	70	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	72	69	74	73	**73**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7072

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-216 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	62	66	63	67	62	**64**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	70	69	82	68	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	81	79	76	77	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-217 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	68	71	72	73	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	80	75	79	72	79	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	73	74	68	75	75	**73**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7072

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-218 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	78	70	71	67	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	74	75	78	75	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	69	82	76	70	80	**75**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2011-10-27

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

e-mail:ccarson@aquaterra-env.com

Bill To:

Aquaterra Environmental Solution
Project # : 4923.10

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**7160**
Material(s) Tested:	(26) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
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A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-219 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	68	70	69	71	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	69	69	71	70	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	75	79	81	83	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-220 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	74	71	71	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	63	70	68	65	**67**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	84	81	81	83	87	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-221 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	71	72	80	69	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	67	67	67	66	71	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	75	74	87	82	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-222 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	71	70	72	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	69	68	69	70	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	80	74	89	84	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-223 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	71	69	70	67	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	74	71	75	72	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	77	70	83	84	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-224 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	75	73	74	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	69	67	70	69	70	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	73	75	80	79	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-225 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	72	71	74	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	73	72	73	73	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	79	73	82	86	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-226 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	73	72	74	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	82	82	76	72	72	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	88	80	83	80	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-227 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	72	72	76	73	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	78	82	77	74	81	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	79	74	82	89	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-228 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	69	71	71	75	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	71	71	75	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	80	80	81	83	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution
Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-229 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	79	73	73	81	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	78	74	80	81	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	82	69	80	83	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-230 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	72	69	72	78	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	70	75	72	79	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	84	77	88	87	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-242 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	71	72	73	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	70	72	72	71	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	72	72	72	71	74	**72**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-243 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	75	73	77	76	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	81	81	80	82	80	**81**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	79	78	82	86	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-244 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	76	78	77	80	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	83	81	82	83	80	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	78	84	79	79	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-245 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	69	70	68	74	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	80	71	70	68	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	90	83	74	76	92	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-246 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	70	69	79	71	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	73	72	75	71	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	81	82	78	84	92	**83**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-247 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	71	71	72	70	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	85	76	78	82	73	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	83	75	77	84	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-248 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	69	68	71	69	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	68	76	75	74	76	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	69	80	74	75	84	**76**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-249 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	70	74	71	69	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	80	73	82	82	**77**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	82	72	77	81	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-250 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	70	68	69	66	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	69	70	70	71	71	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	76	76	76	83	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-251 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	71	69	72	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	70	74	72	71	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	85	76	77	84	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-252 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	71	69	69	76	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	72	73	71	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	79	76	77	86	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-253 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	67	70	67	70	73	**69**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	73	69	71	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	78	77	77	82	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7160

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-255 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	73	70	73	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	72	69	71	72	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	76	78	82	82	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-256 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	73	72	73	72	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	70	70	71	74	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	80	85	75	87	79	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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Date: 2011-10-28

Mail To:
Collen Carson
Aquaterra Environmental Solution
13 Executive Drive, Suite 1
Fairview Heights , IL , 62208

Bill To:

Aquaterra Environmental Solution
Project # : 4923.10

e-mail:ccarson@aquaterra-env.com

Dear Mr. Carson,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Ameren Fly Ash Closure Pond 3**
TRI Job Reference Number:	**7192**
Material(s) Tested:	(12) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

MPatel

Mansukh Patel
Sr. Laboratory Coordinator
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7192

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-231 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	73	73	71	70	71	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	68	71	71	71	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	84	79	76	84	**81**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-232 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	75	75	74	74	74	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	72	72	70	71	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	76	76	78	79	76	**77**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7192

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-233 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	66	67	68	68	70	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	87	74	84	73	92	**82**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	72	79	73	73	74	**74**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-234 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	71	72	73	74	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	72	72	72	72	73	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	83	74	76	77	83	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7192

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-235 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	72	73	71	70	69	**71**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	71	74	73	75	74	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	79	81	82	84	**82**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-236 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	69	77	74	69	80	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	73	73	73	73	79	**74**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	75	78	82	84	82	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7192

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-237 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	85	81	76	79	**80**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	77	78	81	77	79	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	82	85	82	82	90	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-238 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	82	81	76	77	78	**79**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	79	78	78	78	**78**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	85	82	81	87	83	**84**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7192

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-239 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	77	72	82	76	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	74	77	78	72	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	79	78	78	81	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-240 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	71	73	66	73	77	**72**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	76	78	75	76	75	**76**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	79	79	81	79	83	**80**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Aquaterra Environmental Solution

Project: Ameren Fly Ash Closure Pond 3

Material: 40mil. LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 7192

	TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN	Proj.Spec.
Sample ID: DS-241 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	76	72	71	71	73	**73**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						**Peel B**	
Peel Strength (ppi)	75	75	74	75	74	**75**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	78	77	77	83	81	**79**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-254 | Weld: Heat Fusion							
Side: A						**Peel A**	
Peel Strength (ppi)	68	67	66	71	67	**68**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B.						**Peel B**	
Peel Strength (ppi)	69	69	71	71	69	**70**	50 min.
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						**Shear**	
Shear Strength (ppi)	77	81	75	76	80	**78**	60 min.
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

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GEOMEMBRANE LINER REPAIR RECORDS

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/13/11	1	1/2	SS	56	8	DS-1	2'x8'	9/19	LR	P	7' E of WEOS
09/13/11	2	1/2	SS	56	8	Patch	2'x6'	9/19	LR	P	32' E of WEOS
09/13/11	3	1/2	SS	56	8	Patch	2'x4'	9/19	LR	P	265' E of WEOS
09/13/11	4	1/2	SS	56	4	Patch	3'x3'	9/19	LR	P	405' E of WEOS
09/13/11	5	1/2	SS	56	4	Patch	2'x3'	9/19	LR	P	437' E of WEOS
09/12/11	6	1/2	SS	56	7	Patch	2'x2'	9/19	LR	P	610' E of WEOS
09/12/11	7	1/2	SS	56	7	Patch	2'x4'	9/19	LR	P	700' E of WEOS
09/12/11	8	1/2	SS	56	7	Patch	2'x6'	9/19	LR	P	769' E of WEOS
09/13/11	41	3/4	SS	56	4	Cap	30'x3'	9/19	LR	P	20' E of WEOS
09/13/11	42	2/3	SS	56	4	Patch	2'x3'	9/19	LR	P	WEOS
09/13/11	43	3/4	SS	56	4	Patch	2'x4'	9/19	LR	P	121' E of WEOS
09/16/11	44	3/4	SS	56	4	Patch	2'x2'	9/19	LR	P	150' E of WEOS
09/16/11	13	3/4	SS	56	4	Patch	2'x3'	9/19	LR	P	175' E of WEOS
09/13/11	14	3/4	SS	56	4	Patch	2'x3'	9/19	LR	P	186' E of WEOS
09/13/11	15	3/4	SS	56	4	Cap	2'x12'	9/19	LR	P	303' E of WEOS
09/13/11	16	3/4	SS	56	4	Patch	2'x3'	9/19	LR	P	386' E of WEOS
09/13/11	17	3/4	SS	56	4	Patch	2'x3'	9/19	LR	P	395' E of WEOS
09/13/11	18	3/4	SS	56	4	Cap	2'x15'	9/19	LR	P	519' E of WEOS
09/12/11	11	2/3	SS	56	7	Patch	2'x2'	9/19	LR	P	525' E of WEOS
09/12/11	19	3/4	SS	56	7	Patch	2'x3'	9/19	LR	P	551' E of WEOS
09/13/11	16A	3/4	SS	56	4	Patch	2'x3'	9/19	LR	P	390' E of WEOS

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Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/12/11	20	3/4	SS	56	7	Patch	2'x3'	9/19	LR	P	650' E of WEOS
09/12/11	21	3/4	SS	56	7	Patch	2'x4'	9/19	LR	P	710' E of WEOS
09/19/11	22	3/4	SS	56	2	DS-25	2'x8'	9/19	LR	P	300' E of WEOS
09/13/11	23	3/4	SS	56	4	Patch	1'x1'	9/19	LR	P	365' E of WEOS
09/17/11	49	4/5	SS	56	4	Patch	2'x2'	9/19	LR	P	169' E of WEOS
09/13/11	48	4/5	SS	56	4	Patch	2'x3'	9/19	LR	P	489' E of WEOS
09/13/11	47	4/5	SS	56	4	Patch	2'x3'	9/19	LR	P	589' E of WEOS
09/13/11	46	4/5	SS	56	4	Patch	2'x10'	9/19	LR	P	688' E of WEOS
09/13/12	23A	3/4	SS	56	4	Patch	2'x2'	9/19	LR	P	376' E of WEOS
09/12/11	9	1/2	SS	56	7	DS - 2	2'x6'	9/19	LR	P	500' E of WEOS
09/12/11	12	2/3	SS	56	7	DS - 3	2'x6'	9/19	LR	P	704' E of WEOS
09/13/11	10	2/3	SS	56	4	DS - 4	2'x6'	9/19	LR	P	204' E of WEOS
09/13/11	24	3/4	SS	56	4	DS - 5	2'x6'	9/19	LR	P	296' E of WEOS
09/13/11	25	3/4	SS	56	4	Patch	1'x2'	9/19	LR	P	206' E fo WEOS
09/13/11	26	3/4	SS	56	4	Patch	2'x3'	9/19	LR	P	428' E of WEOS
09/13/11	27	3/4	SS	56	4	Patch	1'x1'	9/19	LR	P	455' E of WEOS
09/13/11	28	3/4	SS	56	4	Patch	2'x5'	9/19	LR	P	463' E of WEOS
09/13/11	29	3/4	SS	56	4	Patch	2'x2'	9/19	LR	P	485' E of WEOS
09/12/11	30	3/4	SS	56	7	Patch	2'x2'	9/19	LR	P	573' E of WEOS
09/12/11	31	3/4	SS	56	7	Patch	2'x2'	9/19	LR	P	631' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/12/11	32	3/4	SS	56	7	Patch	2'x2'	9/19	LR	P	631' E of WEOS
09/12/11	33	3/4	SS	56	7	Patch	2'x6'	9/19	LR	P	720' E of WEOS
09/12/11	34	3/4	SS	56	7	Cap	2'x15'	9/19	LR	P	753' E of WEOS
09/12/11	35	3/4	SS	56	7	DS - 6	2'x21	9/19	LR	P	796' E of WEOS
09/13/11	45	4/5	SS	56	4	DS - 7	2'x6'	9/19	LR	P	466' W of EEOS
09/17/11	67	5/6	KK	51	2	Patch	2'x3'	9/19	LR	P	35' E of WEOS
09/17/11	66	5/6	KK	51	2	Cap	2'x10'	9/19	LR	P	66' E of WEOS
09/17/11	65	5/6	KK	51	2	Patch	2'x4'	9/19	LR	P	74' E of WEOS
09/17/11	64	5/6	SS	56	4	DS - 8	2'x8'	9/19	LR	P	206' E of WEOS
09/17/11	63	5/6	SS	56	4	DS - 9	2'x8'	9/19	LR	P	706' E of WEOS
09/17/11	80	6/7	KK	51	2	Patch	2'x2'	9/19	LR	P	43' W of EEOS
09/17/11	79	6/7	KK	51	2	Patch	2'x6'	9/19	LR	P	102' W of EEOS
09/17/11	78	6/7	KK	51	2	Patch	2'x8'	9/19	LR	P	119' W of EEOS
09/17/11	77	6/7	KK	51	2	Patch	2'x5'	9/19	LR	P	132' W of EEOS
09/17/11	76	6/7	KK	51	2	Patch	2'x8'	9/19	LR	P	189' W of EEOS
09/17/11	75	6/7	KK	51	2	Patch	2'x2'	9/19	LR	P	263' W of EEOS
09/17/11	74	6/7	KK	51	2	Patch	2'x3'	9/19	LR	P	313' W of EEOS
09/17/11	73	6/7	KK	51	2	DS - 10	2'x8'	9/19	LR	P	346' W of EEOS
09/17/11	72	6/7	KK	51	2	Patch	3'x6'	9/19	LR	P	555' W of EEOS
09/17/11	71	6/7	KK	51	2	Patch	1'x1'	9/19	LR	P	740' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/12/11	36	3/4	SS	56	7	Patch	2'x6'	9/19	LR	P	789' E of WEOS
09/12/12	37	3/4	SS	56	7	EXT	58'	9/19	LR	P	806' E to WEOS
09/17/11	70	6/7	KK	51	2	Patch	1'x1'	9/19	LR	P	766' W of EEOS
09/17/11	69	6/7	KK	51	2	Patch	2'x2'	9/19	LR	P	812' W of EEOS
09/17/11	54	6/7	KK	51	2	Patch	2'x2'	9/19	LR	P	850' W of EEOS
09/17/11	87	7/8	LR	53	3	Patch	2'x4'	9/19	LR	P	117' E of WEOS
09/17/11	68	6/7	KK	51	2	DS - 11	2'x8'	9/19	LR	P	846' W of EEOS
09/13/11	51	4/5	SS	56	4	DS - 12	2'x8'	9/19	LR	P	30' E of WEOS
09/17/11	86	7/8	KK	51	2	DS - 13	2'x8'	9/19	LR	P	35' E of WEOS
09/17/11	91	7/8	KK	51	2	DS - 14	2'x8'	9/19	LR	P	535' E of WEOS
09/17/11	88	7/8	KK	51	2	Patch	2'x3'	9/19	LR	P	347' E of WEOS
09/17/11	89	7/8	KK	51	2	Patch	2'x4'	9/19	LR	P	483' E of WEOS
09/17/11	90	7/8	KK	51	2	Patch	2'x3'	9/19	LR	P	498' E of WEOS
09/17/11	92	7/8	KK	51	2	Patch	2'x3'	9/19	LR	P	557' E of WEOS
09/17/11	94	8/9	KK	51	7	Patch	2'x8'	9/19	LR	P	42' E of WEOS
09/17/11	95	8/9	KK	51	7	Patch	2'x5'	9/19	LR	P	51' E of WEOS
09/17/11	96	8/9	KK	51	7	Patch	1'x1'	9/19	LR	P	66' E of WEOS
09/17/11	97	8/9	KK	51	7	Patch	2'x3'	9/19	LR	P	70' E of WEOS
09/18/11	98	8/9	KK	51	7	Patch	2'x3'	9/19	LR	P	75' E of WEOS
09/17/11	99	8/9	LR	53	3	Patch	2'x2'	9/19	LR	P	87' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	101	8/9	TN	17	1	Patch	2'x2'	9/19	LR	P	232' E of WEOS
09/17/11	100	8/9	TN	17	6	DS - 15	2'x8'	9/19	LR	P	175' E of WEOS
09/17/11	102	8/9	TN	17	1	Patch	2'x2'	9/19	LR	P	334' E of WEOS
09/17/11	103	8/9	TN	17	1	Patch	2'x2'	9/19	LR	P	350' E of WEOS
09/17/11	104	8/9	TN	17	1	Patch	2'x3'	9/19	LR	P	371' E of WEOS
09/17/11	106	8/9	TN	17	1	Patch	2'x3'	9/19	LR	P	610' E of WEOS
09/17/11	107	8/9	TN	17	1	DS - 16	2'x8'	9/19	LR	P	675' E of WEOS
09/17/11	38	3/4	SS	56	4	Patch	2'x8'	9/19	LR	P	257' E of WEOS
09/17/11	39	3/4	SS	56	4	Patch	2'x2'	9/19	LR	P	200' E of WEOS
09/16/11	40	3/4	SS	56	4	Patch	2'x5'	9/19	LR	P	161' E of WEOS
09/17/11	109	9/10	KK	51	7	Patch	1'x1'	9/19	LR	P	20' W of EEOS
09/17/11	52	9/10	TN	17	1	Patch	2'x2'	9/19	LR	P	90' W of EEOS
09/17/11	127	9/10	TN	17	1	Patch	3'x8'	9/19	LR	P	100' W of EEOS
09/17/11	126	9/10	TN	17	1	Patch	2'x3'	9/19	LR	P	122' W of EEOS
09/17/11	125	9/10	TN	17	1	Patch	2'x2'	9/19	LR	P	169' W of EEOS
09/17/11	123	9/10	TN	17	1	Patch	2'x3'	9/19	LR	P	293' W of EEOS
09/17/11	122	9/10	TN	17	1	Patch	2'x3'	9/19	LR	P	300' W of EEOS
09/17/11	121	9/10	TN	17	1	Patch	2'x5'	9/19	LR	P	360' W of EEOS
09/17/11	120	9/10	TN	17	1	Patch	2'x7'	9/19	LR	P	402' W of EEOS
09/17/11	119	9/10	TN	17	1	Patch	2'x4'	9/19	LR	P	492' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	118	9/10	TN	17	1	Patch	2'x3'	9/19	LR	P	553' W of EEOS
09/17/11	117	9/10	TN	17	1	Patch	2'x2'	9/19	LR	P	567' W of EEOS
09/17/11	116	9/10	TN	17	1	Patch	2'x2'	9/19	LR	P	590' W of EEOS
09/17/11	115	9/10	TN	17	1	Patch	2'x3'	9/19	LR	P	646' W of EEOS
09/17/11	114	9/10	TN	17	1	Patch	2'x3'	9/19	LR	P	668' W of EEOS
09/17/11	112	9/10	KK	51	7	Patch	1'x1'	9/19	LR	P	755' W of EEOS
09/17/11	111	9/10	KK	51	7	Patch	3'x3'	9/19	LR	P	769' W of EEOS
09/17/11	110	9/10	KK	51	7	Patch	3'x8'	9/19	LR	P	778' W of EEOS
09/17/11	129	10/11	KK	51	7	Patch	2'x3'	9/19	LR	P	85' E of WEOS
09/16/11	130	10/11	KK	51	7	Patch	2'x3'	9/19	LR	P	91' E of WEOS
09/17/11	131	10/11	KK	51	7	Patch	1'x1'	9/19	LR	P	95' E of WEOS
09/17/11	132	10/11	KK	51	7	Patch	2'x3'	9/19	LR	P	102' E of WEOS
09/17/11	134	10/11	TN	17	1	Patch	2'x2'	9/19	LR	P	172' E of WEOS
09/17/11	135	10/11	TN	17	1	Patch	2'x2'	9/19	LR	P	214' E of WEOS
09/17/11	136	10/11	TN	17	1	Patch	2'x3'	9/19	LR	P	222' E of WEOS
09/17/11	137	10/11	TN	17	1	Patch	2'x3'	9/19	LR	P	250' E of WEOS
09/17/11	138	10/11	TN	17	1	Patch	2'x2'	9/19	LR	P	267' E of WEOS
09/17/11	139	10/11	TN	17	1	Patch	2'x4'	9/19	LR	P	508' E of WEOS
09/17/11	141	10/11	TN	17	1	Patch	2'x2'	9/19	LR	P	30' W of EEOS
09/17/11	142	10/11	TN	17	1	Patch	2'x2'	9/19	LR	P	25' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	133	10/11	TN	17	1	DS - 19	2'x6'	9/19	LR	P	150' E of WEOS
09/17/11	140	10/11	TN	17	1	DS - 20	2'x6'	9/19	LR	P	650' E of WEOS
09/19/11	143	11/12	XM	55	1	DS - 21	2'x6'	9/19	LR	P	200' W of EEOS
09/17/11	146	12/13	TN	17	6	Patch	2'x3'	9/19	LR	P	77' E of WEOS
09/17/11	147	12/13	TN	17	6	DS - 23	2'x6'	9/19	LR	P	150' E of WEOS
09/19/11	155	12/13	XM	55	1	DS - 24	3'x5'	9/19	LR	P	650' E of WEOS
09/17/11	148	12/13	TN	17	6	Patch	2'x2'	9/19	LR	P	174' E of WEOS
09/19/11	149	12/13	XM	55	3	Patch	2'x2'	9/19	LR	P	376' E of WEOS
09/19/11	150	12/13	XM	55	3	Patch	2'x2'	9/19	LR	P	382' E of WEOS
09/19/11	151	12/13	XM	55	3	Patch	2'x6'	9/19	LR	P	527' E of WEOS
09/13/11	50	4/5	SS	56	4	Patch	2'x3'	9/19	LR	P	551' W of EEOS
09/13/11	53	3/4	SS	56	4	DS - 26	2'x6'	9/19	LR	P	297' E of WEOS
09/19/11	152	12/13	XM	55	3	Patch	2'x2'	9/20	LR	P	580' E of WEOS
09/19/11	153	12/13	XM	55	3	Patch	2'x3'	9/20	LR	P	590' E of WEOS
09/19/11	154	12/13	XM	55	3	Patch	2'x3'	9/20	LR	P	612' E of WEOS
09/17/11	156	12/13	XM	55	3	Patch	2'x3'	9/19	LR	P	659' E of WEOS
09/19/11	157	12/13	XM	55	3	Patch	2'x5'	9/19	LR	P	670' E of WEOS
09/17/11	158	13/14	TN	17	6	Patch	2'x4'	9/19	LR	P	18' E of WEOS
09/17/11	159	13/14	TN	17	6	Patch	2'x10'	9/19	LR	P	52' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	160	13/14	TN	17	6	Patch	2'x3'	9/19	LR	P	77' E of WEOS
09/17/11	161	13/14	TN	17	6	Patch	2'x2'	9/19	LR	P	107' E of WEOS
09/17/11	163	13/14	TN	17	6	Patch	1'x1'	9/19	LR	P	152' E of WEOS
09/17/11	162	13/14	TN	17	6	DS - 27	2'x8'	9/19	LR	P	150' E of WEOS
09/17/11	164	13/14	TN	17	6	Patch	2'x2'	9/19	LR	P	169' E of WEOS
09/17/11	165	13/14	TN	17	6	Patch	2'x2'	9/19	LR	P	175' E of WEOS
09/17/11	166	13/14	TN	17	6	Patch	2'x6'	9/19	LR	P	190' E of WEOS
09/19/11	167	13/14	XM	55	3	Patch	3'x3'	9/20	LR	P	565' E of WEOS
09/19/11	168	13/14	XM	55	3	Patch	2'x3'	9/20	LR	P	588' E of WEOS
09/19/11	169	13/14	XM	55	3	Patch	3'x6'	9/20	LR	P	605' E of WEOS
09/19/11	170	13/14	XM	55	3	DS - 28	2'x5'	9/19	LR	P	650' E of WEOS
09/20/11	171	13/14	SS	56	1	Patch	2'x4'	9/20	LR	P	698' E of WEOS
09/20/11	172	13/14	SS	56	1	Patch	1'x1'	9/20	LR	P	707' E of WEOS
09/20/11	173	13/14	SS	56	1	Patch	1'x1'	9/20	LR	P	712' E of WEOS
09/20/11	174	13/14	SS	56	1	Patch	3'x4'	9/20	LR	P	735' E of WEOS
09/20/11	175	13/14	SS	56	1	Patch	3'x5'	9/20	LR	P	744' E of WEOS
09/20/11	176	13/14	SS	56	1	Patch	2'x4'	9/20	LR	P	758' E of WEOS
09/20/11	177	13/14	SS	56	1	Patch	2'x2'	9/20	LR	P	784' E of WEOS
09/20/11	178	13/14	SS	56	1	Patch	2'x2'	9/20	LR	P	808' E of WEOS
09/20/11	178A	13/14	SS	56	1	Patch	1'x1'	9/20	LR	P	814' E of WEOS
09/20/11	179	13/14	SS	56	1	Patch	1'x6'	9/20	LR	P	828' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	202	15/16	KK	51	2	Patch	2'x2'	9/20	LR	P	8' E of WEOS
09/17/11	203	15/16	KK	51	2	Patch	2'x3'	9/20	LR	P	21' E of WEOS
09/17/11	204	15/16	KK	51	2	Patch	2'x8'	9/20	LR	P	81' E of WEOS
09/17/11	205	15/16	KK	51	2	Patch	3'x5'	9/20	LR	P	110' E of WEOS
09/17/11	206	15/16	KK	51	2	DS - 29	2'x8'	9/20	LR	P	160' E of WEOS
09/17/11	207	15/16	KK	51	2	Patch	2'x2'	9/20	LR	P	198' E of WEOS
09/17/11	208	15/16	KK	51	2	Patch	2'x3'	9/20	LR	P	263' E of WEOS
09/19/11	209	15/16	XM	55	3	Patch	2'x4'	9/20	LR	P	535' E of WEOS
09/19/11	210	15/16	XM	55	3	Patch	2'x32'	9/20	LR	P	565' E of WEOS
09/19/11	211	15/16	XM	55	3	DS - 30	2'x8'	9/20	LR	P	660' E of WEOS
09/19/11	212	15/16	SS	56	2	Patch	3'x4'	9/20	LR	P	696' E of WEOS
09/17/11	180	14/15	TN	17	6	DS - 31	2'x5'	9/19	LR	P	30' E of WEOS
09/17/11	181	14/15	TN	17	6	Patch	2'x2'	9/20	LR	P	151' E of WEOS
09/17/11	182	14/15	TN	17	6	Patch	2'x4'	9/20	LR	P	212' E of WEOS
09/17/11	183	14/15	TN	17	6	Patch	2'x2'	9/20	LR	P	219' E of WEOS
09/17/11	184	14/15	TN	17	6	Patch	2'x3'	9/20	LR	P	242' E of WEOS
09/17/11	185	14/15	TN	17	6	Patch	2'x10'	9/20	LR	P	271' E of WEOS
09/17/11	186	14/15	TN	17	6	Patch	2'x3'	9/20	LR	P	288' E of WEOS
09/17/11	187	14/15	TN	17	6	Patch	2'x3'	9/20	LR	P	293' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	188	14/15	TN	17	6	Patch	1'x1'	9/20	LR	P	297' E of WEOS
09/17/11	189	14/15	TN	17	6	Patch	1'x1'	9/20	LR	P	301' E of WEOS
09/19/11	190	14/15	XM	55	3	Patch	2'x4'	9/20	LR	P	381' E of WEOS
09/19/11	191	14/15	XM	55	3	Patch	2'x2'	9/20	LR	P	388' E of WEOS
09/19/11	192	14/15	XM	55	3	Patch	1'x1'	9/20	LR	P	477' E of WEOS
09/19/11	193	14/15	XM	55	3	Patch	2'x5'	9/20	LR	P	485' E of WEOS
09/19/11	194	14/15	XM	55	3	DS - 32	2'x5'	9/20	LR	P	530' E of WEOS
09/20/11	195	14/15	XM	55	2	Patch	2'x2'	9/20	LR	P	589' E of WEOS
09/17/11	196	14/15	XM	55	5	Patch	2'x2'	9/20	LR	P	624' E of WEOS
09/17/11	197	14/15	XM	55	5	Patch	2'x4'	9/20	LR	P	641' E of WEOS
09/17/11	198	14/15	XM	55	5	Patch	3'x3'	9/20	LR	P	697' E of WEOS
09/17/11	199	14/15	XM	55	5	Patch	2'x10'	9/20	LR	P	723' E of WEOS
09/20/11	200	14/15	SS	56	1	Patch	2'x3'	9/20	LR	P	732' E of WEOS
09/20/11	201	14/15	SS	56	1	Patch	2'x8'	9/20	LR	P	797' E of WEOS
09/17/11	213	16/17	KK	51	2	Patch	1'x1'	9/20	LR	P	62' E of WEOS
09/17/11	214	16/17	KK	51	2	Patch	2'x3'	9/20	LR	P	71' E of WEOS
09/17/11	215	16/17	KK	51	2	DS - 33	2'x6'	9/20	LR	P	155' E of WEOS
09/20/11	216	16/17	XM	55	2	Patch	2'x3'	9/20	LR	P	446' E of WEOS
09/20/11	217	16/17	XM	55	2	Patch	2'x2'	9/20	LR	P	483' E of WEOS
09/20/12	249	15/58	SS	56	1	Cap	2'x27'	9/23	LR	P	Seam Cap/Int

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	232	17/18	KK	51	2	DS-35	2'x5'	9/20	LR	P	47' E of WEOS
09/17/11	238	40/41	SS	56	9	Patch	2'x3'	9/23	LR	P	92' E of WEOS
09/17/11	239	40/41	SS	56	9	Patch	2'x3'	9/23	LR	P	228' E of WEOS
09/21/11	240	40/41	SS	24	4	Patch	2'x3'	9/23	LR	P	348' E of WEOS
09/21/11	241	40/41	SS	24	4	Patch	2'x3'	9/23	LR	P	356' E of WEOS
09/21/11	242	40/41	SS	24	4	Cap	3'x3'	9/23	LR	P	20' W of EEOS
09/17/11	247	41/44	SS	56	9	Patch	2'x4'	9/19	LR	P	58' E of WEOS of 43/44
09/17/11	279	41/43	SS	56	9	Patch	2'x2'	9/19	LR	P	59' E of WEOS
09/21/11	243	40/41/42	SS	24	4	Int	3'x6'	9/23	LR	P	Int
09/21/12	250	38/39	SS	24	4	EXT	22'	9/23	LR	P	ELOS
09/21/11	255	45/47	SS	24	8	Patch	3'x2'	9/23	LR	P	165' E of WEOS
09/21/11	256	45/47	SS	24	8	Patch	2'x2'	9/23	LR	P	301' E of WEOS
09/21/11	257	45/47	SS	24	8	Cap	2'x10'	9/23	LR	P	432' E of WEOS
09/21/11	258	45/47	SS	24	8	Patch	2'x9'	9/23	LR	P	479' E of WEOS
09/17/11	55	3/4	SS	56	4	Patch	2'x4'	9/19	LR	P	125' E of WEOS
09/17/11	56	1/37	XM	55	5	Patch	2'x3'	9/19	LR	P	6' N of SEOS
09/17/11	57	1/2/37/38	XM	55	5	Int	4'x8'	9/19	LR	P	Int
09/17/11	58	2/3/38/40	XM	55	5	Int	4'x6'	9/19	LR	P	Int
09/20/11	218	16/17	XM	55	2	Patch	2'x8'	9/20	LR	P	498' E of WEOS
09/20/11	219	16/17	XM	55	2	Patch	2'x3'	9/20	LR	P	559' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/20/11	220	16/17	XM	55	2	DS - 34	2'x5'	9/20	LR	P	655' E of WEOS
09/20/11	221	16/17	SS	56	1	Patch	2'x8'	9/20	LR	P	667' E of WEOS
09/17/11	409	17/18	KK	51	7	DS - 36	2'x4'	9/20	LR	P	120' W of EEOS
09/27/11	410	17/18	XM	51	2	Patch	2'x4'	9/20	LR	P	398' E of WEOS
09/27/11	411	18/19	XM	51	2	DS - 37	2'x4'	9/27	IS	P	12' E of WEOS
09/30/11	412	18/19	XM	51	2	Patch	2'x4'	9/20	LR	P	391' E of WEOS
09/30/11	413	18/19	XM	51	2	DS - 38	2'x4'	9/20	LR	P	519' E of WEOS
09/30/11	414	18/19	XM	51	2	Patch	1'x1'	9/20	LR	P	537' E of WEOS
09/28/11	415	19/20	XM	51	8	DS - 39	2'x4'	9/28	IS	P	16' E of WEOS
09/28/11	416	19/20	XM	51	8	Patch	2'x4'	10/3	KK	P	94' E of WEOS
09/28/11	417	19/20	XM	51	8	Patch	2'x2'	10/3	KK	P	100' E of WEOS
09/28/11	418	19/20	XM	51	8	Patch	2'x3'	10/3	KK	P	107' E of WEOS
09/30/11	419	19/20	XM	51	2	Patch	2'x4'	10/3	KK	P	318' E of WEOS
09/30/11	420	19/20	XM	51	2	Patch	2'x3'	10/3	KK	P	403' E of WEOS
09/30/11	421	19/20	XM	51	6	Patch	2'x3'	10/3	KK	P	472' E of WEOS
09/28/11	423	20/21	XM	51	8	DS - 41	2'x7'	9/28	IS	P	10' E of WEOS
09/29/11	425	20/21	XM	51	3	Patch	2'x3'	10/3	KS	P	64' E of WEOS
09/29/11	426	20/21	XM	51	3	Patch	2'x5'	10/3	KS	P	75' E of WEOS
09/28/11	424	20/21	XM	51	8	Patch	1'x1'	9/28	IS	P	2' E of WEOS
09/17/11	59	3/40	XM	55	5	Patch	3'x12'	9/19	LR	P	6' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	60	3/4/40/41	XM	55	5	Patch	4'x12'	9/19	LR	P	INT
09/17/11	61	4/5/41/43	XM	55	5	INT	3'x4'	9/19	LR	P	INT
09/17/11	62	5/6/43/45	SS	56	4	INT	3'x8'	9/19	LR	P	INT
09/17/11	81	6/7/45/40	XM	55	5	INT	3'x6'	9/19	LR	P	INT
09/17/11	82	7/8/46/48	XM	55	8	INT	3'x3'	9/19	LR	P	INT
09/17/11	83	8/9/48/50	XM	55	8	INT	2'x10'	9/19	LR	P	INT
09/17/11	84	9/10/50/51	XM	55	8	INT	2'x8'	9/19	LR	P	INT
09/17/11	85	7/8/WEOS	KK	51	2	INT	2'x3'	9/19	LR	P	7/8/WEOS
09/17/11	93	8/9/WEOS	KK	51	2	INT	3'x4'	9/19	LR	P	INT
09/17/11	105	8/9	TN	17	1	Patch	2'x3'	9/19	LR	P	444' E of WEOS
09/17/11	108	9/10/WEOS	KK	51	7	INT	2'x4'	9/19	LR	P	9/10/WEOS
09/17/11	113	9/10	TN	17	1	DS - 18	2'x6'	9/19	LR	P	170' E of WEOS
09/17/11	124	9/10	TN	17	1	DS - 17	2'x6'	9/19	LR	P	200' W of EEOS
09/17/11	128	9/10	KK	51	2	Patch	2'x6'	9/19	LR	P	20' E of WEOS
09/17/11	144	11/12	KK	51	2	Patch	2'x3'	9/19	LR	P	507' W of EEOS
09/17/11	145	11/12	TN	17	1	DS - 22	2'x6'	9/19	LR	P	200' E of WEOS
09/19/11	230	37/38	SS	56	4	DS - 59	2'x6'	9/19	LR	P	30' E of WEOS
09/17/11	231	37/38	SS	56	9	Patch	2'x2'	9/19	LR	P	100' E of WEOS
09/17/11	234	38/40	SS	56	9	Patch	2'x4'	9/19	LR	P	221' W of EEOS
09/17/11	233	38/40	SS	56	9	Patch	2'x4'	9/19	LR	P	204' W of EOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/17/11	235	38/40	SS	56	9	Patch	2'x2'	9/19	LR	P	315' W of EEOS
09/19/11	236	38/40	SS	56	4	DS - 60	2'x5'	9/19	LR	P	15' E of WEOS
09/19/11	237	40/41	SS	56	4	DS - 61	2'x5'	9/19	LR	P	15' E of WEOS
09/19/11	245	41/43	SS	56	4	DS - 62	2'x5'	9/19	LR	P	15' E of WEOS
09/17/11	246	41/43/44	SS	56	9	INT	2'x2'	9/19	LR	P	INT
09/17/11	254	45/46/47	SS	56	9	INT	2'x3'	9/19	LR	P	INT
09/17/11	259	46/47/49	SS	56	9	INT	3'x4'	9/19	LR	P	INT
09/21/11	266	48/50	SS	56	4	Patch	3'x6'	9/23	LR	P	117' E of WEOS
09/21/11	267	48/50	SS	56	4	Patch	3'x3'	9/23	LR	P	131' E of WEOS
09/21/11	268	48/50	SS	56	4	Patch	3'x3'	9/23	LR	P	144' E of WEOS
09/21/11	269	48/50	SS	56	4	Patch	3'x3'	9/23	LR	P	157' E of WEOS
09/21/11	270	48/50	SS	56	4	Patch	3'x3'	9/23	LR	P	195' E of WEOS
09/21/11	271	48/50	SS	56	4	Patch	3'x3'	9/23	LR	P	206' E of WEOS
09/21/11	272	48/49/50	SS	56	4	INT	2'x2'	9/23	LR	P	INT
09/21/11	261	47/48/49	SS	56	4	INT	3'x3'	9/23	LR	P	INT
09/21/11	262	47/49	SS	56	4	Patch	2'x2'	9/23	LR	P	276' E of WEOS
09/23/11	263	47/49	SS	56	4	Patch	2'x3'	9/23	LR	P	338' E of WEOS
09/23/11	260	47/48	SS	24	4	Patch	2'x2'	9/23	LR	P	134' E of WEOS
09/23/11	273	49/50	SS	24	4	Patch	2'x2'	9/23	LR	P	6' E of WEOS
09/23/11	274	49/50	SS	24	4	Patch	2'x3'	9/23	LR	P	111' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/22/11	275	49/50	SS	56	4	Patch	2'x3'	9/23	LR	P	280' E of WEOS
09/22/11	276	49/50	SS	56	4	Patch	2'x3'	9/23	LR	P	295' E of WEOS
09/23/11	277	49/50	SS	56	4	Patch	2'x3'	9/23	LR	P	340' E of WEOS
09/20/11	280	50/51	SS	56	3	Patch	2'x3'	9/23	LR	P	98' E of WEOS
09/20/11	281	50/51	SS	56	3	Patch	2'x4'	9/23	LR	P	144' E of WEOS
09/21/11	283	51/52/53	SS	24	8	INT	2'x2'	9/23	LR	P	INT
09/21/11	294	52/53/54	SS	24	8	INT	2'x2'	9/23	LR	P	INT
09/21/11	284	51/53	SS	24	8	Patch	2'x3'	9/23	LR	P	60' E of WEOS
09/21/11	285	51/53	SS	24	8	Patch	2'x3'	9/23	LR	P	80' E of WEOS
09/22/11	286	51/53	SS	56	4	Patch	2'x3'	9/23	LR	P	142' E of WEOS
09/23/11	287	51/53	SS	56	4	Patch	2'x3'	9/23	LR	P	172' E of WEOS
09/23/11	288	51/53	SS	56	4	Patch	2'x4'	9/23	LR	P	220' E of WEOS
09/23/11	290	51/53	SS	56	4	Patch	2'x3'	9/23	LR	P	266' E of WEOS
09/23/11	291	51/53	SS	56	4	Patch	2'x3'	9/23	LR	P	274' E of WEOS
09/20/11	293	52/54	SS	56	3	Patch	2'x3'	9/23	LR	P	189' E of WEOS
09/20/11	295	53/54	SS	56	3	Patch	2'x2'	9/23	LR	P	10' E of WEOS
09/20/11	296	53/54	SS	56	3	Patch	2'x6'	9/23	LR	P	28' E of WEOS
09/21/11	297	53/54	SS	24	8	Patch	2'x2'	9/23	LR	P	93' E of WEOS
09/23/11	298	53/54	SS	56	6	Patch	2'x2'	9/23	LR	P	197' E of WEOS
09/23/11	300	53/54	SS	56	6	Patch	2'x3'	9/23	LR	P	272' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/23/11	299	53/54	SS	56	6	DS - 74	2'x3'	9/23	LR	P	250' E of WEOS
09/20/11	302	54/55	SS	56	3	Patch	2'x2'	9/23	LR	P	111' E of WEOS
09/20/11	303	54/55	SS	56	3	Patch	2'x2'	9/23	LR	P	161' E of WEOS
09/20/11	304	54/55	SS	56	3	Patch	3'x4'	9/23	LR	P	181' E of WEOS
09/23/11	305	54/55	SS	56	6	Patch	2'x4'	9/23	LR	P	484' E of WEOS
09/19/11	251	43/45	SS	56	4	DS - 63	3'x5'	9/19	LR	P	15' E of WEOS
09/19/11	252	45/46	SS	56	4	DS - 64	3'x5'	9/19	LR	P	15' E of WEOS
09/19/11	264	46/48	SS	56	4	DS - 65	3'x5'	9/19	LR	P	15' E of WEOS
09/19/11	265	48/50	SS	56	4	DS - 66	3'x5'	9/19	LR	P	15' E of WEOS
09/19/11	278	50/51	SS	56	4	DS - 67	2'x5'	9/19	LR	P	15' E of WEOS
09/19/11	282	51/52	SS	56	4	DS - 68	2'x5'	9/23	LR	P	15' E of WEOS
09/19/11	292	52/54	SS	56	4	DS - 69	2'x4'	9/23	LR	P	15' E of WEOS
09/19/11	301	54/55	SS	56	4	DS - 70	2'x3'	9/23	LR	P	15' E of WEOS
09/20/11	307	55/56	SS	56	3	DS - 71	2'x3'	9/23	LR	P	15' E of WEOS
09/20/11	314	56/58	SS	56	3	DS - 72	2'x4'	9/23	LR	P	15' E of WEOS
09/20/11	320	58/59	SS	56	3	DS - 73	2'x3'	9/23	LR	P	15' E of WEOS
09/20/11	308	55/56	SS	56	3	Patch	2'x3'	9/23	LR	P	32' E of WEOS
09/20/11	309	55/56	SS	56	3	Patch	2'x3'	9/23	LR	P	47' E of WEOS
09/20/11	310	55/56	SS	56	3	Patch	2'x3'	9/23	LR	P	57' E of WEOS
09/22/11	311	55/56/57	SS	56	4	Int	2'x2'	9/23	LR	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/21/11	316	56/57/58	SS	24	8	Int	2'x2'	9/23	LR	P	INT
09/23/11	312	55/57	SS	56	4	Patch	2'x3'	9/23	LR	P	218' E of WEOS
09/21/11	315	56/58	SS	24	8	Patch	2'x2'	9/23	LR	P	197' E of WEOS
09/21/11	317	57/58	SS	24	8	Patch	2'x3'	9/23	LR	P	24' E of WEOS
09/23/11	318	57/58	SS	56	6	Patch	2'x3'	9/23	LR	P	180' E of WEOS
09/23/11	319	57/58	SS	56	6	Patch	2'x3'	9/23	LR	P	274' E of WEOS
09/19/11	222	10/51	SS	56	4	Patch	1'x1'	9/20	LR	P	12' N of SEOS
09/19/11	223	10/51	SS	56	4	Patch	2'x3'	9/20	LR	P	19' N of SEOS
09/17/12	224	11/12	TN	17	1	Patch	1'x1'	9/19	LR	P	WEOS
09/19/11	225	11/12	TN	17	1	Patch	2'x3'	9/19	LR	P	15' E of WEOS
09/19/11	226	11/12/52/54	SS	56	4	Int	3'x4'	9/20	LR	P	INT
09/19/11	227	12/13/54/55	SS	56	4	Int	3'x8'	9/20	LR	P	INT
09/19/11	228	13/55	SS	56	4	Patch	2'x2'	9/20	LR	P	15' N of SEOS
09/20/12	229	13/14/55/56	SS	56	4	Int	3'x5'	9/20	LR	P	INT
09/22/11	244	40/42	SS	56	4	Patch	3'x5'	9/23	KP	P	145' E of WEOS (41/42)
09/21/11	248	41/42/44	SS	24	4	Int	2'x2'	9/23	KP	P	INT 243' E of WEOS (43/44)
09/17/11	253	43/44/45	SS	56	4	Int	2'x3'	9/23	LR	P	INT
09/23/11	289	51/53	SS	56	4	Patch	2'x2'	9/23	LR	P	236' E of WEOS
09/21/11	306	52/53	SS	24	8	Patch	2'x2'	9/23	LR	P	3' S of NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/23/11	313	55/57	SS	56	6	DS - 75	2'x4'	9/23	LR	P	20' W of EEOS
09/23/11	321	58/59/60	SS	56	6	Int	2'x2'	9/23	LR	P	INT
09/23/11	322	58/60	SS	56	6	DS - 76	2'x4'	9/23	LR	P	20' W of EEOS
09/26/11	327	60/61/62	SS	56	1	Int	4'x8'	9/20	LR	P	INT
09/26/11	328	61/62	SS	56	8	DS - 77	2'x5'	9/20	LR	P	15' N of SEOS
09/26/11	329	61/62	SS	56	8	Patch	2'x3'	9/20	LR	P	21' N of SEOS
09/26/11	330	61/62	SS	56	1	Patch	2'x3'	9/20	LR	P	60' N of SEOS
09/26/11	331	61/62	SS	56	8	Patch	2'x3'	9/20	LR	P	106' N of SEOS
09/26/11	332	61/62	SS	56	8	Patch	2'x3'	9/20	LR	P	156' N of SEOS
09/26/11	333	61/62	SS	56	8	Patch	2'x3'	9/20	LR	P	194' N of SEOS
09/27/11	334	61/62	SS	56	3	Patch	2'x3'	9/27	LR	P	233' N of SEOS
09/27/11	335	61/62	SS	56	3	Patch	2'x3'	9/27	LR	P	243' N of SEOS
09/27/11	336	61/62	SS	56	4	Patch	2'x3'	9/27	LR	P	309' N of SEOS
09/27/11	337	61/62	SS	56	4	Patch	2'x3'	9/27	LR	P	377' N of SEOS
09/26/11	338	60/62/63	SS	56	1	Int	2'x3'	9/26	LR	P	60/62/63 INT
09/26/11	339	62/63	SS	56	1	DS - 78	2'x4'	9/26	LR	P	15' N of SEOS
09/26/11	340	62/63	SS	56	1	Patch	2'x3'	9/26	LR	P	92' N of SEOS
09/26/11	341	62/63	SS	56	8	Patch	2'x3'	9/30	KP	P	150' E of WEOS
09/26/11	342	62/63	SS	56	8	Patch	2'x3'	9/30	KP	P	206' N of SEOS
09/27/11	343	62/63	SS	56	3	Patch	2'x3'	9/30	KP	P	235' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	344	62/63	SS	56	3	Patch	2'x3'	9/30	LR	P	248' N of SEOS
09/23/11	345	62/63	SS	56	3	Cap	2'x8'	9/30	LR	P	260' N of SEOS
09/26/11	346	62/63/64	SS	56	8	Int	4'x10'	9/30	KP	P	INT
09/26/11	347	64/65	SS	56	8	Patch	3'x12'	9/30	KP	P	28' N of SEOS
09/26/11	348	64/65	SS	56	8	Patch	2'x2'	9/30	KP	P	62' N of SEOS
09/26/11	349	64/65	SS	56	8	Patch	2'x2'	9/30	KP	P	82' N of SEOS
09/26/11	350	64/65	SS	56	8	Patch	2'x2'	9/30	KP	P	95' N of SEOS
09/26/11	353	63/65	SS	56	8	Patch	2'x4'	9/26	LR	P	38' N of SEOS
09/26/11	354	63/65	SS	56	8	Patch	2'x3'	9/26	LR	P	112' N of SEOS
09/26/11	355	63/65	SS	56	8	Patch	2'x10'	9/26	LR	P	140' N of SEOS
09/26/11	356	63/65	SS	56	8	Patch	2'x8'	9/26	LR	P	170' N of SEOS
09/26/11	357	63/64/65	SS	56	8	Int	2'x3'	9/26	LR	P	INT of SEOS
09/21/12	352	37/38/39	SS	24	1	Int	3'x4'	9/23	LR	P	INT
09/26/11	323	60/65/66	SS	56	1	Int	2'x4'	9/30	KP	P	INT
09/26/11	324	65/66	SS	56	1	DS - 80	2'x4'	9/30	KP	P	15' N of SEOS
09/26/11	325	65/66	SS	56	1	Patch	2'x3'	9/30	KP	P	24' N of SEOS
09/26/11	326	65/66	SS	56	1	Patch	2'x3'	9/30	KP	P	31' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	358	65/66	SS	56	8	Patch	2'x3'	9/30	KP	P	137' N of SEOS
09/27/11	359	65/66/67	SS	56	3	Int	3'x4'	9/30	KP	P	65/66/67
09/27/11	360	66/67/68	SS	56	3	Int	2'x2'	9/30	KP	P	66/67/68
09/23/11	361	66/67	SS	56	4	Patch	2'x2'	9/26	LR	P	7' W of EEOS
09/23/11	362	60/66/68	SS	56	4	Int	3'x5'	9/26	LR	P	INT
09/23/11	363	66/68	SS	56	4	DS - 81	2'x12'	9/30	KP	P	15' N of SEOS
09/27/11	364	66/68	SS	56	3	Patch	2'x3'	9/30	KP	P	195' N of SEOS
09/27/11	365	66/68	SS	56	3	Patch	2'x3'	9/30	KP	P	204' N of SEOS
09/27/11	366	66/68	SS	56	3	Patch	2'x3'	9/30	KP	P	218' N of SEOS
09/27/11	367	66/68	SS	56	3	Patch	2'x4'	9/30	KP	P	227' N of SEOS
09/27/11	368	67/68	SS	56	3	Patch	2'x3'	9/30	KP	P	270' N of SEOS
09/27/11	369	67/68	SS	56	4	Patch	2'x3'	9/30	KP	P	86' N of SEOS
09/27/11	370	67/68	SS	56	4	Patch	2'x3'	9/30	KP	P	91' N of SEOS
09/23/11	371	60/68/69	SS	56	6	Int	2'x6'	9/26	LR	P	INT
09/23/11	372	68/69	SS	56	6	DS - 82	2'x3'	9/26	LR	P	15' N of SEOS
09/27/11	373	68/69	SS	56	4	Cap	3'x5'	9/30	KP	P	302' N of SEOS
09/27/11	374	68/69	SS	56	4	Patch	2'x5'	9/30	KP	P	310' N of SEOS
09/27/11	375	59/69/70	LR	17	1	Int	2'x4'	9/30	KP	P	INT
09/27/11	376	69/70/71	LR	17	1	Int	2'x3'	9/30	KP	P	INT
09/27/11	378	69/71	SS	56	4	Patch	2'x3'	9/30	KP	P	118' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	379	69/71	SS	56	3	Patch	2'x3'	9/30	KP	P	136' N of SEOS
09/27/11	380	69/71	SS	56	3	Patch	2'x3'	9/30	KP	P	168' N of SEOS
09/27/11	381	59/70/72	SS	56	3	Int	2'x3'	9/30	KP	P	INT
09/27/11	382	70/71/72	LR	17	1	Int	3'x5'	9/30	KP	P	INT
09/27/11	385	71/72	LR	17	1	Patch	3'x3'	9/30	KP	P	74' N of SEOS
09/27/11	384	71/72	LR	17	1	Patch	3'x3'	9/30	KP	P	100' N of SEOS
09/27/11	386	71/72	LR	17	1	Patch	3'x3'	9/30	KP	P	110' N of SEOS
09/27/11	387	71/72	LR	17	1	Patch	2'x10'	9/30	KP	P	233' N of SEOS
09/27/11	388	71/72	LR	17	1	Patch	2'x8'	9/30	KP	P	284' N of SEOS
09/27/11	389	71/72	LR	17	1	Patch	2'x3'	9/30	KP	P	314' N of SEOS
09/27/11	390	71/72	LR	17	1	Patch	3'x10'	9/30	KP	P	322' N of SEOS
09/27/11	377	69/71	LR	17	1	DS - 83	2'x4'	9/30	KP	P	15' N of SEOS
09/27/11	383	71/72	LR	17	1	DS - 84	2'x4'	9/30	KP	P	15' N of SEOS
09/27/11	391	72/73	LR	17	5	Patch	2'x4'	9/30	KP	P	35' N of SEOS
09/27/11	392	72/73	LR	17	5	Patch	3'x6'	9/30	KP	P	50' N of SEOS
09/27/11	393	72/73	LR	17	5	Patch	2'x3'	9/30	KP	P	100' N of SEOS
09/27/11	394	72/73/74	LR	17	5	Int	3'x5'	9/30	KP	P	INT N of SEOS
09/27/11	395	73/74/75	LR	17	5	Int	2'x2'	9/30	KP	P	INT
09/27/11	396	59/72/73	LR	17	5	Int	3'x3'	9/30	KP	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	397	59/73/75	LR	17	5	Int	3'x4'	9/30	KP	P	INT
09/27/11	399	74/75	LR	17	5	Patch	2'x3'	9/30	KP	P	101' N of SEOS
09/26/11	351	63/65	SS	56	1	DS - 79	2'x20'	9/26	LR	P	INT
09/27/11	398	59/73	LR	17	5	Patch	2'x3'	9/30	KP	P	10' E of WEOS
09/27/11	400	72/74	LR	17	5	Patch	2'x3'	9/30	KP	P	110' N of SEOS
09/27/11	401	72/74	LR	17	5	Patch	2'x3'	9/30	KP	P	143' N of SEOS
09/27/11	402	65/67/106	SS	56	4	Int	3'x4'	9/30	KP	P	INT
09/27/11	403	67/68/106/107	SS	56	4	Int	2'x12'	9/30	KP	P	INT
09/27/11	404	68/107	LR	17	5	Patch	2'x3'	9/30	KP	P	12' W of EEOS
09/27/11	405	68/69/107/108	LR	17	5	Int	3'x12'	9/30	KP	P	INT
09/27/11	406	69/71/108/109	LR	17	5	Int	3'x10'	9/30	KP	P	INT
09/27/11	407	71/72/109/110	LR	17	5	Int	3'x12'	9/30	KP	P	INT
09/27/11	408	72/74/110/111	LR	17	5	Int	2'x2'	9/30	KP	P	INT
09/30/11	524	115/117	LR	17	4	Patch	2'x3'	9/30	KP	P	568' N of SEOS
09/28/11	448	61/62/100/101	SS	56	5	Int	2'x2'	9/30	KP	P	INT
09/28/11	451	100/101	SS	56	5	DS - 106	2'x6'	9/30	KP	P	15' N of SEOS
09/28/11	452	100/101	SS	56	5	Patch	2'x4'	9/30	KP	P	108' N of SEOS
09/28/11	453	62/64/101/102	SS	56	5	Int	2'x2'	9/30	KP	P	INT
09/28/11	454	101/102	SS	56	5	DS - 107	2'x5'	9/30	KP	P	15' N of SEOS
09/28/11	455	64/102	SS	56	5	Patch	2'x4'	9/30	KP	P	6' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/28/11	456	64/102	SS	56	1	Patch	2'x3'	9/30	KP	P	13' W of EEOS
09/28/11	458	65/103	SS	56	1	Patch	2'x2'	9/30	KP	P	4' W of EEOS
09/28/11	460	65/103	SS	56	1	Patch	1'x2'	9/30	LR	P	15' W of EEOS
09/28/11	457	64/65/102/103	SS	56	1	Int	2'x3'	9/30	KP	P	INT
09/28/11	459	102/103	SS	56	1	DS - 108	3'x5'	10/1	LR	P	20' N of SEOS
09/28/11	462	102/103	SS	56	5	Patch	2'x5'	10/1	LR	P	128' N of SEOS
09/28/11	466	103/106	SS	56	5	DS - 109	2'x5'	10/1	LR	P	20' N of SEOS
09/28/11	467	103/106	SS	56	5	Patch	2'x4'	10/1	LR	P	113' N of SEOS
09/30/11	517	104/105	SS	56	3	Patch	2'x3'	10/1	LR	P	95' N of SEOS
09/30/11	516	104/105	SS	56	3	DS - 110	2'x4'	10/1	LR	P	20' N of SEOS
09/30/11	518	103/104	SS	56	3	DS - 111	2'x5'	10/1	LR	P	20' N of SEOS
09/30/11	519	103/104	SS	56	3	Patch	2'x3'	10/1	LR	P	65' N of SEOS
09/30/11	520	103/104	SS	56	3	Patch	2'x2'	10/1	LR	P	107' N of SEOS
09/29/11	521	103/104	SS	56	5	Patch	2'x2'	10/1	KP	P	192' N of SEOS
09/27/11	463	65/106	SS	56	4	DS - 112	2'x5'	9/30	KP	P	15' N of SEOS
09/29/11	461	65/103/106	SS	56	1	Int	2'x6'	9/30	KP	P	INT
09/27/11	468	106/107	SS	56	4	DS - 113	2'x4'	9/30	KP	P	15' N of SEOS
09/29/11	514	106/107	SS	56	4	Patch	2'x3'	9/30	KP	P	574' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/29/11	515	106/107	SS	56	4	Patch	1'x1'	9/30	KP	P	596' N of SEOS
09/27/11	474	107/108	SS	56	4	DS - 114	2'x4'	9/30	KP	P	15' N of SEOS
09/27/11	481	108/109	LR	17	6	DS - 115	2'x4'	9/30	KP	P	25' N of SEOS
09/28/11	484	108/109	SS	56	5	Patch	2'x2'	10/1	LR	P	335' N of SEOS
09/28/11	486	108/109	SS	56	1	Patch	2'x4'	10/1	LR	P	414' N of SEOS
09/27/11	488	109/110	LR	17	5	DS - 116	2'x5'	9/30	KP	P	15' N of SEOS
09/29/11	492	109/110	SS	56	1	Patch	2'x6'	9/30	KP	P	427' N of SEOS
09/29/11	494	109/110	SS	56	4	Patch	2'x5'	9/30	KP	P	568' N of SEOS
09/27/11	495	110/111	LR	17	5	DS - 117	2'x4'	9/30	KP	P	15' N of SEOS
09/28/11	500	110/111	SS	56	1	Patch	2'x3'	9/30	KP	P	448' N of SEOS
09/29/11	501	110/111	SS	56	4	Patch	2'x8'	9/30	KP	P	522' N of SEOS
09/29/11	479	107/108	SS	56	1	Patch	2'x3'	10/1	LR	P	425' N of SEOS
09/29/11	480	107/108	SS	56	4	Patch	2'x12'	10/1	LR	P	490' N of SEOS
09/28/11	482	108/109	SS	56	5	Patch	2'x3'	10/1	LR	P	165' N of SEOS
09/28/11	483	108/109	SS	56	5	Patch	2'x8'	10/1	LR	P	235' N of SEOS
10/03/12	485	22/23	SS	56	7	DS-46	1'8'	10/3	KS	P	514' E of WEOS
09/29/11	487	108/109	SS	56	4	Patch	2'x3'	10/1	LR	P	527' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	489	109/110	LR	17	5	Patch	2'x3'	9/30	KP	P	20' N of SEOS
09/28/11	490	109/110	SS	56	5	Patch	2'x3'	10/1	LR	P	180' N of SEOS
09/28/11	491	109/110	SS	56	5	Patch	2'x3'	10/1	LR	P	325' N of SEOS
09/29/11	493	109/110	SS	56	4	Patch	2'x3'	10/1	LR	P	475' N of SEOS
09/28/11	496	110/111	LR	17	9	Patch	2'x3'	9/30	KP	P	125' N of SEOS
09/28/11	497	110/111	SS	56	5	Patch	2'x3'	10/1	LR	P	175' N of SEOS
09/28/11	498	110/111	SS	56	5	Patch	2'x4'	10/1	LR	P	233' N of SEOS
09/29/11	499	110/111	SS	56	1	Patch	2'x3'	10/1	LR	P	385' N of SEOS
09/28/11	504	111/112	LR	17	9	Patch	2'x4'	9/30	KP	P	110' N of SEOS
09/28/11	505	111/112	SS	56	5	Patch	2'x4'	10/1	LR	P	318' N of SEOS
09/28/11	506	111/112	SS	56	5	Patch	2'x4'	10/1	LR	P	455' N of SEOS
09/28/11	512	112/113	SS	56	5	Patch	3'x8'	10/1	LR	P	232' N of SEOS
09/29/11	513	112/113	SS	56	1	Patch	2'x4'	10/1	LR	P	390' N of SEOS
09/30/11	522	113/115	LR	17	1	Patch	2'x3'	9/30	KP	P	410' N of SEOS
09/30/11	523	113/115	LR	17	1	Patch	2'x4'	9/30	KP	P	488' N of SEOS
09/28/11	502	111/112	LR	17	9	Int	4'x30'	9/30	KP	P	INT
09/28/11	503	111/112	LR	17	9	DS - 118	2'x4'	9/30	KP	P	45' N of SEOS
09/29/11	507	111/112	SS	56	4	Patch	2'x8'	10/1	LR	P	561' N of SEOS
09/28/11	510	75/112/113	LR	17	9	Int	8'x10'	9/30	KP	P	INT
09/28/11	511	112/113	LR	17	9	DS - 119	2'x4'	9/30	KP	P	15' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/29/11	445	112/113/114	SS	56	1	Int	2'x6'	9/30	KP	P	INT
10/01/12	444	19/131	LR	17	8	Patch	2'x2'	10/4	LR	P	7' W of EEOS
09/29/11	441	113/114/115	SS	56	1	Int	2'x2'	10/1	LR	P	INT
09/29/11	442	114/115/116	SS	56	1	Int	2'x3'	10/1	LR	P	INT
09/29/11	443	114/116	SS	56	1	DS - 121	2'x3'	9/30	LR	P	5' N of SEOS
09/28/11	509	75/113	LR	17	9	DS - 120	2'x4'	9/30	KP	P	15' S of NEOS
09/27/11	508	75/113	LR	17	1	Patch	3'x4'	9/30	KP	P	133' N of SEOS
09/27/11	431	75/113	LR	17	1	DS - 124	2'x6'	9/30	KP	P	15' N of SEOS
09/27/11	430	59/75/113	LR	17	1	Int	3'x3'	9/30	KP	P	59/75/113 INT
09/27/11	432	59/113/115	LR	17	1	Int	1'x1'	9/30	KP	P	INT
09/17/11	433	113/115	LR	17	3	DS - 125	2'x5'	9/30	KP	P	5' N of SEOS
09/17/11	434	113/115	LR	17	3	Patch	3'x3'	9/30	KP	P	22' N of SEOS
09/28/11	437	113/115	SS	56	5	Patch	2'x2'	10/1	KP	P	528' N of SEOS
09/29/11	440	113/115	SS	56	4	Patch	2'x4'	9/30	KP	P	810' N of SEOS
09/29/11	446	116/118	SS	56	1	DS - 122	2'x10'	10/1	LR	P	5' N of SEOS
09/29/11	717	115/118	SS	56	1	DS - 123	2'x4'	10/1	LR	P	15' S of NEOS
10/05/12	716	78/79/134	SS	56	3	Int	2'x2'	10/5	KP	P	INT
09/30/11	713	117/118/120	SS	56	5	Int	3'x4'	10/1	LR	P	INT
10/05/12	715	77/134	SS	56	3	Patch	2'x5'	10/5	KP	P	13' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/30/11	*714*	*117/118*	*SS*	*56*	*5*	*Patch*	*2'x2'*	*9/30*	*KP*	*P*	*15' W of EEOS*
09/30/11	*513A*	*115/117*	*LR*	*17*	*1*	*Patch*	*3'x15'*	*9/30*	*KP*	*P*	*182' N of SEOS*
09/27/11	*435*	*59/115/117*	*LR*	*17*	*1*	*Int*	*2'x2'*	*9/30*	*KP*	*P*	*INT*
09/28/11	*438*	*113/115*	*SS*	*56*	*1*	*Patch*	*2'x3'*	*9/30*	*KP*	*P*	*653' N of SEOS*
	439										*NOT USED*
	447										*NOT USED*
10/03/12	*449*	*131/132*	*LR*	*17*	*6*	*Patch*	*2'x2'*	*10/4*	*LR*	*P*	*28' W of EEOS*
09/28/11	*450*	*62/101*	*SS*	*56*	*5*	*Patch*	*1'x1'*	*9/30*	*KP*	*P*	*4' W of EEOS*
09/27/11	*464*	*65/106*	*SS*	*56*	*4*	*Patch*	*2'x2'*	*9/30*	*KP*	*P*	*30' N of SEOS*
09/30/12	*465*	*22/23*	*XM*	*51*	*3*	*Patch*	*1'x1'*	*10/3*	*KS*	*P*	*509' E of WEOS*
	469										*NOT USED*
09/28/11	*476*	*107/108*	*SS*	*56*	*5*	*Patch*	*2'x3'*	*9/30*	*KP*	*P*	*235' N of SEOS*
09/28/11	*477*	*107/108*	*SS*	*56*	*5*	*Patch*	*2'x3'*	*9/30*	*KP*	*P*	*295' N of SEOS*
09/28/11	*478*	*107/108*	*SS*	*56*	*1*	*Patch*	*2'x3'*	*9/30*	*KP*	*P*	*375' N of SEOS*
09/29/11	*532*	*119/121*	*LR*	*17*	*6*	*Patch*	*2'x3'*	*9/30*	*KP*	*P*	*39' N of SEOS*
09/30/11	*535*	*119/121*	*LR*	*17*	*1*	*Patch*	*2'x6'*	*9/30*	*KP*	*P*	*203' N of SEOS*
09/30/11	*540*	*119/122*	*LR*	*17*	*1*	*Patch*	*2'x5'*	*9/30*	*KP*	*P*	*101' N of SEOS*
09/30/11	*541*	*120/122*	*LR*	*17*	*1*	*Patch*	*2'x3'*	*10/1*	*LR*	*P*	*32' N of SEOS*
09/30/11	*542*	*120/122*	*LR*	*17*	*1*	*Patch*	*2'x4'*	*10/1*	*LR*	*P*	*80' N of SEOS*
09/30/11	*543*	*120/122*	*LR*	*17*	*4*	*Patch*	*2'x5'*	*10/1*	*LR*	*P*	*105' N of SEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/30/11	544	120/122	LR	17	4	Patch	2'x3'	10/1	LR	P	127' N of SEOS
09/30/11	723	120/122	LR	17	4	Patch	2'x3'	10/1	LR	P	145' N of SEOS
09/30/11	724	120/122	LR	17	4	Patch	2'x4'	10/1	LR	P	154' N of SEOS
09/30/11	725	120/122	SS	56	5	Patch	2'x4'	10/1	LR	P	336' N of SEOS
09/30/11	726	120/126	SS	56	5	Patch	2'x2'	10/1	LR	P	5' E of WEOS
09/30/11	728	118/126	SS	56	5	Patch	2'x2'	10/1	LR	P	59' N of SEOS
09/30/11	729	118/126	SS	56	5	Patch	2'x3'	10/1	LR	P	87' N of SEOS
09/30/11	722	118/120	SS	56	5	Patch	2'x3'	10/1	LR	P	100' N of SEOS
09/30/11	721	117/120	LR	17	4	Patch	2'x4'	10/1	LR	P	94' N of SEOS
09/29/11	475	117/119	LR	17	6	Patch	1'x1'	9/30	KP	P	23' N of SEOS
09/29/11	525	117/119	LR	17	6	Patch	3'x5'	9/30	KP	P	136' N of SEOS
09/29/11	526	117/119	LR	17	6	Patch	3'x6'	9/30	KP	P	229' N of SEOS
09/29/11	527	117/119	LR	17	6	Patch	2'x4'	9/30	KP	P	304' N of SEOS
09/30/11	529	117/119	LR	17	4	Patch	3'x15'	10/1	LR	P	472' N of SEOS
09/29/11	436	59/117/119	LR	17	6	Int	3'x6'	9/30	KP	P	INT
09/30/11	427	20/21	XM	51	2	Patch	2'x3'	10/3	RS	P	165' E of WEOS
09/30/11	428	38/39/40	SS	24	1	Int	1'x1'	9/23	LR	P	INT
09/30/11	429	20/21	XM	51	6	DS - 42	2'x7'	10/3	RS	P	510' E of WEOS
09/30/11	537	20/21	XM	51	6	Patch	2'x10'	10/3	RS	P	586' E of WEOS
09/30/11	538	20/21	XM	51	6	Patch	1'x2'	10/3	RS	P	594' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/04/12	539	26/27	XM	51	2	Patch	2'x12'	10/5	KP	P	309' E of WEOS
09/28/11	525A	21/22	XM	51	8	DS - 43	2'x5'	9/28	KP	P	10' E of WEOS
09/29/11	526A	21/22	XM	51	3	Patch	1'x4'	10/3	RS	P	70' E of WEOS
09/29/11	527A	21/22	XM	51	3	Patch	1'x3'	10/3	RS	P	90' E of WEOS
09/29/11	528	21/22	XM	51	3	Patch	2'x7'	10/3	RS	P	108' E of WEOS
09/29/11	529A	21/22	XM	51	3	Patch	2'x2'	10/3	RS	P	147' E of WEOS
09/30/11	530	21/22	XM	51	6	Patch	2'x4'	10/3	RS	P	182' E of WEOS
09/30/11	531	21/22	XM	51	6	Patch	1'x4'	10/3	RS	P	199' E of WEOS
09/30/11	533	21/22	XM	51	6	Patch	2'x3'	10/3	RS	P	455' E of WEOS
09/30/11	534	21/22	XM	51	6	Patch	2'x3'	10/3	RS	P	464' E of WEOS
09/30/11	535A	21/22	XM	51	6	DS - 44	2'x6'	10/3	RS	P	510' E of WEOS
09/30/11	536	21/22	XM	51	6	Cap	2'x13'	10/3	RS	P	564' E of WEOS
09/29/11	541A	22/23	XM	51	3	Patch	2'x10'	10/3	RS	P	36' E of WEOS
09/28/11	540A	22/23	XM	51	3	DS - 45	2'x5'	9/28	IS	P	13' E of WEOS
09/30/11	542A	22/23	XM	51	6	Patch	2'x2'	10/3	RS	P	154' E of WEOS
09/30/11	537A	121/122	LR	17	1	Patch	2'x3'	9/30	KP	P	4' E of WEOS
09/30/11	538A	121/122	LR	17	1	Patch	2'x3'	9/30	KP	P	10' E of WEOS
09/29/11	545	121/123	SS	56	1	Patch	2'x3'	9/30	KP	P	200' N of SEOS
09/30/11	547	121/124	LR	17	1	Patch	2'x2'	9/30	KP	P	114' N of SEOS
09/30/11	548	121/124	LR	17	1	Patch	2'x2'	9/30	KP	P	133' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/30/11	549	122/124	LR	17	1	Patch	2'x8'	9/30	KP	P	35' N of SEOS
09/30/11	550	122/124	LR	17	1	Patch	2'x4'	9/30	KP	P	49' N of SEOS
09/30/11	551	122/124	LR	17	4	Patch	2'x2'	10/1	LR	P	153' N of SEOS
09/30/11	552	122/124	LR	17	4	Patch	2'x4'	10/1	LR	P	268' N of SEOS
09/30/11	718	122/124	LR	17	4	Patch	2'x10'	10/1	LR	P	326' N of SEOS
09/30/11	719	122/124	SS	56	5	Patch	2'x2'	10/1	LR	P	558' N of SEOS
09/30/11	720	122/124	SS	56	5	Patch	2'x4'	10/1	LR	P	568' N of SEOS
09/29/11	470	59/123/125	LR	17	6	Int	2'x2'	9/29	KP	P	INT
09/29/11	471	123/125	LR	17	6	DS - 149	2'x5'	9/30	KP	P	10' N of SEOS
09/30/11	528A	117/119	LR	17	1	Patch	2'x4'	10/1	LR	P	365' N of SEOS
09/30/11	530A	117/119/120	LR	17	4	Int	2'x5'	10/1	LR	P	INT
09/30/11	531A	119/120/122	LR	17	4	Int	1'x1'	10/1	LR	P	INT
09/29/11	533A	119/121	SS	56	4	Patch	2'x5'	9/30	KP	P	91' N of SEOS
09/29/11	534A	26/27	XM	51	3	Patch	2'x6'	10/3	KS	P	WEOS
09/30/11	536A	119/121/122	LR	17	1	Int	4'x5'	10/1	LR	P	INT
09/30/11	543A	22/23	XM	51	6	Patch	2'x3'	10/3	RS	P	207' E of WEOS
09/30/11	544A	22/23	XM	51	6	Patch	2'x3'	10/3	RS	P	356' E of WEOS
09/30/11	545A	22/23	XM	51	6	Patch	2'x3'	10/3	RS	P	362' E of WEOS
10/03/11	571	22/23	SS	56	7	Patch	1'x1'	10/3	RS	P	498' E of WEOS
10/03/11	572	22/23	SS	56	7	Patch	1'x2'	10/3	RS	P	504' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/03/11	422	22/23	SS	56	7	DS - 40	2'x8'	10/3	RS	P	520' E of WEOS
10/03/11	573	22/23	SS	56	7	Patch	2'x2'	10/3	RS	P	535' E of WEOS
10/03/11	574	22/23	SS	56	7	Patch	2'x4'	10/3	RS	P	552' E of WEOS
10/03/11	575	22/23	SS	56	7	Patch	2'x6'	10/3	RS	P	577' E of WEOS
10/04/12	546	29/30	XM	51	7	Patch	2'x6'	10/5	KP	P	WEOS
09/29/11	548A	23/24	XM	51	3	Patch	2'x4'	10/3	RS	P	53' E of WEOS
09/29/11	549A	23/24	XM	51	3	Patch	1'x6'	10/3	RS	P	77' E of WEOS
09/29/11	547A	23/24	XM	51	3	DS - 47	2'x12'	10/3	RS	P	20' E of WEOS
09/30/11	550A	23/24	XM	51	6	Patch	1'x3'	10/3	RS	P	191' E of WEOS
09/30/11	551A	23/24	XM	51	6	Patch	2'x2'	10/3	RS	P	219' E of WEOS
09/30/11	576	23/24	XM	51	6	Patch	2'x3'	10/3	RS	P	234' E of WEOS
09/30/11	553	23/24	XM	51	6	Patch	2'x3'	10/3	RS	P	248' E of WEOS
09/30/11	554	23/24	XM	51	6	Patch	2'x3'	10/3	RS	P	261' E of WEOS
09/30/11	555	23/24	XM	51	6	Patch	1'x8'	10/3	RS	P	285' E of WEOS
09/30/11	556	23/24	XM	51	6	Patch	1'x6'	10/3	RS	P	306' E of WEOS
09/30/11	557	23/24	XM	51	6	Patch	1'x3'	10/3	RS	P	314' E of WEOS
09/30/11	558	23/24	XM	51	6	Patch	1'x2'	10/3	RS	P	328' E of WEOS
09/30/11	559	23/24	XM	51	6	Patch	1'x4'	10/3	RS	P	372' E of WEOS
09/30/11	560	23/24	XM	51	6	Patch	2'x4'	10/3	RS	P	394' E of WEOS
09/30/11	561	23/24	XM	51	6	Patch	3'x8'	10/3	RS	P	416' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/30/11	562	23/24	XM	51	6	Patch	2'x6'	10/3	RS	P	455' E of WEOS
10/04/12	577	32/134	LR	17	6	Patch	2'x4'	10/5	KP	P	13' N of SEOS
09/29/11	578	24/25	XM	51	3	Patch	2'x3'	10/3	RS	P	23' E of WEOS
09/29/11	579	24/25	XM	51	3	Patch	2'x3'	10/3	RS	P	41' E of WEOS
09/29/11	580	24/25	XM	51	3	Patch	2'x8'	10/3	RS	P	82' E of WEOS
09/29/11	570	24/25	XM	51	3	DS - 49	2'x8'	10/3	RS	P	10' E of WEOS
10/03/11	581	24/25	SS	56	7	Patch	1'x3'	10/3	RS	P	348' E of WEOS
10/03/11	582	24/25	SS	56	7	DS - 50	2'x12'	10/3	RS	P	470' E of WEOS
10/04/11	583	24/25	XM	51	7	Patch	2'x8'	10/3	RS	P	541' E of WEOS
10/01/11	584	24/25	SS	56	7	Patch	1'x3'	10/3	RS	P	564' E of WEOS
09/29/11	586	25/26	XM	51	3	Patch	2'x3'	10/3	RS	P	71' E of WEOS
09/29/11	587	25/26	XM	51	3	Patch	2'x3'	10/3	RS	P	98' E of WEOS
09/30/11	539A	121/122/124	LR	17	1	Int	2'x6'	9/30	KP	P	INT
09/29/11	546A	121/123/124	LR	17	1	Int	2'x3'	9/30	KP	P	INT
09/29/11	472	59/121/123	LR	17	6	Int	2'x2'	9/30	KP	P	INT
09/29/11	473	59/119/121	LR	17	6	Int	2'x6'	9/30	KP	P	INT
09/30/11	727	120/122/126	SS	56	5	Int	2'x3'	10/1	LR	P	INT
09/30/11	730	118/120/126	SS	56	5	Int	2'x3'	10/1	LR	P	INT
09/30/11	563	23/24	XM	51	6	Patch	1'x1'	10/3	RS	P	465' E of WEOS
09/30/11	564	23/24	XM	51	6	Patch	2'x10'	10/3	RS	P	476' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/30/11	565	23/24	XM	51	6	Patch	2'x3'	10/3	RS	P	484' E of WEOS
09/30/11	566	23/24	XM	51	6	DS - 48	1'x4'	10/3	RS	P	495' E of WEOS
09/30/11	567	23/24	XM	51	6	Patch	1'x3'	10/3	RS	P	520' E of WEOS
09/30/11	568	23/24	XM	51	6	Patch	2'x10'	10/3	RS	P	554' E of WEOS
10/04/12	569	31/32/134	LR	17	6	Patch	2'x4'	10/5	KP	P	INT
10/04/11	591	33/34	XM	51	1	Patch	4'x5'	10/5	KP	P	WEOS
10/04/11	801	26/27	XM	51	7	Patch	2'x3'	10/4	RS	P	285' E of WEOS
10/04/12	804	30/31	XM	51	7	DS-56	2'x15'	10/5	KP	P	17' E of WEOS
10/04/11	807	26/27	XM	51	7	Patch	2'x2'	10/4	RS	P	511' E of WEOS
10/04/11	732	27/28	XM	51	7	Patch	1'x1'	10/4	RS	P	2' E of WEOS
10/06/12	733	85/86	SS	56	3	DS-133	2'x5'	10/7	JC	P	570' E of WEOS
10/04/12	739	103	SS	80	3	Fusion	2'x20'	10/4	KS	P	143' W of EEOS
10/04/12	741	103/R739	XM	51	7	Patch	1'x1'	10/7	JC	P	5' W of EEOS
10/04/12	758	30/31	XM	51	7	DS-56	2'x15'	10/5	KP	P	17' E of WEOS
10/05/11	764	30/31	SS	56	1	Patch	2'x3'	10/5	KP	P	403' E of WEOS
10/05/11	765	30/31	SS	56	1	Patch	1'x1'	10/5	KP	P	416' E of WEOS
10/05/11	766	30/31	SS	56	1	Patch	2'x3'	10/5	KP	P	426' E of WEOS
10/05/11	767	30/31	XM	51	1	Patch	2'x2'	10/5	KP	P	260' E of WEOS
09/29/11	585	25/26	XM	51	3	DS - 51	2'x4'	10/3	RS	P	10' E of WEOS
09/29/11	588	25/26	XM	51	3	Patch	1'x6'	10/3	RS	P	112' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/04/11	590	25/26	XM	51	2	Patch	1'x6'	10/5	KP	P	166' E of WEOS
10/04/11	589	25/26	XM	51	2	Patch	1'x6'	10/5	KP	P	397' E of WEOS
10/04/11	592	25/26	XM	51	2	Patch	2'x2'	10/5	KP	P	523' E of WEOS
10/04/11	593	25/26	XM	51	2	Patch	2'x3'	10/5	KP	P	544' E of WEOS
09/29/11	595	26/27	XM	51	3	Patch	1'x3'	10/3	RS	P	61' E of WEOS
09/29/11	594	26/27	XM	51	3	DS - 52	2'x4'	10/3	RS	P	10' E of WEOS
10/04/11	596	26/27	XM	51	2	Patch	2'x3'	10/5	KP	P	170' E of WEOS
10/04/11	597	26/27	XM	51	2	Patch	2'x3'	10/5	KP	P	175' E of WEOS
10/04/11	598	26/27	XM	51	2	Patch	2'x3'	10/5	KP	P	189' E of WEOS
10/04/11	599	26/27	XM	51	2	Patch	2'x3'	10/5	KP	P	249' E of WEOS
10/04/11	800	26/27	XM	51	2	Patch	1'x6'	10/5	KP	P	261' E of WEOS
10/04/11	802	26/27	XM	51	2	Patch	1'x10'	10/5	KP	P	319' E of WEOS
10/04/11	803	26/27	XM	51	2	Patch	1'x1'	10/5	KP	P	352' E of WEOS
10/04/11	805	26/27	XM	51	2	Patch	1'x2'	10/5	KP	P	427' E of WEOS
10/04/11	806	26/27	XM	51	2	Patch	2'x4'	10/5	KP	P	472' E of WEOS
	809										NOT USED
10/04/11	808	26/27	XM	51	2	Patch	1'x1'	10/5	KP	P	516' E of WEOS
10/03/11	607	17/128/16	SS	56	7	Int	3'x12'	10/3	RS	P	INT
10/03/11	608	17/18/127/128	SS	56	7	Int	2'x2'	10/3	RS	P	INT
10/03/11	609	18/19/127	SS	56	7	Int	2'x3'	10/3	RS	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/03/11	611	19/20/19a/20a	SS	56	7	Int	3'x3'	10/3	RS	P	INT
10/03/11	612	20/21/21a/20a	SS	56	7	Int	3'x3'	10/4	LR	P	INT
10/03/11	604	16/59/128	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	602	59/128/130	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	600	59/125/130	LR	17	6	Int	3'x4'	10/4	LR	P	INT
10/03/11	648	127/128/130	LR	17	6	Int	2'x2'	10/4	LR	P	INT
10/03/11	647	127/129/130	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	646	125/129/130	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	644	125/129/131	LR	17	1	Int	2'x10'	10/4	LR	P	INT
10/01/11	650	19a/129/131	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/01/11	652	19a/20a/131	LR	17	6	Int	3'x3'	10/4	LR	P	INT
10/01/11	653	19a/127/129	LR	17	6	Int	2'x8'	10/4	LR	P	INT
10/01/11	635	20a/21a/131	LR	17	6	Int	3'x4'	10/4	LR	P	INT
10/01/11	634	21a/131/132	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	633	125/131/132	LR	17	1	Int	3'x6'	10/4	LR	P	INT
10/03/11	632	123/125/132	LR	17	1	Int	3'x3'	10/4	LR	P	INT
10/03/11	631	123/132/133	LR	17	6	Int	2'x2'	10/4	LR	P	INT
10/03/11	621	26a/25a	LR	17	6	DS - 150	2'x4'	10/4	LR	P	10' W of EEOS
10/03/11	622	25a/24a	LR	17	6	DS - 151	2'x4'	10/4	LR	P	10' W of EEOS
10/03/11	637	24a/23a	LR	17	6	DS - 152	2'x4'	10/4	LR	P	35' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/03/11	638	23a/22a	LR	17	6	DS - 153	2'x4'	10/4	LR	P	10' W of EEOS
10/03/11	639	22a/21a	LR	17	6	DS - 154	2'x4'	10/4	LR	P	10' W of EEOS
10/03/11	636	21a/20a	LR	17	6	DS - 155	2'x4'	10/4	LR	P	10' W of EEOS
10/03/11	641	22a/132/133	LR	17	6	Int	2'x2'	10/4	LR	P	INT
10/03/11	640	21a/22a/132	LR	17	6	Int	2'x2'	10/4	LR	P	INT
10/03/11	643	22a/23a/133	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	630	133/134/135	LR	17	6	Int	2'x3'	10/4	LR	P	INT
10/03/11	629	23a/133/135	LR	17	6	Int	2'x2'	10/4	LR	P	INT
10/03/11	628	123/133/134	LR	17	6	Int	4'x4'	10/4	LR	P	INT
10/03/11	532A	Pump House	SS	56	2	Bldg Boot	39'x24'	10/4	LR	P	S Pond Structure
10/03/11	613	21/22/21a/22a	SS	56	2	Int	3'x3'	10/4	LR	P	INT
10/01/11	614	P-22a	SS	56	2	Patch	1'x1'	10/4	LR	P	5' S of R-615
10/01/11	615	22/23/22a/23a	SS	56	2	Patch	3'x3'	10/4	LR	P	INT
	616										NOT USED
10/01/11	617	23/24/23a/24a	SS	56	2	Int	3'x3'	10/4	LR	P	INT
10/01/11	618	24a/25a/24/25	SS	56	2	Int	3'x4'	10/4	LR	P	INT
10/01/11	619	P-25a	SS	56	2	Patch	2'x3'	10/4	LR	P	18' N of R-618
10/01/11	620	25a/26a/25/26	SS	56	4	Int	2'x3'	10/4	LR	P	INT
10/03/11	624	23a/24a/135	LR	17	1	Patch	2'x2'	10/4	LR	P	INT
10/05/12	625	76/77	SS	56	3	Patch	3'X3'	10/5	KP	P	447' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/03/11	626	P-134	LR	17	1	Patch	2'x2'	10/4	LR	P	2' N of SE of Panel
10/03/11	627	P-134	LR	17	1	Patch	2'x2'	10/4	LR	P	10' N of SE of Panel
10/03/11	665	24a/25a/134	LR	17	6	Patch	2'x4'	10/4	LR	P	INT
10/04/11	666	25a/26a/134	LR	17	1	Patch	2'x12'	10/4	LR	P	INT
10/04/11	667	26a/27a/134	LR	17	1	Int	3'x4'	10/4	LR	P	INT
10/04/11	668	27a/28a/134	LR	17	1	Int	2'x2'	10/4	LR	P	INT
10/04/11	669	28a/29a/134	LR	17	1	Int	2'x2'	10/4	LR	P	INT
10/04/11	670	29a/134	LR	17	1	Patch	2'x4'	10/5	KP	P	5' N of SEOS
10/04/11	671	29a/30a/134	LR	17	6	Int	2'x3'	10/5	KP	P	INT
10/04/11	705	30a/31a/134	LR	17	6	Int	2'x2'	10/5	KP	P	INT
10/04/11	707	32a/134	LR	17	6	Patch	3'x4'	10/5	KP	P	11' N of SEOS
10/04/11	709	32a/33a/134	LR	17	6	Int	1'x1'	10/5	KP	P	INT
10/04/11	710	33a/134	LR	17	6	Patch	2'x3'	10/5	KP	P	9' N of SEOS
10/04/11	838	77a/78a/134	SS	56	3	Int	2'x3'	10/5	KP	P	INT
	864										NOT USED
10/03/11	642	22a/133	LR	17	1	Patch	1'x2'	10/4	LR	P	19' S of NEOS
10/04/11	661	26a/25a	SS	56	3	Patch	2'x4'	10/4	LR	P	223' W of EEOS
10/03/11	660	23a/22a	SS	56	7	Patch	2'x3'	10/4	LR	P	199' W of EEOS
10/03/11	658	22a/21a	SS	56	7	Patch	2'x3'	10/4	LR	P	93' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/03/11	659	22a/21a	SS	56	7	Patch	2'x3'	10/4	LR	P	109' W of EEOS
10/03/11	657	20a/19a	SS	56	2	Patch	2'x4'	10/4	LR	P	63' W of EEOS
10/03/11	654	127/129	LR	17	6	Patch	2'x3'	10/4	LR	P	25' W of EEOS
10/03/11	655	127/19a	LR	17	6	Patch	2'x4'	10/4	LR	P	6' W of EEOS
10/03/11	656	127/19a	SS	56	1	Patch	2'x4'	10/4	LR	P	63' W of EEOS
10/03/11	703	127/19a	SS	56	7	Patch	2'x3'	10/7	RS	P	197' W of EEOS
10/03/11	706	127/128	SS	56	7	Patch	2'x2'	10/3	RS	P	229' W of EEOS
	651										NOT USED
10/03/11	601	59/130	LR	17	6	Patch	2'x3'	10/4	LR	P	14' W of EEOS
10/03/11	649	130/125	LR	17	6	Patch	2'x3'	10/4	LR	P	16' N of SEOS
10/03/11	645	125/129	LR	17	6	Patch	2'x3'	10/4	LR	P	10' N of SEOS
10/03/11	603	59/128	LR	17	6	Patch	2'x3'	10/4	LR	P	57' W of EEOS
10/03/11	606	16/128	LR	17	6	Patch	2'x2'	10/4	LR	P	16' W of EEOS
10/03/11	605	16/128	SS	56	7	Patch	2'x3'	10/4	LR	P	128' W of EEOS
10/03/11	623	23a/135	LR	17	6	Patch	2'x4'	10/4	LR	P	12' N of SEOS
10/03/11	610	18/19/19a	SS	56	7	Patch	2'x3'	10/3	RS	P	INT
10/04/11	664	26a/27a	LR	17	1	Patch	2'x3'	10/5	KP	P	215' W of EEOS
10/04/11	662	26/27/26a/27a	SS	56	4	Int	2'x2'	10/5	KP	P	INT
	663										NOT USED
10/04/11	672	29a/30a	LR	17	1	DS - 145	2'x4'	10/5	KP	P	10' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/01/11	680	28a/29a/28/29	SS	56	4	Int	2'x3'	10/5	KP	P	INT
10/01/11	681	29a/30a/29/30	SS	56	4	Int	2'x3'	10/5	KP	P	INT
10/01/11	686	27a/28a	SS	56	4	Patch	1'x1'	10/5	KP	P	4' E of WEOS
10/01/11	687	27a/28a/27/28	SS	56	4	Int	2'x4'	10/5	KP	P	INT
10/04/11	691	27a/28a	LR	17	1	DS - 147	2'x4'	10/4	LR	P	10' W of EEOS
10/04/11	692	27a/26a	LR	17	1	DS - 148	2'x4'	10/4	LR	P	10' W of EEOS
10/04/11	693	30a/31a	LR	17	6	DS - 144	2'x4'	10/5	KP	P	10' W of EEOS
10/04/11	694	31a/32a	LR	17	6	DS - 143	2'x4'	10/5	KP	P	10' W of EEOS
10/05/11	696	30/31/30a/31a	SS	56	2	Int	2'x3'	10/5	KP	P	INT
10/05/11	697	31/32/31a/32a	SS	56	2	Int	1'x2'	10/5	KP	P	INT
10/05/11	698	32/33/32a/33a	SS	56	2	Int	2'x2'	10/5	KP	P	INT
10/05/11	699	33/34/33a/34a	SS	56	2	Int	2'x3'	10/5	KP	P	INT
10/05/11	700	34/35/34a/35a	SS	56	2	Int	2'x3'	10/5	KP	P	INT
10/05/11	701	35/36/35a/36a	SS	56	2	Int	2'x3'	10/5	KP	P	INT
10/05/11	702	36/76/36a/76a	SS	56	2	Int	2'x3'	10/5	KP	P	INT
10/04/11	708	32a/33a	LR	17	1	DS - 142	2'x4'	10/5	KP	P	10' W of EEOS
10/04/11	735	27/28	XM	51	7	Patch	2'x4'	10/5	KP	P	62' E of WEOS
09/29/11	734	27/28	XM	51	7	DS - 53	2'x4'	10/3	KP	P	10' E of WEOS
10/04/11	736	27/28	XM	51	7	Patch	2'x4'	10/5	KP	P	69' E of WEOS
10/04/11	737	27/28	XM	51	7	Patch	2'x2'	10/5	KP	P	129' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/05/11	738	27/28	XM	51	1	Patch	2'x2'	10/5	KP	P	192' E of WEOS
10/05/11	740	27/28	XM	51	1	Patch	2'x6'	10/5	KP	P	228' E of WEOS
10/05/11	742	27/28	SS	56	2	Patch	1'x1'	10/5	KP	P	536' E of WEOS
10/04/11	731	28/29	XM	51	7	DS - 54	2'x4'	10/5	KP	P	10' E of WEOS
10/04/11	750	28/29	XM	51	7	Patch	2'x6'	10/5	LR	P	97' E of WEOS
10/04/11	751	28/29	XM	51	7	Patch	1'x2'	10/5	LR	P	119' E of WEOS
10/05/11	752	28/29	XM	51	1	Patch	2'x2'	10/5	KP	P	252' E of WEOS
10/05/11	753	28/29	SS	56	2	Patch	1'x3'	10/5	KP	P	383' E of WEOS
10/04/11	754	28/29	SS	56	4	Patch	2'x2'	10/5	KP	P	481' E of WEOS
10/04/11	755	29/30	XM	51	7	DS - 55	2'x4'	10/5	KP	P	10' E of WEOS
10/05/11	756	29/30	XM	51	1	Patch	2'x2'	10/5	KP	P	165' E of WEOS
10/05/11	757	29/30	XM	51	1	Patch	2'x3'	10/5	KP	P	180' E of WEOS
10/05/11	758	29/30	XM	51	1	Patch	2'x2'	10/5	KP	P	193' E of WEOS
10/04/11	759	30/31	XM	51	7	Patch	2'x5'	10/5	KP	P	60' E of WEOS
10/04/11	760	30/31	XM	51	7	Patch	2'x3'	10/5	KP	P	78' E of WEOS
10/04/11	711	123/134/124	LR	17	1	Int	3'x3'	10/4	LR	P	INT
10/04/11	712	124/134	LR	17	6	Patch	1'x2'	10/5	KP	P	54' N of SEOS
10/05/11	743	124/134	SS	56	3	Patch	2'x3'	10/5	KP	P	261' N of SEOS
10/06/11	744	124/134	SS	56	1	Patch	2'x3'	10/7	JC	P	68' N of SEOS
10/06/11	745	124/134	SS	56	1	Patch	2'x2'	10/7	JC	P	186' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/04/11	746	33a/34a/134	LR	17	6	Int	1'x2'	10/4	LR	P	INT
10/04/11	747	33a/34a	LR	17	6	DS - 141	3'x4'	10/4	LR	P	10' W of EEOS
10/04/11	748	34a/35a	LR	17	6	DS - 140	3'x4'	10/4	LR	P	3' W of EEOS
10/04/11	749	35a/134	LR	17	6	Patch	2'x3'	10/4	LR	P	6' N of SEOS
10/04/11	788	35a/36a/134	LR	17	6	Patch	2'x4'	10/5	KP	P	INT
10/04/11	789	35a/36a	LR	17	6	DS - 139	2'x3'	10/5	KP	P	10' W of EEOS
10/04/11	790	36a/134	LR	17	6	Patch	2'x3'	10/5	KP	P	12' N of SEOS
10/05/11	791	36a/76a/134	SS	56	3	Int	2'x3'	10/5	KP	P	INT
10/05/11	792	36a/76a	SS	56	3	DS - 138	2'x4'	10/5	KP	P	10' W of EEOS
	793										NOT USED
	794										NOT USED
10/05/11	795	76a/77a/134	SS	56	3	Int	2'x2'	10/5	KP	P	INT
10/05/11	796	77a/78a	SS	56	3	DS - 137	2'x4'	10/5	KP	P	10' W of EEOS
10/04/11	761	30/31	XM	51	7	Patch	2'x5'	10/5	KP	P	105' E of WEOS
10/05/11	762	30/31	XM	51	1	Patch	2'x5'	10/5	KP	P	126' E of WEOS
10/05/11	763	30/31	XM	51	1	Patch	2'x12'	10/5	KP	P	141' E of WEOS
10/04/11	774	31/32	XM	51	7	DS - 57	3'x4'	10/5	KP	P	10' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/05/11	775	31/32	SS	56	2	Patch	2'x3'	10/5	KP	P	296' E of WEOS
10/04/11	777	32/33	XM	51	7	DS - 58	2'x4'	10/5	KP	P	10' E of WEOS
10/04/11	778	32/33	XM	51	7	Patch	2'x2'	10/5	KP	P	22' E of WEOS
10/04/11	779	32/33	XM	51	7	Patch	2'x3'	10/5	KP	P	50' E of WEOS
10/05/11	780	32/33	XM	51	1	Patch	2'x4'	10/5	KP	P	128' E of WEOS
10/05/11	781	32/33	XM	51	1	Patch	2'x3'	10/5	KP	P	187' E of WEOS
10/05/11	782	33/34	XM	51	1	Patch	2'x4'	10/5	KP	P	19' E of WEOS
10/05/11	783	33/34	XM	51	1	Patch	2'x4'	10/5	KP	P	30' E of WEOS
10/05/11	784	33/34	XM	51	1	Patch	2'x11'	10/5	KP	P	74' E of WEOS
10/05/11	785	33/34	XM	51	1	Patch	2'x6'	10/5	KP	P	102' E of WEOS
10/05/11	786	33/34	XM	51	1	Patch	2'x3'	10/5	KP	P	141' E of WEOS
10/05/11	787	34/35	SS	56	2	Patch	2'x4'	10/5	KP	P	400' E of WEOS
10/04/12	768	103/R739	XM	51	7	Patch	1'x4'	10/7	JC	P	20' W of EEOS
10/05/11	769	30/31	SS	56	2	Patch	2'x8'	10/5	KP	P	433' E of WEOS
10/05/11	770	30/31	SS	56	2	Patch	2'x4'	10/5	KP	P	445' E of WEOS
10/05/11	771	30/31	SS	56	2	Patch	2'x3'	10/5	KP	P	463' E of WEOS
	772										NOT USED
10/05/11	773	30/31	SS	56	2	Patch	1'x1'	10/5	KP	P	476' E of WEOS
10/05/11	776	31/32	SS	56	2	Patch	2'x4'	10/5	KP	P	350' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/05/11	797	36/76	XM	51	4	DS - 85	2'x2'	10/5	KP	P	20' E of WEOS
10/05/11	798	36/76	XM	51	4	Patch	2'x5'	10/5	KP	P	35' E of WEOS
10/05/11	799	36/76	XM	51	4	Patch	2'x2'	10/5	KP	P	150' E of WEOS
10/05/11	831	36/76	XM	51	4	Patch	2'x10'	10/5	KP	P	160' E of WEOS
10/05/11	832	36/76	XM	51	4	Patch	2'x5'	10/5	KP	P	213' E of WEOS
10/05/11	833	36/76	SS	56	2	Patch	2'x3'	10/5	KP	P	292' E of WEOS
10/05/11	834	36/76	SS	56	2	Patch	2'x5'	10/5	KP	P	305' E of WEOS
10/05/11	835	36/76	SS	56	2	Patch	2'x3'	10/5	KP	P	354' E of WEOS
10/05/11	836	76/77	XM	51	4	DS - 86	2'x5'	10/5	KP	P	20' E of WEOS
10/05/11	837	77/78	XM	51	4	DS - 87	2'x5'	10/5	KP	P	20' E of WEOS
10/05/11	843	78/79	XM	51	4	DS - 88	2'x5'	10/5	KP	P	20' E of WEOS
10/05/11	844	78/79	XM	51	4	Patch	2'x4'	10/5	KP	P	90' E of WEOS
10/05/11	845	79/80	XM	51	4	DS - 89	2'x5'	10/5	KP	P	20' E of WEOS
10/05/11	950	80/81	XM	51	4	DS - 90	2'x5'	10/5	KP	P	20' E of WEOS
10/06/11	951	80/81	SS	56	4	Patch	2'x2'	10/7	JC	P	280' E of WEOS
10/05/11	886	81/82	XM	51	4	DS - 91	2'x5'	10/5	KP	P	20' E of WEOS
10/05/11	887	81/82	XM	51	4	Patch	2'x10'	10/7	JC	P	52' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/04/11	810	102/103/102a	SS	80/56	3/4	Int	3'x22'	10/7	JC	P	102/103/102a/154
10/04/11	811	100	SS	56	4	Cap	6'x13'	10/7	JC	P	ADD-ON to Panel 100
10/04/11	812	154/155	SS	56	4	Boot	6'x6'	10/7	JC	P	15' W of EEOS
10/04/11	813	101/154	SS	56	4	Patch	2'x3'	10/7	JC	P	25' W of EEOS
10/04/11	814	102/102a/154	SS	56	4	Int	1'x3'	10/7	JC	P	INT
	815										NOT USED
	816										NOT USED
10/04/11	817	154/155	SS	56	4	Boot	5'x6'	10/7	JC	P	10' E of WEOS
10/04/11	818	154/155	SS	56	4	Patch	1'x1'	10/7	JC	P	25' W of EEOS
10/04/11	819	155	SS	56	4	Boot	6'x6'	10/7	JC	P	10' S of NEOS/10' W of EEOS
10/04/11	820	105/155	SS	56	4	Patch	2'x6'	10/7	JC	P	10' W of EEOS
10/04/11	821	105/155	SS	56	4	Patch	1'x1'	10/7	JC	P	20' W of EEOS
10/04/11	822	104/105/155	SS	56	4	Int	2'x5'	10/7	JC	P	INT
10/04/11	823	104/155	SS	56	4	Patch	2'x3'	10/7	JC	P	10' E of WEOS
10/04/11	824	155	SS	56	4	Boot	6'x6'	10/7	JC	P	10' S of NEOS/7' E of WEOS
10/04/11	825	103/154/155	SS	56	4	Patch	1'x1'	10/7	JC	P	INT
10/04/11	826	103/104/155	SS	56	4	Int	4'x24'	10/7	JC	P	INT
10/04/11	827	105/155/156	SS	56	4	Int	2'x2'	10/7	JC	P	INT
10/04/11	828	105/156/157	SS	56	4	Int	2'x4'	10/7	JC	P	INT
10/04/11	829	105/157	SS	56	4	Patch	1'x1'	10/7	JC	P	17' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/04/11	830	105/157	SS	56	4	Int	1'x1'	10/5	JC	P	INT
	839										NOT USED
10/05/11	840	77a/78a/77/78	SS	56	2	Int	3'x6'	10/5	KP	P	INT
10/05/11	841	78a/79a/78/79	SS	56	2	Int	3'x2'	10/5	KP	P	INT
10/05/11	842	79a/80a/79/80	SS	56	3	Int	2'x2'	10/5	KP	P	INT
10/05/11	846	79a/80a	SS	56	3	DS - 136	2'x5'	10/5	KP	P	10' W of EEOS
10/05/11	847	79a/80a	SS	56	3	Patch	1'x1'	10/5	KP	P	194' W of EEOS
10/05/11	848	76a/77a	SS	56	3	Patch	2'x2'	10/5	KP	P	193' W of EEOS
10/05/11	849	80a/134	SS	56	3	Patch	2'x3'	10/7	JC	P	10' N of SEOS
10/05/11	850	80a/81a/134	SS	56	3	Int	2'x2'	10/7	JC	P	INT
10/05/11	851	81a/134	SS	56	3	Patch	2'x3'	10/7	JC	P	8' N of SEOS
10/05/11	852	81a/82a/134	SS	56	3	Patch	2'x4'	10/7	JC	P	INT
10/05/11	853	81a/82a	SS	56	3	DS - 135	2'x4'	10/7	JC	P	10' W of SEOS
10/05/11	854	82a/83a/134	SS	56	3	Int	2'x2'	10/7	JC	P	INT
10/05/11	855	83a/84a	SS	56	3	DS - 134	2'x4'	10/7	JC	P	3' W of EEOS
10/04/12	856	103	SS	56	3	Fusion	2'x20'	10/4	KS	P	187' N of SEOS
10/05/11	857	103/R856	SS	56	4	Patch	2'x4'	10/7	JC	P	20' W of EEOS
10/05/11	858	84a/85a/134	SS	56	3	Int	2'x4'	10/7	JC	P	INT
10/06/11	859	85a/86a/134	SS	56	3	Int	2'x5'	10/7	JC	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/06/11	860	86a/87a/134	SS	56	3	Patch	2'x2'	10/7	JC	P	INT
10/06/11	861	87a/134	SS	56	1	Patch	2'x4'	10/7	JC	P	9' N of SEOS
10/06/11	862	87a/88a/134	SS	56	1	Int	2'x2'	10/3	LR	P	INT
10/06/11	863	87a/88a	SS	56	1	DS - 132	2'x3'	10/3	LR	P	10' W of EEOS
	865										NOT USED
09/29/11	866	116/118	SS	56	3	Patch	2'x2'	10/7	JC	P	81' N of SEOS
10/06/11	867	88a/89a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	868	88a/89a	SS	56	1	DS - 131	2'x4'	10/7	JC	P	10' W of EEOS
10/06/11	869	89a/90a/134	SS	56	1	Int	2'x8'	10/7	JC	P	INT
10/06/11	870	90a/91a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	871	90a/91a	SS	56	1	DS - 130	2'x3'	10/7	JC	P	10' W of EEOS
10/06/11	872	91a/92a	SS	56	1	DS - 129	3'x3'	10/7	JC	P	INT
10/06/11	873	92a/93a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	874	93a/94a/134	SS	56	1	Int	2'x3'	10/7	JC	P	INT
10/06/11	875	93a/94a	SS	56	1	DS - 128	2'x4'	10/7	JC	P	5' W of EEOS
10/06/11	876	94a/95a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	877	95a/96a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	878	96a/97a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	879	96a/97a	SS	56	1	DS - 127	2'x2'	10/7	JC	P	5' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/06/11	880	97a/98a/134	SS	56	1	Int	2'x2'	10/7	JC	P	INT
10/06/11	884	84a/85a	SS	56	1	Patch	2'x2'	10/7	JC	P	14' W of EEOS
10/06/11	885	80a/81a	SS	56	3	Patch	1'x1'	10/7	JC	P	150' W of EEOS
10/05/11	704	36a/76a	SS	56	3	Patch	2'x2'	10/5	KP	P	80' W of EEOS
10/05/11	703	36a/76a	SS	56	3	Patch	1'x1'	10/5	KP	P	113' W of EEOS
10/04/11	695	31a/32a	LR	17	6	Patch	2'x5'	10/5	KP	P	212' W of EEOS
10/04/11	690	27a/28a	LR	17	6	Patch	2'x3'	10/5	KP	P	115' W of EEOS
10/04/11	689	27a/28a	LR	17	6	Patch	2'x3'	10/5	KP	P	221' W of EEOS
10/04/11	688	27a/28a	LR	17	6	Patch	2'x3'	10/5	KP	P	227' W of EEOS
10/04/11	673	28a/29a	LR	17	1	DS - 146	2'x4'	10/5	KP	P	10' W of EEOS
10/04/11	674	28a/29a	LR	17	1	Patch	2'x3'	10/5	KP	P	22' W of EEOS
10/04/11	675	28a/29a	LR	17	1	Patch	2'x4'	10/5	KP	P	49' W of EEOS
10/04/11	676	28a/29a	LR	17	1	Patch	2'x10'	10/5	KP	P	79' W of EEOS
10/04/11	678	28a/29a	LR	17	6	Patch	2'x4'	10/5	KP	P	177' W of EEOS
10/04/11	677	28a/29a	LR	17	6	Patch	2'x8'	10/5	KP	P	210' W of EEOS
10/01/11	679	28a/29a	SS	56	4	Patch	2'x6'	10/5	KP	P	240' W of EEOS
10/04/11	685	26a/27a	LR	17	1	Patch	2'x2'	10/5	KP	P	105' W of EEOS
10/04/11	684	26a/27a	LR	17	1	Patch	2'x2'	10/5	KP	P	112' W of EEOS
10/04/11	683	26a/27a	LR	17	6	Patch	1'x2'	10/5	KP	P	200' W of EEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/05/12	682	79/80/134	SS	56	3	Patch	1'x1'	10/5	KP	P	INT
10/06/11	888	81/82	XM	51	2	Patch	1'x6'	10/7	JC	P	168' E of WEOS
10/06/11	889	81/22	XM	51	2	Patch	1'x3'	10/7	JC	P	210' E of WEOS
10/06/11	890	81/22	XM	51	2	Patch	1'x3'	10/7	JC	P	218' E of WEOS
10/06/11	891	81/22	SS	56	3	Patch	1'x3'	10/7	JC	P	350' E of WEOS
10/05/11	893	82/83	XM	51	4	DS - 92	1'x10'	10/7	JC	P	17' E of WEOS
10/06/11	895	82/83	XM	51	2	Patch	2'x15'	10/7	JC	P	45' E of WEOS
10/06/11	896	82/83	XM	51	2	Patch	1'x2'	10/7	JC	P	60' E of WEOS
10/06/11	897	82/83	XM	51	2	Patch	2'x4'	10/7	JC	P	115' E of WEOS
10/06/11	898	82/83	XM	51	2	Patch	1'x4'	10/7	JC	P	231' E of WEOS
10/06/11	899	82/83	XM	51	2	Patch	1'x15'	10/7	JC	P	263' E of WEOS
10/06/11	903	83/84	XM	51	2	Patch	1'x4'	10/7	JC	P	18' E of WEOS
09/30/11	904	83/84	LR	17	1	Patch	2'x3'	10/7	JC	P	366' E of WEOS
10/06/11	905	83/84	SS	56	3	Patch	2'x4'	10/7	JC	P	376' E of WEOS
10/06/11	907	84/85	XM	51	2	DS - 94	1'x5'	10/7	JC	P	16' E of WEOS
10/06/11	910	84/85	XM	51	2	Patch	1'x3'	10/7	JC	P	43' E of WEOS
10/06/11	911	84/85	SS	56	3	Patch	1'x2'	10/7	JC	P	348' E of WEOS
10/06/11	912	84/85	SS	56	3	Patch	1'x1'	10/7	JC	P	352' E of WEOS
10/06/11	913	84/85	SS	56	3	Patch	1'x4'	10/7	JC	P	358' E of WEOS
09/30/11	914	84/85	LR	17	1	Patch	1'x3'	10/7	JC	P	391' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/06/11	917	85/86	XM	51	2	Patch	1'x3'	10/7	JC	P	49' E of WEOS
10/06/11	892	81/82	SS	56	3	Patch	2'x2'	10/7	JC	P	420' E of WEOS
10/05/11	894	82/83	XM	51	4	Patch	1'x3'	10/7	JC	P	25' E of WEOS
10/06/11	881	98a/134	SS	56	1	Patch	1'x2'	10/7	JC	P	8' N of SEOS
10/06/11	882	98a/99a/134	SS	56	1	Int	1'x1'	10/7	JC	P	INT
10/06/11	883	98a/99a	SS	56	1	DS - 126	2'x4'	10/7	JC	P	10' W of EEOS
10/06/11	900	80/81	SS	56	3	Int	3'x3'	10/7	JC	P	80/81/80a/81a
10/06/11	901	82/83	SS	56	3	Int	1'x3'	10/7	JC	P	82/83/82a/83a
10/06/11	902	83/84	XM	51	2	DS - 93	1'x5'	10/7	JC	P	10' E of WEOS
09/30/11	906	83/84	LR	17	1	Int	2'x4'	10/7	JC	P	83/84/83a/84a
10/06/11	908	84/85	XM	51	2	Patch	1'x3'	10/7	JC	P	10' E of WEOS
10/06/11	909	84/85	XM	51	2	Patch	1'x8'	10/7	JC	P	5' E of WEOS
09/30/11	915	84/85	LR	17	1	Int	2'x2'	10/7	JC	P	84/85/84a/85a
10/06/11	916	85/86	XM	51	2	DS - 95	2'x20'	10/7	JC	P	15' E of WEOS
09/30/11	925	85/86	LR	17	1	Int	2'x5'	10/7	JC	P	85/86/85a/86a
09/30/11	931	86/87	LR	17	1	Int	2'x5'	10/7	JC	P	86/87/86a/87a
10/06/11	935	87/88	XM	51	4	DS - 97	1'x5'	10/7	JC	P	30' E of WEOS
10/06/11	947	88/89	XM	51	4	DS - 98	2'x5'	10/7	JC	P	30' E of WEOS
10/06/11	948	88/89	SS	56	3	Int	2'x3'	10/7	JC	P	88/89/88a/89a
10/06/11	949	89/90	XM	51	4	DS - 99	2'x5'	10/7	JC	P	25' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/07/11	*953*	*89/90*	*SS*	*56*	*1*	*Int*	*2'x2'*	*10/7*	*JC*	*P*	*89/90/89a/90a*
	954										*NOT USED*
10/06/11	*918*	*85/86*	*XM*	*51*	*4*	*Patch*	*2'x5'*	*10/7*	*JC*	*P*	*83' E of WEOS*
10/06/11	*919*	*85/86*	*XM*	*51*	*4*	*Patch*	*2'x5'*	*10/7*	*JC*	*P*	*122' E of WEOS*
10/07/11	*920*	*85/86*	*XM*	*51*	*2*	*Patch*		*10/7*	*JC*	*P*	*219' E of WEOS*
10/06/11	*921*	*85/86*	*SS*	*56*	*3*	*Patch*	*2'x4'*	*10/7*	*JC*	*P*	*300' E of WEOS*
10/06/11	*922*	*85/86*	*SS*	*56*	*3*	*Patch*	*1'x10'*	*10/7*	*JC*	*P*	*319' E of WEOS*
10/06/11	*923*	*85/86*	*SS*	*56*	*3*	*Patch*	*1'x10'*	*10/7*	*JC*	*P*	*345' E of WEOS*
10/06/11	*924*	*85/86*	*SS*	*56*	*3*	*Patch*	*1'x6'*	*10/7*	*JC*	*P*	*360' E of WEOS*
10/06/11	*926*	*86/87*	*XM*	*51*	*4*	*DS - 96*	*2'x7'*	*10/7*	*JC*	*P*	*21' E of WEOS*
10/06/11	*927*	*86/87*	*XM*	*51*	*4*	*Patch*	*2'x5'*	*10/7*	*JC*	*P*	*90' E of WEOS*
10/06/11	*928*	*86/87*	*SS*	*56*	*3*	*Patch*	*2'x3'*	*10/7*	*JC*	*P*	*270' E of WEOS*
10/06/11	*929*	*86/87*	*SS*	*56*	*3*	*Patch*	*1'x4'*	*10/7*	*JC*	*P*	*320' E of WEOS*
09/30/11	*930*	*86/87*	*LR*	*17*	*1*	*Patch*	*2'x4'*	*10/7*	*JC*	*P*	*362' E of WEOS*
10/06/11	*932*	*87/88*	*XM*	*51*	*4*	*Patch*	*2'x3'*	*10/7*	*JC*	*P*	*0'-3' from WEOS*
10/06/11	*933*	*87/88*	*XM*	*51*	*4*	*Patch*	*2'x3'*	*10/7*	*JC*	*P*	*15' E of WEOS*
10/06/11	*934*	*87/88*	*XM*	*51*	*4*	*Patch*	*1'x3'*	*10/7*	*JC*	*P*	*25' E of WEOS*
10/06/11	*936*	*87/88*	*XM*	*51*	*4*	*Patch*	*1'x2'*	*10/7*	*JC*	*P*	*89' E of WEOS*
10/06/11	*937*	*87/88*	*XM*	*51*	*4*	*Patch*	*2'x30'*	*10/7*	*JC*	*P*	*115' E of WEOS*
10/06/11	*938*	*87/88*	*XM*	*51*	*4*	*Patch*	*2'x3'*	*10/7*	*JC*	*P*	*181' E of WEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/06/11	939	87/88	XM	51	4	Patch	2'x8'	10/7	JC	P	204' E of WEOS
10/06/11	940	87/88	XM	51	4	Patch	2'x2'	10/7	JC	P	210' E of WEOS
10/06/11	941	87/88	SS	56	3	Patch	1'x3'	10/7	JC	P	250' E of WEOD
10/06/11	942	87/88	SS	56	3	Patch	2'x2'	10/7	JC	P	291' E of WEOS
10/06/11	943	87/88	SS	56	3	Patch	2'x3'	10/7	JC	P	305' E of WEOS
10/06/11	944	87/88	SS	56	3	Patch	1'x4'	10/7	JC	P	358' E of WEOS
10/06/11	945	87/88	XM	56	3	Patch	1'x10'	10/7	JC	P	394' E of WEOS
10/06/11	946	88/89	XM	51	3	Patch	2'x5'	10/7	JC	P	5' E of WEOS
10/07/11	952	89/90	XM	51	4	Patch	2'x3'	10/7	JC	P	193' E of WEOS
10/06/11	955	90/91	XM	51	4	Patch	2'x4'	10/7	JC	P	10' E of WEOS
10/06/11	956	90/91	XM	51	4	Patch	2'x4'	10/7	JC	P	17' E of WEOS
10/06/11	958	90/91	XM	51	4	Patch	1'x6'	10/7	JC	P	75' E of WEOS
09/30/11	963	91/92	SS	56	5	Patch	1'x1'	10/7	JC	P	370' E of WEOS
09/30/11	962	91/92	SS	56	5	Patch	1'x1'	10/7	JC	P	395' E of WEOS
10/06/11	965	92/93	XM	51	4	Patch	1'x2'	10/7	JC	P	15' from WEOS
10/07/11	967	92/93	XM	51	2	Patch	2'x4'	10/7	JC	P	59' E of WEOS
10/07/11	968	92/93	XM	51	2	Patch	2'x5'	10/7	JC	P	93' E of WEOS
10/07/11	969	92/93	SS	56	1	Patch	2'x3'	10/7	JC	P	375' E of WEOS
10/07/11	975	93/94	XM	51	2	Patch	2'x3'	10/7	JC	P	22' E of WEOS
10/07/11	973	93/94	SS	56	1	Patch	3'x4'	10/7	JC	P	377' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/07/11	972	93/94	SS	56	1	Patch	3'x6'	10/7	JC	P	388' E of WEOS
10/07/11	979	94/95	XM	51	2	Patch	2'x2'	10/7	JC	P	396' E of WEOS
10/06/11	957	90/91	XM	51	4	DS - 100	2'x4'	10/7	JC	P	25' E of WEOS
09/30/11	959	90/91	SS	56	5	Int	2'x3'	10/7	JC	P	90/91/90a/91a
09/30/11	960	91a/92a	SS	56	5	Patch	2'x3'	10/7	JC	P	5' E of WEOS
	961										NOT USED
10/06/11	964	91/92	XM	51	4	DS - 101	2'x4'	10/7	JC	P	25' E of WEOS
10/06/11	966	92/93	XM	51	4	DS - 102	2'x4'	10/7	JC	P	25' E of WEOS
09/30/11	970	92/93	SS	56	5	Int	3'x3'	10/7	JC	P	92/93/92a/93a
10/07/11	971	93/94	SS	56	1	Int	2'x4'	10/7	JC	P	93/94/93a/94a
10/07/11	974	93/94	XM	51	2	DS - 103	2'x4'	10/7	JC	P	25' E of WEOS
10/07/11	976	94/95	XM	51	2	DS - 104	2'x4'	10/7	JC	P	25' E of WEOS
10/07/11	977	95/96	XM	51	2	DS - 105	2'x6'	10/7	JC	P	25' E of WEOS
10/07/11	981	94/95	XM	51	2	Int	2'x6'	10/7	JC	P	94/95/94a/95a
10/07/11	982	95/96	XM	51	2	Int	2'x2'	10/7	JC	P	95/96/95a/96a
10/07/11	984	96/97	XM	51	2	Int	2'x3'	10/7	JC	P	96/97/96a/97a
10/07/11	985	97/98	XM	51	2	Int	2'x3'	10/7	JC	P	97/98/97a/98a
10/07/11	986	98/99	XM	51	2	Int	2'x3'	10/7	JC	P	98/99/98a/99a
10/07/11	980	94/95	XM	51	2	Patch	2'x3'	10/7	JC	P	421' E of WEOS
10/07/11	978	95/96	XM	51	2	Patch	2'x4'	10/7	JC	P	45' E of WEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/07/11	987	95/96	XM	51	2	Patch	3'x5'	10/7	JC	P	378' E of WEOS
10/07/11	983	95/96	XM	51	2	Patch	2'x3'	10/7	JC	P	408' E of WEOS
10/07/11	989	96/97	XM	51	2	Patch	2'x3'	10/7	JC	P	328' E of WEOS
10/07/11	988	96/97	XM	51	2	Patch	2'x3'	10/7	JC	P	337' E of WEOS
10/07/11	990	97/98	XM	51	2	Patch	2'x3'	10/7	JC	P	370' E of WEOS
10/07/11	991	98/99	XM	51	2	Patch	3'x4'	10/7	JC	P	197' E of WEOS
10/08/11	992	105/136/104	XM	51	2	Int	3'x6'	10/8	KP	P	INT
10/08/11	993	105/136	XM	51	2	DS - 156	2'x4'	10/8	KP	P	15' W of EEOS
10/07/11	994	103/104/139	XM	51	4	Int	2'x3'	10/8	KP	P	INT
10/07/11	995	103/106/139	XM	51	4	Int	3'x8'	10/8	KP	P	INT
10/08/11	996	104a/136	XM	51	2	DS - 157	2'x5'	10/8	KP	P	10' N of SEOS
10/08/11	997	104a/138/139	XM	51	2	Int	3'x6'	10/8	KP	P	INT
10/07/11	998	104a/138/139	XM	51	4	Int	2'x3'	10/8	KP	P	INT
10/08/11	1002	136/137/138	XM	51	2	Int	3'x4'	10/8	KP	P	INT
10/08/11	1003	137/138	XM	51	2	DS - 158	2'x4'	10/8	KP	P	10' N of SEOS
10/08/11	1004	137/138	XM	51	2	Patch	2'x4'	10/8	KP	P	44' N of SEOS
10/08/11	1005	137/138	XM	51	2	Patch	2'x5'	10/8	KP	P	291' N of SEOS
10/07/11	999	138/139	XM	51	4	DS - 159	4'x4'	10/8	KP	P	10' N of SEOS
10/08/11	1000	138/139	XM	51	2	Patch	2'x3'	10/8	KP	P	20' N of SEOS
10/08/11	1001	138/139	XM	51	2	Patch	2'x3'	10/8	KP	P	46' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/08/11	1006	138/139	XM	51	2	Patch	1'x4'	10/8	KP	P	398' N of SEOS
10/07/11	1012	106a/139	XM	51	4	Patch	1'x2'	10/8	KP	P	11' N of SEOS
10/07/11	1011	106a/139	XM	51	4	Patch	2'x3'	10/8	KP	P	17' N of SEOS
10/08/11	1010	106a/139	XM	51	2	Patch	2'x2'	10/8	KP	P	63' N of SEOS
10/08/11	1014	142/143	SS	17	3	Patch	2'x2'	10/8	KP	P	11' N of SEOS
10/08/11	1015	142/143	SS	17	3	Patch	1'x3'	10/8	KP	P	36' N of SEOS
10/08/11	1007	106a/139/140	SS	56	1	Int	2'x4'	10/8	KP	P	INT
10/08/11	1016	106a/107a/140	SS	56	1	Int	4'x4'	10/8	KP	P	106a/107a/140/141
10/08/11	1019	143/144	SS	56	1	DS - 170	2'x5'	10/8	KP	P	10' N of SEOS
10/08/11	1020	140/141/142	SS	17	1	Int	1'x4'	10/8	KP	P	INT
10/08/11	1022	141/142/143	SS	17	3	Int	1'x2'	10/8	KP	P	INT
10/08/11	1024	107a/108a/141	SS	56	1	Int	2'x3'	10/8	KP	P	107a/108a/141/143
10/07/11	1027	106/106a	XM	51	4	Int	3'x4'	10/8	KP	P	107/107a/106/106a
10/07/11	1028	107/107a	XM	51	4	Int	3'x3'	10/8	KP	P	107/107a/108/108a
10/08/11	1021	141/142	SS	17	1	Patch	1'x1'	10/8	KP	P	4' W of EEOS
10/07/11	1026	106a/107a	XM	51	4	DS - 161	3'x4'	10/8	KP	P	10' N of SEOS
10/07/11	1013	106/139	XM	51	4	DS - 160	3'x4'	10/8	KP	P	10' N of SEOS
10/07/11	1025	107a/108a	XM	51	4	DS - 162	2'x4'	10/8	KP	P	10' N of SEOS
10/07/11	1029	108a/109a	XM	51	4	Int	3'x13'	10/8	KP	P	108/109/108a/109a
10/07/11	1030	108a/109a	SS	56	3	DS - 163	2'x4'	10/8	KP	P	10' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/07/11	1031	109/110/109a	SS	56	3	Int	3'x3'	10/8	KP	P	109/110/109a/110a
10/07/11	1032	109a/110a	SS	56	3	DS - 164	2'x4'	10/8	KP	P	10' N of SEOS
10/08/11	1033	108a/109a	SS	17	4	Patch	2'x3'	10/8	KP	P	72' N of SEOS
10/08/11	1034	110a/145	SS	56	1	Patch	1'x1'	10/8	KP	P	9' W of EEOS
10/08/11	1035	108a/109a	SS	56	1	Int	1'x1'	10/8	KP	P	108a/109a/143
10/08/11	1039	144/145/146	SS	17	3	Int	1'x2'	10/8	KP	P	INT
10/08/11	1041	145/146/148	SS	17	3	Int	1'x1'	10/8	KP	P	INT
10/08/11	1043	109a/110a	SS	56	1	Int	3'x4'	10/8	KP	P	109a/110a/144/145
	1044										NOT USED
	1047										NOT USED
10/07/11	1051	112a/114a	SS	56	3	Int	3'x4'	10/8	KP	P	112a/114a/149/150
10/07/11	1052	114a/150/152	SS	56	3	Int	1'x3'	10/8	KP	P	INT
10/07/11	1049	148/149	SS	56	3	DS - 173	2'x4'	10/8	KP	P	10' N of SEOS
10/07/11	1056	110/111	SS	56	3	Int	2'x3'	10/8	KP	P	110/111/110a/111a
10/07/11	1057	110a/111a	SS	56	3	DS - 165	2'x4'	10/8	KP	P	10' N of SEOS
10/07/11	1058	111/112	SS	56	3	Int	3'x10'	10/8	KP	P	111/112/111a/112a
10/07/11	1055	111a/112a	SS	56	3	DS - 166	2'x6'	10/8	KP	P	15' N of SEOS
	1059										NOT USED
10/07/11	1063	114/116	SS	56	3	Int	2'x3'	10/8	KP	P	114/116/114a/151
10/07/11	1061	112a/114a	SS	56	3	DS - 167	2'x6'	10/8	KP	P	10' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/07/11	1064	114a/151	SS	56	1	DS - 168	2'x5'	10/8	KP	P	10' N of SEOS
10/07/11	1065	116/118/151/153	SS	56	1	Int	3'x4'	10/8	KP	P	INT
10/07/11	1066	151/153	SS	56	1	DS - 169	2'x5'	10/8	KP	P	10' N of SEOS
10/07/11	1067	118/153	SS	56	1	Patch	1'x2'	10/8	KP	P	6' W of EEOS
10/08/11	1068	110a/111a	SS	56	1	Patch	2'x2'	10/8	KP	P	125' N of SEOS
10/07/11	1054	111a/112a	SS	56	1	Patch	2'x2'	10/8	KP	P	114' N of SEOS
10/07/11	1053	111a/112a	SS	56	1	Patch	2'x4'	10/8	KP	P	121' N of SEOS
10/07/11	1050	111a/112a	SS	56	1	Patch	1'x2'	10/8	KP	P	160' N of SEOS
10/07/11	1069	144/145	SS	56	1	DS - 171	2'x4'	10/8	KP	P	10' N of SEOS
10/08/11	1042	144/145	SS	17	3	Patch	1'x1'	10/8	KP	P	67' N of SEOS
10/07/11	1046	145/148	SS	56	1	DS - 172	2'x4'	10/8	KP	P	10' N of SEOS
10/07/11	1070	149/150	SS	56	1	DS - 174	2'x8'	10/8	KP	P	10' N of SEOS
10/07/11	1071	149/150	SS	56	1	Patch	2'x4'	10/8	KP	P	44' N of SEOS
10/08/11	1072	149/150	SS	17	3	Patch	2'x3'	10/8	KP	P	71' N of SEOS
10/08/11	1073	149/150	SS	17	4	Patch	1'x3'	10/8	KP	P	106' N of SEOS
10/08/11	1074	149/150	SS	17	4	Patch	1'x5'	10/8	KP	P	143' N of SEOS
10/08/11	1079	150/152	SS	17	4	Patch	2'x2'	10/8	KP	P	81' N of SEOS
10/08/11	1075	150/152	XM	51	2	Patch	1'x5'	10/8	KP	P	159' N of SEOS
10/08/11	1076	150/152	XM	51	2	Patch	1'x2'	10/8	KP	P	217' N of SEOS
10/07/11	1083	114a/151/152	SS	56	3	Int	2'x4'	10/8	KP	P	114a/151/152

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/07/11	1084	151/152/153	SS	56	3	Int	2'x7'	10/8	KP	P	INT
10/08/11	1008	106a/139	XM	51	2	Patch	2'x3'	10/8	KP	P	107' N of SEOS
10/08/11	1009	106a/139	XM	51	2	Patch	3'x3'	10/8	KP	P	100' N of SEOS
	1017										NOT USED
10/08/11	1018	107a/141	SS	56	1	Patch	2'x2'	10/8	KP	P	4' W of EEOS
10/08/11	1023	141/143	SS	17	3	Patch	1'x1'	10/8	KP	P	58' N of SEOS
	1036										NOT USED
10/08/11	1037	144/146/147	XM	51	2	Int	1'x3'	10/8	KP	P	INT
10/08/11	1038	146/147/148	XM	51	2	Int	1'x3'	10/8	KP	P	INT
10/08/11	1040	145/146	SS	17	3	Patch	2'x2'	10/8	KP	P	6' W of EEOS
10/07/11	1045	111a/145/148	SS	56	3	Int	1'x2'	10/8	KP	P	INT
10/07/11	1048	112a/148/149	SS	56	3	Int	1'x2'	10/8	KP	P	INT
	1060										NOT USED
	1062										NOT USED
10/08/11	1077	152/153	XM	51	2	Patch	1'x4'	10/8	KP	P	323' N of SEOS
10/08/11	1078	152/153	XM	51	2	Patch	1'x8'	10/8	KP	P	266' N of SEOS
10/07/11	1080	114a/152	SS	56	3	Patch	1'x4'	10/8	KP	P	15' S of NEOS
10/07/11	1081	114a/152	SS	56	1	Patch	2'x4'	10/8	KP	P	40' N of SEOS
10/07/11	1082	114a/152	SS	56	3	Patch	2'x3'	10/8	KP	P	10' N of SEOS
10/11/11	1085	118/126	SS	51	3	Int	3'x3'	10/12	JC	P	118/126/153/158

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1086	153	SS	51	3	Patch	1'x1'	10/12	JC	P	1' E of WEOS/8' N of SEOS
10/11/11	1087	122/126	SS	51	3	Int	2'x5'	10/12	JC	P	122/126/158/160
10/11/11	1088	153/158/159	LR	17	4	Int	2'x2'	10/12	JC	P	INT
10/11/11	1089	158/159/160	LR	17	4	Int	1'x2'	10/12	JC	P	INT
10/11/11	1090	159/160/161	LR	17	4	Int	4'x4'	10/12	JC	P	INT
10/11/11	1091	160/161/162	LR	17	4	Int	2'x5'	10/12	JC	P	INT
10/11/11	1092	153/159	LR	17	4	Patch	1'x1'	10/12	JC	P	112' N of SEOS
10/11/11	1093	153/159	LR	17	4	Patch	1'x1'	10/12	JC	P	190' N of SEOS
10/11/11	1094	153/159	JC	55	1	DS - 175	2'x4'	10/13	KP	P	12' S of NEOS
10/11/11	1095	159/161	JC	55	1	DS - 176	2'x4'	10/13	KP	P	15' S of NEOS
10/11/11	1096	161/163	JC	55	1	DS - 177	2'x4'	10/13	KP	P	18' S of NEOS
10/11/11	1097	122/124	SS	51	3	Int	3'x5'	10/12	JC	P	122/124/160/162
10/11/11	1098	124/134/164	SS	51	3	Int	1'x2'	10/12	JC	P	INT
	1099										NOT USED
10/11/11	1100	162/165	SS	51	3	Patch	1'x2'	10/12	JC	P	36' N of SEOS
10/11/11	1101	164/165/167	SS	51	3	Int	1'x2'	10/12	JC	P	INT
10/11/11	1102	162/164/165	SS	51	3	Int	2'x3'	10/12	JC	P	INT
10/11/11	1103	161/162/163	LR	17	4	Int	4'x5'	10/12	JC	P	INT
10/11/11	1104	162/163/165	LR	17	4	Int	2'x2'	10/12	JC	P	INT
10/11/11	1105	165/167/168	LR	17	4	Int	3'x3'	10/12	KP	P	INT

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Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1106	167/168/170	LR	17	4	Int	1'x1'	10/12	KP	P	INT
10/11/11	1107	167/170	LR	17	4	Patch	3'x5'	10/12	KP	P	179' N of SEOS
10/11/11	1108	163/165	LR	17	4	Patch	1'x2'	10/12	KP	P	40' S of NEOS
10/11/11	1109	163/165/166	LR	17	4	Int	2'x2'	10/12	KP	P	INT
10/11/11	1110	165/166/168	LR	17	4	Int	2'x2'	10/12	KP	P	INT
10/11/11	1111	168/170/171	LR	17	4	Int	2'x3'	10/12	KP	P	INT
10/11/11	1112	170/171/174	LR	17	4	Int	2'x2'	10/12	KP	P	INT
10/11/11	1113	171/174	LR	17	4	Patch	1'x2'	10/12	KP	P	7' N of SEOS
10/11/11	1114	170/174	LR	17	4	Patch	1'x2'	10/13	KP	P	5' S of NEOS
10/11/11	1115	170/174	LR	17	4	Patch	1'x2'	10/13	KP	P	28' N of SEOS
10/11/11	1116	170/173/174	LR	17	4	Int	1'x3'	10/13	KP	P	INT
10/11/11	1117	170/173	LR	17	4	Patch	2'x5'	10/12	KP	P	8' S of NEOS
10/11/11	1118	173/174/178	LR	17	4	Int	2'x3'	10/12	KP	P	INT
10/11/11	1119	173/177/178	LR	17	4	Int	2'x3'	10/12	KP	P	INT
10/11/11	1120	177/178/181	LR	17	6	Int	2'x3'	10/12	KP	P	INT
10/13/11	1121	163/166	JC	55	1	DS - 178	2'x5'	10/13	KP	P	15' S of NEOS
10/13/11	1122	166/168	JC	55	1	DS - 179	2'x4'	10/13	KP	P	15' S of NEOS
10/13/11	1123	168/171	JC	55	1	DS - 180	3'x4'	10/13	KP	P	15' S of NEOS
10/13/11	1124	171/175	JC	55	1	DS - 181	2'x4'	10/13	KP	P	15' S of NEOS
10/10/11	1125	164/167	SS	17	7	Patch	1'x4'	10/12	JC	P	21' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/10/11	1126	99/134	SS	17	7	Int	2'x4'	10/12	JC	P	99/134/164/167
10/10/11	1127	99/167	SS	17	7	Patch	2'x2'	10/12	JC	P	7' W of EEOS
10/10/11	1128	99/167	SS	17	7	Patch	2'x2'	10/12	JC	P	12' W of EEOS
10/10/11	1129	99/167/169	SS	17	7	Int	2'x2'	10/12	JC	P	INT
10/10/11	1130	99/169/172	SS	17	7	Int	2'x8'	10/12	JC	P	INT
10/10/11	1131	169/172/173	SS	17	7	Int	1'x1'	10/12	JC	P	INT
10/10/11	1132	172/173/176	SS	17	7	Int	1'x1'	10/12	JC	P	INT
10/10/11	1133	99/172/176	SS	17	7	Int	2'x8'	10/12	KP	P	INT
10/11/11	1134	167/169/170	SS	51	3	Int	1'x3'	10/12	KP	P	INT
10/11/11	1135	169/170/173	SS	51	3	Int	1'x1'	10/12	KP	P	INT
10/11/11	1136	170/173	SS	51	3	Patch	1'x5'	10/12	KP	P	30' N of SEOS
10/11/11	1137	173/176/177	SS	51	3	Int	3'x4'	10/12	KP	P	INT
10/11/11	1138	170/173	SS	51	3	Patch	1'x3'	10/12	KP	P	107' N of SEOS
10/13/11	1139	175/178	JC	55	1	DS - 182	2'x5'	10/13	KP	P	15' S of NEOS
10/13/11	1140	175/178	LR	17	6	Patch	1'x2'	10/12	KP	P	47' N of SEOS
10/13/11	1141	175/178	LR	17	6	Patch	1'x1'	10/12	KP	P	34' N of SEOS
10/13/11	1142	171/174/175	LR	17	6	Int	2'x3'	10/12	KP	P	INT
10/13/11	1143	174/175	LR	17	6	Patch	1'x1'	10/12	KP	P	8' W of EEOS
10/13/11	1144	174/175/178	LR	17	6	Int	2'x3'	10/12	KP	P	INT
10/11/11	1145	174/178	LR	17	6	Patch	1'x3'	10/12	KP	P	47' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1146	178/181	LR	17	6	Patch	1'x5'	10/12	KP	P	103' N of SEOS
10/11/11	1147	177/180/181	LR	17	6	Int	2'x8'	10/12	KP	P	INT
10/11/11	1148	180/181/183	LR	17	6	Int	1'x1'	10/12	KP	P	INT
10/10/11	1149	176/177/180	SS	17	7	Int	1'x1'	10/12	KP	P	INT
10/10/11	1150	176/180	SS	17	7	Patch	1'x3'	10/12	KP	P	8' N of SEOS
10/10/11	1151	176/179/180	SS	17	7	Int	3'x3'	10/12	KP	P	INT
10/10/11	1152	176/179	SS	17	7	Patch	2'x3'	10/12	KP	P	48' N of SEOS
10/11/11	1153	179/180/182	SS	51	3	Int	2'x2'	10/12	KP	P	INT
10/10/11	1154	99a/176/179	SS	17	7	Int	2'x2'	10/12	JC	P	INT
10/10/11	1155	99a/179/182	SS	17	7	Int	1'x1'	10/12	JC	P	INT
10/10/11	1156	99/182/184	SS	17	7	Int	1'x1'	10/12	JC	P	INT
10/11/11	1157	180/182/183	SS	51	3	Int	3'x3'	10/12	JC	P	INT
10/11/11	1158	182/183/184	SS	51	3	Int	1'x1'	10/12	JC	P	INT
	1159										NOT USED
10/13/11	1160	178/181	JC	55	1	DS - 183	2'x5'	10/13	KP	P	15' S of NEOS
10/13/11	1161	181/183	JC	55	1	DS - 184	2'x5'	10/13	KP	P	15' S of NEOS
10/13/11	1162	183/185	JC	55	1	DS - 185	2'x5'	10/13	KP	P	15' S of NEOS
10/13/11	1163	185/187	JC	55	1	DS - 186	2'x18'	10/13	KP	P	15' S of NEOS
10/13/11	1164	187/189	JC	55	1	DS - 187	2'x4'	10/13	KP	P	15' S of NEOS
10/11/11	1165	183/184/185	LR	17	6	Int	2'x4'	10/12	JC	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1166	184/185/187	LR	17	6	Int	1'x1'	10/12	JC	P	INT
10/11/11	1167	184/187	LR	17	6	Patch	2'x6'	10/12	JC	P	66' S of NEOS
10/10/11	1168	99/184/186	SS	17	7	Int	1'x1'	10/12	JC	P	INT
10/11/11	1169	99/186/188	SS	51	3	Int	2'x3'	10/12	JC	P	INT
10/11/11	1170	99/188/190	SS	51	3	Int	1'x1'	10/12	JC	P	INT
10/11/11	1171	99/190/191	SS	51	3	Int	2'x3'	10/12	JC	P	INT
10/11/11	1172	190/191	SS	51	3	Patch	1'x1'	10/12	JC	P	6' N of SEOS
10/11/11	1173	99/191/193	SS	51	8	Int	2'x3'	10/12	JC	P	INT
10/11/11	1174	99/193/194	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1175	99/194/196	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1176	99/196/197	SS	51	8	Int	1'x2'	10/12	JC	P	INT
10/11/11	1177	99/197/199	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1178	184/186/187	SS	51	3	Int	2'x5'	10/12	KP	P	INT
10/11/11	1179	186/187/188	SS	51	3	Int	2'x5'	10/12	KP	P	INT
10/11/11	1180	188/190	SS	51	3	Patch	2'x2'	10/12	KP	P	149' N of SEOS
10/11/11	1181	192/193	LR	17	6	Patch	2'x2'	10/12	KP	P	171' N of SEOS
10/11/11	1182	190/191	SS	51	3	Patch	1'x6'	10/12	KP	P	158' N of SEOS
10/11/11	1183	185/187	LR	17	6	Patch	2'x4'	10/12	KP	P	37' N of SEOS
10/11/11	1184	187/188/189	LR	17	6	Int	2'x5'	10/12	KP	P	INT
10/11/11	1185	188/189/190	LR	17	6	Int	1'x6'	10/12	KP	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1186	188/190	LR	17	6	Patch	1'x2'	10/12	KP	P	56' S of NEOS
10/11/11	1187	186/188	SS	51	3	Patch	1'x3'	10/12	KP	P	60' N of SEOS
10/13/11	1188	189/190	JC	55	1	DS - 188	2'x4'	10/13	KP	P	15' N of SEOS
10/13/11	1189	190/192	JC	55	1	DS - 189	2'x4'	10/13	KP	P	15' N of SEOS
10/13/11	1190	192/193	JC	55	1	DS - 190	2'x4'	10/13	KP	P	15' N of SEOS
10/12/11	1191	193/195	JC	55	1	DS - 191	2'x4'	10/13	KP	P	15' N of SEOS
10/12/11	1192	195/196	JC	55	1	DS - 192	2'x4'	10/13	KP	P	15' N of SEOS
10/11/11	1193	190/191/192	LR	17	6	Int	1'x3'	10/12	KP	P	INT
10/11/11	1194	192	LR	17	6	Patch	1'x1'	10/12	KP	P	5' W of EEOS/1' N of SEOS
10/11/11	1195	192	LR	17	6	Patch	1'x1'	10/12	KP	P	5' E of WEOS/1' N of SEOS
10/11/11	1196	191/192/193	LR	17	6	Int	1'x5'	10/12	KP	P	INT
10/11/11	1197	193/194/195	LR	17	6	Int	1'x4'	10/12	KP	P	INT
10/11/11	1198	194/195/196	LR	17	6	Int	1'x1'	10/12	KP	P	INT
10/13/11	1199	193/195	JC	55	1	Patch	1'x3'	10/12	KP	P	20' S of NEOS
10/12/12	1200	196/198	JC	55	1	Patch	2'x3'	10/12	KP	P	194' N of SEOS
10/11/11	1201	99/199	SS	51	8	Patch	2'x3'	10/12	JC	P	10' E of WEOS
10/11/11	1202	99/199/200	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1203	99/200/202	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1204	99/202/203	SS	51	8	Int	2'x5'	10/12	JC	P	INT
10/11/11	1205	99/203/205	SS	51	8	Int	1'x5'	10/12	JC	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1206	99/205/206	LR	17	6	Int	2'x5'	10/12	JC	P	INT
10/11/11	1207	99/206	SS	51	8	Patch	1'x5'	10/12	JC	P	8' W of EEOS
10/11/11	1208	99/206/208	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1209	99/208/209	SS	51	8	Int	3'x15'	10/12	JC	P	99/208/209 INT
10/11/11	1210	99/209	SS	51	8	Patch	1'x3'	10/12	JC	P	17' E of WEOS
10/11/11	1211	99/209/211	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1212	209/211	SS	51	8	Patch	2'x3'	10/12	JC	P	18' N of SEOS
10/11/11	1213	209/211	SS	51	8	Patch	2'x2'	10/12	JC	P	38' N of SEOS
10/11/11	1214	209/210/211	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1215	208/209/210	SS	51	8	Int	1'x1'	10/12	JC	P	INT
10/11/11	1216	208/210	SS	51	8	Patch	1'x1'	10/12	JC	P	13' N of SEOS
10/11/11	1217	196/197/198	LR	17	6	Int	2'x2'	10/12	JC	P	INT
10/11/11	1218	197/198/199	XM	55	9	Int	1'x2'	10/12	JC	P	INT
10/11/11	1219	199/200/201	XM	55	9	Int	1'x4'	10/12	JC	P	INT
10/11/11	1220	200/201/202	XM	55	9	Int	2'x2'	10/12	JC	P	INT
10/12/11	1221	196/198	JC	51	8	DS-193	2'x4'	10/12	JC	P	15' S of NEOS
10/12/11	1222	198/199	JC	51	8	DS-194	2'x4'	10/12	JC	P	15' S of NEOS
10/12/11	1223	199/201	JC	51	8	DS-195	2'x4'	10/12	JC	P	15' S of NEOS
10/12/11	1224	201/302	JC	51	8	DS-196	2'x4'	10/12	JC	P	15' S of NEOS
10/12/11	1225	198/199	XM	55	9	Patch	2'x4'	10/12	KP	P	141' N of SEOS

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Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1226	198/199	XM	55	9	Patch	2'x4'	10/12	KP	P	71' N of SEOS
10/12/11	1227	202/203/204	JC	55	1	Int	2'x4'	10/12	KP	P	INT
10/12/11	1228	203/204/205	JC	55	1	Int	1'x2'	10/12	KP	P	INT
10/12/11	1229	202/204	XM	55	9	Patch	1'x2'	10/12	KP	P	106' N of SEOS
10/12/11	1230	202/204	JC	55	1	DS - 197	2'x4'	10/12	KP	P	15' S of NEOS
10/12/11	1231	204/205	JC	55	1	DS - 198	2'x4'	10/12	KP	P	15' S of NEOS
10/12/11	1232	205/207	JC	55	1	DS - 199	2'x4'	10/12	KP	P	125' N of SEOS
10/12/11	1233	207/208	JC	55	1	DS - 200	2'x4'	10/12	KP	P	15' S of NEOS
10/12/11	1234	203/205	JC	55	1	Patch	1'x3'	10/12	KP	P	110' N of SEOS
10/12/11	1235	203/205	JC	55	1	Patch	1'x3'	10/12	KP	P	124' N of SEOS
10/11/11	1236	204/205	XM	55	9	Patch	1'x4'	10/12	KP	P	75' N of SEOS
10/11/11	1237	205/207	XM	55	9	Patch	1'x8'	10/12	KP	P	139' N of SEOS
10/11/11	1238	205/207	XM	55	9	Patch	2'x5'	10/12	KP	P	93' N of SEOS
10/11/11	1239	205/207	XM	55	9	Patch	2'x6'	10/12	KP	P	82' N of SEOS
10/11/11	1240	205/207	XM	55	9	Patch	2'x2'	10/12	KP	P	69' N of SEOS
10/11/11	1241	205/207	XM	55	9	Patch	1'x3'	10/12	KP	P	31' N of SEOS
10/11/11	1242	205/206/207	XM	55	9	Int	1'x8'	10/12	KP	P	INT
10/11/11	1243	206/207/208	XM	55	9	Int	3'x4'	10/12	KP	P	INT
10/11/11	1244	207/208	XM	55	9	Patch	1'x3'	10/12	KP	P	21' N of SEOS
10/11/11	1245	207/208	XM	55	9	Patch	1'x3'	10/12	KP	P	106' N of SEOS

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Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/11/11	1246	207/208	XM	55	9	Patch	1'x3'	10/14	KP	P	114' N of SEOS
	1247										NOT USED
10/11/11	1248	208/210	XM	55	9	Cap	2'x40'	10/14	KP	P	25' S of NEOS
10/11/11	1249	206/208	XM	55	9	Patch	1'x4'	10/14	KP	P	165' N of SEOS
10/14/11	1250	161/163	SS	55	3	DS-177A	2'x4'	10/14	JC	P	5' S of NEOS
10/14/11	1251	161/163	SS	55	3	DS-177B	2'x4'	10/19	JC	P	20' S of NEOS
10/14/11	1252	178/181	SS	55	3	DS-183A	2'x4'	10/19	JC	P	5' S of NEOS
10/14/11	1253	178/181	SS	55	3	DS-183B	2'x4'	10/19	JC	P	20' S of NEOS
10/14/11	1254	137/212	SS	51	6	DS-201	1'x4'	10/19	JC	P	10' W of EEOS
10/14/11	1255	212/214	SS	51	6	DS-202	1'x5'	10/19	JC	P	15' N of SEOS
10/17/11	1256	214/215	SS	51	6	DS-203	2'x5'	10/19	JC	P	15' N of SEOS
10/17/11	1257	216/217	SS	51	6	DS-204	1'x5'	10/19	JC	P	15' N of SEOS
10/17/11	1258	217/219	XM	55	7	DS-205	2'x4'	10/19	JC	P	15' N of SEOS
10/17/11	1259	219/220	XM	55	7	DS-206	1'x5'	10/19	JC	P	15' N of SEOS
10/17/11	1260	220/222	XM	102	7	DS-207	1'x4'	10/19	JC	P	15' N of SEOS
10/17/11	1261	212/214/215	SS	51	4	Int	2'x3'	10/19	JC	P	INT
	1262										NOT USED
10/17/11	1263	215	SS	51	4	Patch	1'x22'	10/19	JC	P	15' N of SEOS/8' E of WEOS
10/17/11	1264	214/215/216	SS	51	4	Int	2'x3'	10/19	JC	P	INT
	1265										NOT USED

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Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/17/11	1266	212/213/215	SS	51	4	Int	1'x2'	10/19	JC	P	INT
10/17/11	1267	212/213	SS	51	4	Patch	1'x1'	10/19	JC	P	5' E of WEOS
	1268										NOT USED
10/17/11	1269	213	SS	51	4	Patch	1'x12'	10/19	JC	P	10' N of SEOS/5' W of EEOS
10/17/11	1270	213	SS	51	4	Boot	3'x4'	10/19	JC	P	15' N of SEOS/5' W of EEOS
	1271										NOT USED
10/17/11	1272	213	SS	51	4	Boot	3'x8'	10/19	JC	P	35' N of SEOS/5' W of EEOS
10/17/11	1273	215	SS	51	4	Boot	3'x4'	10/19	JC	P	35' N of SEOS/30' W of EEOS
	1274										NOT USED
10/17/11	1275	215	SS	51	4	Boot	3'x4'	10/19	JC	P	25' N of SEOS/30' W of EEOS
10/17/11	1276	215	SS	51	4	Patch	1'x8'	10/19	JC	P	30' N of SEOS/30' W of EEOS
10/17/11	1277	215/216	LR	17	3	Patch	1'x1'	10/20	JC	P	87' S of NEOS
10/17/11	1278	137/138/212	SS	51	4	Int	2'x4'	10/19	JC	P	INT
10/17/11	1279	138/212/214	SS	51	4	Int	1'x1'	10/19	JC	P	INT
	1280										NOT USED
10/17/11	1281	138/139/214	SS	51	7	Int	2'x5'	10/19	JC	P	138/139/214/216
10/17/11	1282	139/140	SS	51	7	Int	2'x3'	10/19	JC	P	139/140/216/217
10/20/11	1283	216/217	LR	17	3	Patch	2'x4'	10/19	JC	P	331' N of SEOS
10/20/11	1284	216/217/218	LR	17	3	Int	2'x6'	10/20	JC	P	INT
10/20/11	1285	217/218/219	LR	17	3	Int	1'x4'	10/20	JC	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/17/11	1286	217/219	LR	17	3	Patch	1'x2'	10/20	JC	P	342' N of SEOS
	1287										NOT USED
10/17/11	1288	140/217	XM	55	7	Patch	1'x1'	10/19	JC	P	10' W of EEOS
10/17/11	1289	140/142	XM	55	7	Int	2'x3'	10/19	JC	P	140/142/217/219
10/17/11	1290	142/219	XM	55	7	Patch	1'x1'	10/19	JC	P	12' E of WEOS
10/17/11	1291	142/143	XM	55	7	Int	2'x3'	10/19	JC	P	142/143/219/220
10/17/11	1292	143/144	XM	55	7	Int	2'x4'	10/19	JC	P	143/144/220/222
10/20/11	1293	146/147	SS	56	1	Int	2'x3'	10/19	JC	P	144/147/222/223
10/17/11	1294	217/219	XM	55	7	Patch	2'x2'	10/19	JC	P	39' of N of SEOS
10/17/11	1295	217/219	XM	55	7	Patch	2'x3'	10/19	JC	P	60' N of SEOS
10/17/11	1296	217/219	XM	55	7	Patch	2'x3'	10/19	JC	P	79' N of SEOS
10/19/11	1297	217/219	SS	56	1	Patch	1'x2'	10/20	JC	P	113' N of SEOS
10/19/11	1298	217/219	SS	56	1	Patch	1'x1'	10/20	JC	P	120' N of SEOS
10/20/11	1299	217/219	SS	56	1	Patch	1'x3'	10/20	JC	P	202' N of SEOS
10/20/11	1300	217/219	LR	17	3	Patch	1'x4'	10/20	JC	P	263' N of SEOS
10/20/11	1301	217/219	XM	55	2	Patch	2'x5'	10/20	JC	P	303' N of SEOS
10/20/11	1302	219/220/221	XM	55	2	Int	3'x5'	10/20	JC	P	INT
10/20/11	1303	220/221/222	XM	55	2	Int	2'x3'	10/20	JC	P	INT
10/20/11	1304	221/222	XM	55	2	Patch	1'x3'	10/20	JC	P	63' N of SEOS
10/20/11	1305	220/222	XM	55	2	Patch	2'x3'	10/20	JC	P	101' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/20/11	1306	220/222	XM	55	2	Patch	2'x2'	10/20	JC	P	123' N of SEOS
10/20/11	1307	220/222	XM	55	2	Patch	2'x3'	10/20	JC	P	132' N of SEOS
10/20/11	1308	220/222	SS	56	1	Patch	2'x4'	10/20	JC	P	149' N of SEOS
	1309										NOT USED
	1314										NOT USED
10/20/11	1323	222/223/224	XM	55	2	Int	1'x4'	10/20	KP	P	INT
10/20/11	1338	224/225	XM	55	2	Patch	2'x5'	10/20	KP	P	78' S of NEOS
10/20/11	1339	224/225	XM	55	2	Patch	1'x3'	10/20	KP	P	232' S of NEOS
10/20/11	1340	224/225	LR	17	3	Patch	1'x3'	10/20	KP	P	336' S of NEOS
10/17/11	1324	223/224/225	XM	55	2	Int	2'x6'	10/20	KP	P	INT
10/17/11	1341	225/226	LR	17	3	Patch	2'x3'	10/20	KP	P	374' N of SEOS
10/19/11	1310	222/223	SS	56	1	DS - 208	2'x4'	10/20	KP	P	15' N of SEOS
10/19/11	1311	223/225	SS	56	1	DS - 209	2'x4'	10/20	KP	P	10' N of SEOS
10/20/11	1312	225/226	SS	56	1	DS - 210	2'x4'	10/20	KP	P	15' N of SEOS
10/20/11	1313	226/227	SS	56	1	DS - 211	2'x4'	10/20	KP	P	15' N of SEOS
10/20/11	1315	227/229	SS	56	1	DS - 212	2'x4'	10/20	KP	P	15' N of SEOS
10/20/11	1316	229/230	SS	56	6	DS - 213	2'x4'	10/20	KP	P	15' N of SEOS
10/20/11	1318	230/232	SS	56	6	DS - 214	2'x4'	10/20	KP	P	25' N of SEOS
10/20/11	1319	232/233	SS	56	6	DS - 215	2'x3'	10/20	KP	P	20' N of SEOS
10/20/11	1320	233/235	SS	56	6	DS - 216	2'x3'	10/20	KP	P	15' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/20/11	1321	235/236	SS	56	6	DS - 217	2'x7'	10/20	KP	P	30' N of SEOS
10/20/11	1322	236/238	SS	56	6	DS - 218	2'x4'	10/20	KP	P	30' N of SEOS
10/20/11	1325	147/148	SS	56	1	Int	4'x4'	10/20	KP	P	147/148/223/225
10/20/11	1326	148/149	SS	56	1	Int	4'x4'	10/20	KP	P	148/149/225/226
10/20/11	1327	149/150	SS	56	1	Int	4'x4'	10/20	KP	P	149/150/226/227
10/20/11	1328	150/152	SS	56	1	Int	4'x5'	10/20	KP	P	150/152/227/229
10/20/11	1329	152/153	SS	56	1	Int	2'x3'	10/20	KP	P	152/153/229
10/20/11	1330	153/229/230	SS	56	1	Int	2'x3'	10/20	KP	P	INT
10/20/11	1331	153/230/232	SS	56	6	Int	3'x4'	10/20	KP	P	INT
10/17/11	1332	153/232/159	VS	94	5	Cap	2'x18'	10/20	KP	P	15' N of SEOS
10/17/11	1333	159/161/232	SS	56	6	Int	2'x2'	10/20	KP	P	INT
10/19/11	1334	161/232/233	SS	56	6	Int	2'x2'	10/20	KP	P	INT
10/19/11	1335	161/163	SS	56	6	Int	2'x4'	10/20	KP	P	161/163/233/235
10/20/11	1336	163/166	SS	56	6	Int	2'x3'	10/20	KP	P	163/166/235/236
10/20/11	1337	166/168	SS	56	6	Int	2'x3'	10/20	KP	P	166/168/236/238
10/20/11	1342	226/227	LR	17	3	Patch	2'x2'	10/20	KP	P	275' N of SEOS
10/20/11	1343	226/227	LR	17	3	Patch	2'x10'	10/20	KP	P	290' N of SEOS
10/20/11	1344	226/228	LR	17	3	Patch	1'x7'	10/20	KP	P	64' N of SEOS
10/20/11	1345	227/229	LR	17	3	Patch	1'x1'	10/20	KP	P	32' S of NEOS
10/20/11	1346	226/227/228	LR	17	3	Int	1'x5'	10/20	KP	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/20/11	1347	227/228/229	LR	17	3	Int	3'x4'	10/20	KP	P	INT
10/20/11	1348	229/230	XM	55	2	Patch	2'x3'	10/20	KP	P	81' N of SEOS
10/20/11	1349	229/230/231	LR	17	4	Int	3'x6'	10/20	KP	P	INT
10/20/11	1350	230/231/232	LR	17	4	Int	2'x2'	10/20	KP	P	INT
10/20/11	1351	229/231	LR	17	3	Patch	1'x1'	10/20	KP	P	11' N of SEOS
10/20/11	1352	229/231	LR	17	3	Patch	1'x3'	10/20	KP	P	175' N of SEOS
10/20/11	1353	231	LR	17	3	Patch	1'x1'	10/20	KP	P	120' N of SEOS/5' W of EEOS
10/20/11	1354	230/232	SS	56	6	Patch	1'x2'	10/20	KP	P	37' N of SEOS
10/20/11	1355	231/232	LR	17	3	Patch	1'x2'	10/20	KP	P	147' N of SEOS
10/17/11	1356	231/232	LR	17	3	Patch	1'x1'	10/20	KP	P	173' N of SEOS
10/17/11	1357	232/233/234	XM	55	2	Int	2'x3'	10/20	KP	P	INT
10/19/11	1358	233/234/235	XM	55	2	Int	2'x12'	10/20	KP	P	INT
10/19/11	1359	233/235	XM	55	5	Patch	2'x4'	10/21	KS	P	52' N of SEOS
10/20/11	1360	234/235	XM	55	5	Patch	2'x4'	10/21	KS	P	46' N of SEOS
10/20/11	1361	234/235	XM	55	5	Patch	2'x3'	10/20	KP	P	76' N of SEOS
10/20/11	1362	234/235	LR	17	4	Patch	2'x5'	10/20	KP	P	163' N of SEOS
10/20/11	1363	234/235	LR	17	4	Patch	1'x3'	10/20	KP	P	175' N of SEOS
10/20/11	1364	234/235	LR	17	4	Patch	2'x2'	10/21	KS	P	217' N of SEOS
10/20/11	1365	235/236/237	XM	55	5	Int	2'x5'	10/21	KS	P	INT
10/20/11	1366	236/237/238	XM	55	5	Int	2'x5'	10/21	KS	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/20/11	1367	236/237	XM	55	5	Patch	2'x2'	10/20	KP	P	317' S of NEOS
10/20/11	1368	236/237	XM	55	5	Patch	1'x2'	10/20	KP	P	283' S of NEOS
10/20/11	1369	236/237	XM	55	5	Patch	1'x3'	10/20	KP	P	271' S of NEOS
10/20/11	1370	236/237	XM	55	5	Patch	1'x2'	10/20	KP	P	252' S of NEOS
10/20/11	1371	236/237	XM	55	5	Patch	1'x4'	10/20	KP	P	243' S of NEOS
10/20/11	1372	237/238	XM	55	5	Patch	2'x3'	10/20	KP	P	5' N of SEOS
10/20/11	1373	237/238	LR	17	4	Patch	2'x4'	10/21	KS	P	44' S of NEOS
10/25/11	1374	239/240	XM	56	3	Patch	2'x4'	10/26	JC	P	164' N of SEOS
10/21/11	1375	239/240/241	LR	17	9	Int	2'x3'	10/26	JC	P	INT
10/21/11	1376	240/241	LR	17	9	Patch	2'x2'	10/26	JC	P	9' W of EEOS
10/21/11	1377	240/241/242	LR	17	9	Int	1'x2'	10/26	JC	P	INT
10/21/11	1378	241/242/243	LR	17	9	Int	1'x1'	10/26	JC	P	INT
10/21/11	1379	242/244	LR	17	9	Patch	2'x6'	10/26	JC	P	84' S of NEOS
10/21/11	1380	242/243/244	LR	17	9	Int	2'x3'	10/26	JC	P	INT
10/25/11	1381	244/245/246	XM	56	3	Int	3'x5'	10/26	JC	P	INT
10/25/11	1382	245/246/247	XM	56	3	Int	2'x4'	10/26	JC	P	INT
10/21/11	1383	246/247/248	LR	17	9	Int	2'x3'	10/26	JC	P	INT
10/21/11	1384	207/239	KP	56	8	Patch	2'x22'	10/26	JC	P	Entire Length of Cross Seam
10/21/11	1385	205/240	KP	56	8	Patch	2'x4'	10/26	JC	P	2' E of WEOS
10/21/11	1386	204/205	KP	56	8	Int	3'x3'	10/26	JC	P	204/205/240/242

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Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/21/11	1387	202/204	KP	56	8	Int	2'x4'	10/26	JC	P	202/204/242/244
10/21/11	1388	202/244	KP	56	8	Patch	1'x1'	10/26	JC	P	10' E of WEOS
10/21/11	1389	202/244	KP	56	8	Patch	2'X2'	10/26	JC	P	16' E of WEOS
10/21/11	1390	201/202	KP	56	8	Int	1'x4'	10/26	JC	P	201/202/244/246
10/21/11	1391	199/201	KP	56	8	Int	1'x4'	10/26	JC	P	199/201/245/248
10/21/11	1392	198/199	KP	56	8	Int	1'x6'	10/26	JC	P	198/199/247/249
10/21/11	1393	247/248/249	LR	17	9	Int	1'x1'	10/26	JC	P	INT
10/21/11	1394	249/251	LR	17	9	Patch	2'x8'	10/26	JC	P	45' S of NEOS
	1395										NOT USED
10/21/12	1396	196/198/249/250	KP	56	8	Int	1'x4'	10/27	IS	P	INT
10/22/11	1397	195/250/252	JC	56	4	Int	1'x1'	10/27	IS	P	INT
10/24/11	1398	195/252	JC	56	4	Patch	1'x1'	10/27	IS	P	5' E of WEOS
10/24/11	1399	193/195	JC	56	4	Int	1'x4'	10/27	IS	P	193/195/252
10/24/11	1400	193/252/253	JC	56	4	Int	1'x1'	10/27	IS	P	INT
	1401										NOT USED
10/24/11	1402	193/253	JC	56	4	Patch	1'x2'	10/27	IS	P	8' E of WEOS
10/24/11	1403	193/253	JC	56	4	Int	1'x1'	10/27	IS	P	192/193/253
10/24/11	1404	192/253/254	JC	56	4	Int	1'x4'	10/27	IS	P	192/253/254
10/24/11	1405	190/192/254	JC	56	4	Int	1'x2'	10/27	IS	P	INT
	1406										NOT USED

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Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/22/11	1407	189/190/256	JC	56	4	Int	1'x2'	10/27	IS	P	INT
10/21/11	1408	249/250	KP	56	8	Patch	1'x2'	10/27	IS	P	84' N of SEOS
10/21/11	1409	249/250	KS	56	8	Patch	1'x2'	10/27	IS	P	151' N of SEOS
10/25/11	1410	249/250/251	XM	56	3	Int	1'x3'	10/27	IS	P	INT
10/21/11	1411	250/252	KP	56	8	Patch	1'x2'	10/27	IS	P	95' N of SEOS
10/22/11	1412	253/254/255	KP	56	8	Int	1'x1'	10/27	IS	P	INT
10/22/11	1413	254/255/256	KP	56	8	Int	3'x3'	10/27	IS	P	INT
10/25/11	1414	255/256	XM	56	3	Patch	1'x2'	10/27	IS	P	50' S of NEOS
10/24/11	1415	189/256/257	JC	56	4	Int	1'x1'	10/27	IS	P	INT
10/24/11	1416	189/257	JC	56	4	Patch	1'x1'	10/27	IS	P	5' W of EEOS
10/24/11	1417	187/189/257	JC	56	4	Int	1'x3'	10/27	IS	P	INT
10/24/11	1418	187/257/258	JC	56	4	Int	1'x1'	10/27	IS	P	INT
10/24/11	1419	187/258	JC	56	4	Patch	1'x2'	10/27	IS	P	7' E of WEOS
10/24/11	1420	187/258	JC	56	10	Patch	1'x3'	10/27	IS	P	7' W of EEOS
10/24/11	1421	185/187/258	JC	56	10	Int	1'x3'	10/27	IS	P	INT
10/24/11	1422	185/258/259	JC	56	10	Int	1'x1'	10/27	IS	P	INT
10/24/11	1423	183/185/259	JC	56	10	Int	1'x1'	10/27	IS	P	INT
10/24/11	1424	183/259/260	JC	56	10	Int	2'x4'	10/27	IS	P	INT
10/24/11	1425	181/183/260	JC	56	10	Int	1'x4'	10/27	IS	P	INT
10/24/11	1426	260/261	JC	56	10	Patch	1'x1'	10/27	IS	P	50' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/24/11	1427	260/261	JC	56	10	Patch	1'x4'	10/27	IS	P	80' N of SEOS
10/24/11	1428	261/262	LR	17	9	Patch	1'x3'	10/27	IS	P	112' N of SEOS
10/24/11	1429	261/262	LR	17	9	Patch	1'x3'	10/27	IS	P	127' N of SEOS
10/24/11	1430	261/262	LR	17	9	Patch	1'x3'	10/27	IS	P	139' N of SEOS
10/24/11	1431	262/263	LR	17	9	DS - 219	2'x4'	10/27	IS	P	15' S of NEOS
10/24/11	1432	261/262	LR	17	9	DS - 220	2'x4'	10/27	IS	P	12' S of NEOS
10/24/11	1433	260/261	LR	17	9	DS - 221	2'x4'	10/27	IS	P	20' S of NEOS
10/24/11	1434	259/260	LR	17	9	DS - 222	2'x4'	10/27	IS	P	20' S of NEOS
10/24/11	1435	258/259	LR	17	9	DS - 223	1'x4'	10/27	IS	P	18' S of NEOS
10/25/11	1436	257/258	XM	56	3	DS - 224	1'x4'	10/27	IS	P	15' S of NEOS
10/25/11	1437	256/257	XM	56	3	DS - 225	1'x4'	10/27	IS	P	15' S of NEOS
10/25/11	1438	255/256	XM	56	3	DS - 226	1'x4'	10/27	IS	P	18' S of NEOS
10/25/11	1439	253/255	XM	56	3	DS - 227	1'x3'	10/27	IS	P	18' S of NEOS
10/25/11	1440	252/253	XM	56	3	DS - 228	1'x4'	10/27	IS	P	20' S of NEOS
10/25/11	1441	250/252	XM	56	3	DS - 229	1'x4'	10/27	IS	P	18' S of NEOS
10/25/11	1442	249/250	XM	56	3	DS - 230	1'x3'	10/27	IS	P	18' N of SEOS
10/27/11	1443	248/249	LR	17	1	DS - 231	1'x4'	10/28	IS	P	20' S of NEOS
10/27/11	1444	246/248	LR	17	1	DS - 232	1'x4'	10/28	IS	P	25' S of NEOS
10/27/11	1445	244/246	LR	17	1	DS - 233	2'x4'	10/28	IS	P	25' S of NEOS
10/24/11	1446	181/260/261	JC	56	10	Int	1'x1'	10/27	IS	P	INT

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Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/24/11	1447	181/261	JC	56	10	Patch	1'x2'	10/27	IS	P	4' E of WEOS
10/24/11	1448	181/178/261	JC	56	10	Int	1'x2'	10/27	IS	P	INT
10/24/11	1449	178/261/262	JC	56	10	Int	2'x4'	10/27	IS	P	INT
10/24/11	1450	178/262	JC	56	10	Patch	1'x1'	10/27	IS	P	4' E of WEOS
10/24/11	1451	178/262	JC	56	10	Patch	1'x1'	10/27	IS	P	6' E of WEOS
10/24/11	1452	178/175/262	JC	56	10	Int	1'x1'	10/27	IS	P	INT
10/24/11	1453	175/262/263	JC	56	10	Int	1'x1'	10/27	IS	P	INT
10/24/11	1454	171/175/263	JC	56	10	Int	1'x1'	10/27	IS	P	INT
10/24/11	1455	171/263/264A	JC	56	10	Int	1'x1'	10/27	IS	P	INT
10/24/11	1456	171/264A	JC	56	10	Patch	1'x1'	10/27	IS	P	4' E of WEOS
10/24/11	1457	168/171	JC	56	10	Int	3'x3'	10/27	IS	P	168/171/238/264A
10/24/11	1458	238/264	JC	56	10	Int	1'x1'	10/27	IS	P	238/264/264A
10/24/11	1459	264/264A	JC	56	10	Patch	1'x1'	10/27	IS	P	4' W of EEOS
10/24/11	1460	263/264	JC	56	10	Int	2'x3'	10/27	IS	P	263/264/264A
10/24/11	1461	238/264	JC	56	10	Patch	2'x6'	10/27	IS	P	12' N of SEOS
10/24/11	1462	263/264	LR	17	9	Patch	1'x2'	10/27	IS	P	10' S of NEOS
10/24/11	1463	263/264	LR	17	9	Int	2'x2'	10/27	IS	P	238/263/264
10/24/11	1464	238/263	LR	17	9	Patch	1'x1'	10/27	IS	P	20' N of SEOS
10/27/11	1465	265/266	LR	17	1	DS - 234	1'x5'	10/31	IS	P	10' N of SEOS
10/27/11	1466	266/267	LR	17	1	DS - 235	2'x4'	10/31	IS	P	10' N of SEOS

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Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/27/11	1467	267/268	LR	17	1	DS - 236	2'x4'	10/31	IS	P	10' N of SEOS
10/27/11	1468	268/269	LR	17	1	DS - 237	2'x4'	10/31	IS	P	10' N of SEOS
10/27/11	1469	269/270	LR	17	1	DS - 238	2'x4'	10/31	IS	P	10' N of SEOS
10/27/11	1470	270/271	LR	17	3	DS - 239	2'x4'	10/31	IS	P	10' N of SEOS
10/27/11	1471	271/273	LR	17	3	DS - 240	2'x4'	10/31	IS	P	10' N of SEOS
10/27/11	1472	273/274	LR	17	3	DS - 241	2'x4'	10/31	IS	P	10' N of SEOS
10/25/11	1473	251/274	XM	56	3	DS - 242	1'x4'	10/27	IS	P	10' N of SEOS
10/25/11	1474	274/276	XM	56	3	DS - 243	1'x3'	10/27	IS	P	10' N of SEOS
10/25/11	1475	276/278	XM	56	3	DS - 244	1'x4'	10/27	IS	P	10' N of SEOS
10/25/11	1476	278/279	XM	56	3	DS - 245	1'x4'	10/27	IS	P	10' N of SEOS
10/25/11	1477	279/280	XM	56	3	DS - 246	2'x8'	10/27	IS	P	7' N of SEOS
10/25/11	1478	280/282	LR	17	4	DS - 247	2'x5'	10/27	IS	P	5' N of SEOS
10/25/11	1479	289/291	LR	17	4	DS - 248	2'x4'	10/27	IS	P	12' N of SEOS
10/25/11	1480	287/290	RR	55	8	DS - 249	2'x8'	10/27	IS	P	5' N of SEOS
	1481										NOT USED
10/27/11	1482	239/265/266	LR	17	1	Int	1'x6'	10/31	IS	P	INT
10/27/11	1483	301/302	XM	56	1	Patch	2'x17'	11/1	JC	P	NEOS
10/27/11	1484	241/266/267	LR	17	1	Int	1'x1'	10/31	IS	P	INT
10/27/11	1485	241/243/267	LR	17	1	Int	1'x1'	10/31	IS	P	INT
10/27/11	1486	243/267/268	LR	17	1	Int	1'x1'	10/31	IS	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/27/11	1487	243/244/268	LR	17	1	Int	1'x1'	10/31	IS	P	INT
10/27/11	1488	244/268/269	LR	17	1	Int	1'x1'	10/31	IS	P	INT
10/27/11	1489	244/246/269	LR	17	1	Int	1'x1'	10/31	IS	P	INT
10/27/11	1490	246/269/270	LR	17	1	Int	1'x1'	10/31	IS	P	INT
10/27/11	1491	246/248/270	LR	17	1	Int	1'x2'	10/31	IS	P	INT
10/27/11	1492	248/270/271	LR	17	3	Int	1'x1'	10/31	IS	P	INT
10/27/11	1493	248/249/271	LR	17	3	Int	2'x3'	10/27	IS	P	INT
10/27/11	1494	249/251	LR	17	3	Int	4'x6'	10/27	IS	P	249/251/271/273
10/27/11	1495	251/273/274	LR	17	3	Int	2'x2'	10/27	IS	P	INT
10/27/11	1496	271/272/273	LR	17	3	Int	1'x2'	10/27	IS	P	INT
10/27/11	1497	270/271/272	LR	17	3	Int	2'x3'	10/27	IS	P	INT
10/27/11	1498	267/268	LR	17	3	Patch	2'x8'	10/27	IS	P	62' S of NEOS
10/27/11	1499	267/268	LR	17	3	Patch	1'x1'	10/27	IS	P	51' S of NEOS
10/27/11	1500	274/275/276	LR	17	3	Int	1'x2'	10/27	IS	P	INT
10/27/11	1501	275/276	LR	17	3	Patch	1'x2'	10/27	IS	P	12' E of WEOS
10/27/11	1502	275/276/277	LR	17	3	Int	1'x1'	10/31	IS	P	INT
10/27/11	1503	274/276	XM	56	2	Patch	1'x2'	10/28	IS	P	242' N of SEOS
10/27/11	1504	250/251/252	XM	56	3	Int	3'x3'	10/27	IS	P	250/251/252/276
10/25/11	1505	252/274	XM	56	3	Patch	1'x2'	10/27	IS	P	6' E of WEOS
10/25/11	1506	252/253	XM	56	3	Int	2'x2'	10/27	IS	P	252/253/274/276

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/25/11	1507	253/276	XM	56	3	Patch	1'x1'	10/27	IS	P	7' E of WEOS
10/25/11	1508	253/276	XM	56	3	Patch	1'x3'	10/27	IS	P	10' E of WEOS
10/25/11	1509	253/255	XM	56	3	Int	2'x3'	10/27	IS	P	253/255/276/278
10/25/11	1510	255/256	XM	56	3	Int	1'x3'	10/27	IS	P	255/256/278/279
10/25/11	1511	256/257	XM	56	3	Int	2'x4'	10/27	IS	P	256/257/279/280
10/25/11	1512	257/258	LR	17	9	Int	2'x4'	10/27	IS	P	257/258/280/282
10/25/11	1513	258/259	LR	17	9	Int	3'x6'	10/27	IS	P	258/259/282/283
10/24/11	1514	282/283	LR	17	9	Patch	1'x15'	10/27	IS	P	36' N of SEOS
10/24/11	1515	259/260	LR	17	9	Int	3'x10'	10/27	IS	P	259/260/283/288
10/24/11	1516	283/288	LR	17	9	Patch	2'x2'	10/27	IS	P	12' N of SEOS
10/25/11	1517	287/288	LR	17	9	Patch	2'x2'	10/27	IS	P	5' N of SEOS
10/25/11	1518	260/261	LR	17	9	Int	3'x15'	10/27	IS	P	260/261/287/288
10/25/11	1519	287/288	LR	17	9	Patch	27'x39'	10/27	IS	P	Pump House
10/28/11	1520	251/274	XM	56	1	Patch	2'x4'	10/28	IS	P	130' N of SEOS
10/25/11	1521	276/278	XM	56	6	Patch	2'x3'	10/27	IS	P	68' N of SEOS
10/25/11	1522	276/278	XM	56	6	Patch	1'x1'	10/27	IS	P	150' N of SEOS
10/25/11	1523	276/277/278	XM	56	6	Int	2'x4'	10/27	IS	P	INT
10/27/11	1524	277/278/279	XM	56	2	Int	1'x1'	10/28	IS	P	INT
10/28/11	1525	276/277	XM	56	1	Patch	2'x8'	10/31	IS	P	132' N of SEOS
10/25/11	1526	279/281	XM	56	6	Patch	1'x1'	10/27	IS	P	10' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/25/11	1527	280/281	XM	56	6	Patch	1'x1'	10/27	IS	P	16' E of WEOS
10/27/11	1528	279/277	LR	17	3	Patch	1'x2'	10/31	IS	P	11' S of NEOS
10/25/11	1536	280/281/282	XM	56	6	Int	3'x3'	10/27	IS	P	INT
10/25/11	1537	279/280/281	XM	56	6	Int	1'x2'	10/27	IS	P	INT
10/31/11	1538	281/282/284	XM	56	1	Int	2'x10'	10/31	IS	P	INT
10/31/11	1539	282/283/284	XM	56	1	Int	2'x5'	10/31	IS	P	INT
10/31/11	1540	283/284	XM	56	1	Patch	1'x1'	10/31	IS	P	6' N of SEOS
10/31/11	1541	283/284	XM	56	1	Patch	2'x3'	10/31	IS	P	18' N of SEOS
10/31/11	1542	281/284	XM	56	1	Patch	2'x3'	10/31	IS	P	32' N of SEOS
10/27/11	1543	281/282	XM	56	2	Patch	2'x3'	10/31	IS	P	206' S of NEOS
10/25/11	1544	280/282	XM	56	6	Patch	1'x4'	10/27	IS	P	73' N of SEOS
10/25/11	1545	280/282	XM	56	6	Patch	1'x1'	10/27	IS	P	89' N of SEOS
10/25/11	1546	280/282	XM	56	6	Patch	1'x3'	10/27	IS	P	107' N of SEOS
10/25/11	1547	282/283	XM	56	6	Patch	1'x3'	10/27	IS	P	58' N of SEOS
10/25/11	1548	282/283	XM	56	6	Patch	1'x1'	10/27	IS	P	97' N of SEOS
10/27/11	1549	282/283	XM	56	2	Patch	1'x3'	10/27	IS	P	192' N of SEOS
10/27/11	1550	282/283	XM	56	2	Patch	1'x1'	10/27	IS	P	200' N of SEOS
10/25/11	1551	287/261	LR	17	5	Patch	3'x15'	10/27	IS	P	5' W of EEOS
10/25/11	1552	261/287/289	LR	17	5	Int	2'x4'	10/27	IS	P	INT
10/25/11	1553	261/262/289	LR	17	5	Int	2'x3'	10/27	IS	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/25/11	1554	262/263	LR	17	5	Int	3'x4'	10/27	IS	P	262/263/289/291
10/27/11	1555	285/286/287	XM	56	2	Int	3'x5'	10/31	IS	P	INT
10/27/11	1556	283/285/286	XM	56	2	Int	3'x3'	10/31	IS	P	INT
10/25/11	1557	238/263/291	KK	55	8	Int	3'x6'	10/27	IS	P	INT
10/25/11	1558	289/290/291	KK	55	8	Int	1'x1'	10/27	IS	P	INT
10/25/11	1559	289/290	KK	55	8	Patch	1'x2'	10/27	IS	P	4' W of EEOS
10/25/11	1560	289/290	KK	55	8	Patch	1'x3'	10/27	IS	P	8' E of WEOS
10/25/11	1561	289/290	KK	55	8	Patch	2'x2'	10/27	IS	P	4' E of WEOS
10/25/11	1562	238/291/290	KK	55	8	Int	2'x3'	10/27	IS	P	INT
10/25/11	1563	238/290	KK	55	8	Patch	1'x2'	10/27	IS	P	65' N of SEOS
10/28/11	1564	287/290	XM	56	1	Patch	2'x4'	10/31	IS	P	33' S of NEOS
10/28/11	1565	238/287	XM	56	1	Int	3'x6'	10/31	IS	P	238/287/290/293
10/27/11	1567	287/293	XM	56	2	Patch	2'x6'	10/31	IS	P	105' S of NEOS
10/27/11	1568	304	XM	56	1	Patch	11'x22'	11/1	JC	P	NEOS - Extended
10/31/11	1569	287/292/293	XM	56	1	Int	1'x4'	10/31	IS	P	INT
10/31/11	1570	292/293/294	XM	56	1	Int	2'x4'	10/31	IS	P	INT
10/31/11	1571	292/294	XM	56	1	Patch	EXT WELD	10/31	IS	P	9' S of NEOS
10/27/11	1572	293/294	XM	56	2	Patch	2'x5'	10/31	IS	P	122' N of SEOS
10/28/11	1573	293/294	XM	56	1	Patch	2'x6'	10/31	IS	P	41' N of SEOS
10/28/11	1574	237/238	XM	56	1	Int	3'x3'	10/31	IS	P	237/238/293/294

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/28/11	1575	237/294	XM	56	1	Patch	2'x4'	10/31	IS	P	10' W of EEOS
10/28/11	1576	235/237	XM	56	1	Int	2'x3'	10/31	IS	P	235/237/294/295
10/28/11	1577	234/235	XM	56	1	Int	1'x2'	10/31	IS	P	234/235/295/297
10/28/11	1578	232/234	XM	56	1	Int	3'x4'	10/31	IS	P	232/234/297/298
10/27/11	1579	294/295	XM	56	2	Patch	2'x4'	10/31	IS	P	30' S of NEOS
10/27/11	1580	294/295/296	XM	56	2	Int	2'x3'	10/31	IS	P	INT
10/27/11	1581	295/296/297	XM	56	2	Int	2'x2'	10/31	IS	P	INT
10/27/11	1582	294/296	XM	56	2	Patch	2'x3'	10/31	IS	P	50' N of SEOS
10/27/11	1583	296/297	XM	56	1	Patch	2'x3'	10/31	JC	P	25' S of NEOS
10/25/11	1584	287	LR	17	5	Hole	1'x1'	10/27	IS	P	1' W of EEOS/30' N of SEOS
10/25/11	1585	285	XM	56	6	Hole	1'x1'	10/27	IS	P	10' N of SEOS/8' E of WEOS
10/25/11	1586	285/287	XM	56	6	Patch	1'x4'	10/27	IS	P	12' N of SEOS
10/25/11	1587	282/283	LR	17	9	EXT	27'	10/27	IS	P	27' N of SEOS
10/25/11	1588	225/226/303/305	XM	56	2	Patch	2'x4'	10/31	IS	P	INT
10/25/11	1589	285/287	KK	55	8	Patch	1'x3'	10/27	IS	P	69' N of SEOS
10/25/11	1590	285/287	KK	55	8	Patch	1'x2'	10/27	IS	P	77' N of SEOS
10/26/11	1591	285/287	XM	56	2	Patch	1'x4'	10/27	IS	P	128' N of SEOS
10/27/11	1592	278/279	XM	56	2	Patch	1'x3'	10/31	IS	P	8' S of NEOS
10/31/11	1621	287/286	XM	56	1	Patch	2'x12'	10/31	JC	P	NEOS - 12' S
10/26/11	1566	213/215	XM	56	2	Int	3'x8'	10/26	JC	P	213/215/313/315

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/26/11	1593	215/216	XM	56	2	Int	3'x6'	10/26	JC	P	215/216/312/313
10/26/11	1594	312/313/314	LR	17	1	Int	3'x4'	10/26	JC	P	INT
10/26/11	1595	311/312	LR	17	1	Patch	1'x7'	10/26	JC	P	151' N of SEOS
10/26/11	1596	216/218	XM	56	2	Int	3'x8'	10/28	IS	P	216/218/311/312
10/26/11	1597	218/219	XM	56	2	Int	2'x5'	10/28	IS	P	218/219/310/311
10/26/11	1598	310/311	LR	17	1	Patch	2'x9'	10/28	IS	P	205' N of SEOS
10/26/11	1599	309/310	LR	17	1	Patch	2'x2'	10/28	IS	P	18' S of NEOS
10/26/11	1600	309/310	LR	17	1	Patch	2'x4'	10/28	IS	P	100' S of NEOS
10/26/11	1601	308/309/310	LR	17	1	Int	1'x1'	10/28	IS	P	INT
10/26/11	1602	307/308/309	LR	17	1	Int	1'x1'	10/28	IS	P	INT
10/26/11	1603	308/310	LR	17	1	Patch	1'x4'	10/28	IS	P	50' S of NEOS
10/26/11	1604	219/221	XM	56	2	Int	3'x4'	10/28	IS	P	219/221/308/310
10/26/11	1605	221/222	XM	56	2	Int	3'x13'	10/28	IS	P	221/222/307/308
10/26/11	1606	222/224	XM	56	2	Int	2'x2'	10/28	IS	P	222/224/306/307
10/26/11	1607	224/225	XM	56	2	Int	2'x3'	10/28	IS	P	224/225/305/306
10/26/11	1608	305/306	LR	17	1	Patch	1'x2'	10/28	IS	P	150' N of SEOS
10/26/11	1529	312/313	XM	56	2	DS - 250	1'x6'	10/28	IS	P	15' N of SEOS
10/26/11	1530	311/312	XM	56	2	DS - 251	2'x7'	10/28	IS	P	15' N of SEOS
10/26/11	1531	310/311	XM	56	2	DS - 252	2'x5'	10/28	IS	P	15' N of SEOS
10/26/11	1532	308/310	XM	56	2	DS - 253	2'x5'	10/28	IS	P	15' N of SEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: Ameren
Aquaterra Project Name: Fly Ash Closure
Project Location: Venice, IL
Pond 3
Aquaterra Project Number: 4923.10

Aquaterra CQA Technician: CMC

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
10/26/11	1533	307/308	XM	56	2	DS - 254	1'x4'	10/28	IS	P	15' N of SEOS
10/26/11	1534	306/307	XM	56	2	DS - 255	1'x4'	10/28	IS	P	15' N of SEOS
10/26/11	1535	305/306	XM	56	2	DS - 256	2'x5'	10/28	IS	P	15' N of SEOS
10/26/11	1609	304/305/306	LR	17	1	Int	1'x2'	10/28	IS	P	INT
10/26/11	1610	303/304/305	LR	17	1	Int	2'x2'	10/28	IS	P	INT
10/25/11	1611	302/303	LR	17	1	Patch	1'x2'	10/31	IS	P	150' S of NEOS
10/28/11	1612	226/228	XM	56	2	Int	2'x2'	10/31	IS	P	226/228/302/302
10/28/11	1613	228/302	XM	56	2	Hole	3'x6'	10/31	IS	P	10' E of WEOS
10/28/11	1614	228/229	XM	56	2	Int	2'x2'	10/31	IS	P	228/229/301/302
10/28/11	1615	229/231	XM	56	2	Int	2'x2'	10/31	IS	P	229/231/299/301
10/28/11	1616	299/300/301	XM	56	2	Int	2'x2'	10/31	IS	P	INT
10/28/11	1617	298/299/300	XM	56	2	Int	2'x2'	10/31	IS	P	INT
10/28/11	1618	231/232	XM	56	2	Int	2'x2'	10/31	IS	P	231/232/298/299
10/31/11	1619	300/301	XM	56	1	Patch	2'x2'	10/31	IS	P	170' N of SEOS
10/27/11	1620	297/298	XM	56	2	Patch	1'x1'	10/31	IS	P	137' N of SEOS
11/01/11	1622	306/307	XM	56	1	Cap	2'x30'	11/1	JC	P	30' S of NEOS - NEOS
11/01/11	1623	297/298	XM	56	1	Patch	1'x2'	11/1	JC	P	41' S of NEOS
11/01/11	1624	281	XM	56	1	Patch	6'x22'	11/1	JC	P	Add on to P-281 @ NEOS
11/01/11	1625	279	XM	56	1	Patch	5'x22'	11/1	JC	P	Add on to P-279 @ NEOS
11/01/11	1626	277	XM	56	1	Patch	5'x22'	11/1	JC	P	Add on to P-277 @ NEOS

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 2 & 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
11/01/11	*1627*	*274*	*XM*	*56*	*2*	*Patch*	*5'x22'*	*11/1/11*	*JC*	*P*	*Add on to P-274 @ NEOS*
11/01/11	*1628*	*272*	*XM*	*56*	*2*	*Patch*	*10'x22'*	*11/1/11*	*JC*	*P*	*Add on to P-272 @ NEOS*
11/01/11	*1629*	*270*	*XM*	*56*	*2*	*Patch*	*20'x22'*	*11/1/11*	*JC*	*P*	*Add on to P-270 @ NEOS*
11/01/11	*1630*	*306*	*XM*	*56*	*2*	*Patch*	*20'x20'*	*11/1/11*	*JC*	*P*	*Add on to P-306 @ NEOS*
11/28/11	*1631*	*-*	*EN*	*39*	*1*	*Boot*	*3'x3'*	*11/28/11*	*JR*	*P*	*Discharge pipe on W side of S Pump Sta.*
03/01/12	*1632*	*22*	*DV*	*53*	*1*	*Patch*	*1'x3'*	*3/1/12*	*DV*	*P*	*145' W of EEOS/10' N of SEOS*

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	1	1A/1B/1	XM	51	2	Int	2'x3'	9/27	LR	P	INT
09/27/11	2	1B/1C/1	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	3	1C/1D/1	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	4	1D/1	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	5	1E/4	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	6	1E/4/5	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	7	1E/5/6	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	8	1E/6/7	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	9	1E/7/8	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	10	1E/8/9	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	11	1E/9/10	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	12	1E/10/11	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	13	1E/1F/12	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	14	1F/12/13	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	15	1F/1G/13	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	16	1G/13/14	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	17	1G/14/15	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	18	1G/15/16	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	19	1G/16/17	XM	51	2	Int	2'x2'	9/27	LR	P	INT
09/27/11	20	1G/17/18	XM	51	2	Int	2'x2'	9/27	LR	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/27/11	21	1G/1H	XM	51	2	Int	2'x2'	9/27	IS	P	INT
09/27/11	22	1H/18/19	XM	51	6	Int	2'x2'	9/27	IS	P	INT
09/27/11	23	1H/1I/19	XM	51	6	Int	2'x2'	9/27	IS	P	INT
09/27/11	24	1I/19/20	XM	51	6	Int	2'x2'	9/27	IS	P	INT
09/27/11	25	1I/20/21	XM	51	6	Int	2'x2'	9/27	IS	P	INT
09/27/11	26	1I/21/22	XM	51	6	Int	2'x2'	9/27	IS	P	INT
09/27/11	27	1I/22/23	XM	51	6	Int	2'x2'	9/27	IS	P	INT
09/28/11	28	1I/23/24	XM	51	8	Int	2'x2'	9/28	IS	P	INT
09/29/11	29	1I/1J/24	XM	51	8	Int	2'x2'	9/28	IS	P	INT
09/30/11	30	1J/24/25	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/01/11	31	1J/25/26	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/02/11	32	1J/26/27	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/03/11	33	1J/27/28	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/04/11	34	1J/28/29	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/05/11	35	1J/29/30	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/06/11	36	1J/30/31	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/07/11	37	1J/1K/31	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/08/11	38	1K/32/33	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/09/11	39	1K/32/33	XM	51	8	Int	2'x2'	9/28	IS	P	INT
10/10/11	40	1K/33/34	XM	51	8	Int	2'x2'	9/28	IS	P	INT

Electronic Filing: Received, Clerk's Office 09/28/2020

Repair Record

Client Name: *Ameren*
Aquaterra Project Name: *Fly Ash Closure*
Project Location: *Venice, IL*
Pond 3
Aquaterra Project Number: *4923.10*

Aquaterra CQA Technician: *CMC*

Repair Date	Repair Number	Panel/ Seam	Seamer Initials	Machine Number	Trial Weld Number	Repair Type	Repair Size	Test Date	Tester Initials	Test P/F	Location/Comments
09/28/11	*41*	*1K/34/35*	*XM*	*51*	*8*	*Int*	*2'x2'*	*9/28*	*IS*	*P*	*INT*
09/29/11	*42*	*1K/35/36*	*XM*	*51*	*9*	*Int*	*2'x2'*	*9/28*	*IS*	*P*	*INT*
09/30/11	*43*	*1K/36/37*	*XM*	*51*	*10*	*Int*	*2'x2'*	*9/28*	*IS*	*P*	*INT*

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APPENDIX G

PROTECTIVE SOIL LAYER TEST RESULTS

Electronic Filing: Received, Clerk's Office 09/28/2020

SCI ENGINEERING, INC

October 19, 2011

AMEREN
DRAWING REVIEW

☒ No Comments. Submit final drawings; supplier may proceed.
☐ Comments noted. Make noted changes; submit final drawings; supplier may proceed.
☐ Unacceptable. Revise and resubmit.
☐ Review not required.
☐ _____

Review of this drawing does not relieve Supplier from responsibility for errors, correctness of details or compliance with Contract or Purchase Order requirements.

By _____ Date 31OCT11

Mr. Scott Plocher
Plocher Construction Company
2808 Thole-Plocher Road
Highland, Illinois 62249

RE: Topsoil and Imported Fill Letter
Ameren Venice Ash Pond Closure Phase II / Final Cover
Venice, Illinois
SCI No. 2011-3186.00

Dear Mr. Plocher:

SCI Engineering, Inc. (SCI) has performed laboratory testing on soil samples for compliance with topsoil and imported fill specifications for the referenced project. Topsoil samples were obtained from Schoolhouse Road (B2592) and the Port District (B2593). Both samples meet the specified requirements for topsoil. Table 1 below lists the individual test results.

Table 1 – Topsoil

Category	Test Standard	Specification	Sample B2592	Sample B2593
Organic Content (Percent)	AASHTO T 194	1 – 10	3.5	8.3
Percent Passing #10 Sieve	AASHTO T 27	Minimum 90 percent	99	99
pH	ASTM D 4972	5.0 – 8.0	7.0	7.2

A sample of imported fill material was also obtained from the Schoolhouse Road borrow site. The initial sample (B2590) failed with a plasticity index of 6. Two retest samples (B2596 & B2597) were then obtained and tested. Both retest samples met the specifications. We understand you will obtain additional samples periodically to verify compliance. Table 2 below lists the individual results.

Table 2 – Imported Fill

Category	Test Standard	Specification	Initial Sample B2590	Sample Retest 1 B2596	Sample Retest 2 B2597
Soil Classification	ASTM D 2487	CL, SC, ML, or any combination	ML	CL	CL
Plasticity Index	ASTM D 4318	8 – 30	6	11	12

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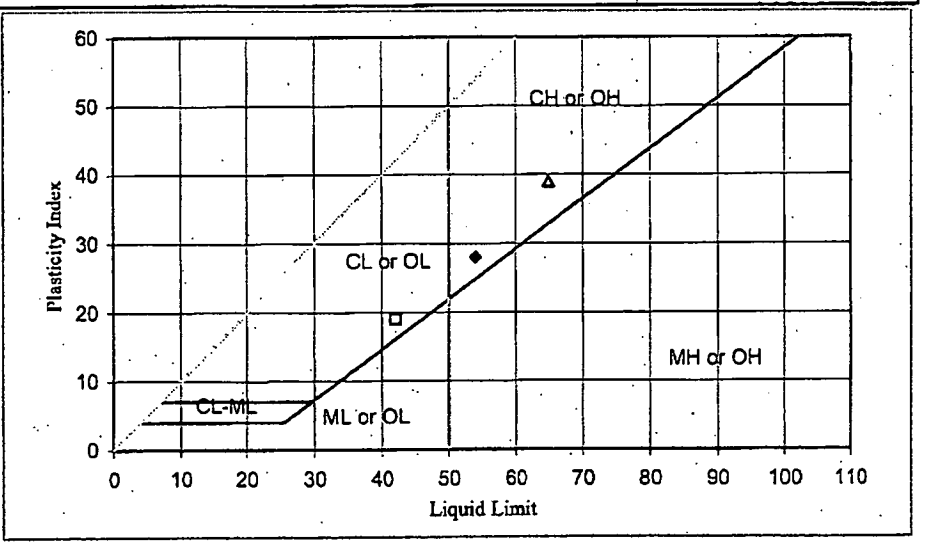
LIQUID AND PLASTIC LIMIT CALCULATION SHEET

PROJECT: Ameren Venice Ash Pond — CALC. BY: J.Booth

JOB NO.: 2011-3186.00 — TASK: QA — CHECKED BY: JME 11-3-11

BORING/ SAMPLE	TEST TYPE	BLOW COUNT	WET & TARE	DRY & TARE	TARE	LL & PL	DELTA	FINAL VALUES	
Port Borrow 8'	LL	22	35.71	29.01	18.90	65.3		LL =	65
	LL	27	34.40	28.30	18.80	64.8		PL =	26
	LL	34	34.89	29.45	20.77	65.0	0.4	PI =	39
△	PL	--	29.40	27.63	20.83	26.0			
	PL	--	30.45	28.59	21.50	26.2	0.2	USC =	CH
	Natural MC		162.00	137.24	40.50	25.6		LI =	0.0
Remarks: B-2609						% Retained:*			
Port Borrow 12'	LL	16	33.79	28.36	18.77	53.6		LL =	54
	LL	28	34.39	29.69	20.88	54.1		PL =	26
	LL	33	36.44	31.35	21.50	53.4	0.6	PI =	28
◆	PL	--	31.11	29.27	22.18	26.0			
	PL	--	31.26	29.39	22.20	26.0	0.1	USC =	CH
	Natural MC		177.50	143.00	39.50	33.3		LI =	0.3
Remarks: B-2610						% Retained:*			
Port Borrow 15'	LL	17	35.64	30.43	18.80	42.8		LL =	42
	LL	22	33.18	28.83	18.69	42.2		PL =	23
	LL	32	37.80	33.11	21.69	42.3	0.5	PI =	19
□	PL	--	27.68	26.22	19.91	23.1			
	PL	--	26.37	24.92	18.62	23.0	0.1	USC =	CL
	Natural MC		196.00	158.00	42.00	32.8		LI =	0.5
Remarks:						% Retained:*			

* the % retained is a visual estimate of the amount of sample retained on the No. 40 sieve.



Electronic Filing: Received, Clerk's Office 09/28/2020

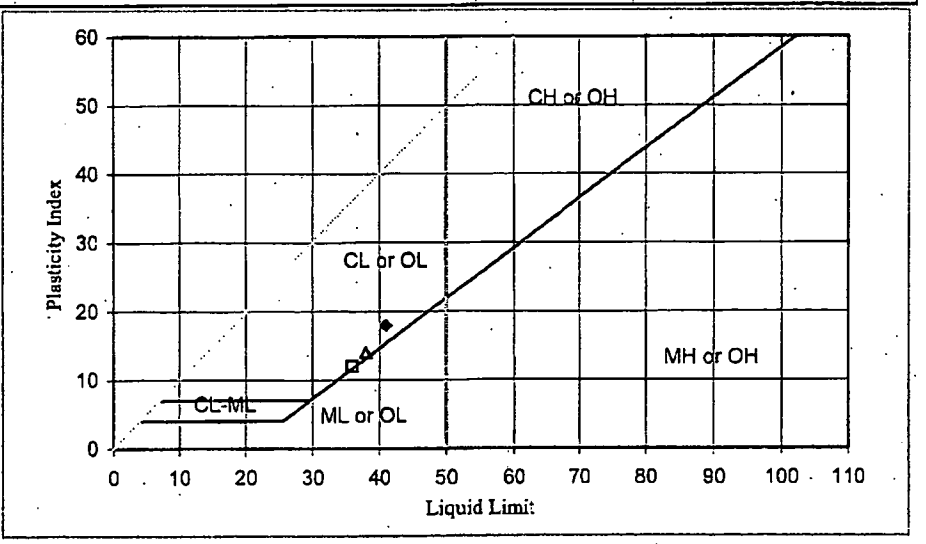
LIQUID AND PLASTIC LIMIT CALCULATION SHEET

PROJECT: Ameren Venice Ash Pond — CALC. BY: J.Booth

JOB NO.: 2011-3186.01 — TASK: QA — CHECKED BY: JAE 12/5/2011

BORING/ SAMPLE	TEST TYPE	BLOW COUNT	WET & TARE	DRY & TARE	TARE	LL & PL	DELTA	FINAL VALUES	
Sample #1	LL	17	38.89	33.13	18.61	37.9		LL =	38
	LL	27	39.59	34.44	20.93	38.5		PL =	24
	LL	35	39.44	34.70	21.88	38.5	0.6	PI =	14
△	PL	–	27.99	26.23	18.74	23.5			
	PL	–	27.89	26.16	18.86	23.7	0.2	USC =	CL
	Natural MC		369.00	293.00	51.00	31.4		LI =	0.5
Remarks:	B-2626					% Retained:*			
Sample #2	LL	17	34.06	29.38	18.46	40.9		LL =	41
	LL	26	39.21	34.31	22.22	40.7		PL =	23
	LL	34	38.82	33.18	18.79	40.7	0.2	PI =	18
◆	PL	–	30.40	28.66	21.20	23.3			
	PL	–	30.70	29.03	21.71	22.8	0.5	USC =	CL
	Natural MC		412.00	329.50	51.00	29.6		LI =	0.4
Remarks:	B-2627					% Retained:*			
Sample #3	LL	18	38.80	34.15	21.69	35.9		LL =	36
	LL	23	38.90	34.29	21.58	35.9		PL =	24
	LL	30	37.80	33.58	21.51	35.7	0.2	PI =	12
□	PL	–	27.31	25.58	18.29	23.7			
	PL	–	27.93	26.17	18.83	24.0	0.2	USC =	CL
	Natural MC		330.50	273.50	50.50	25.6		LI =	0.1
Remarks:	B-2628					% Retained:*			

* the % retained is a visual estimate of the amount of sample retained on the No. 40 sieve.



Electronic Filing: Received, Clerk's Office 09/28/2020

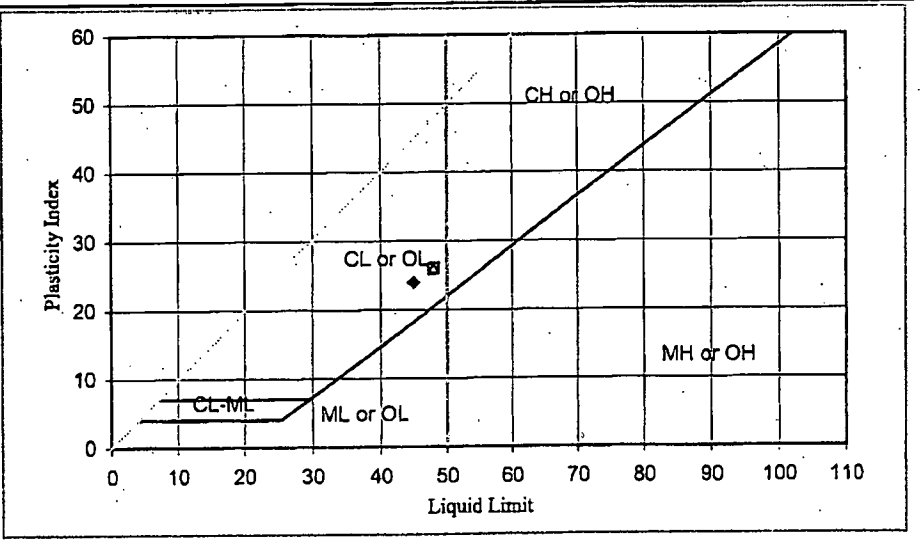
LIQUID AND PLASTIC LIMIT CALCULATION SHEET

PROJECT: Ameren Venice Ash Pond — CALC. BY: J.Booth

JOB NO.: 2011-3186.01 — TASK: QA — CHECKED BY: JAE 12/29/2011

BORING/ SAMPLE	TEST TYPE	BLOW COUNT	WET & TARE	DRY & TARE	TARE	LL & PL	DELTA	FINAL VALUES	
Sample #4	LL	22	36.35	31.50	21.71	48.8		LL =	48
	LL	28	34.68	29.47	18.47	48.0		PL =	22
	LL	35	36.90	31.12	18.61	48.1	0.8	PI =	26
△	PL	–	31.03	29.49	22.26	21.3			
	PL	–	27.97	26.31	18.82	22.2	0.9	USC =	CL
	Natural MC		396.00	308.50	50.50	33.9		LI =	0.5
Remarks: B-2640						% Retained:*			
Sample #5	LL	20	38.60	32.53	19.38	44.9		LL =	45
	LL	26	36.56	31.41	19.91	45.0		PL =	21
	LL	35	38.96	33.45	20.81	45.4	0.5	PI =	24
◆	PL	–	28.89	27.40	20.16	20.6			
	PL	–	27.37	25.84	18.46	20.7	0.2	USC =	CL
	Natural MC		414.00	328.50	50.50	30.8		LI =	0.4
Remarks: B-2641						% Retained:*			
Sample #6	LL	21	35.86	30.22	18.61	47.6		LL =	48
	LL	27	36.75	31.18	19.35	47.5		PL =	22
	LL	33	31.47	27.41	18.64	47.9	0.4	PI =	26
□	PL	–	30.82	29.21	21.71	21.5			
	PL	–	29.15	27.47	19.69	21.6	0.1	USC =	CL
	Natural MC		275.50	222.50	51.50	31.0		LI =	0.3
Remarks: B-2642						% Retained:*			

* the % retained is a visual estimate of the amount of sample retained on the No. 40 sieve.



Electronic Filing: Received, Clerk's Office 09/28/2020

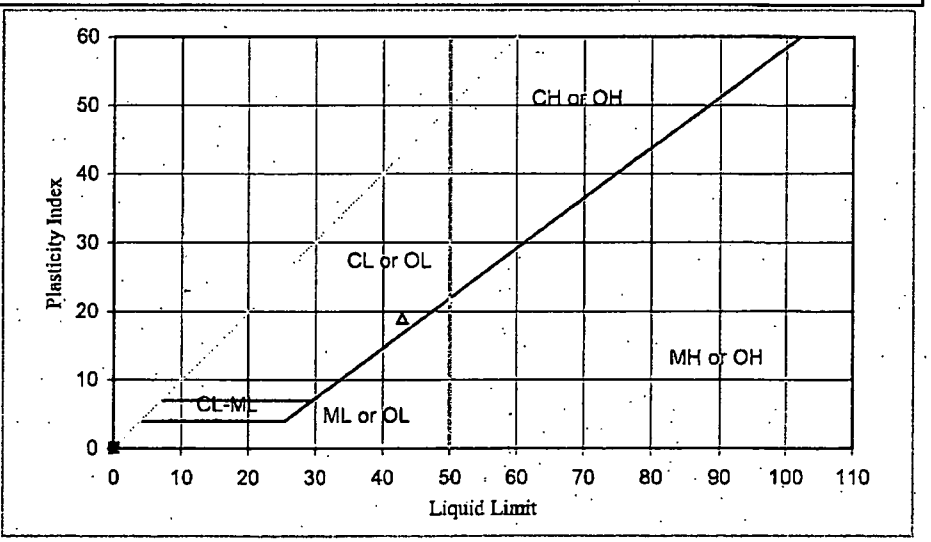
LIQUID AND PLASTIC LIMIT CALCULATION SHEET

PROJECT: Ameren Venice Ash Pond — CALC. BY: J.Booth

JOB NO.: 2011-3186.00 — TASK: QA — CHECKED BY: JAE 2/6/2012

BORING/ SAMPLE	TEST TYPE	BLOW COUNT	WET & TARE	DRY & TARE	TARE	LL & PL	DELTA	FINAL VALUES	
Keller	LL	22	34.86	29.91	18.58	43.0		LL =	43
Borrow	LL	28	35.83	30.68	18.50	42.9		PL =	24
	LL	35	36.73	32.51	22.26	42.9	0.2	PI =	19
△	PL	--	28.63	26.83	19.33	24.0			
	PL	--	28.29	26.54	19.17	23.7	0.3	USC =	CL
	Natural MC					#DIV/0!		LI =	#DIV/0!
Remarks: B-2678						% Retained:*			
	LL					#DIV/0!		LL =	#DIV/0!
	LL					#DIV/0!		PL =	#DIV/0!
	LL					#DIV/0!	#DIV/0!	PI =	#DIV/0!
◆	PL	--				#DIV/0!			
	PL	--				#DIV/0!	#DIV/0!	USC =	
	Natural MC					#DIV/0!		LI =	#DIV/0!
Remarks:						% Retained:*			
	LL					#DIV/0!		LL =	#DIV/0!
	LL					#DIV/0!		PL =	#DIV/0!
	LL					#DIV/0!	#DIV/0!	PI =	#DIV/0!
□	PL	--				#DIV/0!			
	PL	--				#DIV/0!	#DIV/0!	USC =	
	Natural MC					#DIV/0!		LI =	#DIV/0!
Remarks:						% Retained:*			

* the % retained is a visual estimate of the amount of sample retained on the No. 40 sieve.



Electronic Filing: Received, Clerk's Office 09/28/2020

LIQUID AND PLASTIC LIMIT CALCULATION SHEET

PROJECT: Ameren Venice Ash Pond — CALC. BY: J.Booth

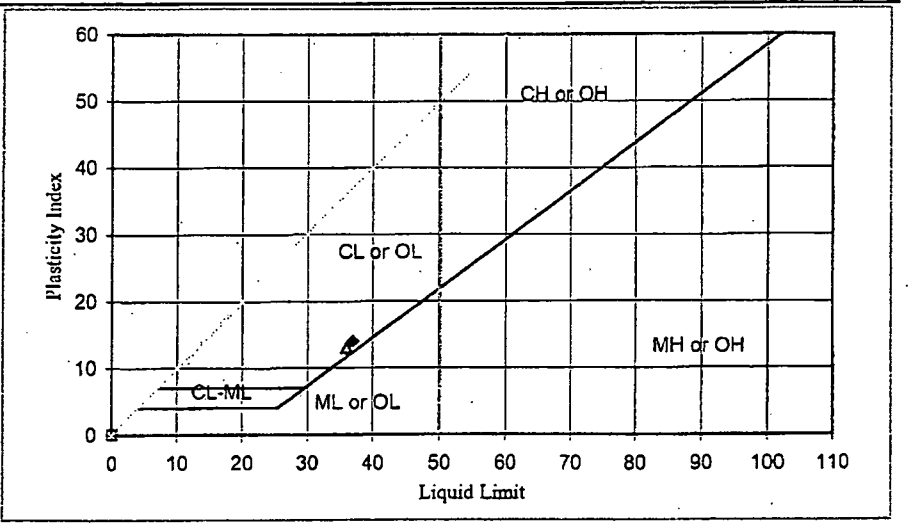
JOB NO.: 2011-3186.00 — TASK: QA — CHECKED BY: JAE 3/5/2012

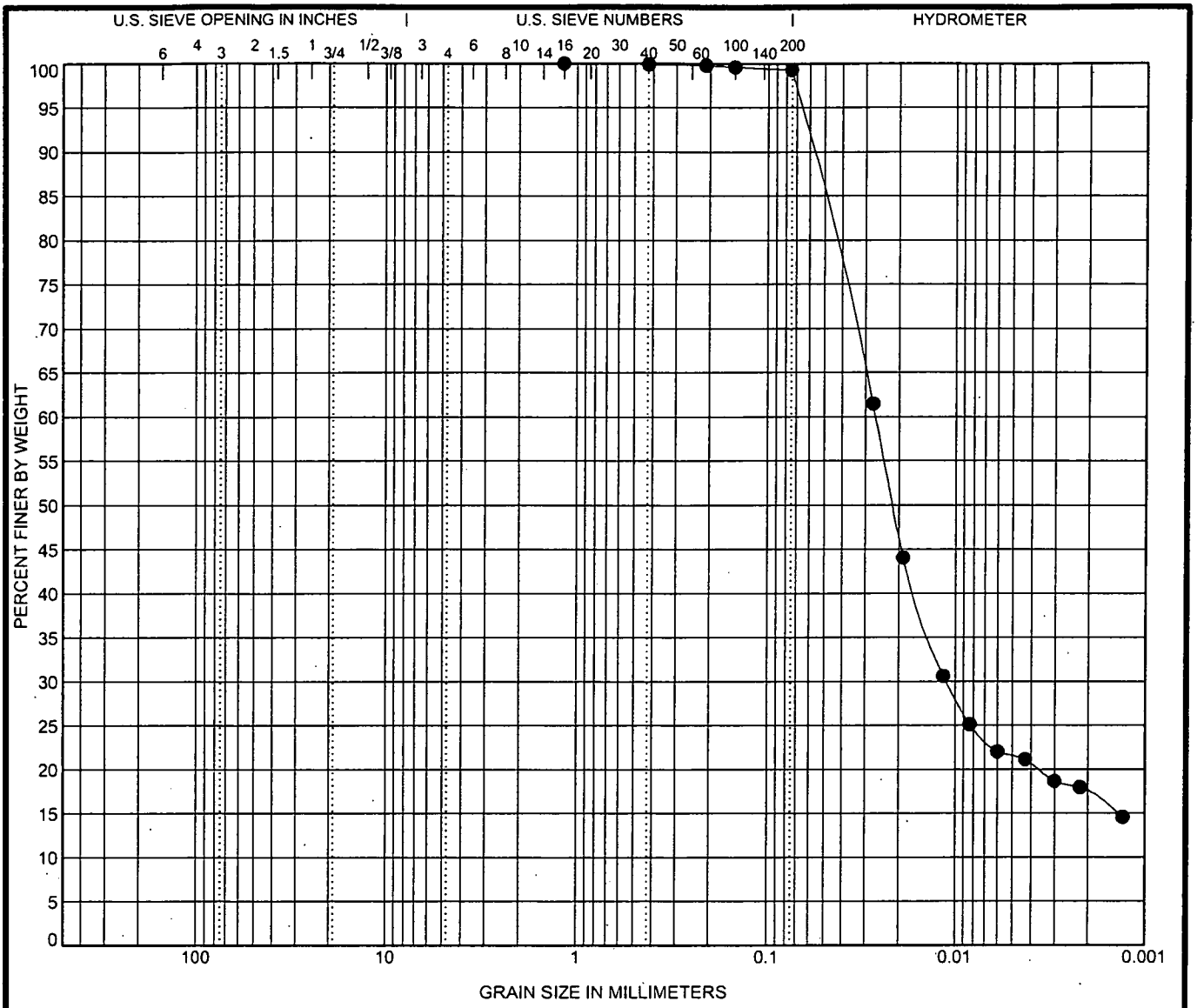
BORING/ SAMPLE	TEST TYPE	BLOW COUNT	WET & TARE	DRY & TARE	TARE	LL & PL	DELTA	FINAL VALUES
Fort Belle Quarry	LL	17	33.89	29.89	19.32	36.1		LL = 36
	LL	26	32.20	28.79	19.40	36.5		PL = 23
	LL	34	36.66	32.29	19.80	36.3	0.4	PI = 13
△	PL	--	30.88	29.18	21.88	23.3		
	PL	--	29.40	27.68	20.38	23.6	0.3	USC = CL
	Natural MC					#DIV/0!		LI = #DIV/0!
Remarks: B-6417						% Retained:*		

Fort Belle Quarry	LL	20	38.99	34.30	21.72	36.3		LL = 37
	LL	26	34.68	30.55	19.18	36.5		PL = 23
	LL	35	34.81	31.17	20.87	36.8	0.5	PI = 14
◆	PL	--	27.68	26.02	18.72	22.7		
	PL	--	27.78	26.07	18.66	23.1	0.3	USC = CL
	Natural MC					#DIV/0!		LI = #DIV/0!
Remarks: B-6418						% Retained:*		

	LL					#DIV/0!		LL = #DIV/0!
	LL					#DIV/0!		PL = #DIV/0!
	LL					#DIV/0!	#DIV/0!	PI = #DIV/0!
□	PL	--				#DIV/0!		
	PL	--				#DIV/0!	#DIV/0!	USC =
	Natural MC					#DIV/0!		LI = #DIV/0!
Remarks:						% Retained:*		

* the % retained is a visual estimate of the amount of sample retained on the No. 40 sieve.





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

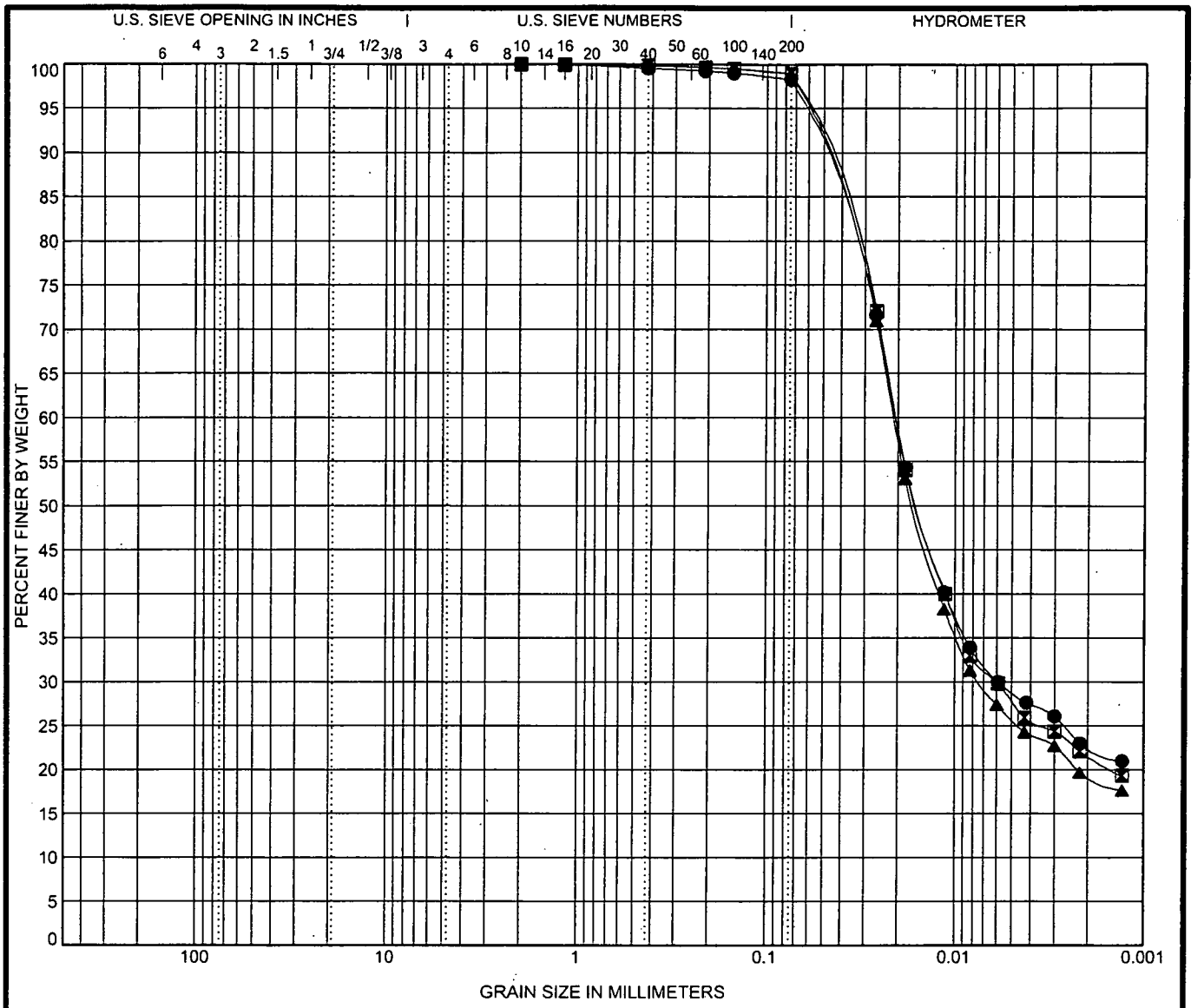
Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-2583	0	LEAN CLAY(CL)	32	23	9		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2583	0	1.18	0.026	0.011		0.0	0.7	77.8	21.5

SCI Engineering, Inc.
650 Pierce Blvd.
O'Fallon, Illinois 62269
Telephone: 618-624-6969
Fax: 618-624-7099

GRAIN SIZE DISTRIBUTION

Project Name: Ameren Venice Ash Pond Closure
Phase II/Final Cover
Location: Venice, Illinois
SCI Project No.: 2011-3186.00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

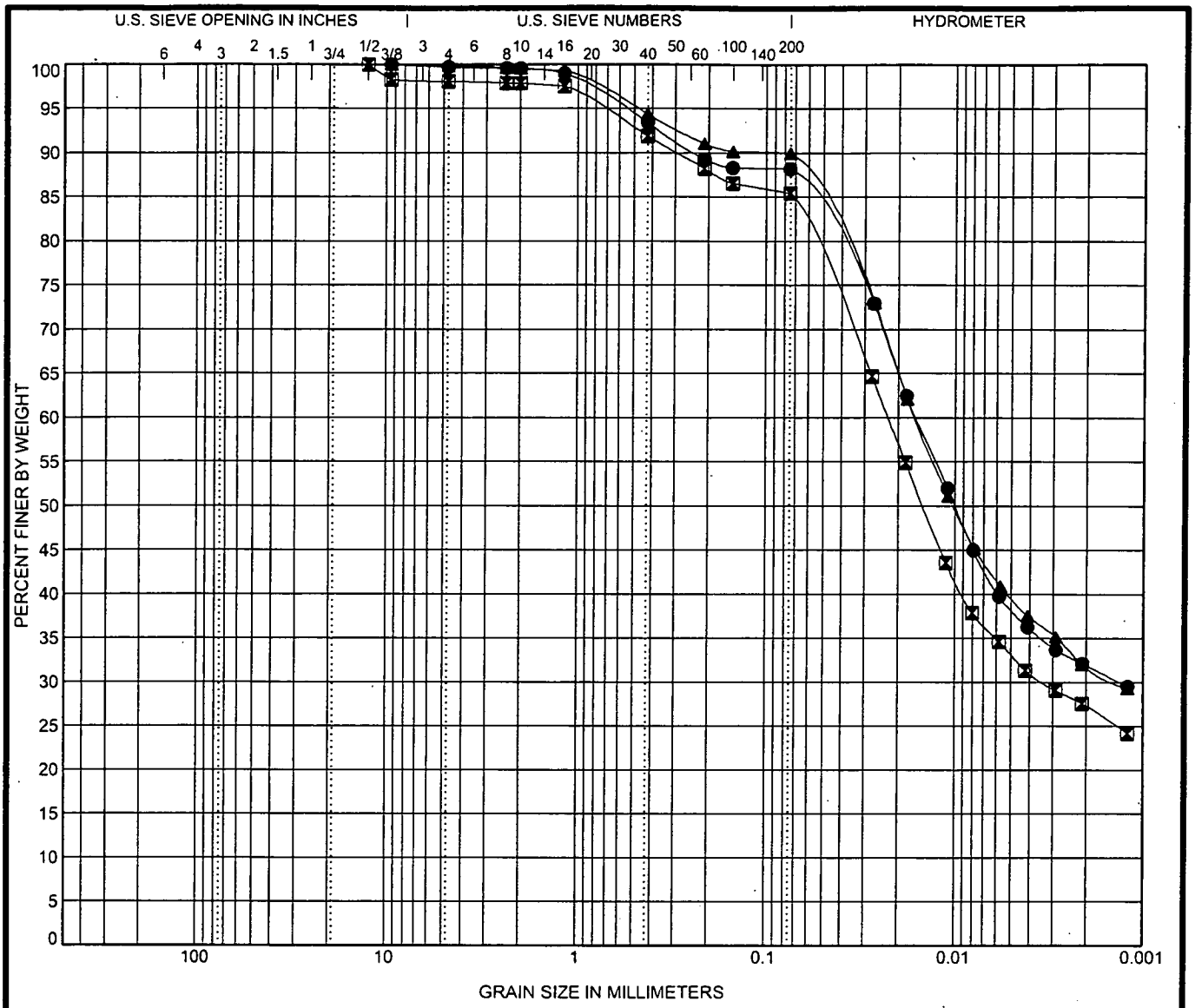
Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-2626	0	LEAN CLAY(CL)	38	24	14		
⊠ B-2627	0	LEAN CLAY(CL)	41	23	18		
▲ B-2628	0	LEAN CLAY(CL)	36	24	12		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2626	0	2	0.021	0.006		0.0	1.7	69.5	28.8
⊠ B-2627	0	2	0.021	0.006		0.0	1.1	71.2	27.8
▲ B-2628	0	2	0.021	0.007		0.0	1.0	73.3	25.7

SCI Engineering, Inc.
650 Pierce Blvd.
O'Fallon, Illinois 62269
Telephone: 618-624-6969
Fax: 618-624-7099

GRAIN SIZE DISTRIBUTION

Project Name: Venice Plant - Ash Pond Closure
Location: Venice, Illinois
SCI Project No.: 2011-3186.01



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

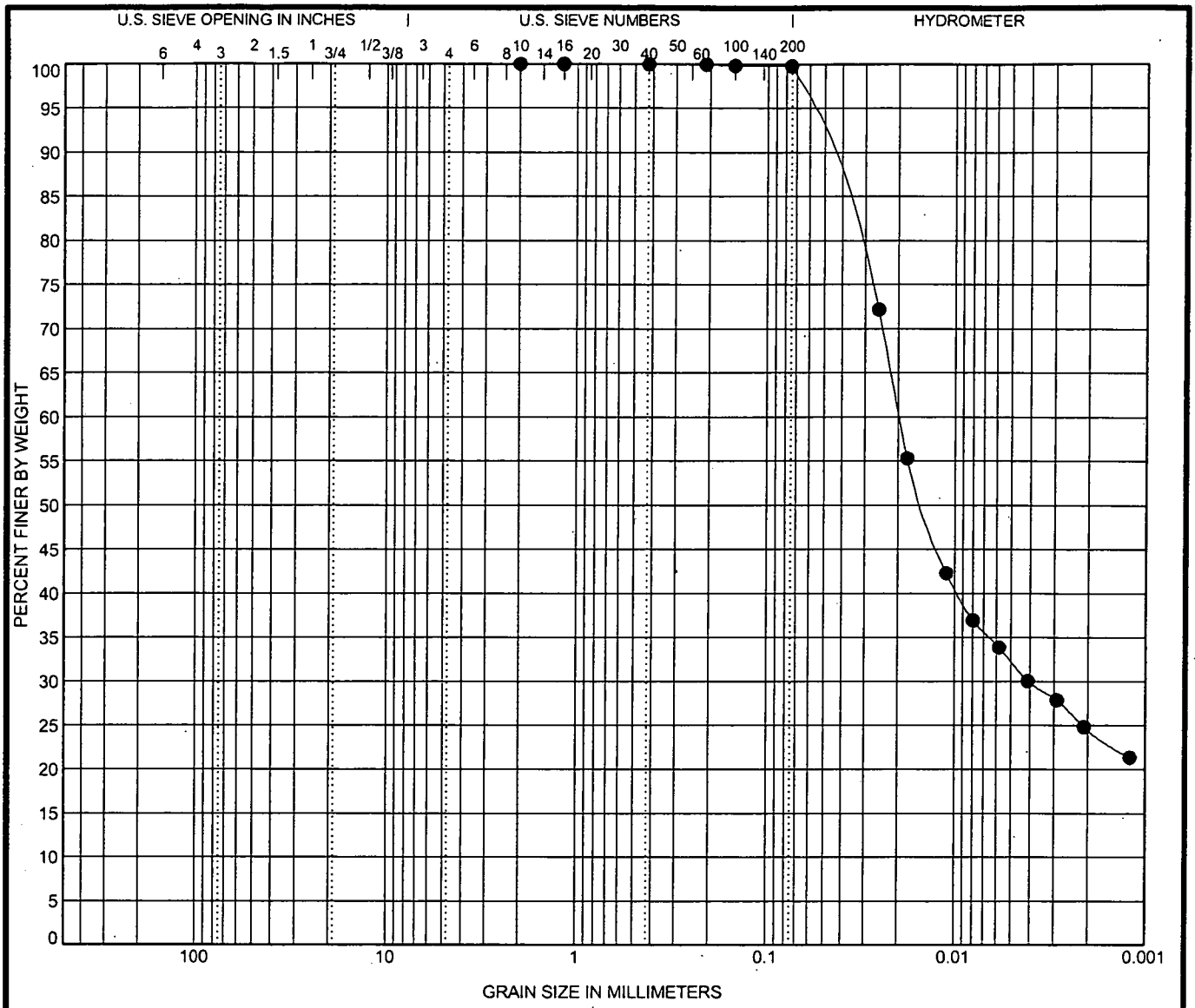
Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-2640	0	LEAN CLAY(CL)	48	22	26		
⊠ B-2641	0	LEAN CLAY(CL)	45	21	24		
▲ B-2642	0	LEAN CLAY(CL)	48	22	26		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2640	0	9.5	0.016	0.001		0.3	11.5	49.9	38.3
⊠ B-2641	0	12.5	0.023	0.003		1.9	12.6	52.4	33.1
▲ B-2642	0	9.5	0.016	0.001		0.1	9.9	50.4	39.6

SCI Engineering, Inc.
650 Pierce Blvd.
O'Fallon, Illinois 62269
Telephone: 618-624-6969
Fax: 618-624-7099

GRAIN SIZE DISTRIBUTION

Project Name: Venice Plant - Ash Pond Closure
Location: Venice, Illinois
SCI Project No.: 2011-3186.01



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-2678	0	**LEAN CLAY(CL)**	**43**	**24**	**19**		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2678	0	**2**	**0.02**	**0.004**		**0.0**	**0.2**	**67.6**	**32.2**

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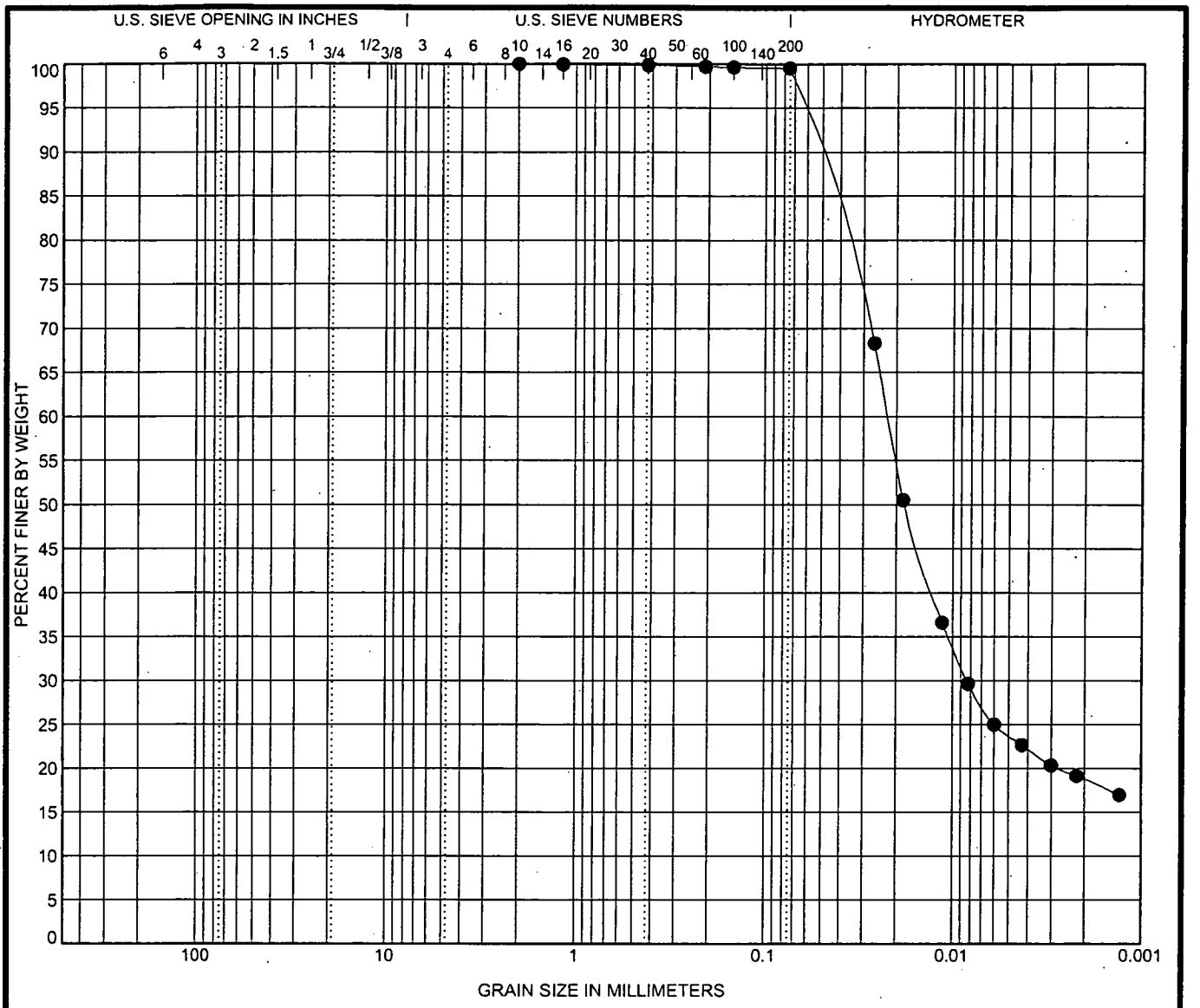
Fax: 618-624-7099

GRAIN SIZE DISTRIBUTION

Project Name: Ameren Venice Ash Pond Closure
Phase II/Final Cover
Location: Venice, Illinois
SCI Project No.: 2011-3186.00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-6417	0	**LEAN CLAY(CL)**	**36**	**23**	**13**		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-6417	0	**2**	**0.022**	**0.008**		**0.0**	**0.5**	**75.8**	**23.7**

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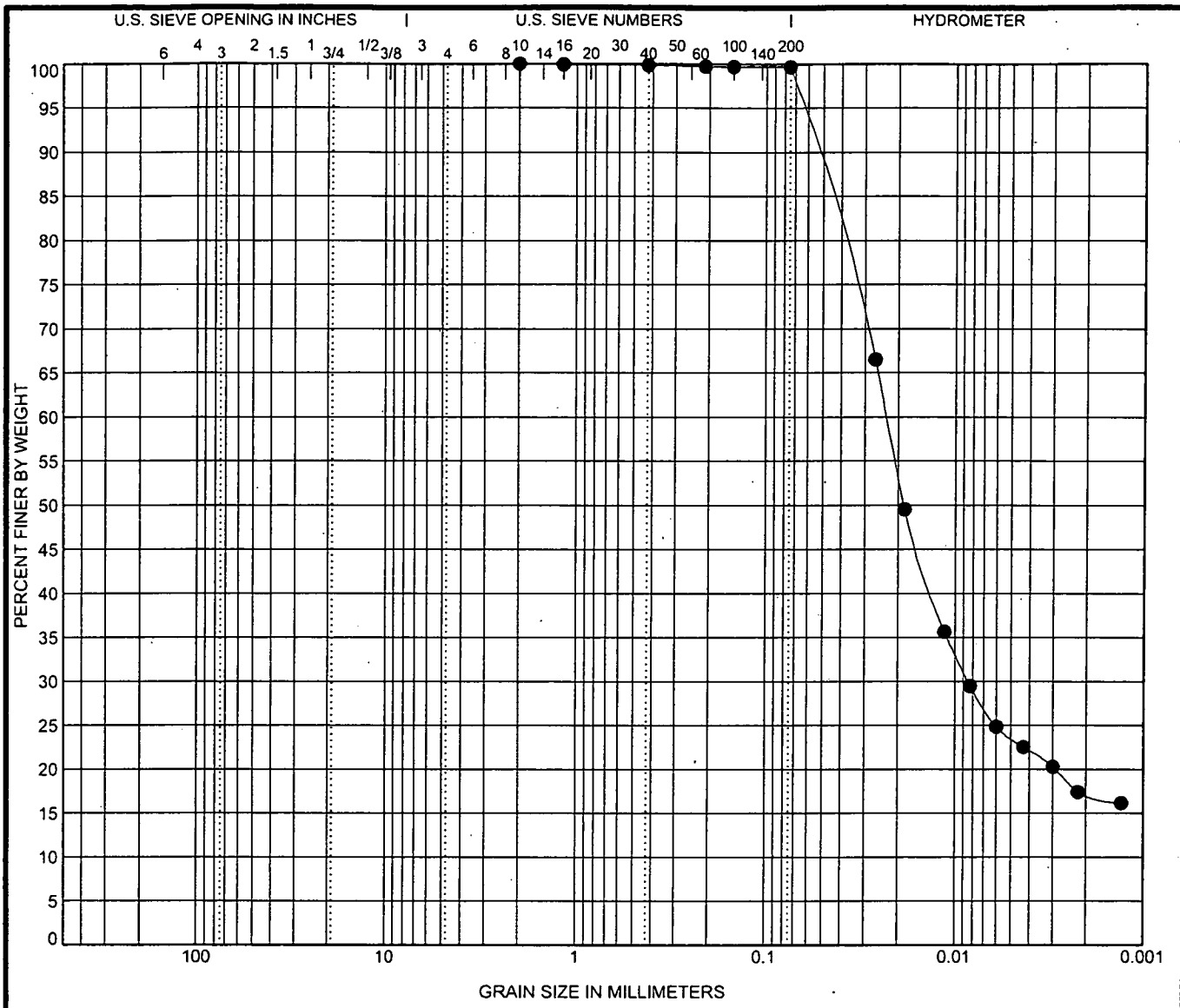
Phase II/Final Cover
Location: Venice, Illinois
SCI Project No.: 2011-3186.00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6418 0	**LEAN CLAY(CL)**	**37**	**23**	**14**		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-6418 0	**2**	**0.023**	**0.009**		**0.0**	**0.3**	**76.1**	**23.6**

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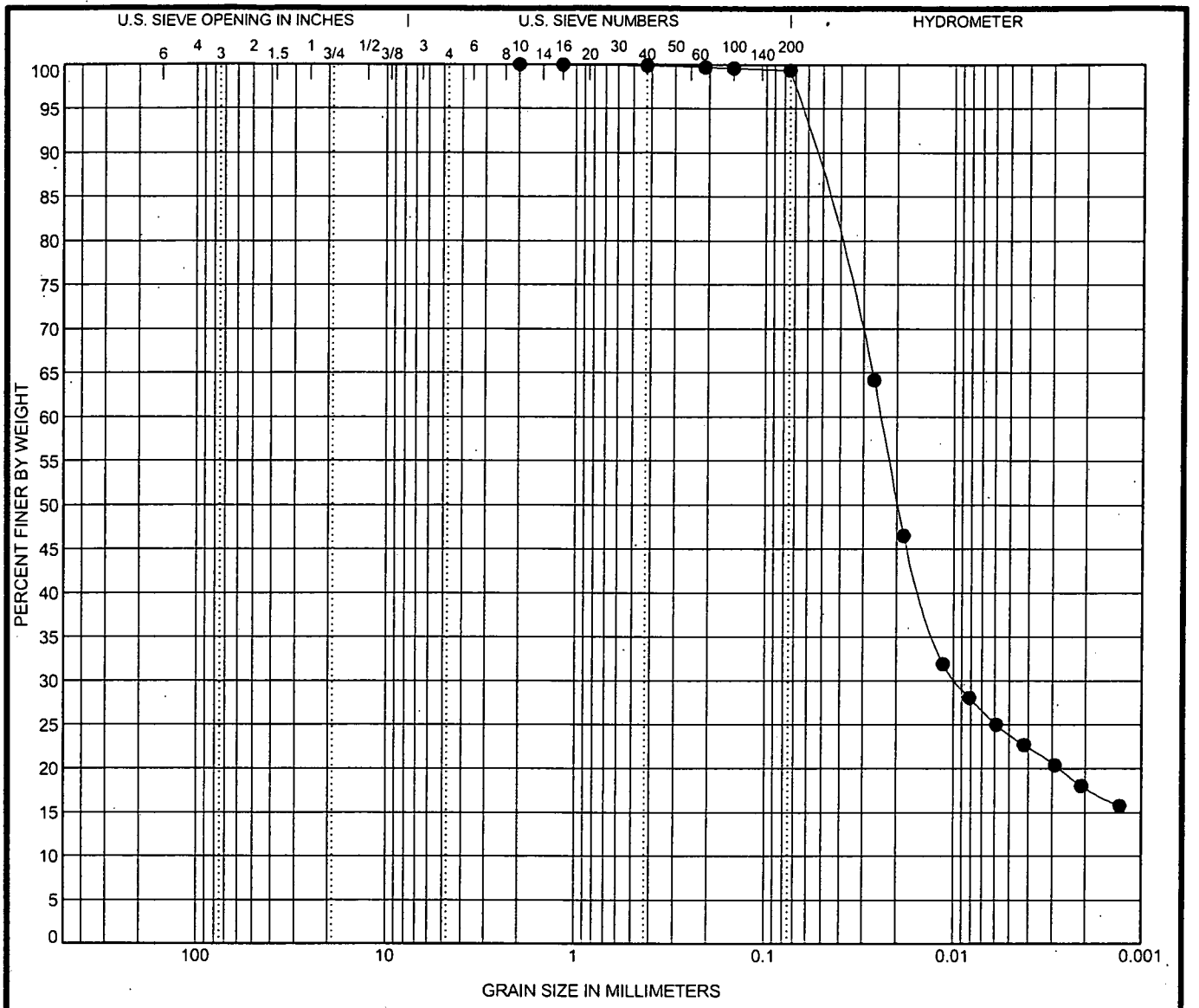
GRAIN SIZE DISTRIBUTION

Project Name: Ameren Venice Ash Pond Closure
Phase II/Final Cover
Location: Venice, Illinois
SCI Project No.: 2011-3186.00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-6498	0	LEAN CLAY(CL)	33	23	10		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-6498	0	2	0.024	0.01		0.0	0.6	75.5	23.9

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GRAIN SIZE DISTRIBUTION

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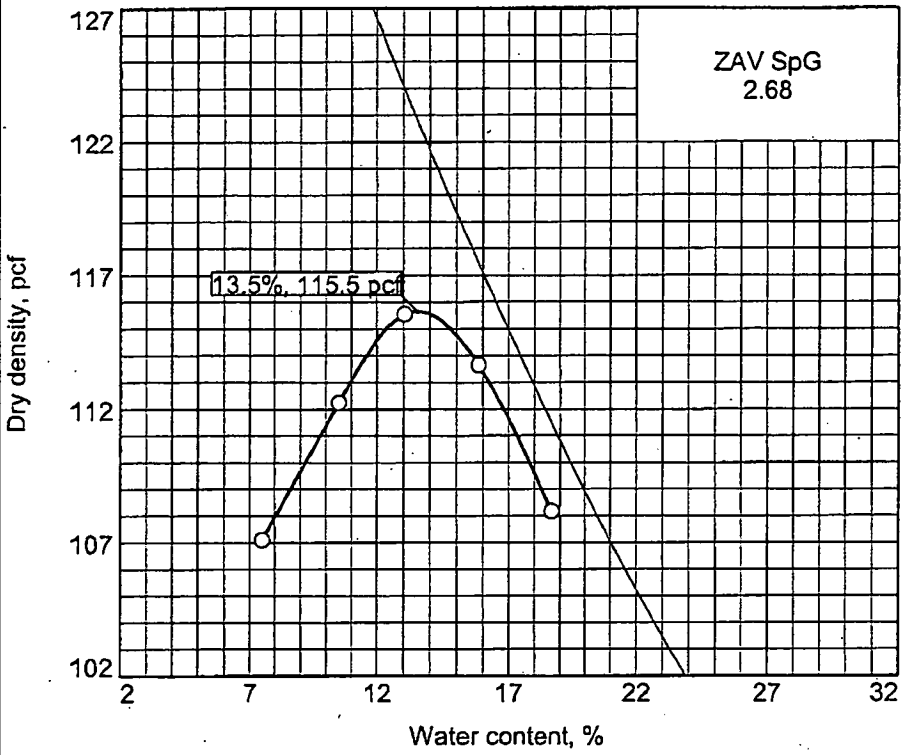
Phase II/Final Cover
Location: Venice, Illinois
SCI Project No.: 2011-3186.00

COMPACTION TEST REPORT



Curve No.
3

Test Specification:
ASTM D 1557-07 Method A (B-4CM-1)
2011

Preparation Method WET
Hammer Wt. 10 lb.
Hammer Drop 18 in.
Number of Layers five
Blows per Layer 25
Mold Size 0.03308 cu. ft.
Test Performed on Material Passing #4 **Sieve**

NM 10.5 **LL** 38 **PI** 17
Sp.G. (ASTM D 854)
%>#4 **%<No.200**
USCS CL **AASHTO**
Date Sampled 08-23-2011
Date Tested 08-24-2011
Tested By J. Booth

TESTING DATA

	1	2	3	4	5	6
WM + WS	3850.5	3949.0	3964.5	3915.5	3716.5	
WM	1989.0	1989.0	1989.0	1989.0	1989.0	
WW + T #1	344.5	337.0	343.0	339.5	338.0	
WD + T #1	316.5	304.0	303.0	294.0	318.0	
TARE #1	50.5	51.0	50.5	50.5	51.0	
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	10.5	13.0	15.8	18.7	7.5	
DRY DENSITY	112.2	115.6	113.7	108.2	107.1	

TEST RESULTS

Maximum dry density = 115.5 pcf

Optimum moisture = 13.5 %

Material Description

LEAN CLAY (CL): Brown, low plastic, trace sand

Remarks:

Project No. 20113186.00 **Client:** Plocher Construction Company
Project: Ameren Venice Ash Pond Closure Phase II / Final Cover
Venice, Illinois
○ **Loc.:** Fort Belle Borrow **Depth:** n/a **Sample No.:** 2554

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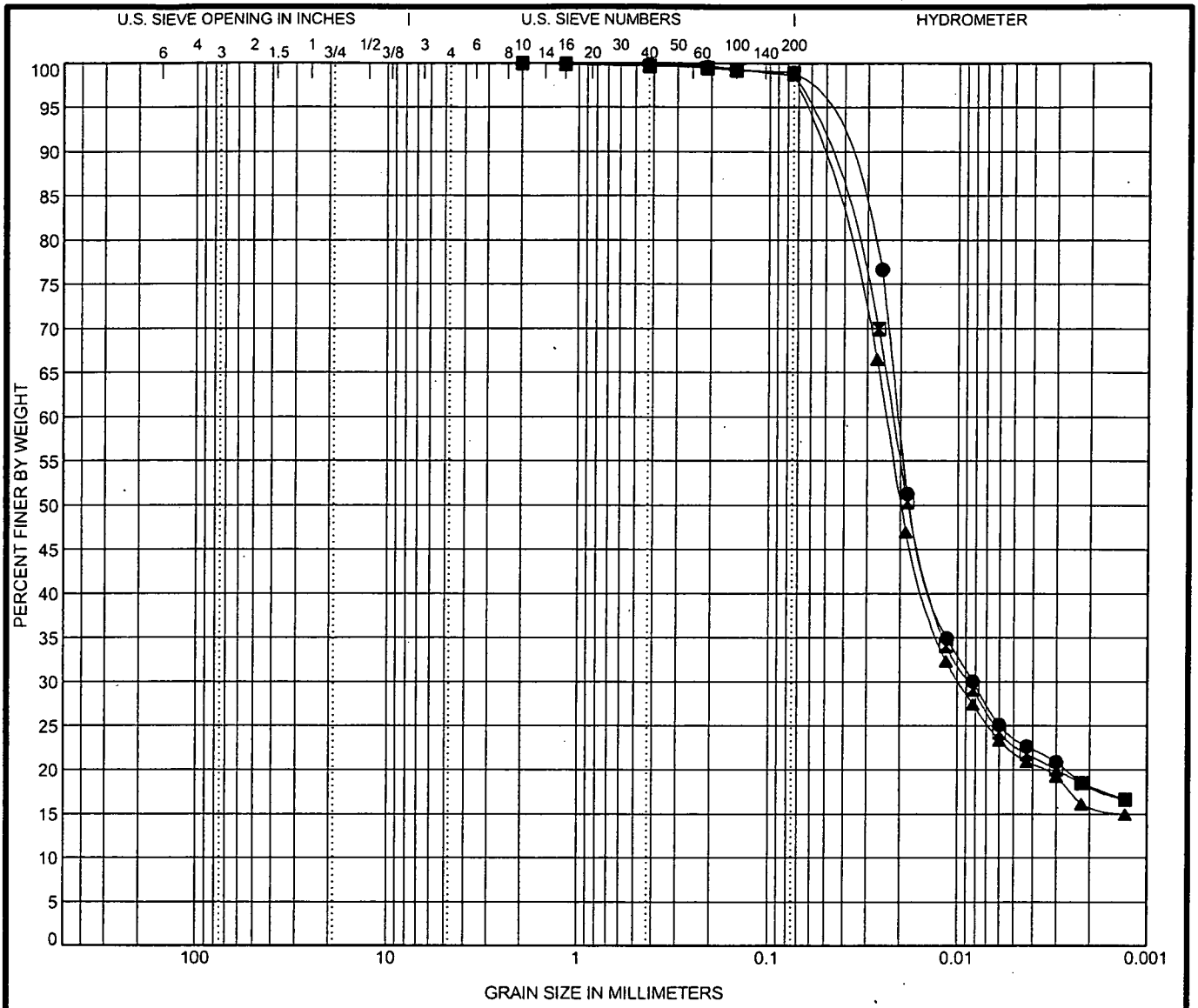
O'Fallon, IL

Checked by: Josh Eckart 8/25/2011
Title: Field Manager

Figure



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-6499	0	LEAN CLAY(CL)	34	23	11		
⊠ B-6500	0	LEAN CLAY(CL)	35	24	11		
▲ B-6501	0	LEAN CLAY(CL)	33	23	10		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-6499	0	2	0.021	0.008		0.0	1.0	75.2	23.8
⊠ B-6500	0	2	0.022	0.009		0.0	1.1	76.0	22.9
▲ B-6501	0	2	0.024	0.01		0.0	1.3	76.6	22.1

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GRAIN SIZE DISTRIBUTION

Project Name: Ameren Venice Ash Pond Closure
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Location: Venice, Illinois
SCI Project No.: 2011-3186.00

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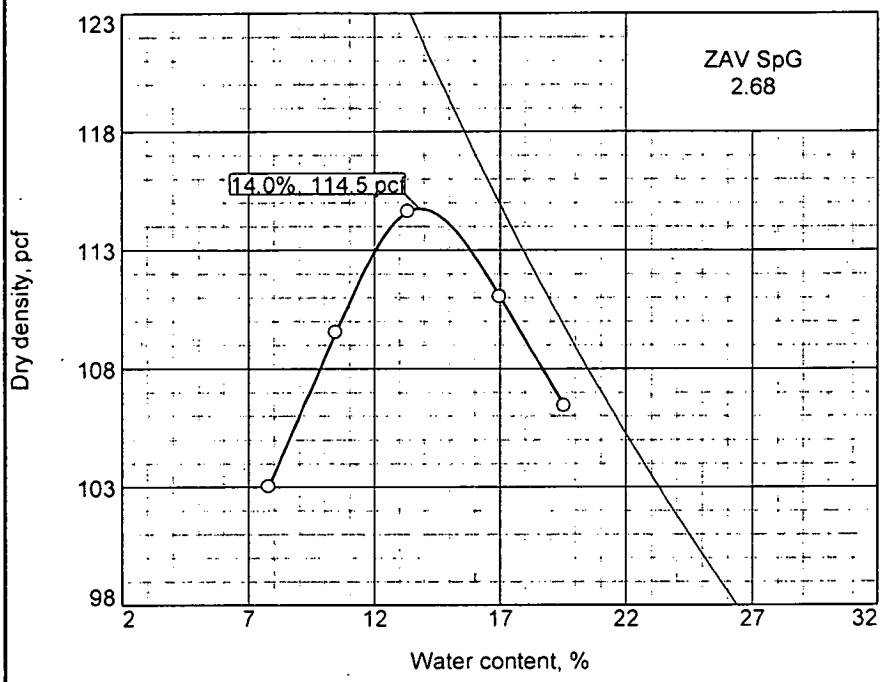
COMPACTION TEST REPORT



Curve No.
4

Test Specification:
ASTM D 1557-07 Method A (B-4CM-1) 2011

Preparation Method	WET
Hammer Wt.	10 lb.
Hammer Drop	18 in.
Number of Layers	five
Blows per Layer	25
Mold Size	0.03308 cu. ft.

Test Performed on Material Passing #4 **Sieve**

NM 18.7 **LL** 32 **PI** 9
Sp.G. (ASTM D 854)
%>#4 **%<No.200**
USCS CL **AASHTO**
Date Sampled 09-30-2011
Date Tested 10-03-2011
Tested By J. Booth

TESTING DATA

	1	2	3	4	5	6
WM + WS	3804.5	3938.5	3938.0	3898.0	3655.5	
WM	1989.0	1989.0	1989.0	1989.0	1989.0	
WW + T #1	315.0	335.5	319.5	341.5	333.5	
WD + T #1	290.0	302.0	280.5	294.0	313.0	
TARE #1	51.0	51.0	51.0	51.0	50.5	
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	10.5	13.3	17.0	19.5	7.8	
DRY DENSITY	109.5	114.6	111.0	106.4	103.0	

TEST RESULTS

Maximum dry density = 114.5 pcf

Optimum moisture = 14.0 %

Material Description

LEAN CLAY (CL): Brown, low plastic

Remarks:
Soil is overburden material from Columbia Quarry - Dupo.

Project No. 20113186.00 **Client:** Plocher Construction Company
Project: Ameren Venice Ash Pond Closure Phase II / Final Cover
Venice, Illinois
○ **Loc.:** Columbia Quarry - Dupo **Depth:** n/a **Sample No.:** B-2583

Checked by: J. Shepherd 10/4/2011
Title: Engineering Technician

SCI Engineering, Inc.

O'Fallon, IL

Figure

Mike Mueller

From: Collin Carson
Sent: Friday, March 09, 2012 9:38 AM
To: Matthew Ballance; Mike Mueller
Subject: Fwd: Ameren Venice Ash Pond Closure (2011-3186.00)

Sent from my Verizon Wireless Phone

----- Forwarded message -----
From: "Scott Plocher" <sjplocher@plocherco.com>
Date: Fri, Mar 9, 2012 9:36 am
Subject: Ameren Venice Ash Pond Closure (2011-3186.00)
To: "Eberhart, Glenn M" <GEberhart2@ameren.com>, "Collin Carson" <CCarson@aquaterra-env.com>
Cc: "Mark R. Plocher" <mrplocher@plocherco.com>, "Patrick, James R" <JPatrick@ameren.com>

FYI

With this new topsoil source, we expect the overwhelming majority of the material required to finish the project (both clay and topsoil) to come from the Fort Belle site.

Scott

From: Eckart, Josh [mailto:jeckart@sciengineering.com]
Sent: Friday, March 09, 2012 9:35 AM
To: Mark R. Plocher; Scott Plocher
Subject: Ameren Venice Ash Pond Closure (2011-3186.00)

Mark & Scott,

Here are the lab test results for the Fort Belle topsoil sample.

pH	6.0
% Passing #10 Sieve	>99%
Organic Content	3.0%

This sample meets the project specifications. Please let me know if you have any questions.

Thanks,

Josh Eckart
Field Manager
SCI Engineering, Inc.
Phone: 618-206-3015
Mobile: 618-781-1324
Fax: 618-624-7099
www.sciengineering.com

[redacted]arning your trust . . . one project at a time.

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Mike Mueller

From: Collin Carson
Sent: Saturday, March 03, 2012 8:53 AM
To: Matthew Ballance; Mike Mueller
Subject: Fwd: Ameren Venice Ash Pond Closure (2011-3186.00)

Sent from my Verizon Wireless Phone

----- Forwarded message -----
From: "Scott Plocher" <sjplocher@plocherco.com>
Date: Sat, Mar 3, 2012 7:52 am
Subject: Ameren Venice Ash Pond Closure (2011-3186.00)
To: "Eberhart, Glenn M" <GEberhart2@ameren.com>, "Collin Carson" <CCarson@aquaterra-env.com>
Cc: "Patrick, James R" <JPatrick@ameren.com>, "Mark R. Plocher" <mrplocher@plocherco.com>

Wood River topsoil sample.

From: Eckart, Josh [mailto:jeckart@sciengineering.com]
Sent: Thursday, March 01, 2012 6:43 AM
To: Mark R. Plocher; Scott Plocher
Cc: Reitz, Ted
Subject: Ameren Venice Ash Pond Closure (2011-3186.00)

Mark & Scott,

Here are the results for the Wood River topsoil sample.

pH	6.5
Organic Content	5.0%
% Passing #10 Sieve	100%

This sample meets the specifications. Please let me know if you have any questions.

Thanks,

Josh Eckart
Field Manager
SCI Engineering, Inc.
Phone: 618-206-3015
Mobile: 618-781-1324
Fax: 618-624-7099
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Exhibit 13

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Intended for
AmerenEnergy Medina Valley CoGen, LLC

Date
January 28, 2020

Project No.
72971

2019 ANNUAL REPORT

FORMER HUTSONVILLE POWER STATION - ASH POND A

RAMBOLL Bright ideas. Sustainable change.

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2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND A

Project name	**Former Hutsonville Power Station - Ash Pond A**
Project no.	**72971**
Recipient	**AmerenEnergy Medina Valley CoGen, LLC**
Document type	**2019 Annual Report**
Revision	**0**
Version	**FINAL**
Date	**January 28, 2020**
Prepared by	**Rachel Banoff, EIT**
Checked by	**Kristin Drucquer**
Approved by	**Sarah Meyer**

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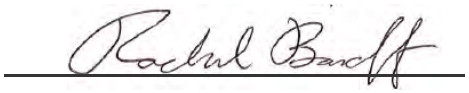
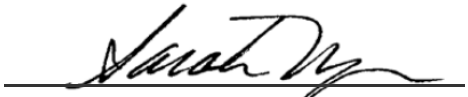


Rachel A. Banoff, EIT
Environmental Engineering



Sarah L. Meyer
Senior Managing Scientist

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APPENDICES

Appendix A Groundwater Monitoring Results 2018-2019
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Appendix C Statistical Output (on CD)
C1 Outlier Test
C2 Sen Slope and Mann Kendall Tests
C3 Test Descriptions

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ACRONYMS AND ABBREVIATIONS

Ameren	AmerenEnergy Medina Valley Cogen, LLC
CCW	Coal Combustion Waste
GMZ	Groundwater Management Zone
HDPE	High Density Polyethylene
Hutsonville	Former Hutsonville Power Station
IAC	Illinois Administrative Code
ILCS	Illinois Compiled Statutes
mg/L	milligrams per liter
TDS	Total Dissolved Solids

1. INTRODUCTION

1.1 Background

This report has been prepared for AmerenEnergy Medina Valley Cogen, LLC (Ameren) for the former Hutsonville Power Station (Hutsonville). Ameren completed closure activities for Ash Pond D in 2012 in accordance with the site-specific closure requirements of 35 Illinois Administrative Code (IAC) 840. Closure activities for Ash Pond D included placement of a 40-mil high density polyethylene (HDPE) cap covered with a three-foot thick vegetative soil layer, construction of surface water control structures, and construction of a groundwater collection system (i.e., Collection Trench). Operation of the Collection Trench began in April 2015. Closure activities for the remaining coal combustion waste (CCW) ponds consisting of Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond were completed in October 2015 in accordance with the Ash Ponds Closure, Closure Plan, dated September 15, 2014, and the site-specific Ash Pond D rule 35 IAC 840 to the extent feasible.

Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond were clean-closed by relocating accumulated ash to Ash Pond A and re-grading the pond areas for proper drainage. Ash Pond A, originally constructed with an 80 mil HDPE liner, was in service between 1986-2011 to receive sluiced fly ash and provide subsequent treatment. Closure activities for Ash Pond A included placement of ash transferred from the other ash ponds and spoils from clean-up of the coal yard, grading according to the Closure Plan, and capping with a low permeability geosynthetic (40-mil HDPE) membrane covered with protective soil. Since Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond were clean-closed, the post-closure groundwater monitoring plan and associated annual reports are for Ash Pond A. This is the fourth annual report for Ash Pond A due to the time needed to collect sufficient quarterly data needed for the statistical analysis required by the Ash Ponds Closure, Groundwater Monitoring Plan, dated September 15, 2014 (Groundwater Monitoring Plan), and the Ash Ponds Closure, Post-Closure Care Plan, dated September 8, 2014 (Closure Plan).

Groundwater has been monitored at the site since 1984. The groundwater monitoring system for Ash Pond A, as defined by the Groundwater Monitoring Plan, originally consisted of two background monitoring wells, MW-10 and MW-10D, and ten downgradient compliance monitoring wells[1], MW-2R, MW-2D, MW-3, MW-3D, MW-4, MW 5, MW-12, MW-22S, and MW-22D. Background wells MW-10 and MW-10D were destroyed due to construction unrelated to Ameren operations after the first quarter, 2016 monitoring period. No trace of the former background wells was found using a metal detector, probes, or digging. As a result, these wells were replaced with background monitoring wells MW-23S and MW-23D in November 2017. In addition, several other monitoring wells and piezometers located at Hutsonville are measured for groundwater level so that groundwater elevation contour maps can be created for the entire site. Ash Pond A is located near the southwest portion of the Hutsonville site, as shown on Figure 1-1, with the sampled monitoring wells shown on Figure 1-2.

In conjunction with Ameren's request for approval of the Closure Plan, Ameren submitted a request to establish a groundwater management zone (GMZ) pursuant to 35 IAC 620.250(a)(2): Ash Ponds Closure, Groundwater Management Zone Application, dated September 8, 2014, which

[1] Note that in the 2017 Annual Report, well MW-9 was mistakenly listed as a compliance well. Well MW-9 is used for groundwater elevation, only.

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was approved along with the Closure Plan. The GMZ is a three-dimensional region containing groundwater being managed to mitigate impacts from a potential release of leachate from the facility. Observed impacts during 2011-2014 included concentrations for boron, sulfate, manganese, and Total Dissolved Solids (TDS) higher than Class I groundwater quality standards within the GMZ. The GMZ is shown on Figure 1-2.

The Groundwater Monitoring Plan, in accordance with 35 IAC 840.114 and 35 IAC 840.116, outlines groundwater monitoring and sampling procedures, establishes the parameters and methods to be used for analyzing the groundwater samples, and describes evaluation methods to assess post-closure groundwater quality and trends to demonstrate compliance with the applicable groundwater standards. The Groundwater Monitoring Program Schedule is provided in Table 1-1.

Monitoring well locations, installation dates, construction information, and the groundwater zone they monitor are provided in Table 1-2. Field and laboratory parameters for evaluating groundwater quality are shown in Table 1-3.

This annual report includes the following elements:

- A summary of groundwater monitoring data collected in 2018 and 2019. Data tables are included in Appendix A.
- Quarterly Site Inspection Forms, including observations and descriptions of any maintenance activities performed on the pond cap, embankment, and groundwater collection trench and discharge system (Appendix B).
- Annual trend and statistical analysis results per Section 7.2.1 of the Groundwater Monitoring Plan, including an assessment of any statistically significant increasing trends (Appendix C).

1.2 Applicable Groundwater Quality Standards

1.2.1 On-Site Groundwater Standards

A GMZ has been established around the maximum predicted area of on-site groundwater impacts associated with Ponds A, B, and C. As described in Section 5.1.1 of the Groundwater Monitoring Plan and pursuant to 35 IAC 840.16(a):

- Prior to the completion of the post-closure care period, the on-site applicable groundwater quality standards at Ash Pond D are the greater of either the actual groundwater monitoring result, or the Class I Potable Resource Groundwater standard set forth in 35 IAC 620.410.
- After completion of the post-closure care period, the on-site concentrations of contaminants from Ash Pond A as determined by groundwater monitoring, if those concentrations exceed the numeric standards for Class I Potable Resource Groundwater set forth in 35 IAC 620.410, are the applicable groundwater standards at the Hutsonville site if the following criteria are addressed to the satisfaction of the Illinois EPA:
  - To the extent practicable, the exceedance has been minimized and beneficial use, as appropriate for the class of groundwater, has been returned on-site.
  - Any threat to public health or the environment on-site has been minimized.
  - An institutional control prohibiting potable uses of groundwater is placed on the Hutsonville site in accordance with the Uniform Environmental Covenants Act (765 Illinois Compiled Statutes (ILCS) 122) or an alternative instrument authorized for environmental uses under

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Illinois law and approved by the Illinois EPA. Existing potable uses of groundwater may be preserved as long as such uses remain fit for human consumption in accordance with accepted water supply principles.

1.2.2 Off-Site Groundwater Standards

For off-site groundwater compliance, the groundwater quality standards are the Class I potable resource groundwater standards [35 IAC 620.410]. Although the established GMZ does not extend south of the Hutsonville Power Station's property boundary, an agreement[2] exists between Ameren and the south property owner regarding shallow well drilling. This restriction covers the first 25 ft. of the water table and lies within a 500-ft offset south of the southern property boundary of the Hutsonville site.

1.3 Demonstration of Compliance

Compliance will be based on attainment of groundwater quality that meets the numeric standards for Class I potable resource groundwater as set forth in 35 IAC 620.410. Groundwater quality that does not meet the Class I standard will be considered in compliance when no statistically significant increasing trend can be attributed to the ash ponds at the compliance GMZ boundary for four (4) consecutive years, which must be approved by the Illinois EPA. Post-closure groundwater compliance monitoring will continue for a minimum of ten years from the Illinois EPA's approval of the Closure Plan.

1.3.1 Compliance Determination

As described in Section 7.2.1 of the Groundwater Monitoring Plan:

- GMZ compliance is demonstrated by performing an annual trend analysis for each monitoring well located at the down-gradient boundaries of the Hutsonville site (Table 1-2) for all constituents listed in Table 1-3. The analysis shall use Sen's Estimate of Slope and be performed on a minimum of four consecutive samples.
- If the results of sampling and analysis show a positive slope at any compliance monitoring well located at the downgradient boundaries of the Hutsonville site, a Mann-Kendall test will be performed at 95 percent confidence to determine whether or not the increasing slope represents a statistically significant increasing trend. Ameren will investigate the cause of a statistically significant increasing trend as described below.
  - If the investigation attributes a statistically significant increasing trend to a superseding cause, Ameren will notify the Illinois EPA in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.
  - If there is no superseding cause and the statistically significant increasing trend continues to be observed over two or more consecutive years, a hydrogeologic investigation (and additional site investigation(s), if necessary) will be performed.

Based on the outcome of the investigation above, Ameren will take action to mitigate statistically significant increasing trends that are causing, threatening or allowing exceedances of off-site groundwater quality standards. Such actions will be proposed as a modification to the post-closure care plan within 180 days after completion of the investigation activities described above.

[2] Available at: http://www.ipcb.state.il.us/documents/dsweb/Get/Document-65177 as Chapter 9 of the Rulemaking Technical Support Documents.

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2. DATA ANALYSIS

2.1 Groundwater Flow

Groundwater flow for 2019 is represented using groundwater elevation contour maps for each quarterly sampling event (Figures 2-1 through 2-4). Groundwater in the upper (shallow) zone generally flowed from west to east and northeast towards the Wabash River during 2019, which is consistent with past evaluations. The Groundwater Collection Trench began operation in April 2015, and following startup, groundwater elevations have exhibited localized flow toward the trench with groundwater elevations generally lower near the trench (Table 1-2). In the depictions of groundwater elevation contours dashed lines have been used to infer the localized drawdown of groundwater levels resulting from trench operation, which is necessary with limited wells situated laterally along the length of the trench.

The horizontal hydraulic gradient in the upper migration zone beneath the northern extent of Ash Pond A ranged from 0.0033 to 0.0047 ft/ft during 2019. There was little variability in horizontal hydraulic gradient across Ash Pond A between sampling events. Horizontal hydraulic gradient was not calculated near the southern end of the pond due to the potential influence of the trench of groundwater flow.

Groundwater flow within the lower (deep alluvial) migration zone along the edge of the Wabash River valley was not contoured since all the deep alluvial monitoring wells are within a narrow zone between Ash Pond D and the Wabash River. Groundwater within the lower zone generally flows from southwest to northeast towards the Wabash River.

2.2 Review of Analytical Data

Table 2-1 presents a site-wide statistical summary of all laboratory analytical data collected in 2018 and 2019. All field and laboratory analytical results are tabulated in Appendix A. Sampling anomalies, such as wells that were dry, had water levels too low for sampling, or were not sampled during a sampling event for other reasons, are noted below.

- MW-3: Not sampled in the first quarter of 2018 due to insufficient water level. Not sampled in the first, second, third, and fourth quarters of 2019 due to insufficient water level.
- MW-10 and MW-10D: Not sampled after the 2016 first quarter sampling event because the off-site wells were destroyed by others.
- MW-23D and MW-23S: These wells were installed in November 2017 and were sampled for the first time during the fourth quarter sampling event in December of 2017. MW-23D and MW-23S analytical data were compared to historical MW-10 and MW-10D data. There is no evidence of ash leachate impacts to monitoring wells MW-23S and MW-23D and they appear to be appropriate replacement upgradient/background wells.

Antimony, total cyanide, mercury, silver, thallium, and vanadium were detected in fewer than 10% of the groundwater samples. In addition to these constituents, beryllium, cadmium, chromium, copper, and lead were detected in fewer than 30% of the samples. A summary of wells and parameters with exceedances of Class I groundwater standards in 2018 and 2019 is shown on Table 2-2.

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Parameters of Concern

Parameters of concern include the constituents that exceeded the Class I groundwater quality standard when the GMZ was established: boron, sulfate, manganese, and TDS. These constituents are discussed below:

- Boron: Boron is a primary indicator constituent for coal ash leachate impacts to groundwater. Downgradient monitoring wells MW-3D, MW-22D and MW-22S exceeded the Class I Potable Resource standard (2.0 milligrams per liter [mg/L]) for most of the 2018-2019 sampling events (Table 2-2 and Figure 4-1). Downgradient monitoring wells MW-2R and MW-3 exceeded the Class I standard, but the last exceedance was in 2018. Background monitoring wells MW-23D and MW-23S exceeded the Class I standard for the fourth quarter 2019 sampling event. The highest boron concentrations were detected in monitoring wells MW-22S and MW-22D. Time series plots of boron at these well locations are shown in Figure 5-1.
- Manganese: Manganese concentrations in downgradient monitoring wells MW-3D, MW-12, MW 22D, and MW-22S had exceedances of the Class I standard (0.15 mg/L) during the 2018-2019 monitoring period (Table 2-2 and Figure 4-2). Concentrations are highest in monitoring well MW-3D, followed by monitoring wells MW-22S, MW-22D and MW-12. Background wells MW-23S and MW-23D also exceeded the Class I standard for the fourth quarter 2019 sampling event (Figures 5-2a and 5-2b). Manganese is commonly present in native soils and is highly sensitive to redox conditions. Prior investigations at the Hutsonville site indicate that elevated manganese concentrations may also be indicative of coal or coal stockpile impacts.
- Sulfate: Sulfate can be an indicator constituent for coal ash; however, there are other anthropogenic sources for elevated sulfate concentrations in groundwater, and sulfate concentrations can decrease in groundwater under strongly reducing conditions. These caveats make sulfate a less reliable indicator for coal ash leachate than boron. Sulfate concentrations at Ash Pond A exceeded the Class I standard (400 mg/L) at MW-3, MW-3D, MW-22D, and MW-22S, where boron concentrations are also high compared to the other monitoring wells (Figure 4-3 and Figure 5-3). The Class I standard was also exceeded at downgradient well MW-12 in the second quarter of 2018 along with background wells MW-23D and MW-23S in the fourth quarter of 2019.
- Total Dissolved Solids (TDS): TDS exceeded the Class I standard of 1,200 mg/L at monitoring wells MW-3, MW-3D, MW-22D, and MW 22S, which also have the highest concentrations of boron and sulfate measured in groundwater (Figure 4-4 and Figure 5-4). The Class I standard was also exceeded at background wells MW-23D and MW-23S in the fourth quarter of 2019.

Other Parameters

Other parameters which had at least one exceedance in 2018-2019 (Table 2-2) in the Ash Pond A monitoring wells are discussed below:

- Arsenic: There were two exceedances of the arsenic Class I standard of 0.01 mg/L for the second and third quarters, 2019 monitoring period at MW-2D. Although neither of the sample results were identified as potential outliers, the fourth quarter sample result at this location was below the standard (Figure 4-5).
- Beryllium: Downgradient monitoring well MW-22S had beryllium concentrations that exceeded the Class I groundwater standard of 0.004 mg/L for most of the 2018 and 2019 sampling

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events. Background monitoring well MW-23S had one exceedance of the Class I standard during the fourth quarter 2019 sampling event (Figure 4-6).

- Cadmium: There were two exceedances of the cadmium Class I standard of 0.005 mg/L for the first quarter sample event 2018 and the third quarter 2019 sample event at MW-3D. Background monitoring well MW-23S had one exceedance of the Class I standard during the fourth quarter 2019 sampling event (Figure 4-7).
- Iron: Three downgradient wells and two background wells had exceedances of the Class 1 standard of 5.0 mg/L for dissolved iron (Figure 4-8). Well MW-3D exceeded the standard for the fourth quarter 2018 sampling event. Well MW-22D exceeded the Class 1 standard for all sampling events, except for the fourth sampling event of 2019. Well MW-22S exceeded the Class 1 standard for all sampling events, except for the second and fourth sampling events of 2019. Two potential outliers were identified at background wells MW-23D and MW-23S for the fourth 2019 sampling event. Both of the background wells also had low pH exceedances. Since iron solubility increases with acidity, it would be expected that the wells with the highest iron concentrations also have the lowest pH across the Hutsonville site.
- Lead: The Class I standard for lead of 0.0075 mg/L was exceeded once in downgradient wells MW-22S and MW-22D during the third quarter 2018 sampling event (Figure 4-9). These well also has the lowest pH compared to the other Ash Pond A monitoring wells (Figure 4-12). Low pH may increase the solubility of lead.
- Nickel: Wells MW-3D, MW-22S, and MW-23S all had exceedances of the Class I standard of 0.1 mg/L for nickel. MW-3D had seven exceedances, MW-22S had three exceedances in 2018, and MW-23S had one exceedance in 2019 (Figure 4-10).
- pH: The lower Class I standard for pH of 6.50 standard units (Std.) was exceeded at monitoring wells MW-3D, MW-22D, MW-22S, MW-23D, and MW-23S. Well MW-3D exceeded the lower Class I standard for all of the 2018-2019 sampling events. MW-22S and MW-22D exceeded the lower Class I standard for every event except the fourth quarter 2019 sampling event. Background wells MW-23D and MW-23S exceeded the lower Class I standard only during the fourth quarter 2019 sampling event (Figure 4-11). Since low pH increases the solubility of most metals, it is not surprising that these five wells also have all the Class I exceedances for metals with the exceptions of arsenic at MW-2D, and manganese at MW-12.

2.3 Statistical Analyses

Analytical data were evaluated for trends following a three-step procedure:

1. Test for outliers using the Grubbs Outlier test.
2. Determine Sen's estimate of slope.
3. Perform a Mann-Kendall trend analysis for any cases (monitoring well/constituent) with a positive slope.

2.3.1 Outlier Analysis

The Grubbs outlier test determines whether or not there is statistical evidence that an extreme high or low observation does not fit the remaining data. The test methodology and results are listed in Appendix C1 and summarized in Table 2-3. The Grubbs test, like all statistical tests, provides statistical evidence of potential outliers, but cannot be used alone to determine whether

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or not a value is a true outlier that should be excluded from future statistical analysis. Corroborating evidence needed to exclude values includes a very high value relative to all other values for a particular monitoring well/parameter case—which suggests a discrete data reporting or analytical error, or numerous values from a single sample event that are higher than all other sample events for that parameter—which indicates potential laboratory bias. Absent corroborating evidence, the flagged values are considered true but extreme values in the data set. No results were eliminated from statistical analysis due to the Grubbs outlier evaluation.

2.3.2 Sen's Estimate of Slope

Sen's estimate of slope is a non-parametric estimator of trend. It is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed. The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar time. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. The test methodology and results are listed in Appendix C2 and summarized in Table 2-4.

Data collected in 2018-2019 show 45 cases with positive slopes, 69 cases with negative slopes, and 136 cases with no slope (Table 2-5). Sen's Estimate of Slope requires a minimum of four consecutive samples. The 45 cases with positive slopes were tested using the Mann-Kendall test to determine if the positive slopes represented statistically significant increasing trends.

2.3.3 Mann-Kendall Trend Analysis

The Mann-Kendall test is a non-parametric, two-sided test to determine whether or not a dataset has a statistically significant increasing or decreasing trend. The test methodology and results are listed in Appendix C3 and summarized in Table 2-5. Statistically significant increasing trends are flagged in Table 2-4.

Ten cases with a statistically significant increasing trend were identified in the analysis covering samples collected in 2018-2019. The ten cases are identified by constituent below:

- Boron: MW-23S has a statistically significant increasing trend for boron. Boron concentrations at MW-23S were below the Class I standard for all the 2018-2019 sampling events but exceeded the Class I standard in the fourth quarter 2019 sampling event (Figure 4-1). Figure 5-1 shows a time series plots for MW-23S, along with plots for wells that have exceeded the Class I boron standard at some time since completion of closure activities (MW-2R, MW-12, MW-3, MW-3D, MW-22D, and MW-22S).
- Chloride: Chloride at well MW-5 has a statistically significant increasing trend; however, the concentrations at MW-5 are lower than Class I groundwater levels.
- Copper: MW-23S has a statistically significant increasing trend for copper. Copper concentrations at well MW-23S were not detected up until the third quarter sampling event of 2019; however, the concentrations at MW-23S are lower than Class I groundwater levels.
- Iron: Iron at wells MW-4, MW-12, MW-23D, and MW-23S have statistically significant increasing trends. The concentrations at wells MW-4 and MW-12 are lower than Class I groundwater levels. The concentrations at MW-23D and MW-23S exceed the Class I standard of 5 mg/L only during the fourth quarter 2019 sampling event. As a note, the Grubb's Outlier Test noted that those two exceedances could be potential high outliers (Figures 5-5a and 5-5b).

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- Manganese: Manganese at MW-2R has a statistically significant increasing trend; however, the concentrations at MW-2R are lower than Class I groundwater levels.
- Nitrate: MW-2D and MW-3D have a statistically significant increasing trends for nitrate but both are lower than the Class I standard of 10 mg/L and concentrations at MW-2D are an order of magnitude lower than the Class I standard.

2.4 Site Inspection

The Post-Closure Care Plan requires quarterly inspection until completion of the post-closure period. Inspections are also required after storm events defined as a 25-year, 24-hour event, or approximately 5.37 inches of precipitation. Discontinuance of Hutsonville site inspections will occur after Illinois EPA approval of the certified Post-Closure Care Report.

Hutsonville site inspections include assessment of the condition and need for repair of final cover and vegetation, as wells as fencing, monitoring points, and surface water control features. The inspection reports for 2019 are included in Appendix B.

The Hutsonville site inspection performed on December 4, 2019 noted a small area of erosion at the bottom of the north cap drainage drop that is to be repaired. No other notes were mentioned for the site inspections performed on March 31, 2019; June 27, 2019; and September 26, 2019.

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3. EVALUATION OF COMPLIANCE

3.1 Review of Statistically Significant Increasing Trends

The post-closure groundwater monitoring began in March 2017. This report focuses on the eight quarters of groundwater quality data that were collected in 2018-2019. Since post-closure operation began, downgradient monitoring wells MW-2D, MW-22S, MW-22D, and upgradient wells MW-23S and MW-23D were installed. The Sens Estimate of Slope and Mann-Kendall Trend Analysis were performed for all downgradient monitoring well locations; and these analyses require a minimum of four consecutive data points. The former upgradient monitoring wells (MW-10 and MW-10D) were destroyed, so no samples were collected or analyzed for statistical trends in 2018 or 2019. Because of this, analyses for statistically significant increasing trends were performed at the new upgradient monitoring wells (MW-23S and MW-23D) that were installed in November of 2017. Analyses for statistically significant increasing trends were also performed at downgradient monitoring wells MW-2R, MW-3D, MW-4, MW-5, and MW-12.

The following ten cases with statistically significant increasing trends sorted by monitoring well location, were identified in the analysis covering samples collected in 2018-2019.

- MW-2D: nitrate
- MW-2R: manganese
- MW-3D: nitrate
- MW-4: iron
- MW-5: chloride
- MW-12: iron
- MW-23D: iron
- MW-23S: boron, copper, iron

Of these ten cases of statistically significant increasing trends, only concentrations of boron at MW-23S, iron at MW-23D, and iron at MW-23S exceeded their respective Class I standards.

In addition to having three statistically significant increasing trends at monitoring well MW-23S, there were also exceedances of Class I standards for beryllium, cadmium, manganese, nickel, pH, sulfate, and TDS all during the fourth quarter 2019 sampling event. Although MW-2D did not have any significantly increasing trends that exceeded Class I standards, it did have two Class I exceedances for arsenic. Similarly, MW-3 did not have sufficient samples to perform statistical analyses but it did have two Class I exceedances for boron, and three Class I exceedances for sulfate and TDS. MW-3D, MW-22D, MW-22S, MW-23D, and MW-23S also have exceedances for boron and sulfate, the primary indicator constituents for coal ash leachate. These wells also shared exceedances for iron, manganese, nickel, pH, and TDS. Monitoring well MW-12 has one statistically significant increasing trend for iron and has six exceedances for manganese and one exceedance for sulfate.

Given the Class I exceedances for the coal ash indicators boron and sulfate, combined with those parameters with increasing trends, it is likely that wells MW-2R, MW-3, MW-3D, MW-12, MW-22D, MW-22S, MW-23D, and MW-23S remain impacted by a release of coal ash leachate.

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These wells (with exception of upgradient wells MW-23D and MW-23s) are located within the GMZ established for mitigation of impacts from a potential release from Ash Pond A. Elevated concentrations of boron, sulfate, and TDS at these locations are consistent with constituents of concern identified during establishment of the GMZ. Monitoring wells MW-3D, MW-22D, MW-22S, MW-23D, and MW-23S all have exceedances of Class I standards for multiple metals. Exceedances in metals at wells MW-3D, MW-23D, and MW-23S may be a result of lower pH at these locations. Acidic conditions increase the solubility of most metals that may be present in both coal ash and soil. Elevated nitrate concentrations are attributed to off-site agricultural sources. Elevated manganese concentrations may be attributed to both impacts from Ash Pond A and naturally occurring conditions.

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4. CONCLUSIONS

GMZ compliance is demonstrated by the absence of statistically significant increasing concentration trends or the identification of a to a superseding cause of a statistically significant increasing concentration trend as discussed in Section 1.3.1. Statistical analyses of concentration results for groundwater samples collected in 2018 and 2019 at the Hutsonville Ash Pond A identified ten cases of statistically significant increasing trends:

- MW-2D: nitrate
- MW-2R: manganese
- MW-3D: nitrate
- MW-4: iron
- MW-5: chloride
- MW-12: iron
- MW-23D: iron
- MW-23S: boron, copper, iron

With the exception of the upgradient wells MW-23D and MW-23S, all of the wells with constituent concentrations appearing in statistically significant increasing trends are located within the GMZ established for mitigation of impacts from a potential release from Ash Pond A.

Observed impacts during 2011-2014 included concentrations for boron, sulfate, manganese, and TDS higher than Class I groundwater quality standards within the GMZ. Recent elevated concentrations of boron, manganese, sulfate, and TDS at these locations are consistent with the constituents of concern identified during establishment of the GMZ.

There were significant increasing trends at upgradient wells, along with Class I exceedances, for boron at MW-23S, iron at MW-23D, and iron at well MW-23S. There are no Class I exceedances associated with statistically significant increasing trends for chloride, copper, manganese or nitrate.

This is the third annual report following the completion of Ash Pond A closure activities. Only one well (MW-3) had insufficient data for statistical evaluation in the 2019 annual report. The Groundwater Monitoring Plan requires a hydrogeologic investigation if a statistically significant increasing trend occurs over a period of two or more consecutive years since closure that cannot be attributed to a superseding cause. Since the only three statistically significant increasing trends for 2017-2018 (boron at MW-2R, sulfate at MW-12, and lead at MW-22S) were not also significantly increasing in 2018-2019, no action, other than submittal of this report, is required per Section 5.2.3 of the Groundwater Monitoring Plan (Compliance Determination).

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5. REFERENCES

Hanson, NRT, 2014. *Ash Ponds Closure, Closure Plan – Hutsonville Power Station*. September 15, 2014.

Hanson, NRT, 2014. *Ash Ponds Closure, Groundwater Monitoring Plan – Hutsonville Power Station.* September 15, 2014.

Hanson, NRT, 2014. *Ash Ponds Closure, Groundwater Management Zone Application – Hutsonville Power Station*. September 8, 2014.

Hanson, NRT, 2014. *Ash Ponds Closure, Post-Closure Care Plan – Hutsonville Power Station*. September 8, 2014.

35 Illinois Administrative Code 620: Groundwater Quality.

35 Illinois Administrative Code 840: Site-Specific Closures of Coal Combustion Waste Surface Impoundments.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Frequency	Duration	Sampling Quarter	Report Due Date
Quarterly	Begins: January 2016	January- March (1) April - June (2) July - September (3) October - December (4)	May 31 August 31 November 30 February 28
	Ends: After successful completion of the post-closure activities required and approval of the Illinois EPA.		

Table 1-2. Groundwater Monitoring System Wells
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Well	Installation Date	Surface Elevation[1] (ft, MSL[2])	TOC[1, 3] Elevation (ft, MSL[2])	Top of Screen Elevation[4] (ft, MSL[2])	Bottom of Screen Elevation[4] (ft, MSL[2])	Total Well Depth[5] (ft, BGS[2])	Objective	Position	Monitoring Zone[6]
Ash Pond A Groundwater Monitoring System Wells: Water Quality and Groundwater Elevations									
MW-2R	6/4/2012	453.0	455.37	446.0	435.3	17.8	Compliance	Downgradient	UZ - s&g
MW-2D	10/14/2015	452.9	455.42	435.1	430.4	23.1	Compliance	Downgradient	UZ - ss
MW-3	2/9/1984	453.7	454.84	447.7	442.7	11.0	Compliance	Downgradient	UZ - s&g
MW-3D	10/6/1998	453.57	455.01	433.6	428.6	25.0	Compliance	Downgradient	UZ - ss
MW-4	2/13/1984	454.0	456.76	449.4	441.9	12.1	Compliance	Downgradient	UZ - s&g, ss
MW-5	2/13/1984	452.1	454.67	447.3	434.3	17.8	Compliance	Downgradient	UZ - s&g, ss
MW-10[7]	10/7/1998	452.9	454.23	447.2	442.2	10.7	Background	Upgradient	UZ - si s&g, ss
MW-10D[7]	10/7/1998	452.9	454.65	436.6	431.6	21.3	Background	Upgradient	UZ - ss
MW-23S[7]	11/28/2017	453.4	456.03	444.2	438.9	14.5	Background	Upgradient	UZ - s si, si s, ss
MW-23D[7]	11/28/2017	453.5	455.90	434.0	428.7	24.8	Background	Upgradient	UZ - ss, sh
MW-12	10/8/1998	455.5	456.74	448.6	438.6	16.9	Compliance	Downgradient	UZ - s&g
MW-22S	10/14/2015	449.2	451.48	441.9	437.2	12.7	Compliance	Downgradient	UZ - si s&g, ss
MW-22D	10/14/2015	449.1	451.36	431.7	427.0	22.7	Compliance	Downgradient	UZ - si s&g, ss
Other Monitoring Wells and Piezometers: Groundwater Elevations									
MW-6	2/9/1984	438.7	443.17	433.9	427.5	11.2	- -	- -	UZ - s&g, ss
MW-7	2/8/1984	439.9	442.28	422.9	412.9	27.0	- -	- -	UZ - si s&g
MW-7D	10/5/1998	438.9	442.75	398.2	393.2	45.7	- -	- -	LZ - si s&g
MW-8	2/8/1984	440.0	443.65	422.9	417.9	22.1	- -	- -	UZ - si sand
MW-9	2/14/1984	451.7	454.38	443.5	433.5	18.2	- -	- -	UZ - s&g
MW-11R	10/3/2001	440.4	443.01	435.4	425.4	15.0	- -	- -	UZ - s&g
MW-14	10/3/2001	440.1	442.89	412.9	407.9	32.2	- -	- -	LZ - s&g
MW-115S	5/1/2004	438.7	440.88	408.4	403.4	35.3	- -	- -	LZ - s&g
MW-115D	5/1/2004	439.1	441.39	356.4	351.4	87.7	- -	- -	LZ - s&g
MW-121	10/2/2001	439.2	440.23	403.8	398.8	40.3	- -	- -	LZ - s&g

[O: JJW 4/22/19; C:EDP 4/22/19]

Notes:

1. Well survey data collected by Lamac Engineering November 30, 2017 to December 1, 2017.
2. BGS = below ground surface; MSL = mean sea level.
3. TOC = top of casing
4. Screen elevations presented in the table reflect values provided in boring logs or well construction forms and assume no changes to the screen elevations occurred after well installation.
5. The total well depth is assumed to be equal to the depth to the bottom of screen from ground surface when data is not available in boring logs or well construction forms.
6. UZ = Upper Zone, LZ = Lower Zone (deep alluvial aquifer); s = sand or sandy, s&g = sand and gravel, si = silt or silty, ss = sandstone, sh = shale
7. Background wells MW-10 and MW-10D were damaged and replaced with background wells MW-23D and MW-23S.

Table 1-3. Groundwater Monitoring Program Parameters
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Field Parameters	STORET Code
pH[2]	00400
Specific Conductance[2]	00094
Temperature (Fahrenheit)	00011
Depth to Water (BMP)	72109
Elevation of GW Surface[2]	71993
Depth of Well (BGS)[2]	72008
Elevation of Measuring Point	72110
Laboratory Parameters[1]	**STORET Code**
Boron[2]	01020
Iron[2]	01046
Manganese[2]	01056
Sulfate[2]	00946
Total Dissolved Solids (TDS)[2]	70300
Antimony	01095
Arsenic	01000
Barium	01005
Beryllium	01010
Cadmium	01025
Chloride	00941
Chromium	01030
Cobalt	01035
Copper	01040
Cyanide	00720
Fluoride	00950
Lead	01049
Mercury	71890
Nickel	01065
Nitrate as N	00618
Selenium	01145
Silver	01075
Thallium	01057
Vanadiium	01085
Zinc	01090

[O: YD/SJC, C: YD/SJC]

Notes:

[1] Reported as dissolved (filtered) concentrations.

[2] Mandatory monitoring parameter per 35 IAC 840.114(a).

Table 2-1. Statistical Summary of Groundwater Monitoring Data
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Parameter	Units	Count	Minimum	Mean	Median	Maximum	Non-Detects
Ag, diss	mg/L	83	0.0003	0.0003	0.0003	0.0003	100.0%
As, diss	mg/L	83	0.0002	0.0021	0.0003	0.0138	55.4%
B, diss	mg/L	83	0.0250	2.1937	0.3200	29.9000	9.6%
Ba, diss	mg/L	83	0.004	0.029	0.026	0.090	1.2%
Be, diss	mg/L	83	0.0010	0.0017	0.0010	0.0085	88.0%
Cd, diss	mg/L	83	0.0003	0.0011	0.0003	0.0100	71.1%
Cl, diss	mg/L	83	0.2	8.8	7.0	25.8	0.0%
CN, total	mg/L	83	0.01	0.01	0.01	0.09	96.4%
Co, diss	mg/L	83	0.001	0.031	0.001	0.332	69.9%
Cr, diss	mg/L	83	0.0003	0.0011	0.0010	0.0059	80.7%
Cu, diss	mg/L	83	0.0005	0.0015	0.0005	0.0105	83.1%
F, diss	mg/L	83	0.1	0.3	0.2	1.3	42.2%
Fe, diss	mg/L	83	0.010	36.470	0.210	522.000	31.3%
Hg, diss	mg/L	83	0.0001	0.0001	0.0001	0.0010	96.4%
Mn, diss	mg/L	83	0.0006	3.5212	0.0674	27.8000	12.1%
Ni, diss	mg/L	83	0.0002	0.0345	0.0006	0.3690	26.5%
NO3, diss	mg/L	83	0.050	0.773	0.284	7.340	38.6%
Pb, diss	mg/L	83	0.001	0.002	0.001	0.012	85.5%
pH (field)	STD	83	3.48	6.51	6.97	7.62	0.0%
Sb, diss	mg/L	83	0.002	0.002	0.002	0.002	100.0%
Se, diss	mg/L	83	0.0005	0.0043	0.0029	0.0500	59.0%
SO4, diss	mg/L	83	0.5	671.0	72.8	4,100.0	1.2%
Spec. Cond.	micromhos/cm	83	15	1159	720	3,560	0.0%
TDS	mg/L	83	13	1074	513	4,320	2.4%
Tl, diss	mg/L	83	0.0003	0.0003	0.0003	0.0025	100.0%
V, diss	mg/L	83	0.001	0.001	0.001	0.003	92.8%
Zn, diss	mg/L	83	0.01	0.07	0.01	0.67	66.3%

[O: RAB 1/13/2020, C:YMD 1/15/2020]

Notes:
One-half the MDL was substituted for non-detects
Analytical data collected in 2018 and 2019

Table 2-2. Summary of Exceedances of Class I Groundwater Standards
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Parameters Submitted to the IEPA for Routine Groundwater Monitoring	Class 1 Standard	Unit	Number of exceedances of Class 1 Groundwater Standards between January 2018 and December 2019 (and year of last exceedance)[1]										
			Current Monitoring Wells Monitored Quarterly for Reporting to the IEPA										
			2R	2D	3	3D	4	5	12	22D	22S	23D[bck]	23S[bck]
	Number of Samples		8	8	3	8	8	8	8	8	8	8	8
Antimony	0.006	mg/L	0	0	0	0	0	0	0	0	0	0	0
Arsenic	0.01**	mg/L	0	**2**	0	0	0	0	0	0	0	0	0
Barium	2.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Beryllium	0.004	mg/L	0	0	0	0	0	0	0	0	**7**	0	**1***
Boron	2.0	mg/L	**3**	0	**2**	**8**	0	0	0	**7**	**7***	**1***	**1***
Cadmium	0.005	mg/L	0	0	0	**2***	0	0	0	0	0	0	**1***
Chloride	200	mg/L	0	0	0	0	0	0	0	0	0	0	0
Chromium	0.1	mg/L	0	0	0	0	0	0	0	0	0	0	0
Cobalt	1.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Copper	0.65	mg/L	0	0	0	0	0	0	0	0	0	0	0
Cyanide, total	0.2	mg/L	0	0	0	0	0	0	0	0	0	0	0
Fluoride	4.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Iron	5.0	mg/L	0	0	0	**1**	0	0	0	**7**	**6**	**1***	**1***
Lead	0.0075	mg/L	0	0	0	0	0	0	0	**1**	**1**	0	0
Manganese	0.15	mg/L	0	0	0	**8**	0	0	**6***	**6**	**7**	**1***	**1***
Mercury	0.002	mg/L	0	0	0	0	0	0	0	0	0	0	0
Nickel	0.1	mg/L	0	0	0	**7**	0	0	0	0	**3***	0	**1***
Nitrate as N	10	mg/L	0	0	0	0	0	0	0	0	0	0	0
pH	6.50 / 9.00	Std.	0	0	0	**8**	0	0	0	**7**	**7**	**1***	**1***
Selenium	0.05	mg/L	0	0	0	0	0	0	0	0	0	0	0
Silver	0.05	mg/L	0	0	0	0	0	0	0	0	0	0	0
Sulfate	400	mg/L	0	0	**3**	**7***	0	0	**1***	**7***	**7**	**1***	**1***
Thallium	0.002	mg/L	0	0	0	0	0	0	0	0	0	0	0
Total Dissolved Solids	1,200	mg/L	0	0	**3**	**8***	0	0	0	**7**	**7***	**1***	**1***
Vanadium	0.049	mg/L	0	0	0	0	0	0	0	0	0	0	0
Zinc	5.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Specific Conductivity	no Class 1 Standard		0	0	0	0	0	0	0	0	0	0	0

[O: RAB 1/13/2020, C: YMD 1/15/2020]

Notes:

[1] Based on 8 quarterly groundwater sampling events, except as noted.
* Potential outlier.
** Class I groundwater standard for Arsenic changed from 0.05 to 0.01 mg/L on 10/05/12.
[bck] Background monitoring wells.

Last exceedance occurred in 2018
Last exceedance occurred in 2019

Table 2-3. Summary of Potential Outliers
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Constituent	Well	Date	Result (mg/L)	Non-detect?	Outlier Low	Outlier High	Action
Arsenic dissolved, mg/L	MW3D	3/12/2018	0.0054	No		1	none
Arsenic dissolved, mg/L	MW23S	10/28/2019	0.0092	No		1	none
Barium dissolved, mg/L	MW22S	10/28/2019	0.042	No		1	none
Barium dissolved, mg/L	MW23S	10/28/2019	0.009	No	1		none
Beryllium dissolved, mg/L	MW23S	10/28/2019	0.0082	No		1	none
Boron dissolved, mg/L	MW2D	5/14/2018	0.340	No		1	none
Boron dissolved, mg/L	MW12	8/28/2018	0.460	No		1	none
Boron dissolved, mg/L	MW22S	8/28/2018	29.900	No		1	none
Boron dissolved, mg/L	MW23D	10/28/2019	8.02	No		1	none
Boron dissolved, mg/L	MW23S	10/28/2019	5.240	No		1	none
Cadmium dissolved, mg/L	MW3D	3/12/2018	0.01	No		1	none
Cadmium dissolved, mg/L	MW22S	10/28/2019	0.0003	Yes	1		none
Cadmium dissolved, mg/L	MW23D	10/28/2019	0.0016	No		1	none
Cadmium dissolved, mg/L	MW23S	10/28/2019	0.0051	No		1	none
Chloride dissolved, mg/L	MW12	3/12/2018	11.5	No		1	none
Chloride dissolved, mg/L	MW22S	5/14/2018	20.6	No		1	none
Chloride dissolved, mg/L	MW22D	5/14/2018	14.2	No		1	none
Chloride dissolved, mg/L	MW2D	6/17/2019	16.5	No		1	none
Chloride dissolved, mg/L	MW23D	10/28/2019	9.7	No		1	none
Chloride dissolved, mg/L	MW23S	10/28/2019	10.1	No		1	none
Chromium dissolved, mg/L	MW22S	5/14/2018	0.0041	No		1	none
Chromium dissolved, mg/L	MW22D	5/14/2018	0.0059	No		1	none
Chromium dissolved, mg/L	MW23S	10/28/2019	0.0003	No	1		none
Cobalt dissolved, mg/L	MW3D	3/12/2018	0.332	No		1	none
Cobalt dissolved, mg/L	MW22S	10/28/2019	0.001	Yes	1		none
Cobalt dissolved, mg/L	MW22D	10/28/2019	0.001	Yes	1		none
Cobalt dissolved, mg/L	MW23D	10/28/2019	0.105	No		1	none
Cobalt dissolved, mg/L	MW23S	10/28/2019	0.091	No		1	none
Cyanide, total, mg/L	MW12	5/14/2018	0.09	No		1	none
Cyanide, total, mg/L	MW22D	5/14/2018	0.05	No		1	none
Cyanide, total, mg/L	MW2D	8/28/2018	0.02	No		1	none
Fluoride dissolved, mg/L	MW22D	8/28/2018	0.9	No		1	none
Fluoride dissolved, mg/L	MW3D	6/17/2019	1.3	No		1	none
Fluoride dissolved, mg/L	MW23D	10/28/2019	0.6	No		1	none
Fluoride dissolved, mg/L	MW23S	10/28/2019	0.9	No		1	none
Iron dissolved, mg/L	MW23D	10/28/2019	70	No		1	none
Iron dissolved, mg/L	MW23S	10/28/2019	204	No		1	none
Lead dissolved, mg/L	MW12	8/26/2019	0.01	Yes		1	none
Lead dissolved, mg/L	MW23S	8/26/2019	0.01	Yes		1	none
Lead dissolved, mg/L	MW23D	10/28/2019	0.002	No		1	none
Manganese dissolved, mg/L	MW12	8/28/2018	1.66	No		1	none
Manganese dissolved, mg/L	MW23D	10/28/2019	8.6	No		1	none
Manganese dissolved, mg/L	MW23S	10/28/2019	13.5	No		1	none
Mercury, dissolved, mg/L	MW12	8/26/2019	0.001	Yes		1	none
Mercury, dissolved, mg/L	MW22S	8/26/2019	0.001	Yes		1	none
Mercury, dissolved, mg/L	MW23S	8/26/2019	0.001	Yes		1	none
Nickel dissolved, mg/L	MW2D	3/12/2018	0.0006	No		1	none
Nickel dissolved, mg/L	MW22S	10/28/2019	0.0003	No	1		none
Nickel dissolved, mg/L	MW23D	10/28/2019	0.0465	No		1	none

Table 2-3. Summary of Potential Outliers
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

Constituent	Well	Date	Result (mg/L)	Non-detect?	Outlier Low	Outlier High	Action
Nickel dissolved, mg/L	MW23S	10/28/2019	0.119	No		1	none
Nitrate Nitrogen dissolved, mg/L	MW22S	3/12/2018	0.35	No		1	none
Nitrate Nitrogen dissolved, mg/L	MW22D	3/12/2018	0.45	No		1	none
Nitrate Nitrogen dissolved, mg/L	MW4	6/17/2019	7.34	No		1	none
Nitrate Nitrogen dissolved, mg/L	MW3D	10/28/2019	2.56	No		1	none
pH (field), STD	MW22S	10/28/2019	6.99	No		1	none
pH (field), STD	MW23D	10/28/2019	5.28	No	1		none
pH (field), STD	MW23S	10/28/2019	3.75	No	1		none
Selenium dissolved, mg/L	MW12	3/12/2018	0.0112	No		1	none
Selenium dissolved, mg/L	MW3D	3/12/2018	0.05	Yes		1	none
Selenium dissolved, mg/L	MW4	5/14/2018	0.0097	No		1	none
Selenium dissolved, mg/L	MW23D	10/28/2019	0.005	Yes		1	none
Selenium dissolved, mg/L	MW23S	10/28/2019	0.005	Yes		1	none
Specific Conductance (field), micromhos/cm	MW23D	10/28/2019	2180	No		1	none
Specific Conductance (field), micromhos/cm	MW23S	10/28/2019	2800	No		1	none
Sulfate dissolved, mg/L	MW12	5/14/2018	475	No		1	none
Sulfate dissolved, mg/L	MW3D	5/14/2018	0.5	Yes	1		none
Sulfate dissolved, mg/L	MW22D	10/28/2019	31.1	No	1		none
Sulfate dissolved, mg/L	MW23D	10/28/2019	1320	No		1	none
Sulfate dissolved, mg/L	MW23S	10/28/2019	2060	No		1	none
Thallium, dissolved, mg/L	MW12	8/26/2019	0.0025	Yes		1	none
Thallium, dissolved, mg/L	MW22S	8/26/2019	0.0025	Yes		1	none
Thallium, dissolved, mg/L	MW23S	8/26/2019	0.0025	Yes		1	none
Total Dissolved Solids, mg/L	MW12	5/14/2018	933	No		1	none
Total Dissolved Solids, mg/L	MW22S	10/28/2019	164	No	1		none
Total Dissolved Solids, mg/L	MW23D	10/28/2019	1790	No		1	none
Total Dissolved Solids, mg/L	MW23S	10/28/2019	2800	No		1	none
Total Dissolved Solids, mg/L	MW3D	10/28/2019	2060	No	1		none
Zinc dissolved, mg/L	MW3D	03/12/2018	0.09	No		1	none
Zinc dissolved, mg/L	MW23D	10/28/2019	0.19	No		1	none
Zinc dissolved, mg/L	MW23S	10/28/2019	0.6	No		1	none

[O: RAB 1/13/2020, C: YMD 1/14/2020]

Date range of potential outlier analysis is 1/17/1984-10/28/2019.

Table 2-4. Trend Analysis Results
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

	MW-2R	MW-2D	MW-3	MW-3D	MW-4	MW-5	MW-12	MW-22D	MW-22S	MW-23D	MW-23S
Number of Samples	**8**	**8**	**3**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
Antimony, dissolved	None	None	ID	None	None	None	None	None	None	None	None
Arsenic, dissolved	None	Positive	ID	Positive	None	None	None	Positive	Negative	Negative	None
Barium, dissolved	Negative	Negative	ID	Positive	Positive	Negative	Negative	Positive	Positive	Negative	Positive
Beryllium, dissolved	None	None	ID	None	None	None	None	None	Negative	None	None
Boron, dissolved	Negative	None	ID	Positive	MK-Negative	Negative	Negative	Positive	Negative	None	MK-Positive
Cadmium, dissolved	None	None	ID	Negative	None	None	None	MK-Negative	MK-Negative	None	None
Chloride, dissolved	Positive	Positive	ID	MK-Negative	Negative	MK-Positive	MK-Negative	Negative	MK-Negative	Positive	Positive
Chromium, dissolved	None	None	ID	None	MK-Negative	MK-Negative	None	MK-Negative	Negative	None	None
Cobalt, dissolved	None	None	ID	Negative	None	None	None	Negative	MK-Negative	None	None
Copper, dissolved	None	None	ID	None	None	None	None	None	MK-Negative	None	MK-Positive[1]
Cyanide, total	Positive[2]	Positive	ID	Positive[2]	Positive[2]	Positive[2]	None	None	Positive[2]	Positive[2]	Positive[2]
Fluoride, dissolved	None	None	ID	Positive	None	None	None	MK-Negative	Negative	None	None
Iron, dissolved	Positive	Positive	ID	Negative	MK-Positive	Positive	MK-Positive	Negative	MK-Negative	MK-Positive	MK-Positive
Lead, dissolved	None	None	ID	None	None	None	None	None	Negative	None	None
Manganese, dissolved	MK-Positive	Negative	ID	Negative	Positive	Positive	Positive	Negative	Negative	Negative	Negative
Mercury, dissolved	None	None	ID	None	None	None	None	None	None	None	None
Nickel, dissolved	None	None	ID	Negative	None	Positive	Negative	Negative	MK-Negative	Positive	Negative
Nitrate nitrogen, dissolved	Positive	MK-Positive	ID	MK-Positive	Positive	Negative	Positive	None	None	Positive[2]	Negative
Selenium, dissolved	Positive	None	ID	None	Negative	MK-Negative	Negative	Negative	Negative	None	None
Silver, dissolved	None	None	ID	None	None	None	None	None	None	None	None
Sulfate, dissolved	Negative	Positive	ID	Positive	Negative	MK-Negative	MK-Negative	Negative	Negative	Negative	Negative
Thallium, dissolved	None	None	ID	None	None	None	None	None	None	None	None
Total Dissolved Solids	Positive	Negative	ID	Negative	Positive	MK-Negative	MK-Negative	Negative	MK-Negative	Positive	Positive
Vanadium, dissolved	None	None	ID	None	None	None	None	None	None	None	None
Zinc, dissolved	None	None	ID	Positive	None	None	None	Negative	Negative	None	None

Notes: [O: RAB 1/13/2020, C:YMD 1/15/2020]

- "positive", "negative", and "none" describe the slope as calculated using Sen's median estimate of slope; slopes that are statistically significant (see below) are indicated by the MK prefix.
- MK trend analysis done with non-detects at one half the detection limit.
1. MANAGES 4.1 output displays 0.0 for the median slope; however the direction of the slope was confirmed to be positive by evaluating the data set.
2. MANAGES 4.1 output displays a statistically signficiant positive trend, but further investigation revealed that the designation was due to the reporting limit changes between subsequent sampling events. Therefore, these counts are included into the "none" category in Table 2-5 as there were no trends.

- Green shading indicates increasing positive trends that are statistically significant as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration lower than the Class I groundwater quality standard.

- Yellow shading indicates increasing positive trends that are statistically significant as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration higher than the Class I groundwater quality standard.

- ID indicated that there was insufficient data to perform Sen's Estimate of Slope

Table 2-5. Summary of Trend Analyses
2019 Annual Report
Former Hutsonville Power Station - Ash Pond A

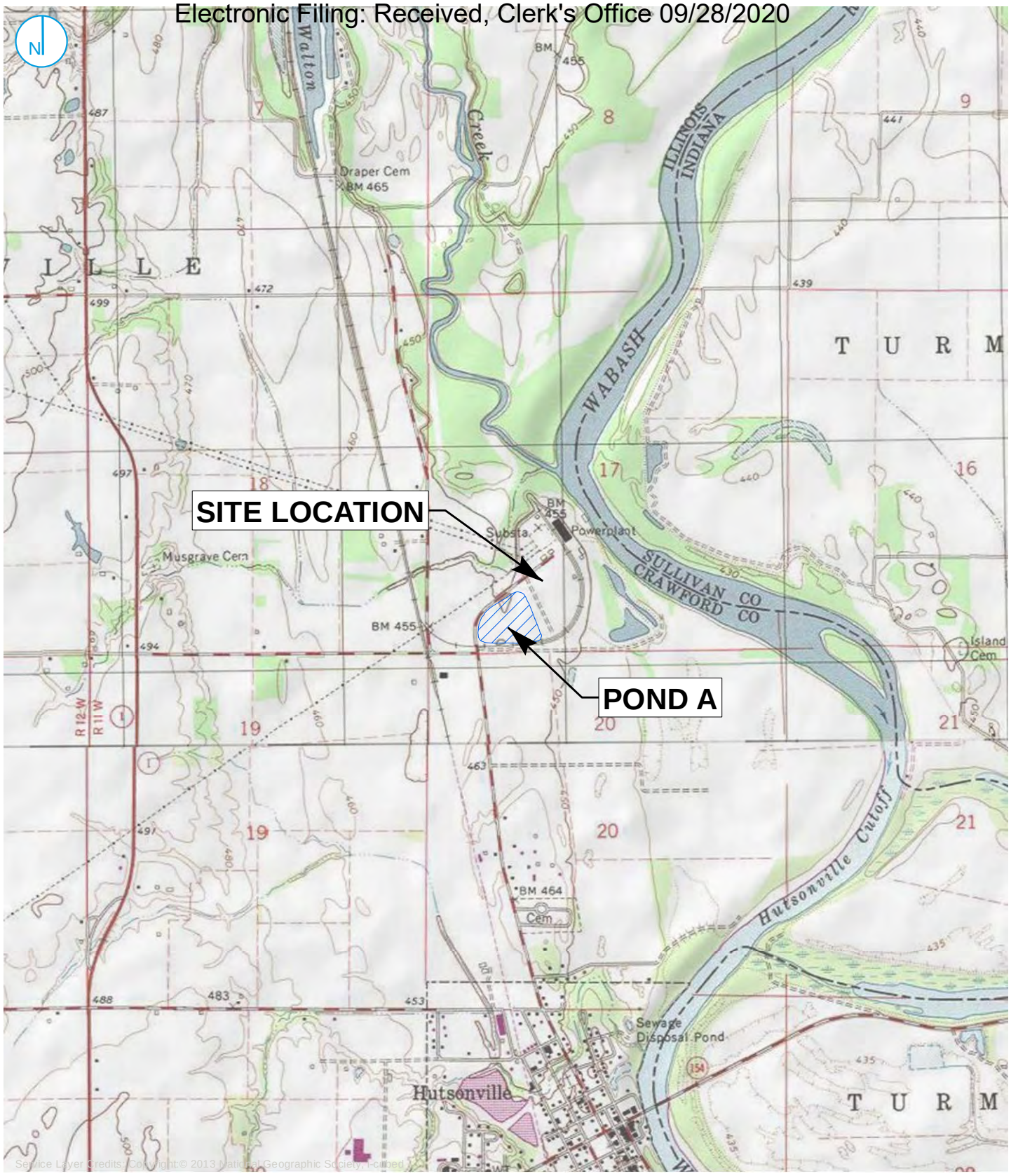
Time Period	Slope			Statistically Significant Increasing Trends
	Negative	None	Positive	
2016-2017	33	42	25	8
2017-2018	82	127	66	9
2018-2019	69	136	45	10

[O:RAB 1/14/2020, C:YMD 1/15/2020]

Notes:
Trends based on data collected during the specified periods.
The number of samples per well location are noted on Table 2-4.

FIGURES

Electronic Filing: Received, Clerk's Office 09/28/2020



Service Layer Credits: Copyright © 2013 National Geographic Society, i-cubed

Y:\Mapping\Projects\24\24201MXDs\2019APA\Figure 1-1_Site Location Map Ash Pond D2_ramboll.mxd
PROJECT: 72971 | DATED: 1/17/2020 | DESIGNER: GALARNMC



Map Scale: 1:1:24,000;
Map Center: 87°39'45"W 39°7'53"N

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 1-1

2019 ANNUAL REPORT
FORMER HUTSONVILLE
POWER STATION - ASH POND A
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\1242420\MXDs\2019APA\Figure 1-2_Site Basemap Ash Pond D2_ramboll.mxd

PROJECT: 169000XXXX | DATED: 1/17/2020 | DESIGNER: GALARNMC



- ASH POND D MONITORING WELL LOCATION
- NESTED ASH POND D MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- NESTED MONITORING WELL LOCATION
- ABANDONED NESTED MONITORING WELL LOCATION
- PROPERTY LINE
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

0 150 300 Feet

SITE BASEMAP

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND A
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 1-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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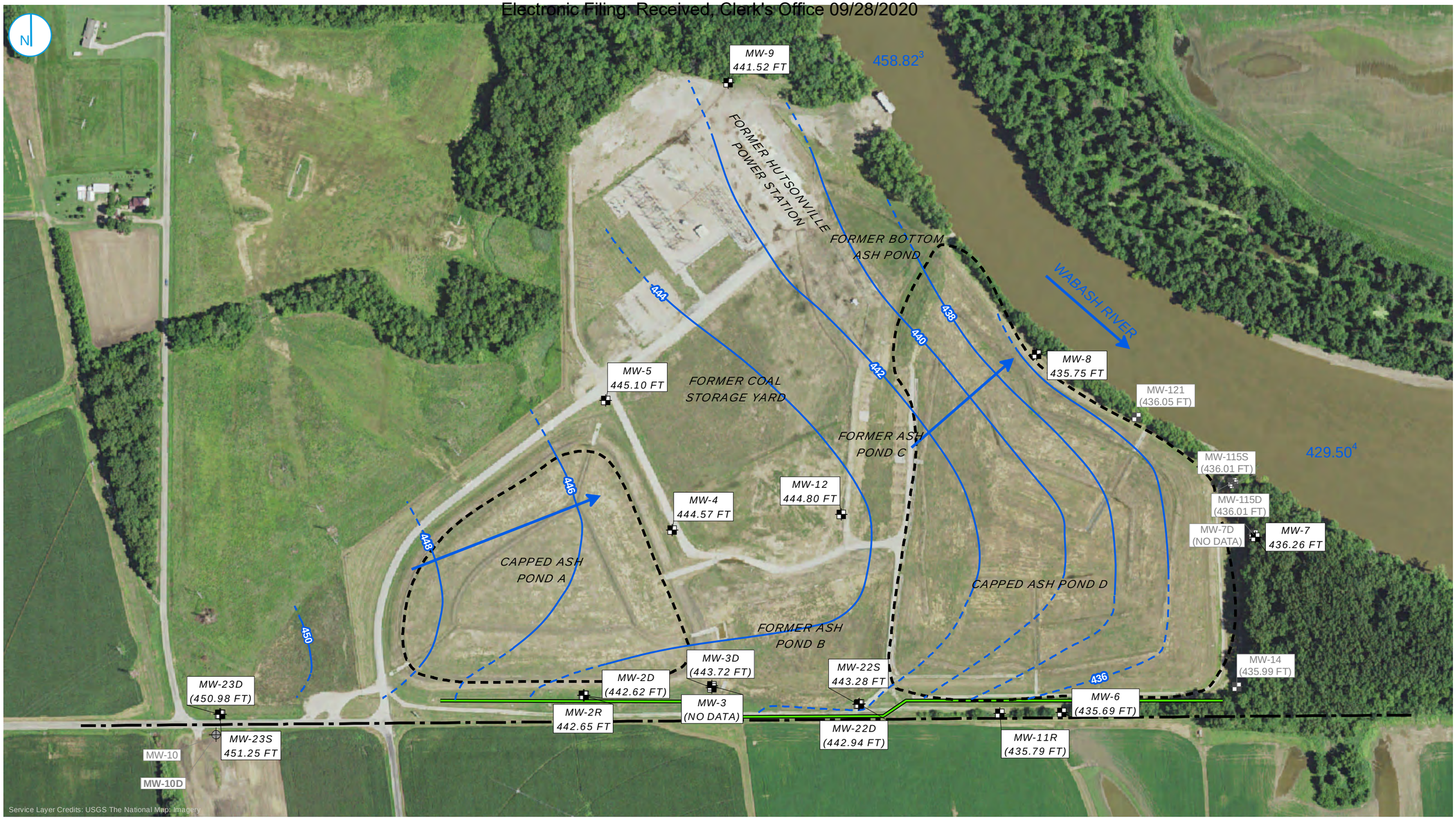
Y:\Mapping\Projects\2412420\MXDs\2019APA\Figure 2-1_Q1_2019_GW_Elevation.mxd

PROJECT: 169000XXXX | DATED: 1/21/2020 | DESIGNER: GALARNMC



- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- ABANDONED MONITORING WELL LOCATION
- PROPERTY LINE

0 150 300 Feet

- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q1 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP FEBRUARY 25, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND A
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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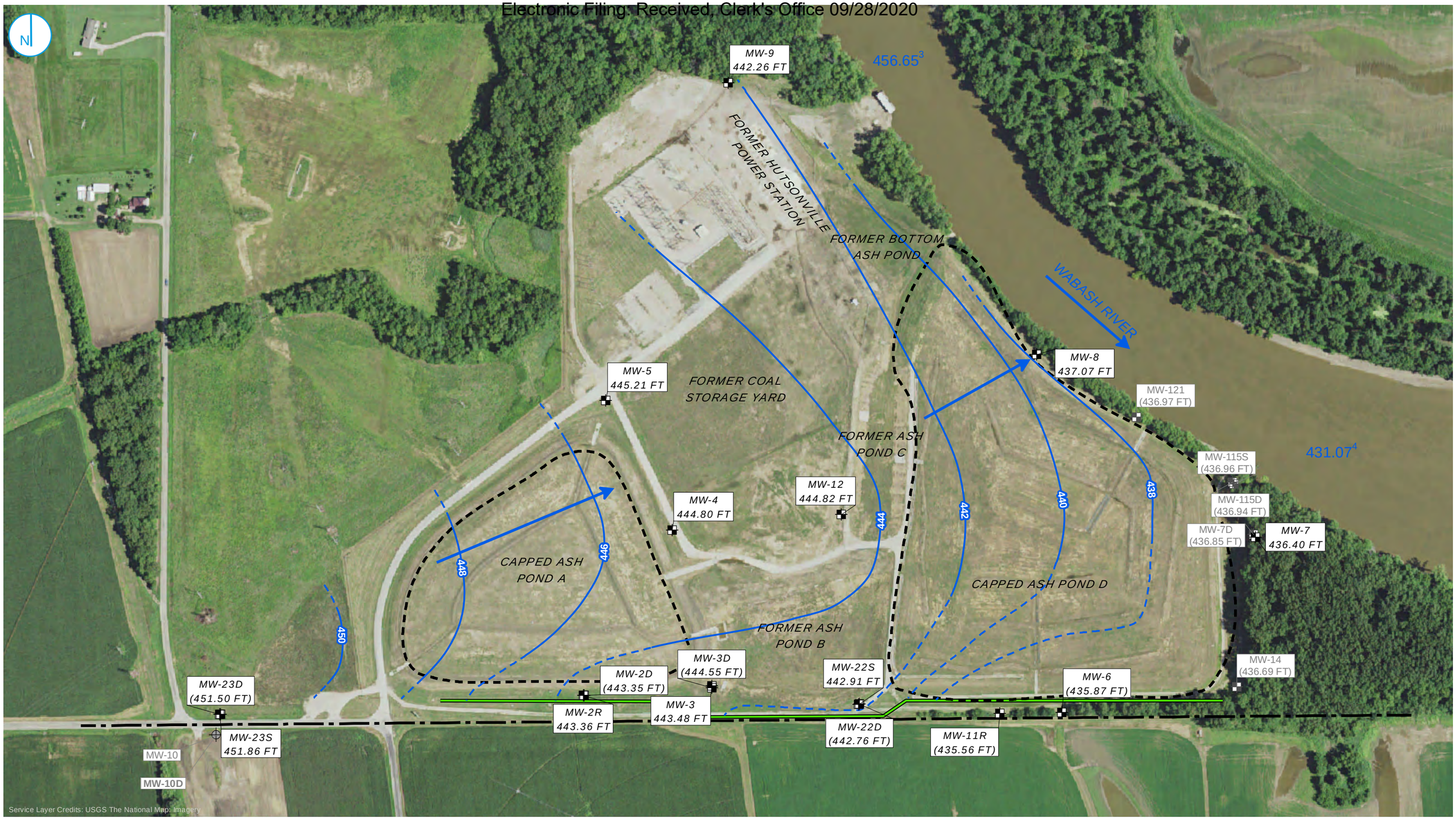
Y:\Mapping\Projects\2412420\MXDs\2019APA\Figure 2-2_Q2_2019_GW_Elevation.mxd

PROJECT: 169000XXXX | DATED: 1/21/2020 | DESIGNER: GALARNMC



- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- ABANDONED MONITORING WELL LOCATION
- PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

0 150 300 Feet

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q2 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP JUNE 17, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND A
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

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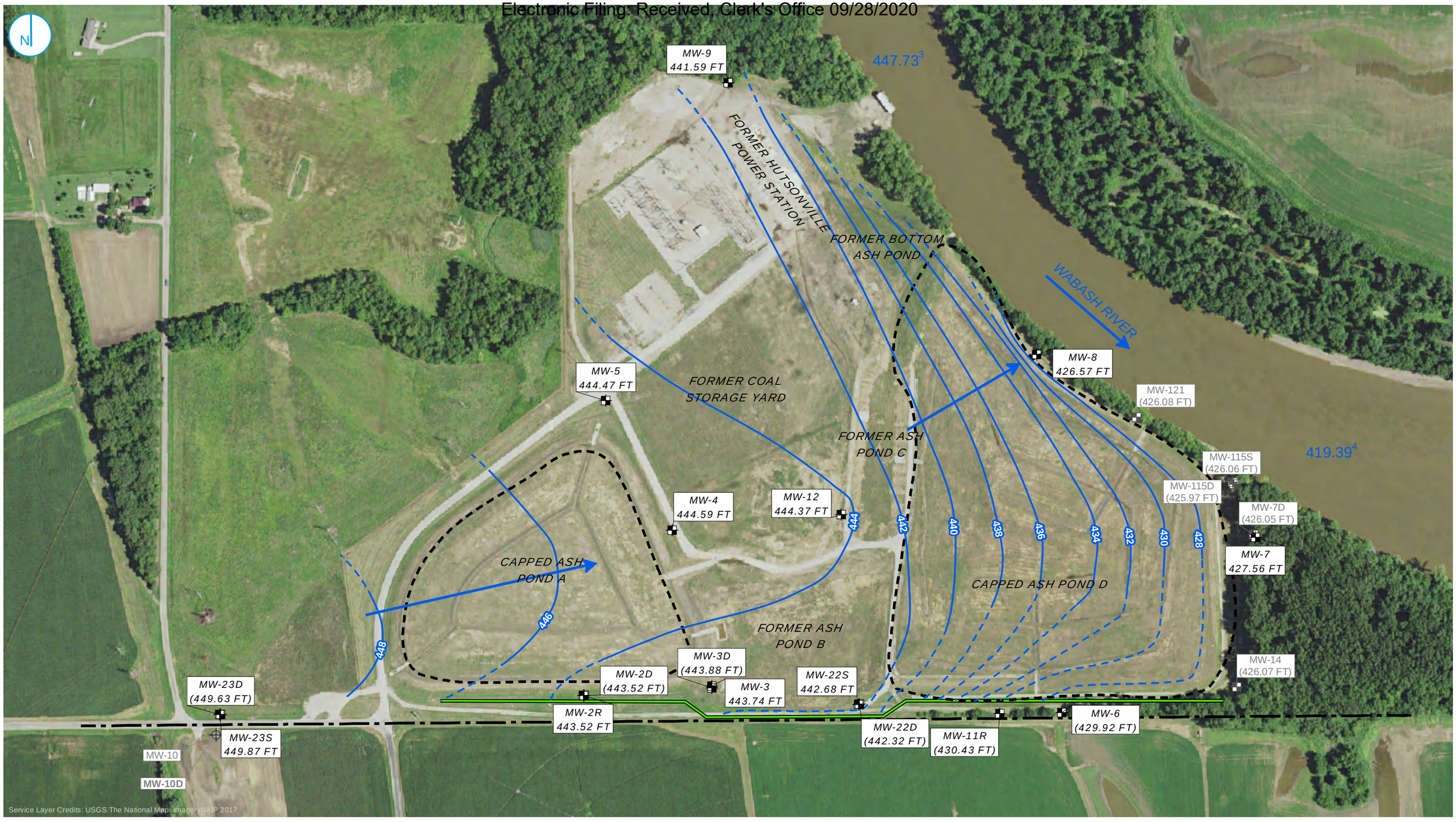
Y:\Mapping\Projects\2412420\MXDs\2019APA\Figure 2-3_Q3_2019_GW_Elevation.mxd

PROJECT: 169000XXXX | DATED: 1/21/2020 | DESIGNER: GALARNMC



- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- ABANDONED MONITORING WELL LOCATION
- PROPERTY LINE

0 150 300 Feet

- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q3 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP AUGUST 26, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND A
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-3

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

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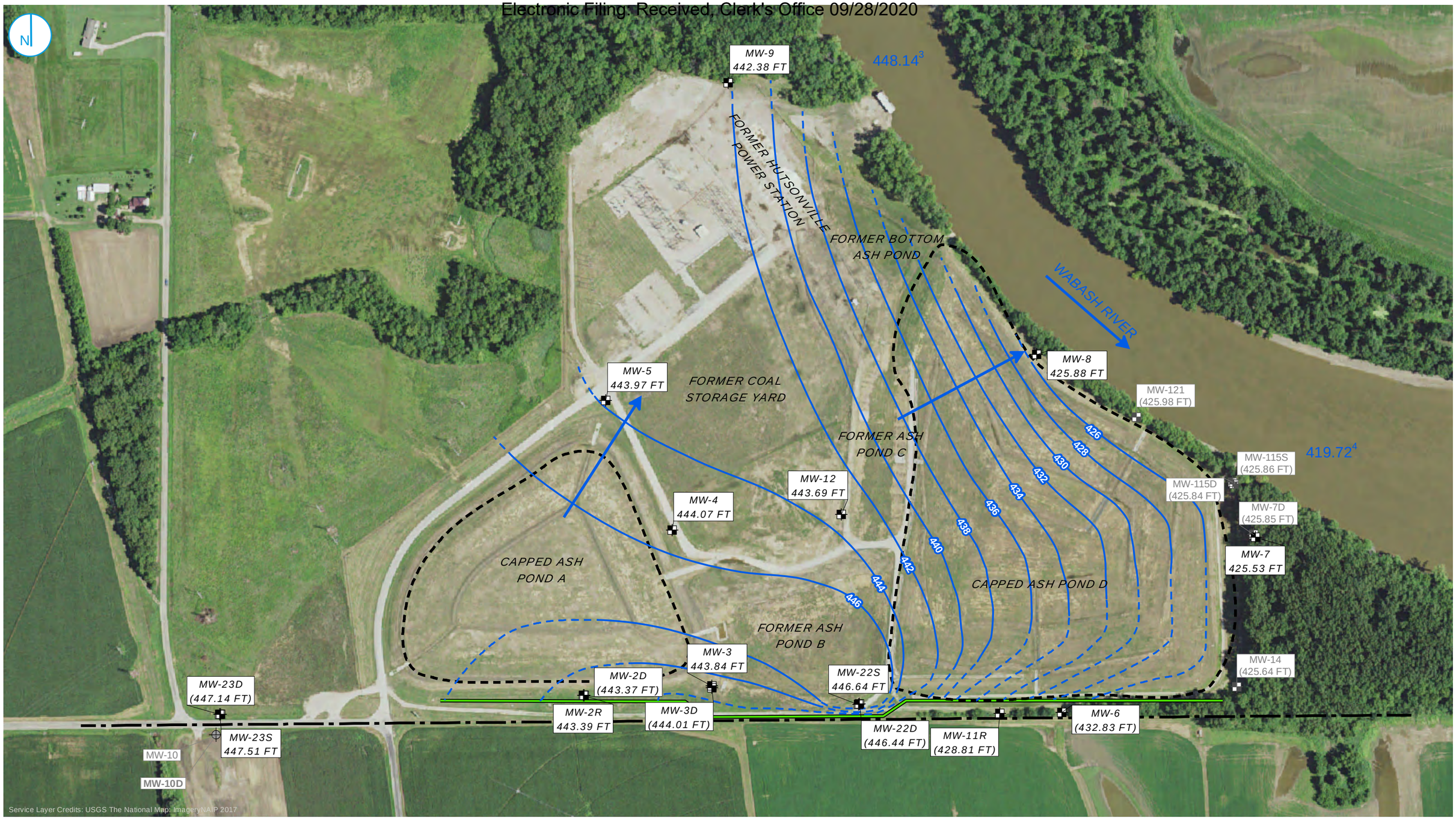
Y:\Mapping\Projects\2412420\MXDs\2019APA\Figure 2-4_Q4_2019_GW_Elevation.mxd

PROJECT: 169000XXXX | DATED: 1/21/2020 | DESIGNER: GALARNMC



- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- ABANDONED MONITORING WELL LOCATION
- PROPERTY LINE

0 150 300 Feet

- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q4 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP OCTOBER 28, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND A
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-4

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

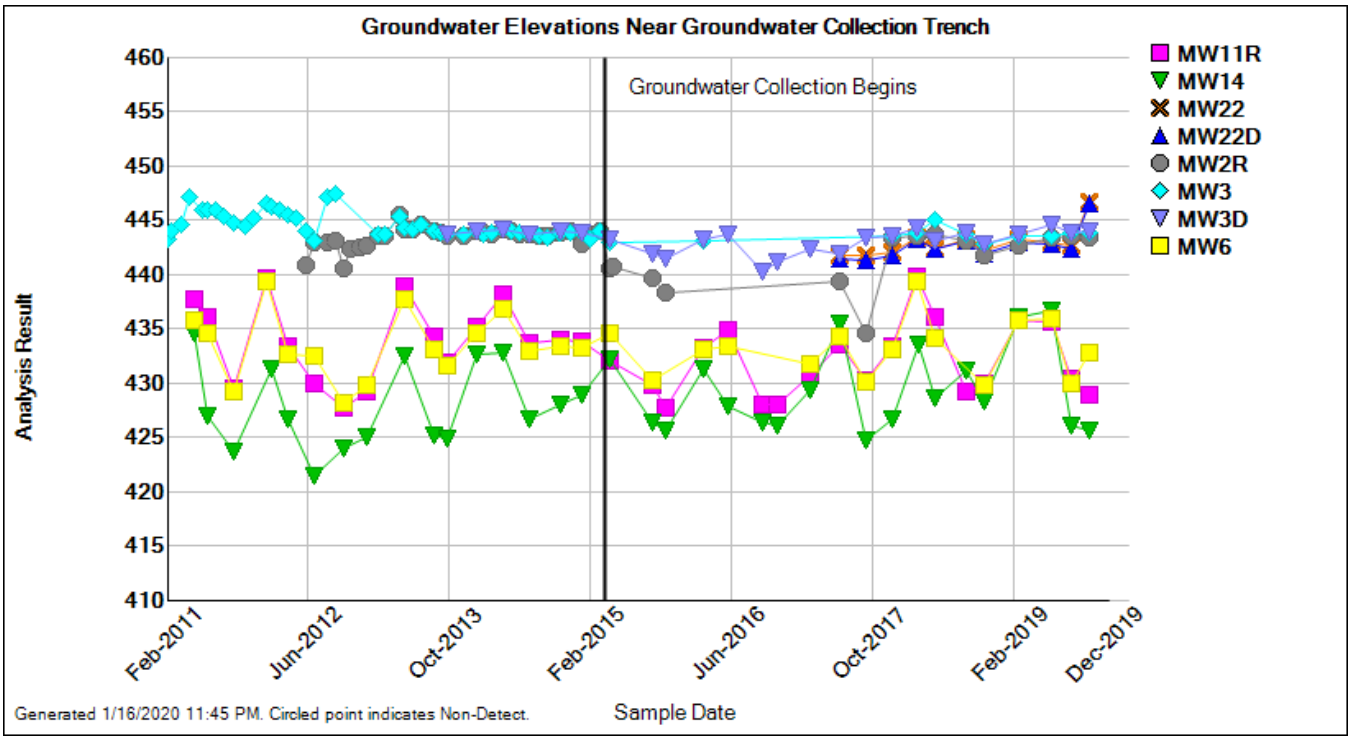


Figure 3. Groundwater elevations near groundwater collection trench.

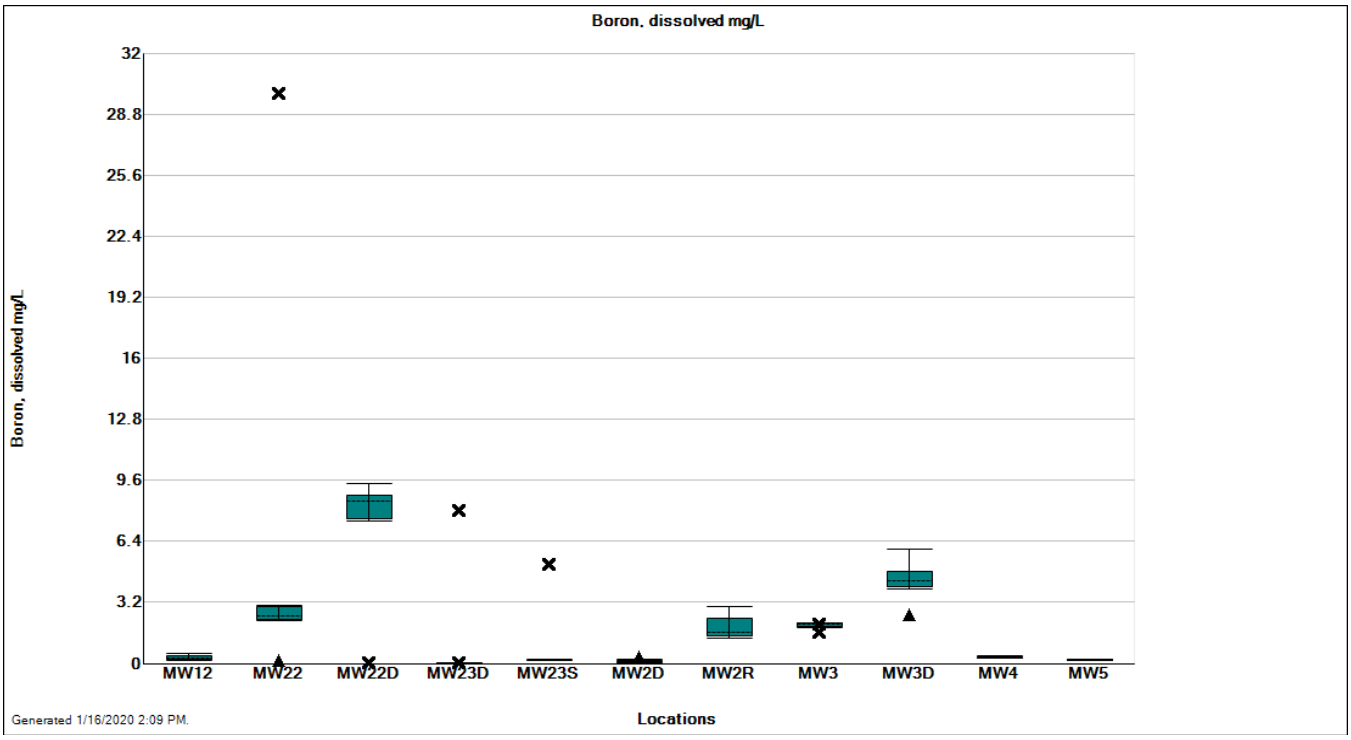


Figure 4-1. Box-whisker plot showing distribution of boron concentration by monitoring well for data collected in 2018 and 2019.

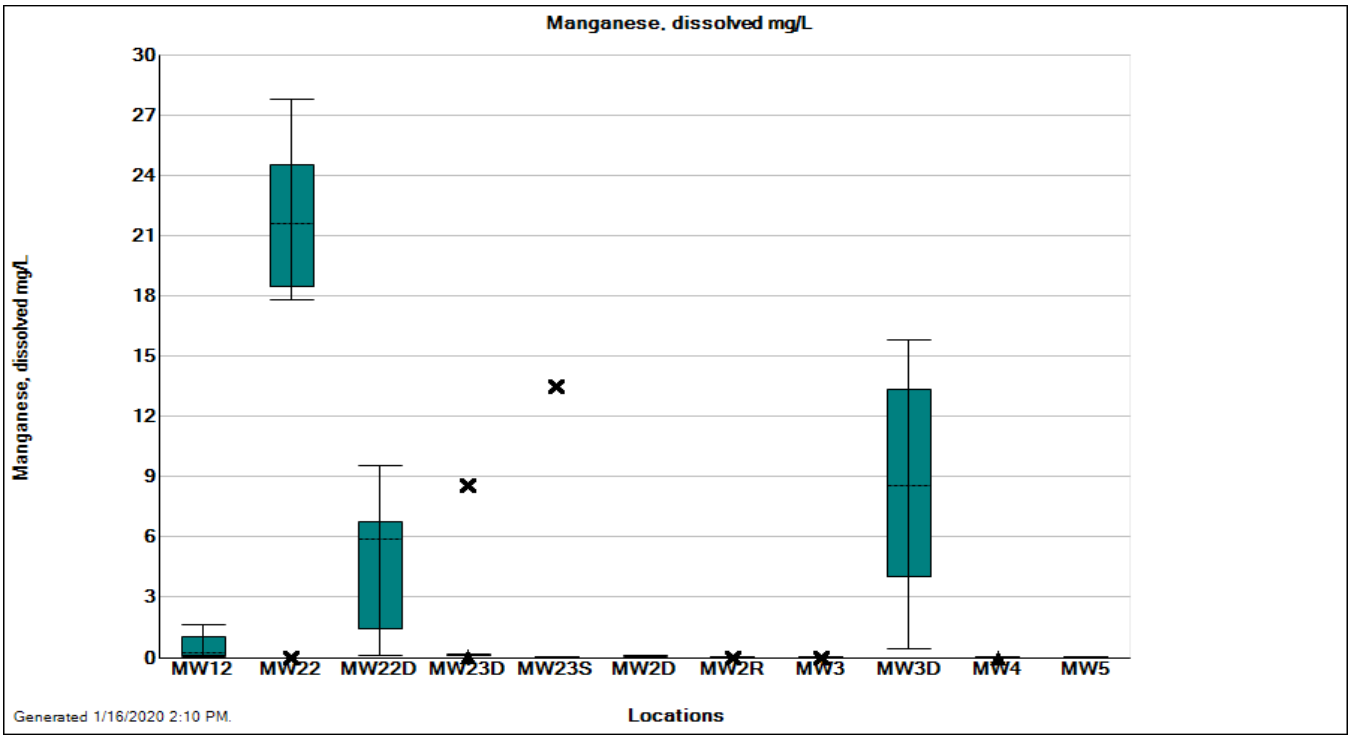


Figure 4-2. Box-whisker plot showing distribution of manganese concentration by monitoring well for data collected in 2018 and 2019.

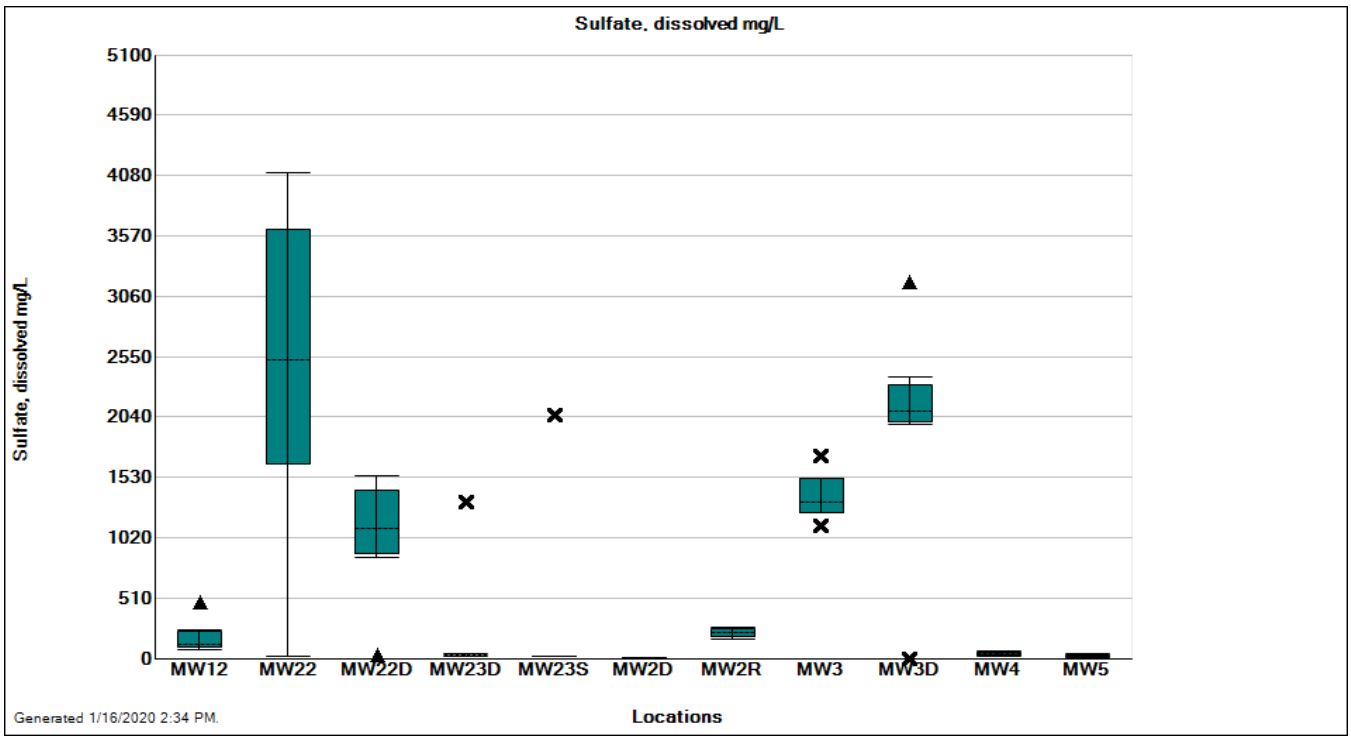


Figure 4-3. Box-whisker plot showing distribution of sulfate concentration by monitoring well for data collected in 2018 and 2019.

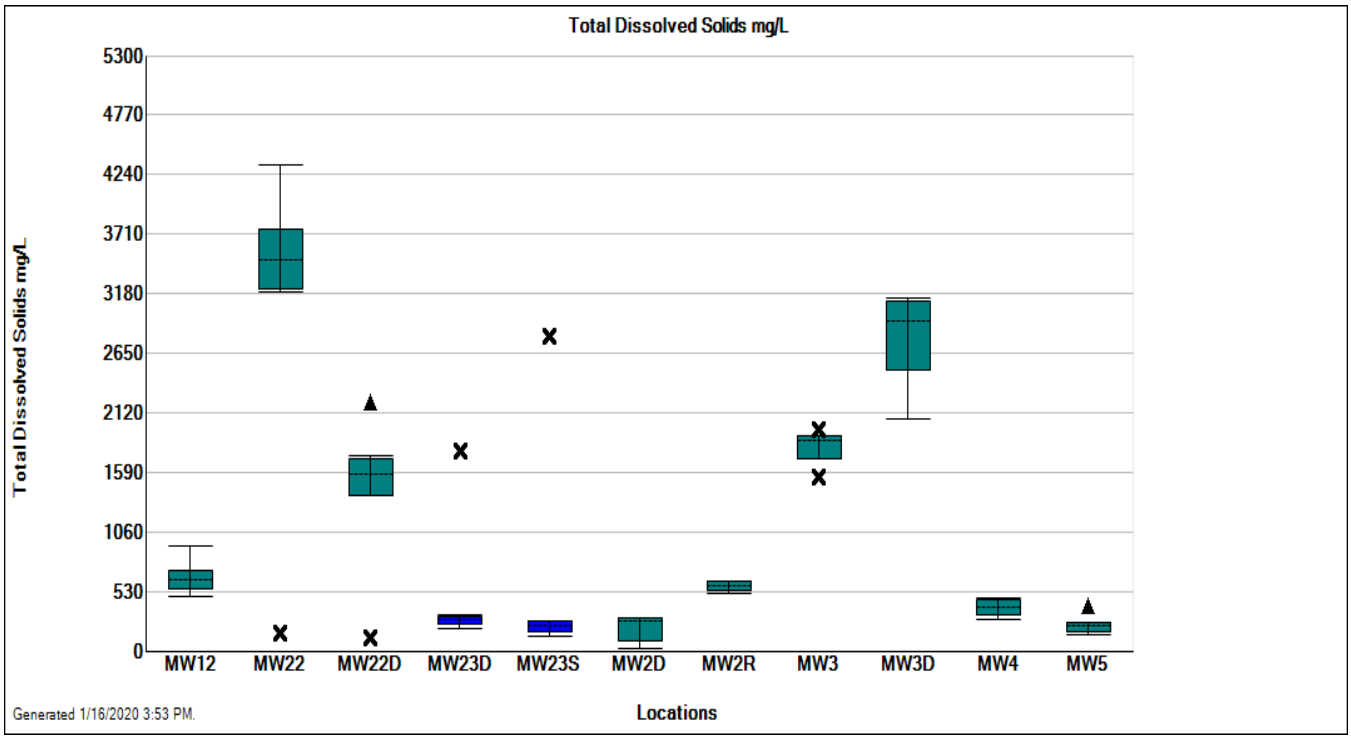


Figure 4-4. Box-whisker plot showing distribution of TDS concentration by monitoring well for data collected in 2018 and 2019.

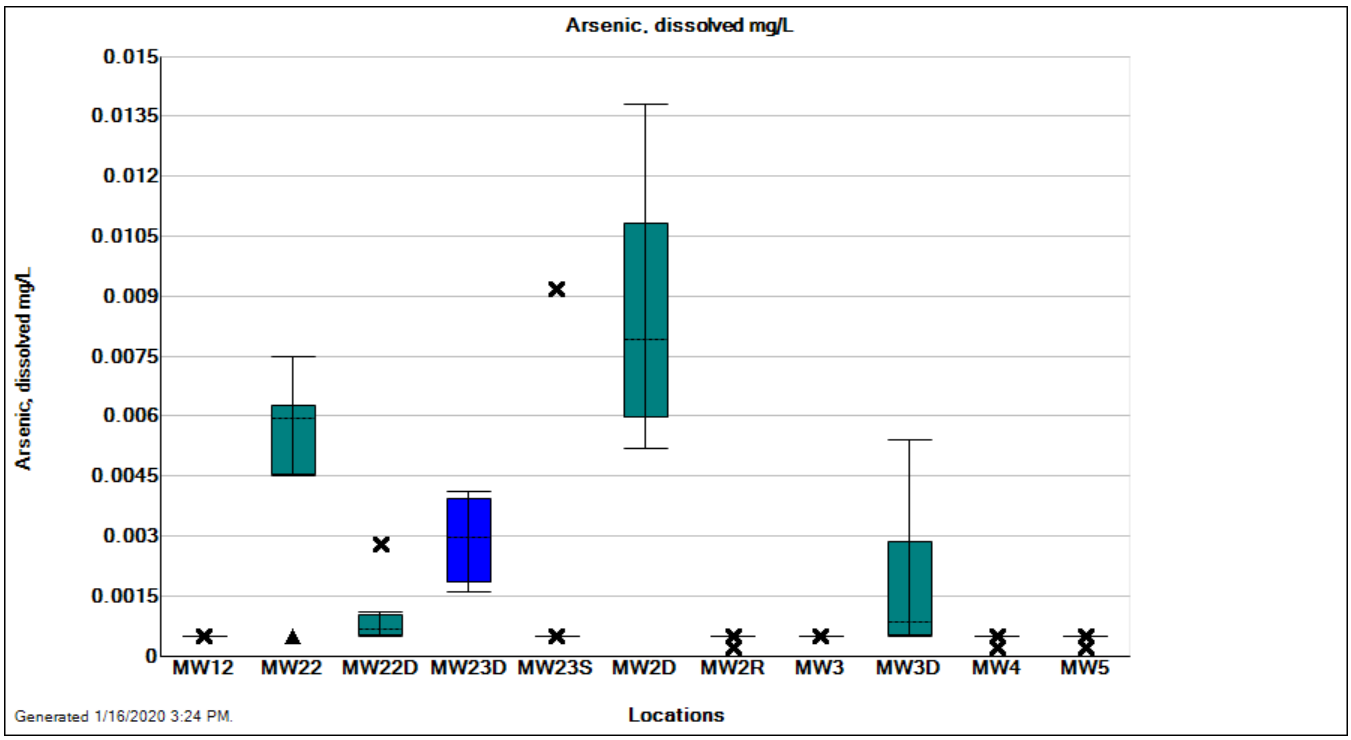


Figure 4-5. Box-whisker plot showing distribution of arsenic concentration by monitoring well for data collected in 2018 and 2019.

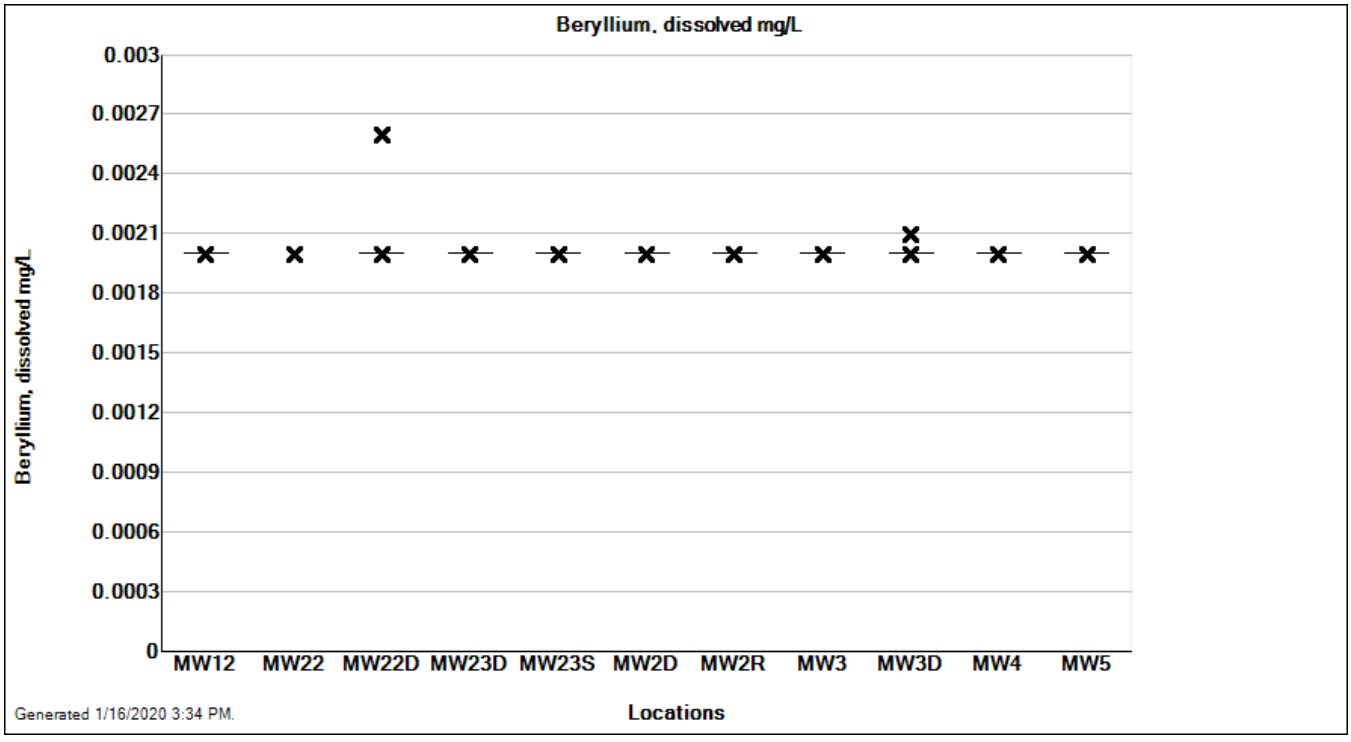


Figure 4-6. Box-whisker plot showing distribution of beryllium concentration by monitoring well for data collected in 2018 and 2019.

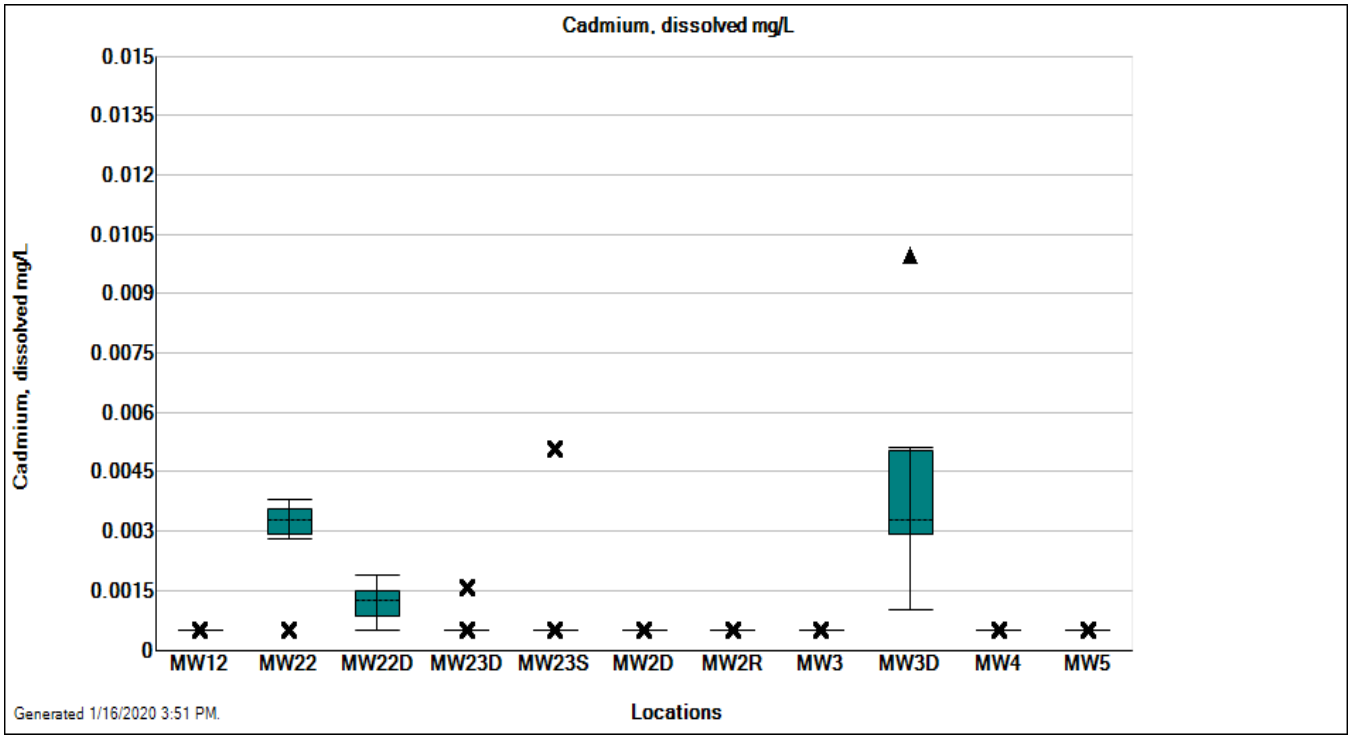


Figure 4-7. Box-whisker plot showing distribution of cadmium concentration by monitoring well for data collected in 2018 and 2019.

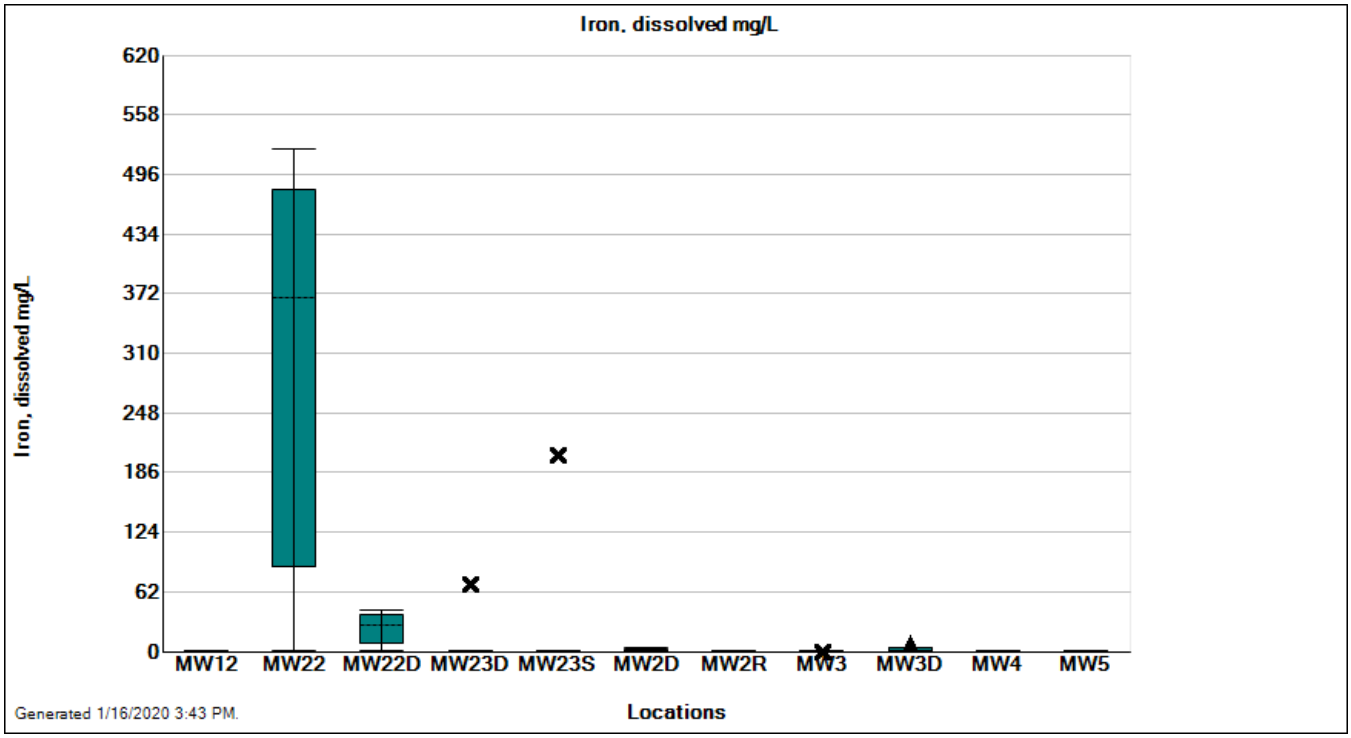


Figure 4-8. Box-whisker plot showing distribution of iron concentration by monitoring well for data collected in 2018 and 2019.

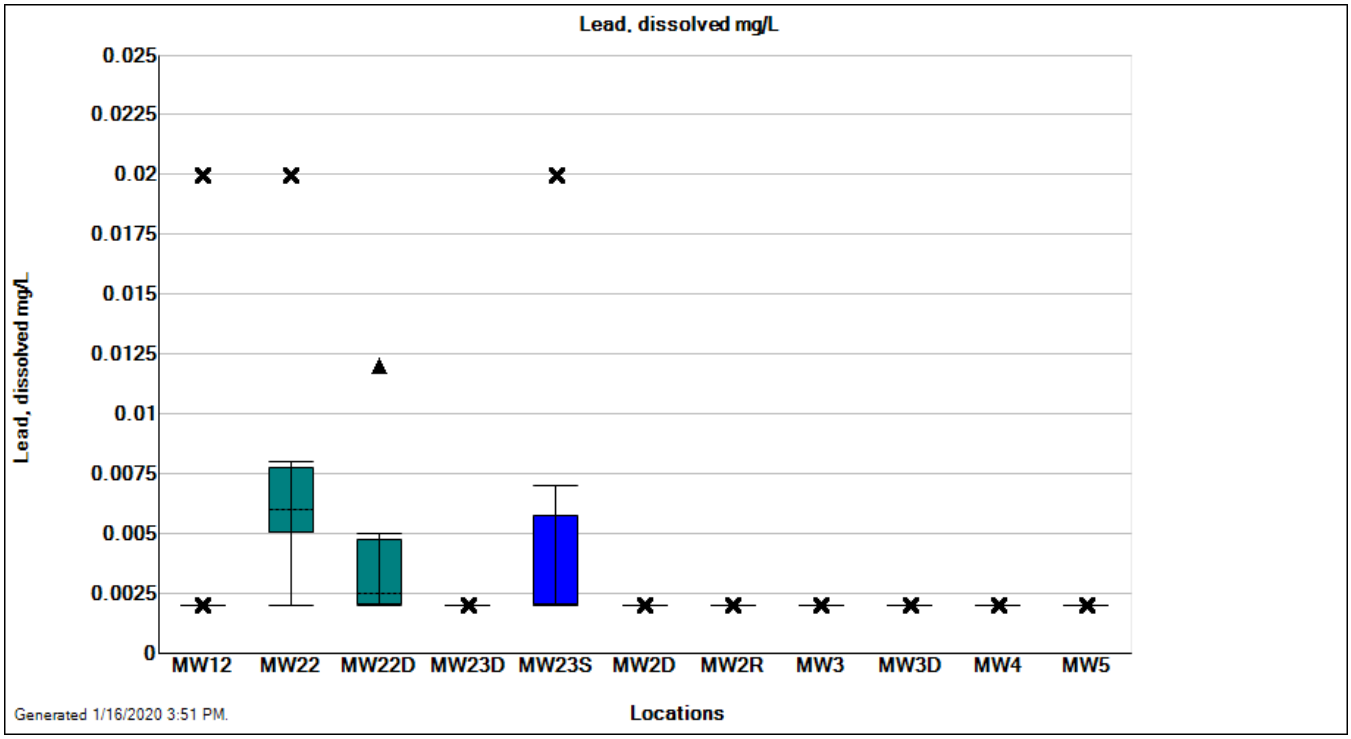


Figure 4-9. Box-whisker plot showing distribution of lead concentration by monitoring well for data collected in 2018 and 2019.

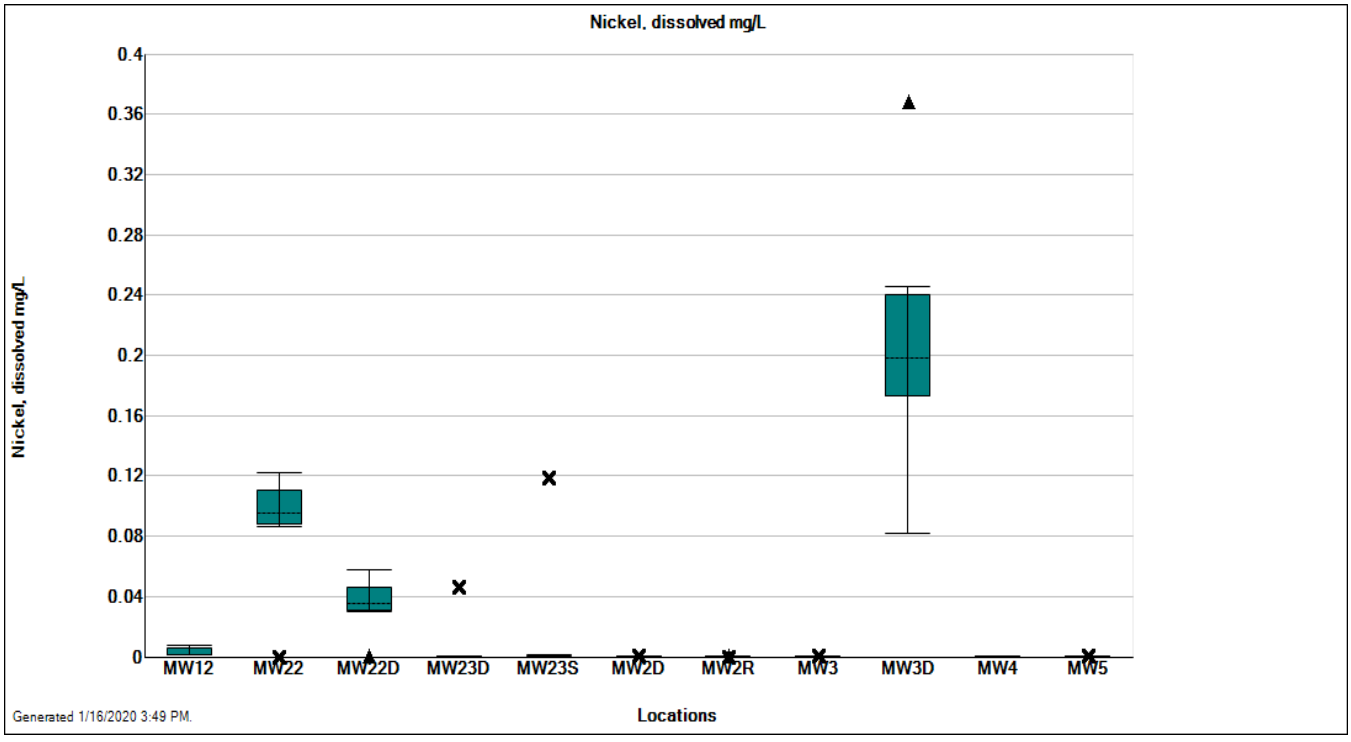


Figure 4-10. Box-whisker plot showing distribution of nickel concentration by monitoring well for data collected in 2018 and 2019.

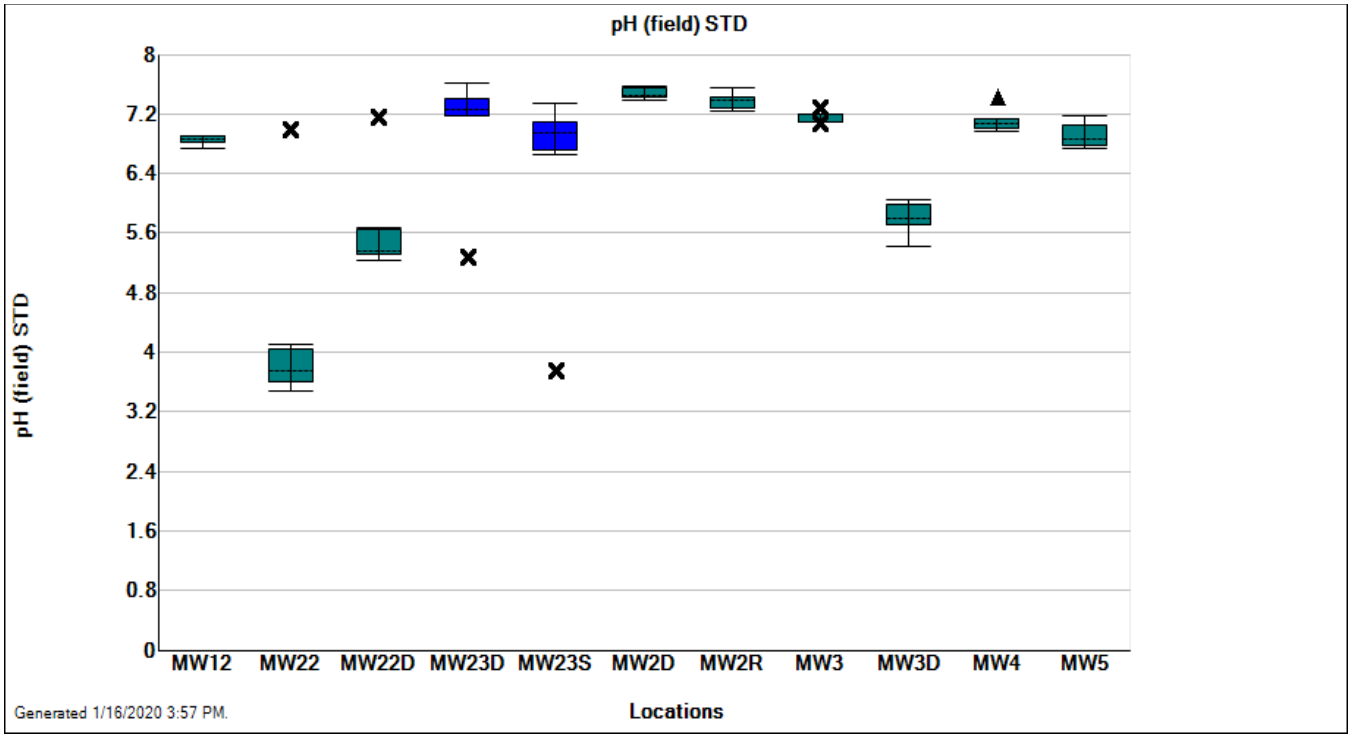


Figure 4-11. Box-whisker plot showing distribution of pH by monitoring well for data collected in 2018 and 2019.

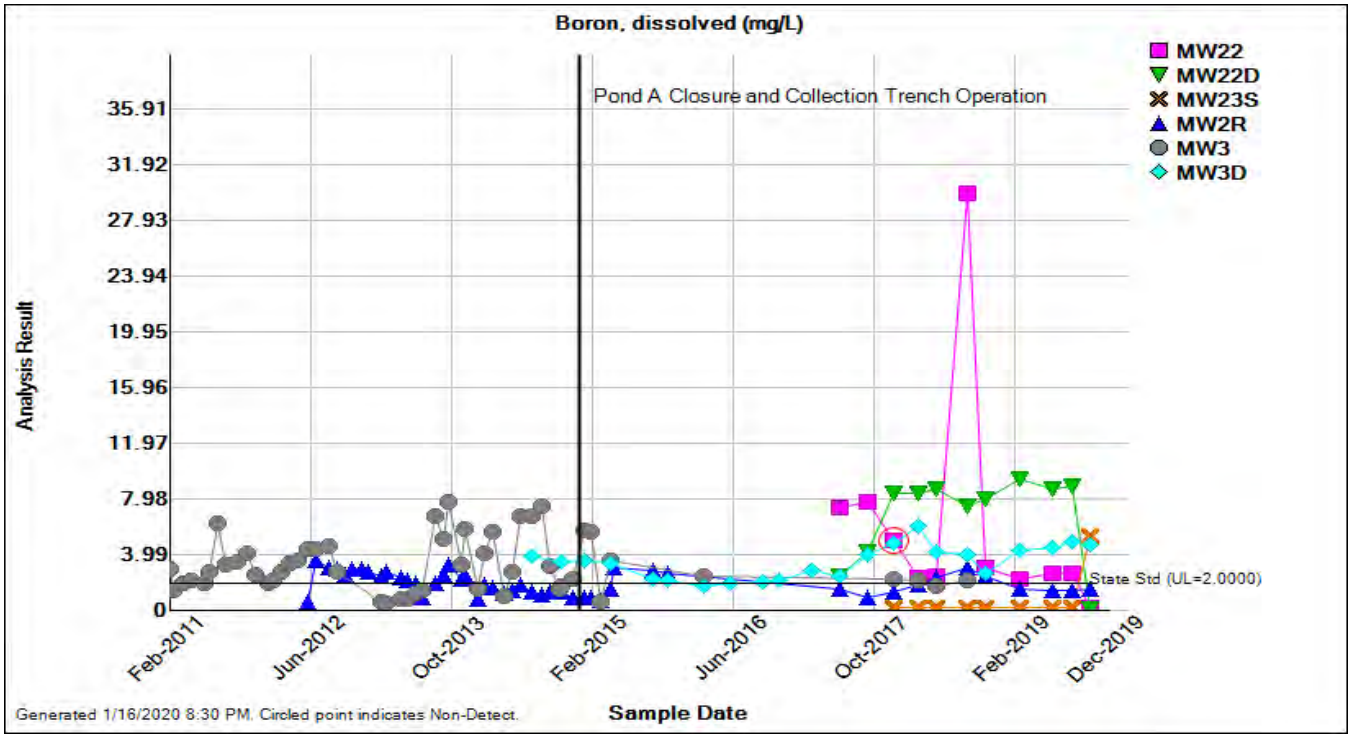


Figure 5-1. Time series plot for boron at wells exceeding the Class I standard following closure activities (MW-2R, MW-12, MW-3, MW-3D, MW-22D, MW-22S, and MW-23S). MW-23S also has a statistically significant positive trend.

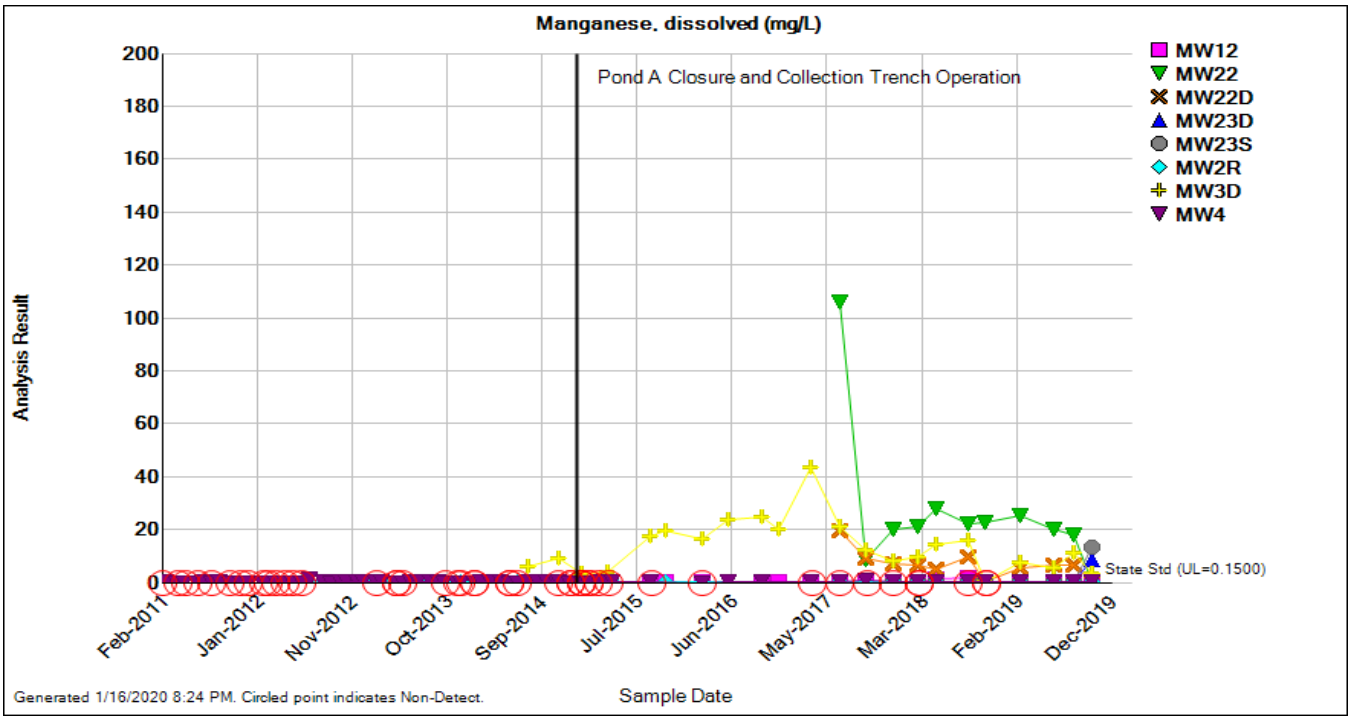


Figure 5-2a. Time series plot for manganese at wells exceeding the Class I standard following closure activities (MW-3D, MW-4, MW-12, MW 22D, MW-22S, MW-23D, and MW-23S). MW-2R does not exceed the standard but has a statistically significant positive trend.

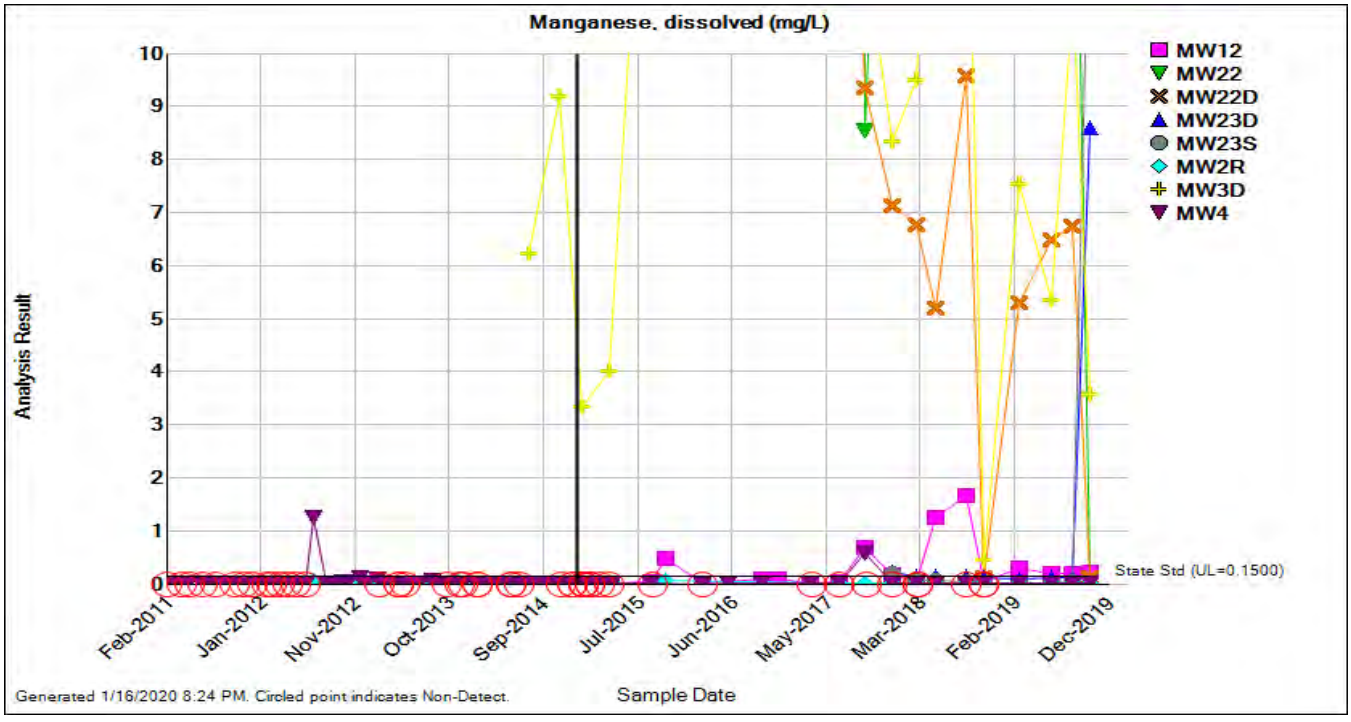


Figure 5-2b. Time series plot for manganese at wells exceeding the Class I standard following closure activities (MW-3D, MW-4, MW-12, MW 22D, MW-22S, MW-23D, and MW-23S). MW-2R does not exceed the standard but has a statistically significant positive trend. Zoomed in to show the Class I standard.

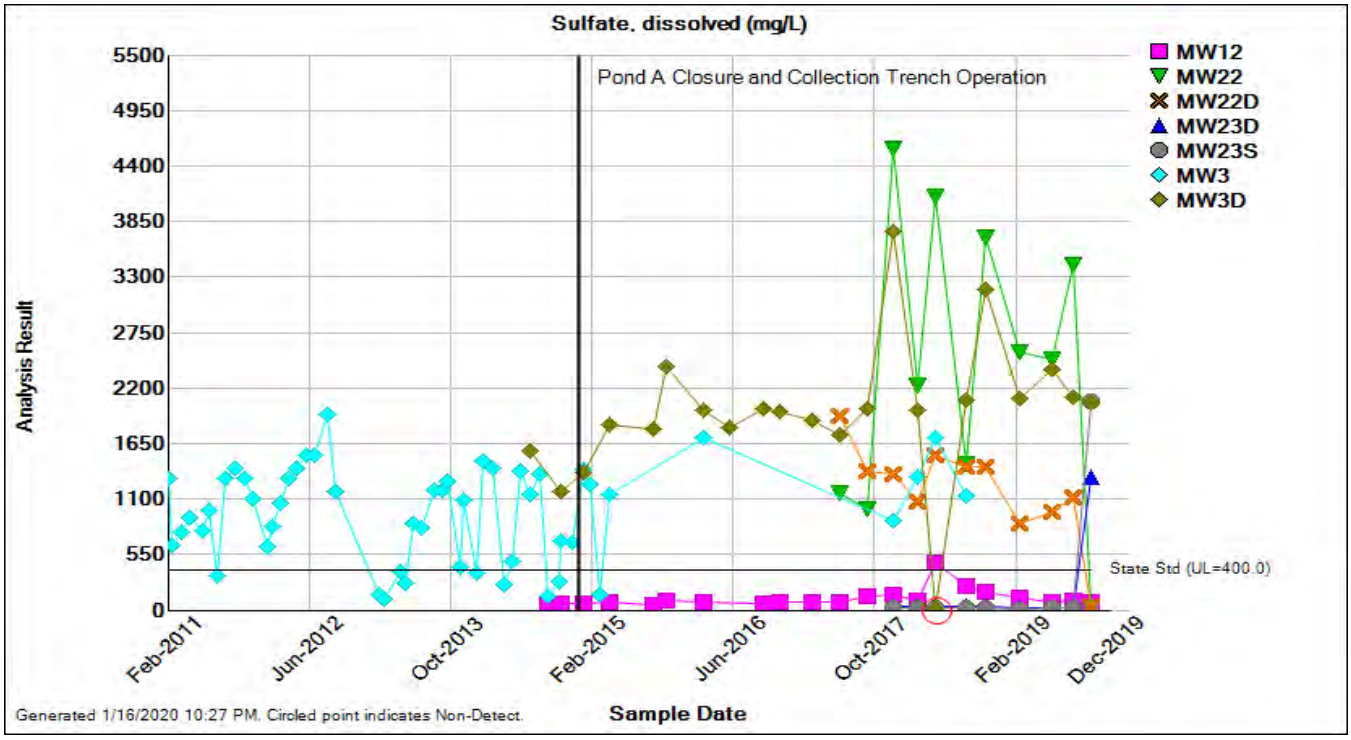


Figure 5-3. Time series plot for sulfate at wells exceeding the Class I standard following closure activities (MW-3, MW-3D, MW-12, MW 22D, MW-22S, MW-23D, and MW-23S).

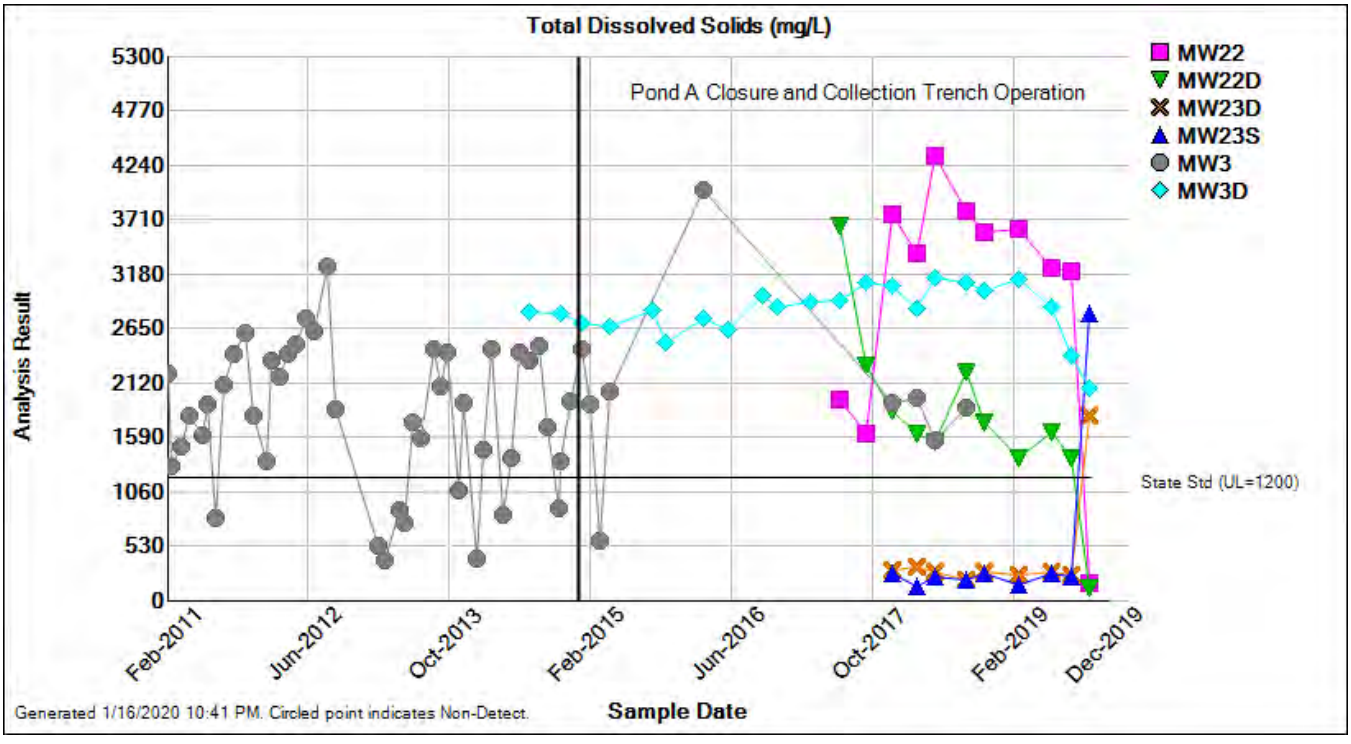


Figure 5-4. Time series plot for TDS at wells exceeding the Class I standard following closure activities (MW-3, MW-3D, MW-22D, MW 22S, MW-22S, MW-23D, and MW-23S).

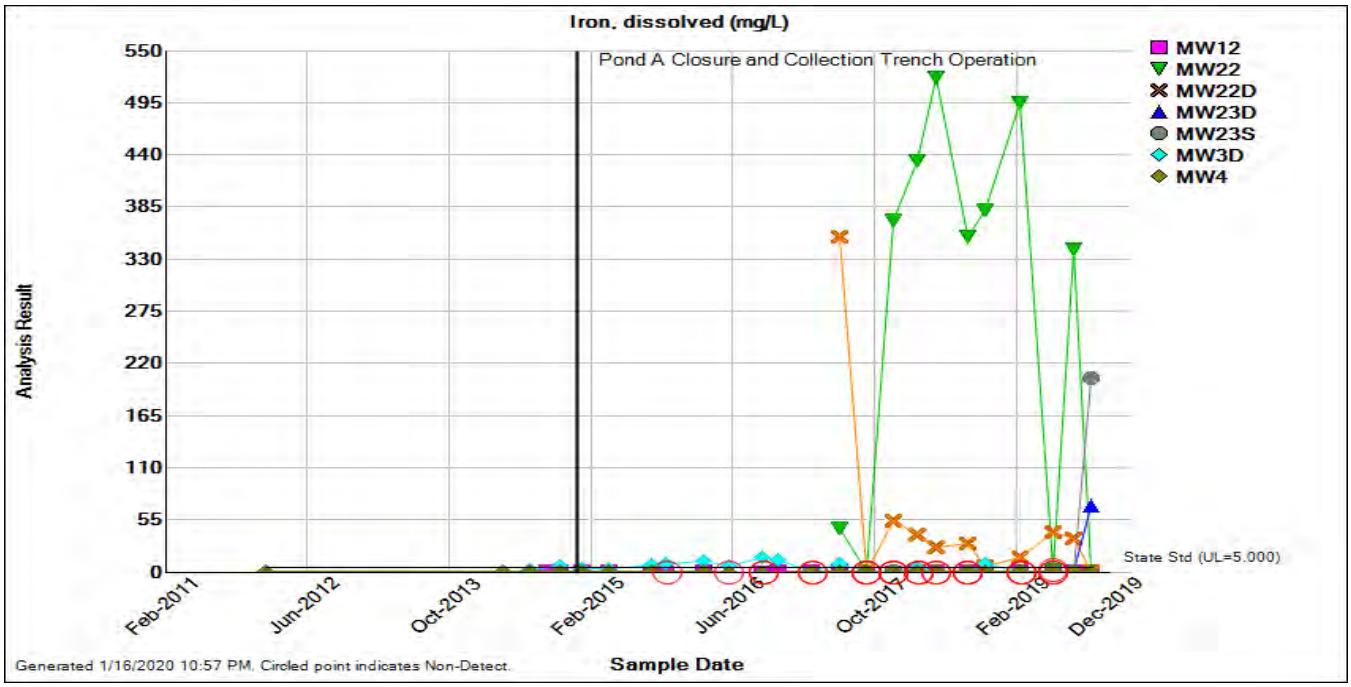


Figure 5-5a. Time series plot for iron at wells exceeding the Class I standard following closure activities (MW-3D, MW-22D, MW-22S, MW-23D, and MW-23S). Wells MW-4 and MW-12 do not exceed the Class I standard but have statistically significant positive trends.

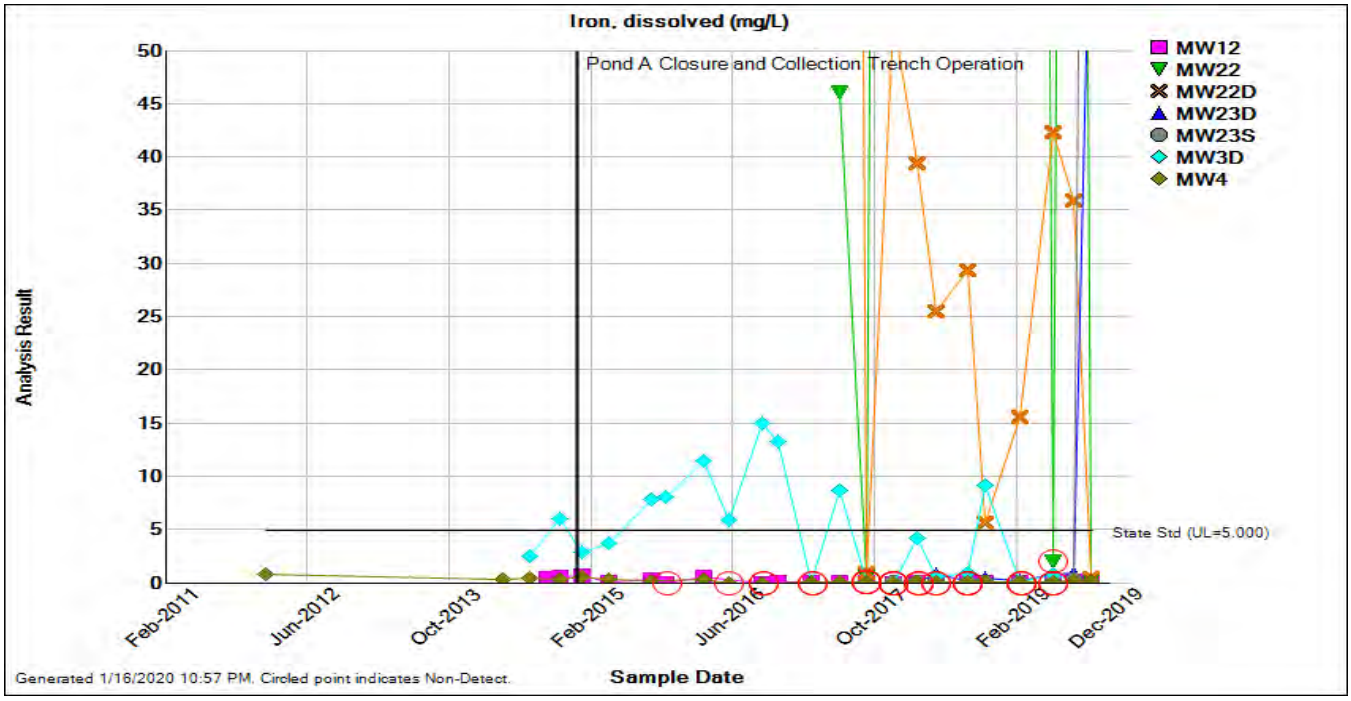


Figure 5-5b. Time series plot for TDS at wells exceeding the Class I standard following closure activities (MW-3D, MW-22D, MW-22S, MW-23D, and MW-23S). Wells MW-4 and MW-12 do not exceed the Class I standard but do have statistically significant positive trends. Zoomed in to show the Class I standard.

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APPENDIX A
GROUNDWATER MONITORING RESULTS 2018-2019

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW2D

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0078	0.0080	0.0058	0.0082	0.0052	0.0138	0.0117	0.0064
B, diss, mg/L	<0.0500	0.3400	<0.0500	<0.0500	<0.0500	<0.0500	0.2000	<0.0500
Ba, diss, mg/L	0.078	0.073	0.061	0.063	0.064	0.075	0.090	0.060
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	11.1	11.8	10.6	11.3	9.8	16.5	11.7	13.1
CN, total, mg/L	<0.01	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.4	0.2	0.2	0.2	0.2	0.3	0.2	0.3
Fe, diss, mg/L	0.830	1.480	0.066	0.377	0.393	3.560	2.880	0.327
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.0657	0.0880	0.0600	0.0674	0.0617	0.0750	0.0714	0.0600
Ni, diss, mg/L	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
NO3, diss, mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	0.128	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.55	7.58	7.47	7.41	7.55	7.44	7.41	7.39
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	2.9	2.9	5.1	5.3	2.7	2.1	5.7	4.9
Spec. Cond. (field), micromho	457	387	496	509	500	494	480	506
TDS, mg/L	<25	299	<25	288	264	286	274	234
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW2R

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	1.8000	2.3000	2.9800	2.3800	1.4600	1.3400	1.3900	1.4400
Ba, diss, mg/L	0.035	0.032	0.034	0.031	0.033	0.029	0.030	0.035
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	19.7	22.9	21.5	18.0	17.1	22.4	22.7	25.8
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fe, diss, mg/L	<0.020	<0.020	<0.020	0.027	<0.020	<0.020	0.213	0.210
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	0.0020	<0.0020	<0.0020	0.0019	0.0020	0.0024	0.0032
Ni, diss, mg/L	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0002	<0.0005
NO3, diss, mg/L	1.700	1.100	1.170	1.390	1.990	1.660	1.320	1.630
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.55	7.45	7.38	7.23	7.25	7.37	7.38	7.33
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0047	0.0037	0.0023	0.0035	0.0037	0.0049	0.0037	0.0042
SO4, diss, mg/L	192.0	236.0	216.0	260.0	226.0	180.0	161.0	258.0
Spec. Cond. (field), micromho	746	685	860	906	913	886	810	841
TDS, mg/L	513	580	585	622	608	624	534	544
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW3

	3/12/2018	5/14/2018	8/28/2018
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005
B, diss, mg/L	2.0700	1.6500	2.1100
Ba, diss, mg/L	0.006	0.004	0.006
Be, diss, mg/L	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	6.2	2.5	1.1
CN, total, mg/L	<0.01	<0.01	<0.01
Co, diss, mg/L	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	0.0030	<0.0010	<0.0010
F, diss, mg/L	0.4	0.3	0.3
Fe, diss, mg/L	<0.020	<0.020	<0.020
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	0.0059	<0.0020
Ni, diss, mg/L	0.0009	0.0006	0.0006
NO3, diss, mg/L	1.200	0.360	0.644
Pb, diss, mg/L	<0.002	<0.002	<0.002
pH (field), STD	7.30	7.08	7.09
Sb, diss, mg/L	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0161	0.0079	0.0086
SO4, diss, mg/L	1320.0	1710.0	1130.0
Spec. Cond. (field), micromho	2180	1380	1860
TDS, mg/L	1970	1560	1870
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002
Zn, diss, mg/L	0.05	0.03	0.04

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW3D

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0054	0.0007	<0.0005	<0.0005	<0.0005	0.0010	0.0015	0.0033
B, diss, mg/L	5.9600	4.1800	3.9100	2.5900	4.2400	4.4300	4.8800	4.7000
Ba, diss, mg/L	0.013	0.010	0.015	0.017	0.010	0.011	0.012	0.014
Be, diss, mg/L	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	0.0100	0.0035	0.0030	0.0010	0.0031	0.0029	0.0051	0.0049
Cl, diss, mg/L	17.9	18.6	16.3	16.8	15.5	16.5	12.4	14.1
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	0.332	0.144	0.126	0.039	0.029	0.014	0.163	0.150
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	0.0024	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.8	<0.2	<0.2	0.2	0.4	1.3	0.9	0.9
Fe, diss, mg/L	4.230	0.520	0.853	9.080	0.060	0.736	0.171	0.169
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	9.5000	14.1000	15.8000	0.4480	7.5300	5.3500	11.1000	3.5800
Ni, diss, mg/L	0.3690	0.2020	0.1800	0.0816	0.2240	0.1940	0.2460	0.1710
NO3, diss, mg/L	2.300	<0.100	<0.100	0.128	0.278	0.839	1.140	2.560
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	5.43	5.70	5.87	6.05	6.01	5.73	5.88	5.69
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.1000	<0.0100	<0.0100	<0.0010	<0.0100	<0.0100	<0.0100	<0.0100
SO4, diss, mg/L	1980.0	<1.0	2080.0	3180.0	2100.0	2380.0	2110.0	2050.0
Spec. Cond. (field), micromho	2800	2560	3010	36	3230	2940	2500	2460
TDS, mg/L	2840	3140	3100	3010	3120	2850	2380	2060
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	0.09	0.02	0.03	<0.01	0.02	0.03	0.03	0.04

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW4

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	0.3700	0.3500	0.3800	0.3200	0.2500	0.3300	0.3200	0.2500
Ba, diss, mg/L	0.019	0.023	0.024	0.020	0.015	0.021	0.026	0.023
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	5.7	5.3	0.6	1.4	1.7	2.9	2.5	1.2
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0004	0.0004	0.0004	0.0006
Cu, diss, mg/L	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	0.2	0.2	<0.2	0.2	0.2	0.3
Fe, diss, mg/L	<0.020	0.102	<0.020	0.036	<0.020	0.062	0.221	0.238
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	0.0088	0.0024	<0.0020	0.0026	0.0216	0.0027	0.0017
Ni, diss, mg/L	<0.0005	<0.0005	0.0006	<0.0005	0.0003	0.0004	0.0002	<0.0005
NO3, diss, mg/L	0.410	1.600	0.151	0.499	1.970	7.340	4.290	0.455
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.43	7.02	7.13	7.12	6.98	7.00	6.97	7.12
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0041	0.0097	0.0018	0.0015	0.0017	0.0060	0.0036	0.0011
SO4, diss, mg/L	38.8	58.0	32.3	22.3	22.1	52.4	47.6	23.2
Spec. Cond. (field), micromho	620	577	576	531	576	720	643	513
TDS, mg/L	318	370	314	394	444	468	472	278
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW5

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	0.1700	0.1800	0.2200	0.2200	0.1400	0.1400	0.1700	0.1600
Ba, diss, mg/L	0.029	0.026	0.028	0.031	0.020	0.017	0.023	0.027
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	1.6	1.8	0.2	1.8	2.3	5.2	5.8	2.2
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0003	0.0003	0.0005	0.0003
Cu, diss, mg/L	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	0.2	0.2	0.2	<0.2	0.2	0.2	0.2
Fe, diss, mg/L	<0.020	0.041	<0.020	0.026	<0.020	<0.020	0.242	0.242
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	0.0027	<0.0020	<0.0020	0.0006	0.0015	0.0031	0.0022
Ni, diss, mg/L	<0.0005	0.0005	0.0006	<0.0005	0.0005	0.0004	0.0004	0.0012
NO3, diss, mg/L	0.830	0.790	0.267	0.300	1.270	0.661	0.248	0.585
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.17	6.96	6.92	6.78	7.09	6.77	6.79	6.74
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0029	0.0046	0.0017	0.0018	0.0021	0.0019	0.0012	0.0010
SO4, diss, mg/L	40.7	35.4	22.1	16.3	16.1	14.1	9.6	15.8
Spec. Cond. (field), micromho	393	331	381	426	368	340	331	291
TDS, mg/L	256	245	411	244	192	170	172	146
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW12

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	0.2600	0.2800	0.4600	<0.5000	0.2900	0.2600	0.2100	0.1700
Ba, diss, mg/L	0.025	0.020	0.026	0.023	0.021	0.018	0.020	0.023
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	11.5	8.8	6.7	6.7	4.6	4.4	4.2	4.4
CN, total, mg/L	<0.01	0.09	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fe, diss, mg/L	<0.020	<0.020	<0.020	0.022	<0.020	<0.020	0.178	0.239
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0020	<0.0002
Mn, diss, mg/L	0.0306	1.2600	1.6600	0.0272	0.2860	0.1870	0.2050	0.2160
Ni, diss, mg/L	0.0009	0.0061	0.0077	0.0041	0.0018	0.0013	0.0012	0.0010
NO3, diss, mg/L	1.300	1.300	2.130	2.840	3.030	1.810	1.500	2.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	<0.002
pH (field), STD	6.82	6.91	6.86	6.74	6.91	6.90	6.87	6.82
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0112	0.0056	<0.0010	0.0017	0.0042	0.0040	0.0023	0.0014
SO4, diss, mg/L	98.0	475.0	238.0	180.0	128.0	72.8	91.6	78.5
Spec. Cond. (field), micromho	868	995	1180	1050	1050	954	886	893
TDS, mg/L	572	933	737	666	654	620	550	490
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0050	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW22D

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	0.0011	0.0006	<0.0005	0.0008	0.0007	0.0028
B, diss, mg/L	8.3200	8.7100	7.4500	7.9000	9.4300	8.6500	8.8400	0.0500
Ba, diss, mg/L	0.027	0.022	0.028	0.026	0.025	0.023	0.031	0.049
Be, diss, mg/L	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	0.0015	0.0014	0.0019	0.0015	0.0008	0.0009	0.0011	<0.0005
Cl, diss, mg/L	7.4	14.2	7.6	7.8	6.5	8.1	7.5	6.6
CN, total, mg/L	<0.01	0.05	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	0.095	0.073	0.112	0.099	0.068	0.073	0.097	<0.002
Cr, diss, mg/L	0.0049	0.0059	<0.0020	<0.0020	<0.0020	<0.0020	0.0003	<0.0020
Cu, diss, mg/L	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.5	0.2	0.9	0.4	<0.2	0.3	<0.2	<0.2
Fe, diss, mg/L	39.400	25.500	29.300	5.650	15.600	42.300	35.900	0.408
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	6.7600	5.1900	9.5700	0.1040	5.2900	6.4800	6.7400	0.1150
Ni, diss, mg/L	0.0449	0.0351	0.0577	0.0466	0.0299	0.0308	0.0359	<0.0005
NO3, diss, mg/L	0.450	<0.100	<0.100	<0.100	0.284	<0.100	<0.200	<0.200
Pb, diss, mg/L	0.003	<0.002	0.012	<0.002	<0.002	0.005	0.004	<0.002
pH (field), STD	5.31	5.30	5.23	5.32	5.53	5.39	5.68	7.17
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0100	<0.0100	<0.0500	<0.0100	<0.0100	<0.0050	<0.0100	<0.0010
SO4, diss, mg/L	1070.0	1540.0	1420.0	1420.0	856.0	973.0	1120.0	31.1
Spec. Cond. (field), micromho	1700	1380	2020	2000	1080	1840	1550	481
TDS, mg/L	1620	1540	2220	1740	1380	1640	1380	126
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	0.15	0.11	0.20	0.16	0.08	0.11	0.12	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW22

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0059	0.0075	0.0063	0.0045	0.0046	0.0060	0.0061	<0.0005
B, diss, mg/L	2.2900	2.3800	29.9000	3.0600	2.2500	2.5900	2.6400	0.1900
Ba, diss, mg/L	0.007	0.006	0.008	0.008	0.005	0.006	<0.020	0.042
Be, diss, mg/L	0.0063	0.0074	0.0085	0.0076	0.0071	0.0067	0.0075	<0.0020
Cd, diss, mg/L	0.0034	0.0038	0.0036	0.0032	0.0028	0.0034	0.0032	<0.0005
Cl, diss, mg/L	10.4	20.6	8.6	10.1	9.0	8.8	8.7	2.9
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	0.110	0.137	0.114	0.098	0.104	0.095	0.084	<0.002
Cr, diss, mg/L	<0.0020	0.0041	<0.0020	<0.0020	0.0007	0.0004	0.0007	<0.0020
Cu, diss, mg/L	0.0105	0.0104	0.0099	0.0088	0.0084	0.0073	0.0086	<0.0010
F, diss, mg/L	0.6	0.5	0.8	0.6	0.4	0.5	0.6	<0.2
Fe, diss, mg/L	433.000	522.000	354.000	382.000	495.000	<2.000	340.000	0.201
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0020	<0.0002
Mn, diss, mg/L	21.0000	27.8000	22.2000	22.7000	25.1000	20.3000	17.8000	0.0060
Ni, diss, mg/L	0.1050	0.1220	0.1120	0.0885	0.0977	0.0933	0.0866	0.0003
NO3, diss, mg/L	0.350	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	0.249
Pb, diss, mg/L	0.006	0.006	0.008	0.007	0.005	0.005	<0.020	<0.002
pH (field), STD	4.10	3.74	3.62	3.90	3.60	3.48	3.76	6.99
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0100	<0.0200	<0.0500	<0.0100	<0.0100	<0.0200	<0.0100	<0.0010
SO4, diss, mg/L	2220.0	4100.0	1440.0	3690.0	2550.0	2490.0	3420.0	18.7
Spec. Cond. (field), micromho	3550	2700	3020	3310	3560	3190	2890	396
TDS, mg/L	3370	4320	3790	3590	3620	3240	3200	164
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0050	<0.0005
V, diss, mg/L	0.002	0.003	<0.002	0.002	0.002	0.002	0.002	<0.002
Zn, diss, mg/L	0.54	0.61	0.67	0.41	0.66	0.43	0.40	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW23D

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0016	0.0041	0.0023	0.0037	0.0022	0.0036	0.0040	0.0017
B, diss, mg/L	0.0500	0.0500	0.0500	0.0500	0.0500	<0.0500	0.0500	8.0200
Ba, diss, mg/L	0.044	0.041	0.045	0.046	0.042	0.041	0.047	0.029
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016
Cl, diss, mg/L	5.8	6.2	5.5	6.1	5.4	6.4	5.9	9.7
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.105
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6
Fe, diss, mg/L	0.106	0.805	0.192	0.403	0.221	0.797	0.858	70.000
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.1390	0.1460	0.1300	0.1250	0.0832	0.1270	0.1260	8.6000
Ni, diss, mg/L	0.0005	<0.0005	<0.0005	<0.0005	0.0002	0.0003	0.0004	0.0465
NO3, diss, mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
pH (field), STD	7.34	7.17	7.21	7.44	7.62	7.20	7.32	5.28
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0100
SO4, diss, mg/L	32.9	34.0	31.6	30.6	20.0	26.4	25.5	1320.0
Spec. Cond. (field), micromho	472	401	483	478	488	495	455	2180
TDS, mg/L	317	276	200	274	238	282	244	1790
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.19

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW23S

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0092
B, diss, mg/L	0.1600	0.1600	0.1700	0.1900	0.1500	0.1700	0.1900	5.2400
Ba, diss, mg/L	0.024	0.025	0.033	0.030	0.031	0.033	0.040	0.009
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0082
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0051
Cl, diss, mg/L	3.0	2.9	2.4	3.2	2.1	7.0	2.7	10.1
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.091
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0003
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0064	0.0078
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.9
Fe, diss, mg/L	<0.020	<0.020	<0.020	0.029	<0.020	<0.020	0.249	204.000
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0020	<0.0002
Mn, diss, mg/L	0.0591	0.0530	0.0343	0.0144	0.0037	0.0230	0.0375	13.5000
Ni, diss, mg/L	0.0010	0.0008	0.0006	0.0005	0.0003	0.0003	0.0005	0.1190
NO3, diss, mg/L	0.450	<0.100	0.197	0.294	0.371	0.180	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	0.007
pH (field), STD	6.81	6.65	6.88	7.04	7.35	7.02	7.10	3.75
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0100
SO4, diss, mg/L	20.5	21.1	19.2	17.6	13.5	15.6	15.3	2060.0
Spec. Cond. (field), micromho	387	312	405	15	417	425	376	2800
TDS, mg/L	130	231	205	264	152	264	230	2800
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0050	<0.0005
V, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.60

APPENDIX B
SITE INSPECTION REPORTS

Hutsonville Power Station

Ash Pond A Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	12/04/2019
Inspector	LGH
Temperature	45 degrees F
Weather	Sunny

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	MM	Small area of erosion at bottom of north cap drainage drop to be repaired.
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	Control Panels	NI	See Pond D checklist.
	Drainage Sumps / Manholes	NI	See Pond D checklist.
	Pumps	NI	See Pond D checklist.
	Groundwater Monitoring Wells	NI	See Pond D checklist.
	Flow Meter Totalizer	NI	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	NI	N/A - meters are being read remotely.
	Other	NI	See Pond D checklist.

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.

Gray Area not inspected - data capture is via remote electronic signal.



Looking northerly across southeast toe



Looking west along south berm



Looking at east drainage drop



Looking down east drainage drop toward former Ash Pond B



Looking northwest across east berm



Looking west across cap



Looking at southwest cap drainage drop



Looking east up western cap face



Looking northeast along west berm



Looking at north cap drainage drop on north toe, small area of erosion at bottom of drainage drop



Looking south across cap



Drainage area along west berm, facing southwest

Hutsonville Power Station

Ash Pond A Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	09/26/2019
Inspector	HEC/LGH
Temperature	75 degrees F
Weather	Sunny

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	GC	
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	Control Panels	NI	See Pond D checklist.
	Drainage Sumps / Manholes	NI	See Pond D checklist.
	Pumps	NI	See Pond D checklist.
	Groundwater Monitoring Wells	NI	See Pond D checklist.
	Flow Meter Totalizer	NI	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	NI	N/A - meters are being read remotely.
	Other	NI	See Pond D checklist.

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.

Gray Area not inspected - data capture is via remote electronic signal.



Looking East Across South Berm



Looking Northerly Across West Berm



Looking Northerly Across Lower East Terrace



Looking Southerly Across Lower East terrace



Looking Northwest Across Upper East Terrace



Looking Southerly Across Upper East Terrace



Looking Down East Drainage Drop



Looking Down Southwest Cap Drainage Ditch - Repaired Area



Looking Northerly Up Western Cap Face



Looking Down North Cap Drainage Ditch and Repaired Area



Looking Down North Cap Drainage Ditch and Repaired Area to Drop



Looking Westerly Across North Berm

Hutsonville Power Station

Ash Pond A Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	**03/21/2019**
Inspector	**HEC**
Temperature	**45 degrees F**
Weather	**Cloudy**

	Item	Condition Code *	Comments
Pond Cap	**Vent Pipes**	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	GC	
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	**Vegetation**	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	**Control Panels**	GC	See Pond D checklist.
	Drainage Sumps / Manholes	GC	See Pond D checklist.
	Pumps	GC	See Pond D checklist.
	Groundwater Monitoring Wells	GC	See Pond D checklist.
	Flow Meter Totalizer	GC	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	GC	N/A - meters are being read remotely.
	Other	GC	See Pond D checklist.

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.

Gray Area not inspected - data capture is via remote electronic signal.



Looking Northwesterly Across Southeast Toe



Looking West at South Berm



Looking Northwesterly Across Southeast Toe 2



Looking East Across South Berm



Looking Up Southwest Drainage Drop



Looking Northeasterly Across West Berm



Looking South Across Northeast Lower Terrace



Looking Northwest Across Northeast Lower Terrace



Looking Northwest Across Northeast Upper Terrace



Looking Southeast Across Northeast Upper Terrace



Looking West Across Northeast Face of Cap



Looking West Across Upper South Terrace



Looking Southeast Down Upper Drainage Ditch



Looking Southeast Down Lower Drainage Ditch



Looking Down Southeast Drainage Drop



Looking West Across South Lower Terrace



Looking Northerly Up South Cap



Looking Southwesterly Down Southwest Toe



Looking Down Upper Southwest Drainage Ditch



Looking Northerly Across Lower West Terrace



Looking Northwest Up West Face of Cap



Looking Across Northwest Face of Cap



Looking Northeast Across Lower Northwest Terrace



Looking Westerly Across Lower Northwest Terrace



Looking Northeast Across Lower Northwest Terrace



Looking Southerly Up Northeast Cap Face



Looking Northerly Down Upper North Drainage Ditch



Looking Northeast Across North Toe



Looking Westerly Across Lower Northwest Terrace



Looking Down North Drainage Drop



Looking South Across Northeast Lower Terrace



Looking Southwest Across Northwest Berm



Looking Southwest Across Northwest Berm 2

Hutsonville Power Station

Ash Pond A Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	**6/27/2019**
Inspector	**HEC**
Temperature	**90 degrees F**
Weather	**Sunny**

	Item	Condition Code *	Comments
Pond Cap	**Vent Pipes**	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	GC	
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	**Vegetation**	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	**Control Panels**	NI	See Pond D checklist.
	Drainage Sumps / Manholes	NI	See Pond D checklist.
	Pumps	NI	See Pond D checklist.
	Groundwater Monitoring Wells	NI	See Pond D checklist.
	Flow Meter Totalizer	NI	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	NI	N/A - meters are being read remotely.
	Other	NI	See Pond D checklist.

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.

Gray Area not inspected - data capture is via remote electronic signal.



Looking Northerly Across the Southeast Toe



South Berm Looking Westerly



Looking East Across South Berm



Looking Northerly Acrosss West Berm



Looking Northerly Across Lower East Terrace



Looking Southerly Across Lower East terrace



Looking Northerly Across Upper East Terrace



Looking Southerly Across Upper East Terrace



Looking Northerly Across Cap



Looking Westerly Across South Terraces



Looking Southerly Toward Cap Southeast Drainage Ditch Entrance



Looking Down Repaired Cap Drainage Ditch



Looking Northwesterly Over Cap



Looking Westerly Across Lower South Terrace



Looking Southerly Across Lower South Terrace



Looking Down Southwest Cap Drainage Ditch - Repaired Area



Looking Northerly Up Western Cap Face



Looking East Across Upper North Terrace



Looking East Across Lower North Terrace



Looking Southwest Across Lower North Terrace



Repaired Lower North Terrace Area



Looking Down North Cap Drainage Ditch and Repaired Area



Looking Down North Cap Drainage Ditch and Repaired Area to Drop



Looking Down North Drainage Drop



Looking Westerly Across North Berm

APPENDIX C
STATISTICAL OUTPUT

APPENDIX C1
OUTLIER TEST

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Antimony, dissolved, mg/L
Location: MW12

Mean of all data: 0.002
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 3.884
T Critical of all data: Tcr = 2.580

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/18/2017	<0.010	True		1

Antimony, dissolved, mg/L
Location: MW22

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW22D

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Antimony, dissolved, mg/L

Location: MW23D

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW23S

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW2D

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Antimony, dissolved, mg/L
Location: MW2R

Mean of all data: 0.002
Standard Deviation of all data: 0.004
Largest Observation Concentration of all data: Xn = 0.018
Test Statistic, high extreme of all data: Tn = 3.905
T Critical of all data: Tcr = 2.504

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.018	False		1

Antimony, dissolved, mg/L
Location: MW3

Mean of all data: 0.002
Standard Deviation of all data: 0.003
Largest Observation Concentration of all data: Xn = 0.009
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.176

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.009	False		1

Antimony, dissolved, mg/L
Location: MW3D

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.872
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Antimony, dissolved, mg/L
Location: MW4

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.005
Test Statistic, high extreme of all data: Tn = 2.861
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.005	False		1

Antimony, dissolved, mg/L
Location: MW5

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 1.743
T Critical of all data: Tcr = 2.644

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L
Location: MW12

Mean of all data: 0.0002
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0006
Test Statistic, high extreme of all data: Tn = 2.7500
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2017	0.0006	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Arsenic, dissolved, mg/L
Location: MW22

Mean of all data: 0.0044
Standard Deviation of all data: 0.0028
Largest Observation Concentration of all data: Xn = 0.0075
Test Statistic, high extreme of all data: Tn = 1.1314
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L
Location: MW22D

Mean of all data: 0.0017
Standard Deviation of all data: 0.0021
Largest Observation Concentration of all data: Xn = 0.0065
Test Statistic, high extreme of all data: Tn = 2.3094
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	0.0065	False		1

Arsenic, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0027
Standard Deviation of all data: 0.0011
Largest Observation Concentration of all data: Xn = 0.0041
Test Statistic, high extreme of all data: Tn = 1.2301
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0012
Standard Deviation of all data: 0.0030
Largest Observation Concentration of all data: Xn = 0.0092
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0092	False		1

Arsenic, dissolved, mg/L
Location: MW2D

Mean of all data: 0.0080
Standard Deviation of all data: 0.0030
Largest Observation Concentration of all data: Xn = 0.0138
Test Statistic, high extreme of all data: Tn = 1.9367
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L
Location: MW2R

Mean of all data: 0.0004
Standard Deviation of all data: 0.0009
Largest Observation Concentration of all data: Xn = 0.0040
Test Statistic, high extreme of all data: Tn = 3.9056
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0040	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW3

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 2.6032
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0010	False		1

Arsenic, dissolved, mg/L

Location: MW3D

Mean of all data: 0.0008
Standard Deviation of all data: 0.0013
Largest Observation Concentration of all data: Xn = 0.0054
Test Statistic, high extreme of all data: Tn = 3.4930
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.0054	False		1

Arsenic, dissolved, mg/L

Location: MW4

Mean of all data: 0.0003
Standard Deviation of all data: 0.0006
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 4.3585
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0030	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW5

Mean of all data: 0.0002
Standard Deviation of all data: 0.0004
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 4.3941
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0020	False		1

Barium, dissolved, mg/L

Location: MW12

Mean of all data: 0.019
Standard Deviation of all data: 0.004
Largest Observation Concentration of all data: Xn = 0.026
Test Statistic, high extreme of all data: Tn = 1.768
T Critical of all data: Tcr = 2.580

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW22

Mean of all data: 0.014
Standard Deviation of all data: 0.012
Largest Observation Concentration of all data: Xn = 0.042
Test Statistic, high extreme of all data: Tn = 2.256
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.042	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Barium, dissolved, mg/L
Location: MW22D

Mean of all data: 0.025
Standard Deviation of all data: 0.011
Largest Observation Concentration of all data: Xn = 0.049
Test Statistic, high extreme of all data: Tn = 2.210
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.041
Standard Deviation of all data: 0.007
Largest Observation Concentration of all data: Xn = 0.047
Test Statistic, high extreme of all data: Tn = 0.974
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.028
Standard Deviation of all data: 0.009
Largest Observation Concentration of all data: Xn = 0.040
Test Statistic, high extreme of all data: Tn = 1.393
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.009	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Barium, dissolved, mg/L
Location: MW2D

Mean of all data: 0.071
Standard Deviation of all data: 0.011
Largest Observation Concentration of all data: Xn = 0.090
Test Statistic, high extreme of all data: Tn = 1.695
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW2R

Mean of all data: 0.036
Standard Deviation of all data: 0.006
Largest Observation Concentration of all data: Xn = 0.050
Test Statistic, high extreme of all data: Tn = 2.178
T Critical of all data: Tcr = 2.504

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW3

Mean of all data: 0.009
Standard Deviation of all data: 0.004
Largest Observation Concentration of all data: Xn = 0.015
Test Statistic, high extreme of all data: Tn = 1.516
T Critical of all data: Tcr = 2.176

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW3D

Mean of all data: 0.014
Standard Deviation of all data: 0.003
Largest Observation Concentration of all data: Xn = 0.021
Test Statistic, high extreme of all data: Tn = 2.096
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW4

Mean of all data: 0.020
Standard Deviation of all data: 0.004
Largest Observation Concentration of all data: Xn = 0.026
Test Statistic, high extreme of all data: Tn = 1.658
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW5

Mean of all data: 0.034
Standard Deviation of all data: 0.015
Largest Observation Concentration of all data: Xn = 0.071
Test Statistic, high extreme of all data: Tn = 2.404
T Critical of all data: Tcr = 2.644

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Beryllium, dissolved, mg/L
Location: MW12

Mean of all data: 0.0008
Standard Deviation of all data: 0.0011
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 3.8843
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/18/2017	<0.0050	True		1

Beryllium, dissolved, mg/L
Location: MW22

Mean of all data: 0.0057
Standard Deviation of all data: 0.0026
Largest Observation Concentration of all data: Xn = 0.0085
Test Statistic, high extreme of all data: Tn = 1.0754
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW22D

Mean of all data: 0.0024
Standard Deviation of all data: 0.0022
Largest Observation Concentration of all data: Xn = 0.0072
Test Statistic, high extreme of all data: Tn = 2.1239
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Beryllium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0018
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0082
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0082	False		1

Beryllium, dissolved, mg/L
Location: MW2D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Beryllium, dissolved, mg/L
Location: MW2R

Mean of all data: 0.0006
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.7752
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW3

Mean of all data: 0.0004
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.1619
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0006
Standard Deviation of all data: 0.0006
Largest Observation Concentration of all data: Xn = 0.0021
Test Statistic, high extreme of all data: Tn = 2.4994
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Beryllium, dissolved, mg/L
Location: MW4

Mean of all data: 0.0005
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.8919
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW5

Mean of all data: 0.0005
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.9789
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW12

Mean of all data: 0.1980
Standard Deviation of all data: 0.0877
Largest Observation Concentration of all data: Xn = 0.4600
Test Statistic, high extreme of all data: Tn = 2.9876
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	0.4600	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Boron, dissolved, mg/L

Location: MW22

Mean of all data: 5.7091
Standard Deviation of all data: 8.3268
Largest Observation Concentration of all data: Xn = 29.9000
Test Statistic, high extreme of all data: Tn = 2.9052
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	29.9000	False		1

Boron, dissolved, mg/L

Location: MW22D

Mean of all data: 6.7545
Standard Deviation of all data: 3.1054
Largest Observation Concentration of all data: Xn = 9.4300
Test Statistic, high extreme of all data: Tn = 0.8615
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW23D

Mean of all data: 0.9300
Standard Deviation of all data: 2.6588
Largest Observation Concentration of all data: Xn = 8.0200
Test Statistic, high extreme of all data: Tn = 2.6666
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	8.0200	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Boron, dissolved, mg/L

Location: MW23S

Mean of all data: 0.7333
Standard Deviation of all data: 1.6901
Largest Observation Concentration of all data: Xn = 5.2400
Test Statistic, high extreme of all data: Tn = 2.6666
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	5.2400	False		1

Boron, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0845
Standard Deviation of all data: 0.1025
Largest Observation Concentration of all data: Xn = 0.3400
Test Statistic, high extreme of all data: Tn = 2.4921
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	0.3400	False		1

Boron, dissolved, mg/L

Location: MW2R

Mean of all data: 1.8875
Standard Deviation of all data: 0.8002
Largest Observation Concentration of all data: Xn = 3.5500
Test Statistic, high extreme of all data: Tn = 2.0776
T Critical of all data: Tcr = 2.9480

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Boron, dissolved, mg/L
Location: MW3

Mean of all data: 3.1898
Standard Deviation of all data: 1.9405
Largest Observation Concentration of all data: Xn = 7.7800
Test Statistic, high extreme of all data: Tn = 2.3655
T Critical of all data: Tcr = 2.9710

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW3D

Mean of all data: 3.4036
Standard Deviation of all data: 1.1883
Largest Observation Concentration of all data: Xn = 5.9600
Test Statistic, high extreme of all data: Tn = 2.1513
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW4

Mean of all data: 0.2796
Standard Deviation of all data: 0.1259
Largest Observation Concentration of all data: Xn = 0.8310
Test Statistic, high extreme of all data: Tn = 4.3801
T Critical of all data: Tcr = 3.0710

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/11/2012	0.8310	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Boron, dissolved, mg/L

Location: MW5

Mean of all data: 0.2261
Standard Deviation of all data: 0.1365
Largest Observation Concentration of all data: Xn = 0.7100
Test Statistic, high extreme of all data: Tn = 3.5462
T Critical of all data: Tcr = 3.0820

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/06/2011	0.7100	False		1

Cadmium, dissolved, mg/L

Location: MW12

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0013
Test Statistic, high extreme of all data: Tn = 3.8843
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/18/2017	<0.0013	True		1

Cadmium, dissolved, mg/L

Location: MW22

Mean of all data: 0.0028
Standard Deviation of all data: 0.0011
Largest Observation Concentration of all data: Xn = 0.0038
Test Statistic, high extreme of all data: Tn = 0.8847
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.0003	True	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Cadmium, dissolved, mg/L
Location: MW22D

Mean of all data: 0.0018
Standard Deviation of all data: 0.0013
Largest Observation Concentration of all data: Xn = 0.0045
Test Statistic, high extreme of all data: Tn = 2.0148
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0004
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0016
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0016	False		1

Cadmium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0008
Standard Deviation of all data: 0.0016
Largest Observation Concentration of all data: Xn = 0.0051
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0051	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cadmium, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW2R

Mean of all data: 0.0002
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.7752
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW3

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.1619
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Cadmium, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0023
Standard Deviation of all data: 0.0026
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 2.9607
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.0100	False		1

Cadmium, dissolved, mg/L
Location: MW4

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.8919
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L
Location: MW5

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.9789
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chloride, dissolved, mg/L

Location: MW12

Mean of all data: 4.5
Standard Deviation of all data: 2.7
Largest Observation Concentration of all data: Xn = 11.5
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	11.5	False		1

Chloride, dissolved, mg/L

Location: MW22

Mean of all data: 9.2
Standard Deviation of all data: 4.3
Largest Observation Concentration of all data: Xn = 20.6
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	20.6	False		1

Chloride, dissolved, mg/L

Location: MW22D

Mean of all data: 8.0
Standard Deviation of all data: 2.1
Largest Observation Concentration of all data: Xn = 14.2
Test Statistic, high extreme of all data: Tn = 2.9
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	14.2	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chloride, dissolved, mg/L

Location: MW23D

Mean of all data: 6.3
Standard Deviation of all data: 1.3
Largest Observation Concentration of all data: Xn = 9.7
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	9.7	False		1

Chloride, dissolved, mg/L

Location: MW23S

Mean of all data: 4.1
Standard Deviation of all data: 2.7
Largest Observation Concentration of all data: Xn = 10.1
Test Statistic, high extreme of all data: Tn = 2.2
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	10.1	False		1

Chloride, dissolved, mg/L

Location: MW2D

Mean of all data: 11.6
Standard Deviation of all data: 1.9
Largest Observation Concentration of all data: Xn = 16.5
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/17/2019	16.5	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Chloride, dissolved, mg/L

Location: MW2R

Mean of all data: 18.4
Standard Deviation of all data: 4.7
Largest Observation Concentration of all data: Xn = 26.8
Test Statistic, high extreme of all data: Tn = 1.8
T Critical of all data: Tcr = 2.5

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW3

Mean of all data: 7.8
Standard Deviation of all data: 6.8
Largest Observation Concentration of all data: Xn = 21.9
Test Statistic, high extreme of all data: Tn = 2.1
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW3D

Mean of all data: 13.5
Standard Deviation of all data: 3.5
Largest Observation Concentration of all data: Xn = 18.6
Test Statistic, high extreme of all data: Tn = 1.4
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2015	1.0	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chloride, dissolved, mg/L
Location: MW4

Mean of all data: 2.1
Standard Deviation of all data: 1.4
Largest Observation Concentration of all data: Xn = 5.7
Test Statistic, high extreme of all data: Tn = 2.5
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW5

Mean of all data: 3.5
Standard Deviation of all data: 2.6
Largest Observation Concentration of all data: Xn = 8.3
Test Statistic, high extreme of all data: Tn = 1.8
T Critical of all data: Tcr = 2.7

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chromium, dissolved, mg/L
Location: MW12

Mean of all data: 0.0011
Standard Deviation of all data: 0.0015
Largest Observation Concentration of all data: Xn = 0.0060
Test Statistic, high extreme of all data: Tn = 3.1723
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/22/2014	0.0060	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW22

Mean of all data: 0.0012
Standard Deviation of all data: 0.0010
Largest Observation Concentration of all data: Xn = 0.0041
Test Statistic, high extreme of all data: Tn = 2.9537
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	0.0041	False		1

Chromium, dissolved, mg/L

Location: MW22D

Mean of all data: 0.0017
Standard Deviation of all data: 0.0018
Largest Observation Concentration of all data: Xn = 0.0059
Test Statistic, high extreme of all data: Tn = 2.2665
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	0.0059	False		1

Chromium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0009
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.3333
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0003	False	-1	

Chromium, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chromium, dissolved, mg/L

Location: MW2R

Mean of all data: 0.0016
Standard Deviation of all data: 0.0032
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 3.8473
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0140	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW3

Mean of all data: 0.0028
Standard Deviation of all data: 0.0045
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 2.5072
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0140	False		1

Chromium, dissolved, mg/L

Location: MW3D

Mean of all data: 0.0007
Standard Deviation of all data: 0.0007
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 3.2366
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	0.0030	False		1

Chromium, dissolved, mg/L

Location: MW4

Mean of all data: 0.0017
Standard Deviation of all data: 0.0032
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 3.8129
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0140	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW5

Mean of all data: 0.0009
Standard Deviation of all data: 0.0015
Largest Observation Concentration of all data: Xn = 0.0070
Test Statistic, high extreme of all data: Tn = 4.1636
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0070	False		1

Cobalt, Dis, mg/L

Location: MW12

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.845
T Critical of all data: Tcr = 2.580

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW22

Mean of all data: 0.105
Standard Deviation of all data: 0.043
Largest Observation Concentration of all data: Xn = 0.180
Test Statistic, high extreme of all data: Tn = 1.743
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.001	True	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cobalt, Dis, mg/L

Location: MW22D

Mean of all data: 0.081
Standard Deviation of all data: 0.030
Largest Observation Concentration of all data: Xn = 0.112
Test Statistic, high extreme of all data: Tn = 1.032
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.001	True	-1	

Cobalt, Dis, mg/L

Location: MW23D

Mean of all data: 0.014
Standard Deviation of all data: 0.034
Largest Observation Concentration of all data: Xn = 0.105
Test Statistic, high extreme of all data: Tn = 2.652
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.105	False		1

Cobalt, Dis, mg/L

Location: MW23S

Mean of all data: 0.011
Standard Deviation of all data: 0.030
Largest Observation Concentration of all data: Xn = 0.091
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.091	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Cobalt, Dis, mg/L
Location: MW2D

Mean of all data: 0.001
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L
Location: MW2R

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.775
T Critical of all data: Tcr = 2.504

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L
Location: MW3

Mean of all data: 0.001
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.006
Test Statistic, high extreme of all data: Tn = 2.760
T Critical of all data: Tcr = 2.176

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	0.006	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cobalt, Dis, mg/L

Location: MW3D

Mean of all data: 0.084
Standard Deviation of all data: 0.081
Largest Observation Concentration of all data: Xn = 0.332
Test Statistic, high extreme of all data: Tn = 3.054
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.332	False		1

Cobalt, Dis, mg/L

Location: MW4

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.892
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW5

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.979
T Critical of all data: Tcr = 2.644

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L
Location: MW12

Mean of all data: 0.0005
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 3.0000
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	0.0020	False		1

Copper, dissolved, mg/L
Location: MW22

Mean of all data: 0.0070
Standard Deviation of all data: 0.0043
Largest Observation Concentration of all data: Xn = 0.0116
Test Statistic, high extreme of all data: Tn = 1.0610
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW22D

Mean of all data: 0.0038
Standard Deviation of all data: 0.0082
Largest Observation Concentration of all data: Xn = 0.0273
Test Statistic, high extreme of all data: Tn = 2.8642
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	0.0273	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0005
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0005
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0020
Standard Deviation of all data: 0.0029
Largest Observation Concentration of all data: Xn = 0.0078
Test Statistic, high extreme of all data: Tn = 1.9900
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0005
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0005
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Copper, dissolved, mg/L
Location: MW2R

Mean of all data: 0.0006
Standard Deviation of all data: 0.0006
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 2.4144
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW3

Mean of all data: 0.0038
Standard Deviation of all data: 0.0051
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 2.5834
T Critical of all data: Tcr = 2.3710

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/28/1994	0.0170	False		1

Copper, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0014
Standard Deviation of all data: 0.0028
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 4.0725
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/07/2016	0.0130	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L

Location: MW4

Mean of all data: 0.0083
Standard Deviation of all data: 0.0376
Largest Observation Concentration of all data: Xn = 0.2000
Test Statistic, high extreme of all data: Tn = 5.0936
T Critical of all data: Tcr = 2.7140

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/27/1991	0.2000	False		1

Copper, dissolved, mg/L

Location: MW5

Mean of all data: 0.0007
Standard Deviation of all data: 0.0014
Largest Observation Concentration of all data: Xn = 0.0070
Test Statistic, high extreme of all data: Tn = 4.4920
T Critical of all data: Tcr = 2.7140

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/28/1994	0.0070	False		1

Cyanide, total, mg/L

Location: MW12

Mean of all data: 0.01
Standard Deviation of all data: 0.02
Largest Observation Concentration of all data: Xn = 0.09
Test Statistic, high extreme of all data: Tn = 4.28
T Critical of all data: Tcr = 2.58

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	0.09	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cyanide, total, mg/L

Location: MW22

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.26
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW22D

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.05
Test Statistic, high extreme of all data: Tn = 2.96
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	0.05	False		1

Cyanide, total, mg/L

Location: MW23D

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.05
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cyanide, total, mg/L

Location: MW23S

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.05
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW2D

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.02
Test Statistic, high extreme of all data: Tn = 2.56
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	0.02	False		1

Cyanide, total, mg/L

Location: MW2R

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.48
T Critical of all data: Tcr = 2.50

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cyanide, total, mg/L

Location: MW3

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.16
T Critical of all data: Tcr = 2.18

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW3D

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.66
T Critical of all data: Tcr = 2.60

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW4

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.02
Test Statistic, high extreme of all data: Tn = 2.40
T Critical of all data: Tcr = 2.60

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cyanide, total, mg/L

Location: MW5

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.07
Test Statistic, high extreme of all data: Tn = 4.46
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/26/2016	0.07	False		1

Fluoride, dissolved, mg/L

Location: MW12

Mean of all data: 0.1
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.5
Test Statistic, high extreme of all data: Tn = 3.1
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	0.5	False		1

Fluoride, dissolved, mg/L

Location: MW22

Mean of all data: 0.5
Standard Deviation of all data: 0.2
Largest Observation Concentration of all data: Xn = 0.8
Test Statistic, high extreme of all data: Tn = 1.3
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L

Location: MW22D

Mean of all data: 0.3
Standard Deviation of all data: 0.3
Largest Observation Concentration of all data: Xn = 0.9
Test Statistic, high extreme of all data: Tn = 2.4
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	0.9	False		1

Fluoride, dissolved, mg/L

Location: MW23D

Mean of all data: 0.2
Standard Deviation of all data: 0.2
Largest Observation Concentration of all data: Xn = 0.6
Test Statistic, high extreme of all data: Tn = 2.3
T Critical of all data: Tcr = 2.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.6	False		1

Fluoride, dissolved, mg/L

Location: MW23S

Mean of all data: 0.2
Standard Deviation of all data: 0.3
Largest Observation Concentration of all data: Xn = 0.9
Test Statistic, high extreme of all data: Tn = 2.4
T Critical of all data: Tcr = 2.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.9	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L

Location: MW2D

Mean of all data: 0.3
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.4
Test Statistic, high extreme of all data: Tn = 1.9
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW2R

Mean of all data: 1.3
Standard Deviation of all data: 5.0
Largest Observation Concentration of all data: Xn = 21.2
Test Statistic, high extreme of all data: Tn = 4.0
T Critical of all data: Tcr = 2.5

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	21.2	False		1

Fluoride, dissolved, mg/L

Location: MW3

Mean of all data: 0.2
Standard Deviation of all data: 0.3
Largest Observation Concentration of all data: Xn = 1.0
Test Statistic, high extreme of all data: Tn = 2.4
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	1.0	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Fluoride, dissolved, mg/L

Location: MW3D

Mean of all data: 0.3
Standard Deviation of all data: 0.4
Largest Observation Concentration of all data: Xn = 1.3
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/17/2019	1.3	False		1

Fluoride, dissolved, mg/L

Location: MW4

Mean of all data: 0.2
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.5
Test Statistic, high extreme of all data: Tn = 2.2
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW5

Mean of all data: 0.2
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.4
Test Statistic, high extreme of all data: Tn = 2.5
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Iron, dissolved, mg/L

Location: MW12

Mean of all data: 0.155
Standard Deviation of all data: 0.229
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 2.421
T Critical of all data: Tcr = 2.580

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW22

Mean of all data: 267.710
Standard Deviation of all data: 210.535
Largest Observation Concentration of all data: Xn = 522.000
Test Statistic, high extreme of all data: Tn = 1.208
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW22D

Mean of all data: 54.754
Standard Deviation of all data: 100.794
Largest Observation Concentration of all data: Xn = 354.000
Test Statistic, high extreme of all data: Tn = 2.969
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	354.000	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Iron, dissolved, mg/L
Location: MW23D

Mean of all data: 8.154
Standard Deviation of all data: 23.195
Largest Observation Concentration of all data: Xn = 70.000
Test Statistic, high extreme of all data: Tn = 2.666
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	70.000	False		1

Iron, dissolved, mg/L
Location: MW23S

Mean of all data: 22.707
Standard Deviation of all data: 67.985
Largest Observation Concentration of all data: Xn = 204.000
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	204.000	False		1

Iron, dissolved, mg/L
Location: MW2D

Mean of all data: 1.086
Standard Deviation of all data: 1.171
Largest Observation Concentration of all data: Xn = 3.560
Test Statistic, high extreme of all data: Tn = 2.113
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Iron, dissolved, mg/L
Location: MW2R

Mean of all data: 0.182
Standard Deviation of all data: 0.195
Largest Observation Concentration of all data: Xn = 0.603
Test Statistic, high extreme of all data: Tn = 2.158
T Critical of all data: Tcr = 2.504

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L
Location: MW3

Mean of all data: 0.295
Standard Deviation of all data: 0.737
Largest Observation Concentration of all data: Xn = 2.890
Test Statistic, high extreme of all data: Tn = 3.520
T Critical of all data: Tcr = 2.887

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	2.890	False		1

Iron, dissolved, mg/L
Location: MW3D

Mean of all data: 4.598
Standard Deviation of all data: 4.725
Largest Observation Concentration of all data: Xn = 15.000
Test Statistic, high extreme of all data: Tn = 2.201
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Iron, dissolved, mg/L

Location: MW4

Mean of all data: 0.095
Standard Deviation of all data: 0.160
Largest Observation Concentration of all data: Xn = 0.751
Test Statistic, high extreme of all data: Tn = 4.099
T Critical of all data: Tcr = 2.986

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/30/2012	0.751	False		1

Iron, dissolved, mg/L

Location: MW5

Mean of all data: 0.075
Standard Deviation of all data: 0.146
Largest Observation Concentration of all data: Xn = 0.840
Test Statistic, high extreme of all data: Tn = 5.228
T Critical of all data: Tcr = 3.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/22/1991	0.840	False		1

Lead, dissolved, mg/L

Location: MW12

Mean of all data: 0.001
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 3.840
T Critical of all data: Tcr = 2.580

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.010	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L
Location: MW22

Mean of all data: 0.005
Standard Deviation of all data: 0.003
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 1.646
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW22D

Mean of all data: 0.004
Standard Deviation of all data: 0.004
Largest Observation Concentration of all data: Xn = 0.012
Test Statistic, high extreme of all data: Tn = 2.114
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW23D

Mean of all data: 0.001
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.002	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Lead, dissolved, mg/L

Location: MW23S

Mean of all data: 0.003
Standard Deviation of all data: 0.003
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 2.162
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.010	True		1

Lead, dissolved, mg/L

Location: MW2D

Mean of all data: 0.001
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW2R

Mean of all data: 0.001
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.687
T Critical of all data: Tcr = 2.504

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Lead, dissolved, mg/L

Location: MW3

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 1.162
T Critical of all data: Tcr = 2.176

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW3D

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.892
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW4

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.892
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Lead, dissolved, mg/L
Location: MW5

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 0.979
T Critical of all data: Tcr = 2.644

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L
Location: MW12

Mean of all data: 0.2626
Standard Deviation of all data: 0.4389
Largest Observation Concentration of all data: Xn = 1.6600
Test Statistic, high extreme of all data: Tn = 3.1836
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	1.6600	False		1

Manganese, dissolved, mg/L
Location: MW22

Mean of all data: 26.5224
Standard Deviation of all data: 27.5030
Largest Observation Concentration of all data: Xn = 106.0000
Test Statistic, high extreme of all data: Tn = 2.8898
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	106.0000	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW22D

Mean of all data: 6.9372
Standard Deviation of all data: 5.2189
Largest Observation Concentration of all data: Xn = 19.6000
Test Statistic, high extreme of all data: Tn = 2.4264
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	19.6000	False		1

Manganese, dissolved, mg/L

Location: MW23D

Mean of all data: 1.0764
Standard Deviation of all data: 2.8216
Largest Observation Concentration of all data: Xn = 8.6000
Test Statistic, high extreme of all data: Tn = 2.6665
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	8.6000	False		1

Manganese, dissolved, mg/L

Location: MW23S

Mean of all data: 1.5472
Standard Deviation of all data: 4.4827
Largest Observation Concentration of all data: Xn = 13.5000
Test Statistic, high extreme of all data: Tn = 2.6664
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	13.5000	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0675
Standard Deviation of all data: 0.0094
Largest Observation Concentration of all data: Xn = 0.0880
Test Statistic, high extreme of all data: Tn = 2.1796
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW2R

Mean of all data: 0.0088
Standard Deviation of all data: 0.0133
Largest Observation Concentration of all data: Xn = 0.0534
Test Statistic, high extreme of all data: Tn = 3.3564
T Critical of all data: Tcr = 2.9480

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	0.0534	False		1

Manganese, dissolved, mg/L

Location: MW3

Mean of all data: 0.0746
Standard Deviation of all data: 0.1338
Largest Observation Concentration of all data: Xn = 0.7080
Test Statistic, high extreme of all data: Tn = 4.7341
T Critical of all data: Tcr = 2.9710

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	0.7080	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW3D

Mean of all data: 13.5554
Standard Deviation of all data: 9.7851
Largest Observation Concentration of all data: Xn = 43.7000
Test Statistic, high extreme of all data: Tn = 3.0807
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2017	43.7000	False		1

Manganese, dissolved, mg/L

Location: MW4

Mean of all data: 0.0359
Standard Deviation of all data: 0.1656
Largest Observation Concentration of all data: Xn = 1.2500
Test Statistic, high extreme of all data: Tn = 7.3304
T Critical of all data: Tcr = 3.0710

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	1.2500	False		1

Manganese, dissolved, mg/L

Location: MW5

Mean of all data: 0.0037
Standard Deviation of all data: 0.0074
Largest Observation Concentration of all data: Xn = 0.0380
Test Statistic, high extreme of all data: Tn = 4.6480
T Critical of all data: Tcr = 3.0820

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/27/2014	0.0380	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Mercury, dissolved, mg/L

Location: MW12

Mean of all data: 0.0001
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 3.8404
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0010	True		1

Mercury, dissolved, mg/L

Location: MW22

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 3.0151
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0010	True		1

Mercury, dissolved, mg/L

Location: MW22D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Mercury, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0010	True		1

Mercury, dissolved, mg/L
Location: MW2D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Mercury, dissolved, mg/L
Location: MW2R

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0002
Test Statistic, high extreme of all data: Tn = 2.2443
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW3

Mean of all data: 0.0000
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 1.2613
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0002
Test Statistic, high extreme of all data: Tn = 2.3870
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Mercury, dissolved, mg/L

Location: MW4

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0002
Test Statistic, high extreme of all data: Tn = 2.3870
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L

Location: MW5

Mean of all data: 0.0001
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0009
Test Statistic, high extreme of all data: Tn = 4.5107
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0009	False		1

Nickel, dissolved, mg/L

Location: MW12

Mean of all data: 0.0030
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0078
Test Statistic, high extreme of all data: Tn = 1.9605
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nickel, dissolved, mg/L
Location: MW22

Mean of all data: 0.0832
Standard Deviation of all data: 0.0352
Largest Observation Concentration of all data: Xn = 0.1220
Test Statistic, high extreme of all data: Tn = 1.1008
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0003	False	-1	

Nickel, dissolved, mg/L
Location: MW22D

Mean of all data: 0.0469
Standard Deviation of all data: 0.0278
Largest Observation Concentration of all data: Xn = 0.1050
Test Statistic, high extreme of all data: Tn = 2.0922
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0058
Standard Deviation of all data: 0.0153
Largest Observation Concentration of all data: Xn = 0.0465
Test Statistic, high extreme of all data: Tn = 2.6590
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0465	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Nickel, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0139
Standard Deviation of all data: 0.0394
Largest Observation Concentration of all data: Xn = 0.1190
Test Statistic, high extreme of all data: Tn = 2.6665
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.1190	False		1

Nickel, dissolved, mg/L
Location: MW2D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0006
Test Statistic, high extreme of all data: Tn = 3.0151
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.0006	False		1

Nickel, dissolved, mg/L
Location: MW2R

Mean of all data: 0.0020
Standard Deviation of all data: 0.0031
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 3.2323
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.0120	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Nickel, dissolved, mg/L
Location: MW3

Mean of all data: 0.0133
Standard Deviation of all data: 0.0119
Largest Observation Concentration of all data: Xn = 0.0300
Test Statistic, high extreme of all data: Tn = 1.4067
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L
Location: MW3D

Mean of all data: 0.1515
Standard Deviation of all data: 0.0851
Largest Observation Concentration of all data: Xn = 0.3690
Test Statistic, high extreme of all data: Tn = 2.5561
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L
Location: MW4

Mean of all data: 0.0029
Standard Deviation of all data: 0.0068
Largest Observation Concentration of all data: Xn = 0.0310
Test Statistic, high extreme of all data: Tn = 4.1528
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/30/2012	0.0310	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nickel, dissolved, mg/L

Location: MW5

Mean of all data: 0.0017
Standard Deviation of all data: 0.0022
Largest Observation Concentration of all data: Xn = 0.0080
Test Statistic, high extreme of all data: Tn = 2.8810
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0080	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW12

Mean of all data: 1.416
Standard Deviation of all data: 0.705
Largest Observation Concentration of all data: Xn = 3.030
Test Statistic, high extreme of all data: Tn = 2.290
T Critical of all data: Tcr = 2.580

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW22

Mean of all data: 0.114
Standard Deviation of all data: 0.099
Largest Observation Concentration of all data: Xn = 0.350
Test Statistic, high extreme of all data: Tn = 2.377
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.350	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nitrate nitrogen, dissolved, mg/L

Location: MW22D

Mean of all data: 0.135
Standard Deviation of all data: 0.124
Largest Observation Concentration of all data: Xn = 0.450
Test Statistic, high extreme of all data: Tn = 2.537
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.450	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW23D

Mean of all data: 0.061
Standard Deviation of all data: 0.022
Largest Observation Concentration of all data: Xn = 0.100
Test Statistic, high extreme of all data: Tn = 1.764
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW23S

Mean of all data: 0.216
Standard Deviation of all data: 0.133
Largest Observation Concentration of all data: Xn = 0.450
Test Statistic, high extreme of all data: Tn = 1.763
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nitrate nitrogen, dissolved, mg/L

Location: MW2D

Mean of all data: 0.078
Standard Deviation of all data: 0.051
Largest Observation Concentration of all data: Xn = 0.200
Test Statistic, high extreme of all data: Tn = 2.410
T Critical of all data: Tcr = 2.234

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	0.200	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW2R

Mean of all data: 2.491
Standard Deviation of all data: 2.891
Largest Observation Concentration of all data: Xn = 12.700
Test Statistic, high extreme of all data: Tn = 3.532
T Critical of all data: Tcr = 2.504

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/18/2017	12.700	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW3

Mean of all data: 1.306
Standard Deviation of all data: 1.126
Largest Observation Concentration of all data: Xn = 3.880
Test Statistic, high extreme of all data: Tn = 2.285
T Critical of all data: Tcr = 2.176

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/07/2016	3.880	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Nitrate nitrogen, dissolved, mg/L
Location: MW3D

Mean of all data: 0.506
Standard Deviation of all data: 0.715
Largest Observation Concentration of all data: Xn = 2.560
Test Statistic, high extreme of all data: Tn = 2.874
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2.560	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW4

Mean of all data: 1.277
Standard Deviation of all data: 1.756
Largest Observation Concentration of all data: Xn = 7.340
Test Statistic, high extreme of all data: Tn = 3.452
T Critical of all data: Tcr = 2.603

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/17/2019	7.340	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW5

Mean of all data: 1.582
Standard Deviation of all data: 1.439
Largest Observation Concentration of all data: Xn = 5.060
Test Statistic, high extreme of all data: Tn = 2.418
T Critical of all data: Tcr = 2.644

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

pH (field), STD

Location: MW12

Mean of all data: 6.96
Standard Deviation of all data: 0.35
Largest Observation Concentration of all data: Xn = 8.18
Test Statistic, high extreme of all data: Tn = 3.46
T Critical of all data: Tcr = 2.98

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/29/1999	8.18	False		1

pH (field), STD

Location: MW22

Mean of all data: 4.35
Standard Deviation of all data: 1.16
Largest Observation Concentration of all data: Xn = 6.99
Test Statistic, high extreme of all data: Tn = 2.27
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	6.99	False		1

pH (field), STD

Location: MW22D

Mean of all data: 5.29
Standard Deviation of all data: 0.86
Largest Observation Concentration of all data: Xn = 7.17
Test Statistic, high extreme of all data: Tn = 2.19
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

pH (field), STD

Location: MW23D

Mean of all data: 7.11
Standard Deviation of all data: 0.70
Largest Observation Concentration of all data: Xn = 7.62
Test Statistic, high extreme of all data: Tn = 0.72
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	5.28	False	-1	

pH (field), STD

Location: MW23S

Mean of all data: 6.65
Standard Deviation of all data: 1.11
Largest Observation Concentration of all data: Xn = 7.35
Test Statistic, high extreme of all data: Tn = 0.64
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	3.75	False	-1	

pH (field), STD

Location: MW2D

Mean of all data: 7.52
Standard Deviation of all data: 0.10
Largest Observation Concentration of all data: Xn = 7.68
Test Statistic, high extreme of all data: Tn = 1.68
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

pH (field), STD

Location: MW2R

Mean of all data: 7.36
Standard Deviation of all data: 0.16
Largest Observation Concentration of all data: Xn = 7.64
Test Statistic, high extreme of all data: Tn = 1.76
T Critical of all data: Tcr = 2.95

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/20/2013	6.85	False	-1	

pH (field), STD

Location: MW3

Mean of all data: 9.65
Standard Deviation of all data: 35.04
Largest Observation Concentration of all data: Xn = 440.00
Test Statistic, high extreme of all data: Tn = 12.28
T Critical of all data: Tcr = 3.53

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2010	440.00	False		1

pH (field), STD

Location: MW3D

Mean of all data: 6.20
Standard Deviation of all data: 0.36
Largest Observation Concentration of all data: Xn = 7.50
Test Statistic, high extreme of all data: Tn = 3.59
T Critical of all data: Tcr = 3.01

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/05/2003	7.50	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

pH (field), STD

Location: MW4

Mean of all data: 9.17
Standard Deviation of all data: 24.87
Largest Observation Concentration of all data: Xn = 320.00
Test Statistic, high extreme of all data: Tn = 12.50
T Critical of all data: Tcr = 3.54

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/17/2010	320.00	False		1

pH (field), STD

Location: MW5

Mean of all data: 7.82
Standard Deviation of all data: 10.43
Largest Observation Concentration of all data: Xn = 150.00
Test Statistic, high extreme of all data: Tn = 13.64
T Critical of all data: Tcr = 3.55

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/17/2010	150.00	False		1

Selenium, dissolved, mg/L

Location: MW12

Mean of all data: 0.0028
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0112
Test Statistic, high extreme of all data: Tn = 3.4852
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.0112	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW22

Mean of all data: 0.0085
Standard Deviation of all data: 0.0076
Largest Observation Concentration of all data: Xn = 0.0250
Test Statistic, high extreme of all data: Tn = 2.1911
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW22D

Mean of all data: 0.0105
Standard Deviation of all data: 0.0147
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 2.6939
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	<0.0500	True		1

Selenium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0015
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.0050	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0010
Standard Deviation of all data: 0.0015
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.0050	True		1

Selenium, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0005
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0005
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW2R

Mean of all data: 0.0060
Standard Deviation of all data: 0.0039
Largest Observation Concentration of all data: Xn = 0.0156
Test Statistic, high extreme of all data: Tn = 2.4711
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Selenium, dissolved, mg/L
Location: MW3

Mean of all data: 0.0146
Standard Deviation of all data: 0.0089
Largest Observation Concentration of all data: Xn = 0.0365
Test Statistic, high extreme of all data: Tn = 2.4476
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/07/2016	0.0365	False		1

Selenium, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0042
Standard Deviation of all data: 0.0105
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.3627
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	<0.0500	True		1

Selenium, dissolved, mg/L
Location: MW4

Mean of all data: 0.0028
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0097
Test Statistic, high extreme of all data: Tn = 2.8480
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	0.0097	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Selenium, dissolved, mg/L
Location: MW5

Mean of all data: 0.0021
Standard Deviation of all data: 0.0016
Largest Observation Concentration of all data: Xn = 0.0048
Test Statistic, high extreme of all data: Tn = 1.7122
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW12

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0013
Test Statistic, high extreme of all data: Tn = 3.8843
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/18/2017	<0.0013	True		1

Silver, dissolved, mg/L
Location: MW22

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L

Location: MW22D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L
Location: MW2D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW2R

Mean of all data: 0.0008
Standard Deviation of all data: 0.0017
Largest Observation Concentration of all data: Xn = 0.0060
Test Statistic, high extreme of all data: Tn = 3.0176
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	0.0060	False		1

Silver, dissolved, mg/L
Location: MW3

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0018
Test Statistic, high extreme of all data: Tn = 2.7720
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	0.0018	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.8919
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW4

Mean of all data: 0.0002
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0006
Test Statistic, high extreme of all data: Tn = 2.7989
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	0.0006	False		1

Silver, dissolved, mg/L
Location: MW5

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0005
Test Statistic, high extreme of all data: Tn = 2.4792
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Specific Conductance (field), micromhos/cm

Location: MW12

Mean of all data: 844
Standard Deviation of all data: 528
Largest Observation Concentration of all data: Xn = 3090
Test Statistic, high extreme of all data: Tn = 4
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/18/2017	3090	False		1

Specific Conductance (field), micromhos/cm

Location: MW22

Mean of all data: 2541
Standard Deviation of all data: 991
Largest Observation Concentration of all data: Xn = 3560
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm

Location: MW22D

Mean of all data: 1652
Standard Deviation of all data: 595
Largest Observation Concentration of all data: Xn = 2690
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Specific Conductance (field), micromhos/cm
Location: MW23D

Mean of all data: 635
Standard Deviation of all data: 584
Largest Observation Concentration of all data: Xn = 2180
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2180	False		1

Specific Conductance (field), micromhos/cm
Location: MW23S

Mean of all data: 599
Standard Deviation of all data: 835
Largest Observation Concentration of all data: Xn = 2800
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2800	False		1

Specific Conductance (field), micromhos/cm
Location: MW2D

Mean of all data: 469
Standard Deviation of all data: 58
Largest Observation Concentration of all data: Xn = 513
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	331	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Specific Conductance (field), micromhos/cm

Location: MW2R

Mean of all data: 834
Standard Deviation of all data: 129
Largest Observation Concentration of all data: Xn = 1120
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm

Location: MW3

Mean of all data: 2288
Standard Deviation of all data: 856
Largest Observation Concentration of all data: Xn = 3990
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm

Location: MW3D

Mean of all data: 2265
Standard Deviation of all data: 892
Largest Observation Concentration of all data: Xn = 3230
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Specific Conductance (field), micromhos/cm
Location: MW4

Mean of all data: 707
Standard Deviation of all data: 231
Largest Observation Concentration of all data: Xn = 1570
Test Statistic, high extreme of all data: Tn = 4
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/09/1987	1570	False		1

Specific Conductance (field), micromhos/cm
Location: MW5

Mean of all data: 450
Standard Deviation of all data: 155
Largest Observation Concentration of all data: Xn = 925
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW12

Mean of all data: 114.9
Standard Deviation of all data: 94.2
Largest Observation Concentration of all data: Xn = 475.0
Test Statistic, high extreme of all data: Tn = 3.8
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	475.0	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Sulfate, dissolved, mg/L
Location: MW22

Mean of all data: 2423.5
Standard Deviation of all data: 1430.0
Largest Observation Concentration of all data: Xn = 4570.0
Test Statistic, high extreme of all data: Tn = 1.5
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW22D

Mean of all data: 1189.1
Standard Deviation of all data: 484.1
Largest Observation Concentration of all data: Xn = 1920.0
Test Statistic, high extreme of all data: Tn = 1.5
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	31.1	False	-1	

Sulfate, dissolved, mg/L
Location: MW23D

Mean of all data: 173.0
Standard Deviation of all data: 430.1
Largest Observation Concentration of all data: Xn = 1320.0
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	1320.0	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Sulfate, dissolved, mg/L

Location: MW23S

Mean of all data: 245.1
Standard Deviation of all data: 680.6
Largest Observation Concentration of all data: Xn = 2060.0
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2060.0	False		1

Sulfate, dissolved, mg/L

Location: MW2D

Mean of all data: 5.8
Standard Deviation of all data: 3.7
Largest Observation Concentration of all data: Xn = 14.1
Test Statistic, high extreme of all data: Tn = 2.2
T Critical of all data: Tcr = 2.2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L

Location: MW2R

Mean of all data: 183.1
Standard Deviation of all data: 61.6
Largest Observation Concentration of all data: Xn = 312.0
Test Statistic, high extreme of all data: Tn = 2.1
T Critical of all data: Tcr = 2.9

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Sulfate, dissolved, mg/L
Location: MW3

Mean of all data: 965.6
Standard Deviation of all data: 472.8
Largest Observation Concentration of all data: Xn = 1930.0
Test Statistic, high extreme of all data: Tn = 2.0
T Critical of all data: Tcr = 3.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW3D

Mean of all data: 1960.9
Standard Deviation of all data: 697.7
Largest Observation Concentration of all data: Xn = 3750.0
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.6

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	<0.5	True	-1	

Sulfate, dissolved, mg/L
Location: MW4

Mean of all data: 60.9
Standard Deviation of all data: 48.9
Largest Observation Concentration of all data: Xn = 288.0
Test Statistic, high extreme of all data: Tn = 4.6
T Critical of all data: Tcr = 3.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/11/2012	288.0	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Sulfate, dissolved, mg/L

Location: MW5

Mean of all data: 50.9
Standard Deviation of all data: 36.3
Largest Observation Concentration of all data: Xn = 180.0
Test Statistic, high extreme of all data: Tn = 3.6
T Critical of all data: Tcr = 3.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2011	180.0	False		1

Thallium, dissolved, mg/L

Location: MW12

Mean of all data: 0.0003
Standard Deviation of all data: 0.0006
Largest Observation Concentration of all data: Xn = 0.0025
Test Statistic, high extreme of all data: Tn = 3.8404
T Critical of all data: Tcr = 2.5800

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0025	True		1

Thallium, dissolved, mg/L

Location: MW22

Mean of all data: 0.0005
Standard Deviation of all data: 0.0007
Largest Observation Concentration of all data: Xn = 0.0025
Test Statistic, high extreme of all data: Tn = 3.0151
T Critical of all data: Tcr = 2.2340

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0025	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Thallium, dissolved, mg/L
Location: MW22D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Thallium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Thallium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0005
Standard Deviation of all data: 0.0008
Largest Observation Concentration of all data: Xn = 0.0025
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0025	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Thallium, dissolved, mg/L

Location: MW2D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Thallium, dissolved, mg/L

Location: MW2R

Mean of all data: 0.0003
Standard Deviation of all data: 0.0004
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 3.8628
T Critical of all data: Tcr = 2.5040

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0020	False		1

Thallium, dissolved, mg/L

Location: MW3

Mean of all data: 0.0003
Standard Deviation of all data: 0.0004
Largest Observation Concentration of all data: Xn = 0.0012
Test Statistic, high extreme of all data: Tn = 2.0453
T Critical of all data: Tcr = 2.1760

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Thallium, dissolved, mg/L
Location: MW3D

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0013
Test Statistic, high extreme of all data: Tn = 3.2999
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/26/2016	0.0013	False		1

Thallium, dissolved, mg/L
Location: MW4

Mean of all data: 0.0002
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0006
Test Statistic, high extreme of all data: Tn = 2.7706
T Critical of all data: Tcr = 2.6030

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/26/2016	0.0006	False		1

Thallium, dissolved, mg/L
Location: MW5

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.9789
T Critical of all data: Tcr = 2.6440

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW12

Mean of all data: 544
Standard Deviation of all data: 132
Largest Observation Concentration of all data: Xn = 933
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	933	False		1

Total Dissolved Solids, mg/L

Location: MW22

Mean of all data: 2966
Standard Deviation of all data: 1221
Largest Observation Concentration of all data: Xn = 4320
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	164	False	-1	

Total Dissolved Solids, mg/L

Location: MW22D

Mean of all data: 1765
Standard Deviation of all data: 843
Largest Observation Concentration of all data: Xn = 3650
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	3650	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW23D

Mean of all data: 434
Standard Deviation of all data: 509
Largest Observation Concentration of all data: Xn = 1790
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	1790	False		1

Total Dissolved Solids, mg/L

Location: MW23S

Mean of all data: 503
Standard Deviation of all data: 863
Largest Observation Concentration of all data: Xn = 2800
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2800	False		1

Total Dissolved Solids, mg/L

Location: MW2D

Mean of all data: 209
Standard Deviation of all data: 118
Largest Observation Concentration of all data: Xn = 299
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Total Dissolved Solids, mg/L
Location: MW2R

Mean of all data: 517
Standard Deviation of all data: 162
Largest Observation Concentration of all data: Xn = 1010
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/12/2012	1010	False		1

Total Dissolved Solids, mg/L
Location: MW3

Mean of all data: 2368
Standard Deviation of all data: 667
Largest Observation Concentration of all data: Xn = 4000
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 4

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L
Location: MW3D

Mean of all data: 2714
Standard Deviation of all data: 212
Largest Observation Concentration of all data: Xn = 3140
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2060	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW4

Mean of all data: 464
Standard Deviation of all data: 225
Largest Observation Concentration of all data: Xn = 1778
Test Statistic, high extreme of all data: Tn = 6
T Critical of all data: Tcr = 4

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/09/1987	1778	False		1

Total Dissolved Solids, mg/L

Location: MW5

Mean of all data: 321
Standard Deviation of all data: 182
Largest Observation Concentration of all data: Xn = 1010
Test Statistic, high extreme of all data: Tn = 4
T Critical of all data: Tcr = 4

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2014	1010	False		1

Zinc, dissolved, mg/L

Location: MW12

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.02
Test Statistic, high extreme of all data: Tn = 2.80
T Critical of all data: Tcr = 2.58

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/07/2016	0.02	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Zinc, dissolved, mg/L

Location: MW22

Mean of all data: 0.43
Standard Deviation of all data: 0.21
Largest Observation Concentration of all data: Xn = 0.67
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Zinc, dissolved, mg/L

Location: MW22D

Mean of all data: 0.18
Standard Deviation of all data: 0.13
Largest Observation Concentration of all data: Xn = 0.50
Test Statistic, high extreme of all data: Tn = 2.43
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	0.50	False		1

Zinc, dissolved, mg/L

Location: MW23D

Mean of all data: 0.03
Standard Deviation of all data: 0.06
Largest Observation Concentration of all data: Xn = 0.19
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.19	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Zinc, dissolved, mg/L
Location: MW23S

Mean of all data: 0.07
Standard Deviation of all data: 0.20
Largest Observation Concentration of all data: Xn = 0.60
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.60	False		1

Zinc, dissolved, mg/L
Location: MW2D

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 0.00
T Critical of all data: Tcr = 2.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Zinc, dissolved, mg/L
Location: MW2R

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.03
Test Statistic, high extreme of all data: Tn = 2.31
T Critical of all data: Tcr = 2.50

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Zinc, dissolved, mg/L
Location: MW3

Mean of all data: 0.09
Standard Deviation of all data: 0.05
Largest Observation Concentration of all data: Xn = 0.17
Test Statistic, high extreme of all data: Tn = 1.72
T Critical of all data: Tcr = 2.18

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Zinc, dissolved, mg/L
Location: MW3D

Mean of all data: 0.02
Standard Deviation of all data: 0.02
Largest Observation Concentration of all data: Xn = 0.09
Test Statistic, high extreme of all data: Tn = 3.21
T Critical of all data: Tcr = 2.60

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.09	False		1

Zinc, dissolved, mg/L
Location: MW4

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.04
Test Statistic, high extreme of all data: Tn = 3.99
T Critical of all data: Tcr = 2.60

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.04	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/17/1984 to 10/28/2019

Confidence Level: 95%

Transform: None

LT Multiplier: x 0.50

Number of Outliers: One Outlier

Zinc, dissolved, mg/L

Location: MW5

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.03
Test Statistic, high extreme of all data: Tn = 3.79
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.03	False		1

Based on Grubbs one-sided outlier test

APPENDIX C2
SEN SLOPE AND MANN KENDALL TESTS

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	-1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.001	mg/L per period
R-Squared error of fit:	0.067	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.005	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.14	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.82
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.8	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.4	mg/L per period
R-Squared error of fit:	0.3	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.3	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.7	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.203	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.880
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-0.0002	mg/L per period
R-Squared error of fit:	0.2614	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-0.0002	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0007	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.4961
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.551	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.863
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.182	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.873
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0011	mg/L per period
R-Squared error of fit:	0.1533	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0031	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0006	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2772	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3609
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.06	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.44
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3432	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3609
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW12**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-4	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-2	mg/L per period
Lower Confidence Limit of Slope, M1:	-5	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.012	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.430
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.5	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-2.2	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-1.9	mg/L per period
Lower Confidence Limit of Slope, M1:	-6.9	mg/L per period
Upper Confidence Limit of Slope, M2+1:	4.4	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.2
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3517	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.8660
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.319	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.131
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2599	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.6186
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0124	mg/L per period
R-Squared error of fit:	0.0768	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0009	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0146	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0012	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.3712
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.4074	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.8848
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2567	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3403
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.575	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.598
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5786	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.8455
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-0.661	mg/L per period
R-Squared error of fit:	0.502	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-0.597	mg/L per period
Lower Confidence Limit of Slope, M1:	-1.150	mg/L per period
Upper Confidence Limit of Slope, M2+1:	-0.017	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.856
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.073	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.628
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0258	mg/L per period
R-Squared error of fit:	0.4480	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0175	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0488	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0041	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.6083
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.5108	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	-2.3506	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Downward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.165	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.869
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.47	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.61
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1427	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.0722
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-2	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-1	mg/L per period
Lower Confidence Limit of Slope, M1:	-4	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.131	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.09	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.82
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-1.5	mg/L per period
R-Squared error of fit:	0.5	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-1.1	mg/L per period
Lower Confidence Limit of Slope, M1:	-3.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.5
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.8
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3852	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.5281
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.346	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.866
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0583	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.4364
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0064	mg/L per period
R-Squared error of fit:	0.2135	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0132	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0032	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.6140	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.7455
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5854	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.8635
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.308	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.018	mg/L per period
R-Squared error of fit:	0.064	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.041	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.086	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.040	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.619
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.015	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.133
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0048	mg/L per period
R-Squared error of fit:	0.1004	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0024	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0231	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0065	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.3712
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.4664	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.3609
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.41	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.25
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1386	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.5768
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW22D**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	1	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	2	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.547	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.833
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	1.1	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	1.4	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0045	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.197	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.249
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0069	mg/L per period
R-Squared error of fit:	0.2928	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.3288
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.289	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.061	mg/L per period
R-Squared error of fit:	0.300	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.002	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.080	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.103
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.294	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.309
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0074	mg/L per period
R-Squared error of fit:	0.2914	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0093	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.3712
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2932	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.7641
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.29	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.31
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	2	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	3	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.182	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.4	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	1.8	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	2.2	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.003	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0044	mg/L per period
R-Squared error of fit:	0.2970	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0044	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.7732
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.294	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.309
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5529	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.9728
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.178	mg/L per period
R-Squared error of fit:	0.295	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.003	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.863
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.495	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.644
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0117	mg/L per period
R-Squared error of fit:	0.2920	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0147	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0001	mg/L per period
R-Squared error of fit:	0.2897	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.8796
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.29	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.31
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	1	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.630	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.738
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.05	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.10
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.2
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1110	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.3712
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.002	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.124
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.0346	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.002	mg/L per period
R-Squared error of fit:	0.130	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.003	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.007	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.124
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0648	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.2494
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2D**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.082	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.002	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.371
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.2	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0162	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.101	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.748
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0018	mg/L per period
R-Squared error of fit:	0.4276	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0010	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0035	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0006	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.3609
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.547	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.577
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.6073	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.1826
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2340	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.0034
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0372	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.5094
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW2R**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0162	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-1	mg/L per period
R-Squared error of fit:	1	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-1	mg/L per period
Lower Confidence Limit of Slope, M1:	-2	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.001	mg/L per period
R-Squared error of fit:	0.083	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.002	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.005	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.745
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.7	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	1.5	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.2	mg/L per period
Lower Confidence Limit of Slope, M1:	-1.9	mg/L per period
Upper Confidence Limit of Slope, M2+1:	4.3	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.4	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0145	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.5094
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.004	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.249
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.0004	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0012	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0032	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0024	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.6186
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0648	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.181	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.866
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.006	mg/L per period
R-Squared error of fit:	0.155	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.002	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.011	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.361
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0102	mg/L per period
R-Squared error of fit:	0.1817	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0114	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0266	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0184	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.8660
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.0933	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0004	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0002	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.6186
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.09	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.39
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2804	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.6576
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW3D**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0162	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.005	mg/L per period
R-Squared error of fit:	0.230	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.005	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.013	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.113
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.4
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0162	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.057	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.748
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0002	mg/L per period
R-Squared error of fit:	0.4834	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0002	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0003	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	-1.8848	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Downward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.6871	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.6483
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.486	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.783
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0331	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.4987
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0236	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1328
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1343	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.1135
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW4**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0162	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-3
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.029	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.003	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.866
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.4	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.8	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.8
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0162	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.250	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.866
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.2049	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0002	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.7600
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.7484	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.9230
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.502	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.072
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1245	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.7641
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2789	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.7600
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01085**
Location Class:		**Parameter:**	**Vanadium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.18	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.87
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5665	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.8558
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW5**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

APPENDIX C3
TEST DESCRIPTIONS

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MANAGES

Groundwater Data Management and Evaluation Software

Software Manual Product ID #1012581

Software Manual, February 2010

EPRI Project Manager
K. Ladwig

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10
STATISTICAL ANALYSIS

Stand-Alone Statistical Tests

Statistical Evaluation Report

The Statistical Evaluation Report is comprised of a series of subreports as described below.

User Selections:

- One location.
- Sample date range for data selection.
- Interval length: the length of the averaging period in months (1,2,3,4, or 6).
- One parameter.
- Non-detect processing: multiplier between 0 and 1.
- One-sided confidence $(1-\alpha)$ level – 0.90, 0.95 or 0.99.
- Limit type: used in the statistical overview to determine exceedances.

Mann-Kendall Trend and Seasonal Analysis Tests

The Mann-Kendall test for trend is insensitive to the presence or absence of seasonality. The test is non-parametric and does not assume any type of data distribution. Nonetheless, two forms of the test are provided in MANAGES, one ignoring data seasonality even if it is present, and one considering data seasonality. In the test, the null hypothesis, H_0, is that the Sen trend is zero, and the alternate hypothesis, H_a, is that the trend is non-zero.

In general, the Mann-Kendall test considering seasonality indicates a larger range for allowable Sen estimate of trend when seasonality is actually present than the range indicated by the test performed ignoring seasonality.

In the Mann-Kendall Trend Analysis, available in under the Statistical Evaluation Report and in the Statistical Procedure for Detection Monitoring, and Mann-Kendall Seasonal Analysis, found under the Statistical Evaluation Report, MANAGES first calculates the Sen slope and the upper and lower confidence limits of the Sen slope, and then determines whether the Sen slope is statistically significant. Slope is statistically significant if it is non-zero.

Mann-Kendall Test for Sen Slope Significance – a two-sided, non-parametric method for data sets as small as 10, unless there are many tied (e.g., equal, NDs are treated as tieds) values (Gilbert, 1987; p. 208)	
Indicator Function $\text{sgn}(x_{ij} - x_{jk})$	= 1 if $(x_{ij} - x_{jk}) > 0$ = 0 if $(x_{ij} - x_{jk}) = 0$ = -1 if $(x_{ij} - x_{jk}) < 0$ where $x_{i1}, x_{i2}, \ldots, x_{in}$ are the time ordered data (n_i is total of data in the i-th season).
Mann-Kendall Statistic, S_i	$= \sum_{k=1}^{n_i-1} \sum_{j=k+1}^{n_i} \text{sgn}(x_{ij} - x_{jk})$
Variance of S_i $VAR(S_i)$	$VAR(S_i) =$ $\frac{1}{18}\left\{ n_i(n_i-1)(2n_i+5) - \sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(2t_{ip}+5) - \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(2u_{iq}+5) \right\}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(t_{ip}-2) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(u_{iq}-2)}{9n_i(n_i-1)(n_i-2)}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)}{2n_i(n_i-1)}.$ The variable g_i is the number of tied groups (equal-valued) data in the i-th season, t_{ip} is the number of tied data in the p-th group for the i-th season, h_i is the number of sampling times (or time periods) in the i-th season that contain multiple data, u_{iq} is the number of multiple data in the q-th time period in the i-th season, and n_i is the number of data values in the i-th season.

Test Statistic, Z	If $S' = \sum_{i=1}^{K} S_i$, where K is the number of seasons, then the test statistic Z is computed as: $$Z = \begin{cases} \dfrac{S'-1}{[VAR(S')]^{1/2}} & \text{iff } S' > 0 \\ 0 & \text{iff } S' = 0 \\ \dfrac{S'+1}{[VAR(S')]^{1/2}} & \text{iff } S' < 0 \end{cases}$$ Where "iff" is an acroym meaning: if-and-only-if. A positive Z value means an upward trend and a negative Z value means a negative trend.
Hypothesis Test: H_0 = no trend H_a = trend present This is a two-sided test at the α significance level.	Accept the null hypothesis H_0 of no trend if $\lvert Z \rvert \leq Z_{1-\alpha/2}$ Reject the null hypothesis H_0 if $\lvert Z \rvert > Z_{1-\alpha/2}$ where $Z_{1-\alpha/2}$ is obtained from Table A1 in Gilbert (1987; p. 254).

Kruskal-Wallis Analysis (Test for Seasonality)

To perform the Kruskal-Wallis test for data seasonality, data points are first segmented according to season (Gilbert, 1987). The null hypothesis, H_0, is that all seasons have the same mean value. The alternative hypothesis, H_a ,is that at least one season has a mean larger or smaller than the mean of at least one other season. Montgomery et al. (1987) provide additional information on groundwater data seasonality. This is a two-sided, non-parametric test.

In MANAGES, the Kruskal-Wallis Test for Seasonality is found under Data Review // Non-Parametric Methods // Kruskal-Wallis Analysis. It determines whether the seasonal means for the specified parameter at the specified location are statistically the same.

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	or $Z_i \geq SCL$.

Outlier Tests

Outlier tests are useful in detecting inconsistencies of measurement within a data set. An outlier is defined as an observation that appears to deviate markedly from other values of a sample set. There are many possible reasons for the presence of an outlier, including 1) the presence of a true but extreme value from a single population, resulting from random variability inherent in the data; 2) an improper identification of the underlying distribution describing the population from which the sample set comes from; 3) the occurrence of some unknown event(s) such as a spill, creating a mixture of two or more populations; 4) a gross deviation from prescribed sampling procedures or laboratory analysis; 5) a transcription error in the data value or data unit of measurement.

USEPA (1989; p. 8-11) states that the purpose of a test for outliers is to determine whether or not there is statistical evidence that an observation that appears extreme does not fit the distribution of the rest of the data. If an observation is identified as an outlier, then steps need to be taken to determine whether it is the result of an error or a valid extreme observation. If a true error, such as in transcription, dilution, or analytical procedure, can be identified, then the suspect value should be replaced with its corrected value. If the source of the error can be determined but no correction is possible, then the observation is deleted and the reason for deletion is reported along with any statistical analysis. If no source of error can be documented, then it must be assumed that the observation is a true but extreme value of the data set. If this is the case, the outlier observation(s) must not be altered or excluded from any statistical analysis. Identification of an observation as an outlier but with no error documented could be used to suggest resampling to confirm the value (USEPA, 1989; p. 8-13).

The outlier tests provided in MANAGES are based on either the single outlier test of Grubbs (1969), which is used by USEPA (1989; pp. 8-10 to 8-13) or the single outlier test of Dixon (1951, 1953), which is used by USEPA (2000; pp. 4-24) and by ASTM (1998). The outlier tests assume the data come from a normal distribution. Only one outlier, either an extreme low or an extreme high, can be detected during a single analysis of a data set. Additional outliers can be detected by temporarily removing a previously detected outlier from a data set and then repeating the test on the remaining, reduced, data set. During each pass of the outlier test, the sample mean, standard deviation, and sample size used in the test statistics are computed using only the data remaining in the set. The process can be continued until there is either an insufficient amount of data remaining (a minimum of 3 values) or when no additional outliers are found. When using MANAGES, the user will be asked how many outliers are to be checked and it will then automatically perform all of the recursive calls and data reductions with the Grubbs or Dixon routine. When done, a report can be generated that will show each outlier marked with a flag indicating the sequential order in which the outliers were identified.

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Critical values used in the one-sided Grubbs test are taken directly from those in Grubbs and Beck (1972) for sample sizes smaller than 147 observations. Critical values for sample sizes larger than 147 were generated numerically using a Monte Carlo routine, where each sampling event was simulated 100,000 times. Sample sizes ranging from 148 to 5,000 where used and then their resultant test statistic T_n curve fitted at specific significance levels. By this method, it was possible to match Grubbs results to at least four significant digits for corresponding tabulated values.

Critical values used in the one-sided Dixon outlier test are taken directly from tables given in Dixon (1951), Dixon (1953; page 89), and USEPA (2000; p. A-5, Table A-3). The critical values were then curve fitted for every sample size between 3 and 25 as a function of the significance level. By this method, it was possible to match Dixon's results to at least four significant digits for corresponding tabulated values. Note that the Dixon test assumes the data are either normally or lognormally distributed. Hence, sample sizes can only range between 3 and 25, inclusive. Dixon never developed an outlier test for sample sizes larger than 25.

User Selections:

- One or up to 100 locations: a separate test is performed for each location.
- One or up to 100 parameters: a separate test is performed for each parameter.
- Evaluation date range.
- Confidence $(1-\alpha)$ level: 0.90, 0.95 or 0.99.
- Non-detect processing: multiplier between 0 and 1.
- Data transformation option: none and log (base e).
- Number of outliers: one, two, first 5%, first 10%. Selecting any option other than one causes MANAGES to rerun the test, with outliers from prior tests removed, until either no outliers are detected or the specified number of outliers are detected.

Technical Details

Grubbs Outlier Test – The Grubbs outlier test determines whether there is statistical evidence that an observation does not fit the remaining data (USEPA, 1989; p. 8-11). This significance test looks at either the highest or the lowest observation in normal samples.	
The number of observations taken during a specified scoping period; n	*n*

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Mean of the observed data during the scoping period; $\overline{X}$	$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$ where X_i is the i-th observation.
Standard deviation of observed data; S_x.	$S_x = \sqrt{\frac{1}{(n-1)}\sum_{i=1}^{n}(X_i - \overline{X})^2}$
Test statistics: T_l & T_n	Sort the data into ascending order, then compute the statistics $T_l = (\overline{X} - X_l)/S_x$ $T_n = (X_n - \overline{X})/S_x$ where X_l is the smallest value of the n observations and X_n is the largest value of the n observations.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Grubbs single, one-sided test of either an extreme low outlier : X_l *is an outlier if* $T_l \geq T_{cr(1-\alpha,n)}$ or an extreme high outlier: X_n *is an outlier if* $T_n \geq T_{cr(1-\alpha,n)}$. The function $T_{cr(1-\alpha,n)}$ is the critical value, given in Grubbs and Beck (1972; Table 1) and USEPA (1989; p. B-11, Table 8) . Note that the critical value assumes that the mean and standard deviation are computed from the sample being tested.

Dixon Outlier Test – The Dixon outlier test determines whether there is statistical evidence that an extreme observation does not fit the remaining data (USEPA, 2000; p. 4-24 and ASTM D6312, 1998). This significance test looks at both the highest and the

lowest observations in a sample data set. However, the routine will only perform the outlier tests if several conditions are first satisfied. For example, the Dixon outlier algorithm checks the distribution of the sample data for both normality and lognormality using the Shapiro-Wilk W-test. The outlier routine will not proceed with a data set if the W-test fails. In addition, the Dixon outlier test is limited to a minimum of 3 and a maximum sample size n of 25 data values.	
The number of observations taken during a specified scoping period; n	Number of observations, n, where $3 \le n \le 25$.
Sorting the sample data	Sort the data into ascending order, with the minimum data value $X_{(1)}$ first and the maximum data value $X_{(n)}$ last. Use the natural log of the data values if data are lognormally distributed, i.e., $X_{(j)} = Ln[X_{(j)}]$.
Goodness-of fit tests	After temporarily excluding either the minimum or maximum value of the data set, the Shapiro-Wilk's W-test is used to determine if the remaining $n-1$ values are normally or lognormally distributed. If not, the Dixon outlier test can't be used.
Test statistic, T_s, for the minimum data value	Compute the T_s test statistic for $X_{(1)}$ as an outlier: $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}}$ *for* $14 \le n \le 25.$
Test statistic, T_s, for the maximum data value	Compute the T_s test statistic for $X_{(n)}$ as an outlier:

	$T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}}$ *for* $14 \le n \le 25$.
Critical value T_c	USEPA (2000; p. A-5, Table A-3) lists the critical values of the Dixon test as a function of sample size for a one-sided extreme value test at the significance levels α of 0.1, 0.05, and 0.01.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Dixon's single, one-sided test for statistical evidence of either an extreme low-valued outlier: $X_{(1)}$ *is an outlier if* $T_s \ge T_c$ or an extreme high-valued outlier: $X_{(n)}$ *is an outlier if* $T_s \ge T_c$. The function T_c is the critical value, given in Dixon (1953; page 89) and USEPA (2000; p. A-5, Table A-3). Note that the critical value assumes that the data are either normally or lognormally distributed.

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Other Statistical Calculations Used in MANAGES

Sen Estimate of Slope

The Sen estimate of slope is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed (Gilbert, 1987). The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar days. Sen's estimate of slope is a non-parametric estimator of trend. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. In contrast, linear regression and other least squares estimators of slope are significantly more sensitive, and more likely to give erroneous slope indications, even when only a few outlier values are present.

When data averaging is not activated, the Sen slope is calculated using individual data points and actual sampling dates. When data averaging is activated, multiple data points within each specified season period are reduced to one data point by arithmetic averaging over each of the season periods. These averaged values are then assigned to the day that corresponds to the middle of that season's period.

The approximate lower and upper confidence limits for the Sen slope can also be calculated using normal theory (Gilbert, 1987). It should be noted that confidence limits for the Sen slope are not necessarily symmetrical about the estimated slope since ranked values of slope are used in the calculation.

MANAGES calculates Sen slope in the Sen Slope Overlay Graph, Statistical Summary reports and in the two Mann-Kendall tests performed under the Statistical Evaluation Report.

Sen's Estimate of Slope – two-sided, non-parametric method that calculates the trend of a single data series. It is less sensitive to outliers and non-detect values than linear regression (Gilbert, 1987; p. 217).	
Slope, Q	$= \frac{x_{i'} - x_i}{i' - i}$ where $X_{i'}$ and x_i are data values at times i' and i, respectively, and where $i'>i$. Typically, i' and i are expressed in units of either days for trend analysis or years for seasonal analysis.
N′	Number of unique data point pairs that can be made for the observations in the data set, for $i'>i$. For n monitoring events, N′ is given as: N′ = n(n-1)/2

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Sen's Slope Estimate	Sen's slope estimator = median slope $= Q_{[(N'+1)/2]}$ if N' is odd $= \frac{1}{2}(Q_{[N'/2]} + Q_{[(N'+2)/2]})$ if N' is even where the Q values have first been ranked from smallest to largest.
$Z_{1-\alpha/2}$	Statistic for the cumulative normal distribution (Gilbert, 1987; p. 254) for the two-sided, α significance level.
Variance estimate of the Mann-Kendall S Statistic, VAR(S)	VAR(S) $= \frac{1}{18}\left[n(n-1)(2n+5) - \sum_{p=1}^{g} t_p(t_p-1)(2t_p+5)\right]$ where g is the number of tied groups, t_p is the number of data in the pth group, and n is the number of data values.
C_α	$= Z_{1-\alpha/2}\sqrt{VAR(S)}$
Sen's Slope , a two-sided test at the α significance level	$M_1 = \frac{(N'-C_\alpha)}{2}$ $M_2 = \frac{(N'+C_\alpha)}{2}$ Lower limit of confidence interval is the M_1-th largest slope, and upper limit of confidence interval is the (M_2+1)-th largest of the N′ ordered slope estimates.

Coefficient of Skewness for Normality

The coefficient of skewness is another measure for data normality (Gilbert, 1987). MANAGES provides the value of the coefficient of skewness in the Statistical Evalueation Report, Statistical Overview. Additional information on data normality is given by Montgomery, et al. (1987).

Exhibit 14

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AmerenEnergy Medina Valley CoGen, LLC

Date
January 28, 2020

Project No.
72971

2019 ANNUAL REPORT

FORMER HUTSONVILLE POWER STATION - ASH POND D

RAMBOLL Bright ideas. Sustainable change.

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2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D

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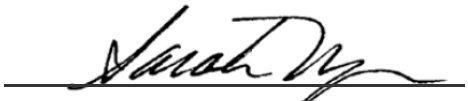

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APPENDICES

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Appendix C Statistical Output (on CD)
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C2 Sen Slope and Mann Kendall Tests
C3 Test Descriptions

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ACRONYMS AND ABBREVIATIONS

Ameren	AmerenEnergy Medina Valley Cogen, LLC
CCW	Coal Combustion Waste
GMZ	Groundwater Management Zone
HDPE	High Density Polyethylene
Hutsonville	Former Hutsonville Power Station
IAC	Illinois Administrative Code
ILCS	Illinois Compiled Statutes
TDS	Total Dissolved Solids

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1. INTRODUCTION

1.1 Background

This report has been prepared for AmerenEnergy Medina Valley Cogen, LLC (Ameren) for the former Hutsonville Power Station (Hutsonville). The Hutsonville Ash Pond D (Figure 1-1) received coal combustion waste (CCW) from the coal fired power plant between 1968 and 2000. Ameren completed closure activities for Ash Pond D in 2012 in accordance with the site-specific closure requirements of 35 Illinois Administrative Code (IAC) 840. Closure activities included placement of a 40-mil high density polyethylene (HDPE) cap covered with a three-foot thick vegetative soil layer, construction of surface water control structures, and construction of a groundwater collection system (i.e., Collection Trench). It is important to note that Ameren was unable to initiate operation of the Collection Trench until they received authorization for the associated discharge under Hutsonville's renewed National Pollutant Discharge Elimination System (NPDES) permit (IL0004120) with an effective date of March 1, 2015. Operation of the Collection Trench began in April 2015. Hutsonville Ash Pond D post closure care requirements were established in the Post-Closure Care Plan and the Groundwater Monitoring Plan, both dated July 26, 2011.

Groundwater has been monitored at the Hutsonville site since 1984. The groundwater monitoring system established in the Groundwater Monitoring Plan for Ash Pond D consisted of two background monitoring wells, MW-10 and MW 10D, and nine downgradient compliance monitoring wells[1], MW-6, MW-7, MW-7D, MW-8, MW 11R, MW-14, MW 115S, MW-115D, and MW-121 (Figure 1-2). However, background wells MW-10 and MW-10D were destroyed due to construction unrelated to Ameren operations after the first quarter, 2016 monitoring period. No trace of the former background wells was found using a metal detector, probes, or digging. As a result, these wells were replaced with new background monitoring wells, MW-23S and MW-23D, in November 2017. In addition to the compliance monitoring wells, several other monitoring wells and piezometers located at Hutsonville are measured for groundwater level so that groundwater elevation contour maps can be created for the entire site. Ash Pond D is located near the southeast portion of the Hutsonville site, as shown on Figure 1-1, with the sampled monitoring wells shown on Figure 1-2.

The Groundwater Monitoring Plan, in accordance with 35 IAC 840.114 and 35 IAC 840.116, outlines groundwater monitoring and sampling procedures, establishes the parameters and methods to be used for analyzing the groundwater samples, and describes evaluation methods to assess post-closure groundwater quality and trends to demonstrate compliance with the applicable groundwater standards.

The sampling frequency is quarterly for the first five years following completion of the post-closure activities. Table 1-1 outlines the initial sampling frequency and requirements that must be met to request reduced sampling frequency from the Illinois Environmental Protection Agency (EPA). Monitoring well locations, installation dates, construction information, and the groundwater zone they monitor are provided in Table 1-2. Field and laboratory parameters for evaluating groundwater quality are shown in Table 1-3.

[1] Note that in the 2017 Annual Report, Section 1.1, well MW-7D was mistakenly left off the list of compliance wells.

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This is the seventh annual report since completion of closure activities, includes the most recent 8 quarters of sampling data, and is the sixth annual report to include statistical analysis of the data. It includes the following elements:

- A summary of groundwater monitoring data collected in 2018 and 2019. Data tables are included in Appendix A.
- Quarterly Site Inspection Forms, including observations and descriptions of any maintenance activities performed on the pond cap, embankment, and groundwater collection trench and discharge system (Appendix B).
- Annual trend and statistical analysis results per Section 5.2 of the Groundwater Monitoring Plan, including an assessment of any statistically significant increasing trends (Appendix C).

1.2 Applicable Groundwater Quality Standards

1.2.1 On-Site Groundwater Standards

As described in Section 5.1.1 of the Groundwater Monitoring Plan and pursuant to 35 IAC 840.16(a):

- Prior to the completion of the post-closure care period, the on-site applicable groundwater quality standards at Ash Pond D are the greater of either the actual groundwater monitoring result, or the Class I Potable Resource Groundwater standard set forth in 35 IAC 620.410.
- After completion of the post-closure care period, the on-site concentrations of contaminants from Ash Pond D as determined by groundwater monitoring, if those concentrations exceed the numeric standards for Class I Potable Resource Groundwater set forth in 35 IAC 620.410, are the applicable groundwater standards at the Hutsonville site if the following criteria are addressed to the satisfaction of the Illinois EPA:
  - To the extent practicable, the exceedance has been minimized and beneficial use, as appropriate for the class of groundwater, has been returned on-site.
  - Any threat to public health or the environment on-site has been minimized.
  - An institutional control prohibiting potable uses of groundwater is placed on the Hutsonville site in accordance with the Uniform Environmental Covenants Act (765 Illinois Compiled Statutes (ILCS) 122) or an alternative instrument authorized for environmental uses under Illinois law and approved by the Illinois EPA. Existing potable uses of groundwater may be preserved as long as such uses remain fit for human consumption in accordance with accepted water supply principles.

1.2.2 Off-Site Groundwater Standards

As described in Section 5.1.2 of the Groundwater Monitoring Plan and pursuant to 35 IAC 840.116(b):

- Off-site groundwater quality standards are the Class I Potable Resource standards [35 IAC 620.410] for the upper zone (defined during rulemaking as the fine-grained sediments directly beneath Ash Pond D) and the 35 IAC 620 Subpart C non-degradation standards for the lower zone, unless a groundwater management zone (GMZ) has been established as provided in 35 IAC 620.250. Currently, no GMZ is established for Pond D.

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1.3 Demonstration of Compliance

1.3.1 On-Site Groundwater Compliance

As described in Section 5.2.1 of the Groundwater Monitoring Plan:

- Compliance with on-site groundwater quality standards will be achieved when no statistically significant increasing trend that can be attributed to Ash Pond D is detected in the concentrations of all constituents monitored at the compliance (down-gradient) boundary of the Hutsonville site for four consecutive years after changing to an annual monitoring frequency.

1.3.2 Off-Site Groundwater Compliance

As described in Section 5.2.1 of the Groundwater Monitoring Plan:

- For off-site groundwater, the following compliance criteria must be met:
  - Statistically significant decreasing trends in concentration for all constituents monitored in accordance with 35 IAC 840.114 in the upper zone of the aquifer at the compliance boundary are detected for a period of four consecutive years after changing to annual monitoring.
  - No statistically significant increasing trend that can be attributed to Ash Pond D is detected in the concentrations of all constituents monitored in accordance with 35 IAC 840.114 in the lower zone of the aquifer at the compliance boundary for a period of four consecutive years after changing to an annual monitoring frequency.
  - All concentrations of constituents monitored in accordance with 35 IAC 840.114 are at or below the applicable groundwater quality standard as provided in 35 IAC 840.116(b) at the down-gradient boundaries of the Hutsonville site.

1.3.3 Compliance Determination

As described in Section 5.2.3 of the Groundwater Monitoring Plan:

- Compliance is demonstrated by performing an annual trend analysis for each monitoring well located at the down-gradient boundaries of the Hutsonville site for all constituents monitored in accordance with 35 IAC 840.114. The analysis shall use Sen's Estimate of Slope and be performed on a minimum of four consecutive samples.
- If a GMZ is established for off-site groundwater in the future, the demonstration of compliance will be set forth in the GMZ approved by the closure or post-closure care plan.
- If the results of sampling and analysis show a positive slope at any compliance monitoring well located at the downgradient boundaries of the Hutsonville site, a Mann-Kendall test will be performed at 95 percent confidence to determine whether or not the increasing slope represents a statistically significant increasing trend. Ameren will investigate the cause of a statistically significant increasing trend as described below. If the statistically significant increasing trend occurs during post-closure care, the investigation will include more frequent inspection of the surface of the cover system and evaluation of background concentrations.
  - If the investigation attributes a statistically significant increasing trend to a superseding cause, Ameren will notify Illinois EPA in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.

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  - If there is no superseding cause for the statistically significant increasing trend and sampling frequency has been reduced pursuant to semi-annual or annual sampling, a quarterly sampling schedule will be reestablished. After four consecutive quarterly samples show no statistically significant increasing trend, the frequency of groundwater monitoring will return to either semi-annual or annual, whichever frequency was utilized prior to the return to quarterly sampling.
  - Notifications concerning statistically significant increasing trends and revisions of the sampling frequency will be reported to Illinois EPA in writing within 30 days after making the determinations.
- If a statistically significant increasing trend is observed to continue over a period of two or more consecutive years and there are no superseding causes for the trend, then Ameren will perform the following:
  - A hydrogeologic investigation
  - Additional site investigation, if necessary

Based on the outcome of the investigation above, Ameren may take action to mitigate statistically significant increasing trends. Such actions will be proposed as a modification to the post-closure care plan within 180 days after completion of the investigation activities described above.

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2. DATA ANALYSIS

2.1 Groundwater Flow

Groundwater flow for 2019 is represented using groundwater elevation contour maps for each quarterly sampling event (Figures 2-1 through 2-4). Groundwater in the upper (shallow) zone generally flowed from west to east and northeast towards the Wabash River during 2019, which is consistent with past evaluations. The Groundwater Collection Trench began operation in April 2015, and following startup groundwater elevations have exhibited localized flow toward the trench with groundwater elevations generally lower near the trench (Figure 3). In the depictions of groundwater elevation contours dashed lines have been used to infer the localized drawdown of groundwater levels resulting from trench operation, which is necessary with limited wells situated laterally along the length of the trench.

The horizontal hydraulic gradient in the upper migration zone beneath Ash Pond D ranged from 0.0033 to 0.0047 ft/ft during 2019. Horizontal hydraulic gradient was calculated near the northern extent of Ash Pond D to limit the influence of the trench to the south in gradient values. The highest gradient occurred during May 2018 when groundwater elevation was lowest. Conversely, the lowest gradient occurred when groundwater elevation was highest in March 2018.

Groundwater flow within the lower (deep alluvial) migration zone along the edge of the Wabash River valley was not contoured since all the deep alluvial monitoring wells are within a narrow zone between Ash Pond D and the Wabash River. Groundwater within the lower zone generally flows from southwest to northeast towards the Wabash River.

2.2 Review of Analytical Data

Table 2-1 presents a site-wide statistical summary of all laboratory analytical data collected in 2018 and 2019. All field and laboratory analytical results are tabulated in Appendix A. Sampling anomalies, such as wells that were dry, had water levels too low for sampling, or were not sampled during a sampling event for other reasons, are noted below.

- MW-6: Not sampled in the 3rd and 4th quarter sampling events of 2018 due to insufficient water level.
- MW-11R: Not sampled in the 4th quarter sampling event of 2018 due to insufficient water level.

Antimony, beryllium, cadmium, chromium, cobalt, total cyanide, lead, mercury, silver, thallium, and zinc were detected in fewer than 10% of the groundwater samples. In addition to these constituents, copper and selenium were detected in fewer than 30% of the samples. A summary of wells and parameters with exceedances of Class I groundwater standards in 2018 and 2019 is shown on Table 2-2.

Parameters of Concern

Parameters of concern (POCs), which correspond to mandatory monitoring parameters per 35 IAC 840.114(a) and as identified in prior reports, are discussed below:

- Boron: Boron is a primary indicator constituent for coal ash leachate impacts to groundwater. Downgradient monitoring well MW-8 exceeded the Class I Potable Resource standard (2.0 milligrams per liter [mg/L]) during all 2018-2019 sampling events (Table 2-2). The highest boron concentrations were also detected in downgradient monitoring well MW-8 during

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this reporting period (Figure 4-1). Background monitoring wells MW-23S and MW-23D had one exceedance during this monitoring period. Downgradient monitoring wells MW-6 and MW-11R had one and two exceedances during 2018-2019 respectively. Time series plots of boron concentrations at wells MW-6, MW-8, MW-11R, MW-23S, and MW-23D are shown in Figure 5-1A-B.

- Iron: There was one exceedance of the iron Class I standard (5.0 mg/L) at MW-23S and MW-23D during the fourth quarter of 2019 (Figure 4-2A-B). Time series plot for these wells are shown in Figure 5-2A-B.
- Manganese: Manganese concentrations in downgradient monitoring wells MW-7D, MW-115S, and MW-121 exceeded the Class I standard (0.15 mg/L) during all 2018-2019 sampling events (Figure 4 3A-B). Monitoring well MW-14 had six exceedances; monitoring wells MW-8 and MW-115D had five exceedances; and monitoring wells MW-6, MW-23D, and MW-23S each had one exceedance in 2018-2019 monitoring period. Time series plots of manganese concentration at these wells are shown in Figure 5-3A-B. Manganese is commonly present in native soils and is highly sensitive to redox conditions. However, prior investigations at the Hutsonville site indicate that elevated manganese concentrations may also be indicative of coal or coal stockpile impacts.
- Sulfate: Sulfate can be an indicator constituent for coal ash; however, there are other anthropogenic sources for elevated sulfate concentrations in groundwater, and sulfate concentrations can decrease in groundwater under strongly reducing conditions. These caveats make sulfate a less reliable indicator for coal ash leachate than boron. Sulfate concentrations at Ash Pond D are the highest at MW-8, where boron concentrations are also high compared to most of the other monitoring wells (Figure 4-4). Sulfate concentrations were elevated above the Class I standard (400 mg/L) at MW-8 during all eight sampling events in 2018-2019. There was also one sulfate exceedance of the Class I standard at downgradient monitoring well MW-7 in 2018 and at both background monitoring wells in 2019 (Figure 54A-B). MW-11R, located downgradient of the Collection Trench, routinely exceeded the Class I standard prior to operation of the Collection Trench. Although sulfate concentrations at MW-11R have been below the Class I standard since operation of the Collection Trench began in April 2015, during the fourth quarter of 2019, the sulfate concentration was higher than the Class I standard (Figure 5-4A-B).
- pH: There was one exceedance of the lower pH Class I standard (6.5 standard units (Std.)) at MW-23D and MW-23S during the 2018-2019 monitoring period. Prior to operation of the Collection Trench, downgradient well MW-11R was routinely below this lower limit. The pH returned to values within the Class I boundaries in April 2015 and has remained within limits (Figure 4-5). Time series plots of pH at MW-23D and MW-23S are shown in Figure 5-5.
- Total Dissolved Solids (TDS): TDS exceeded the Class I standard of 1,200 mg/L at upper zone monitoring well MW-8 during five of the eight sampling events. This well also has the highest concentrations of boron and sulfate measured in groundwater (Figure 4-6). There was also one exceedance at wells MW-23D and MW-23S in 2019 (Figure 5-6). Although TDS concentrations at upper zone monitoring well MW-11R have been below the Class I standard since operation of the Collection Trench began in April 2015, during the fourth quarter of 2019, the sulfate concentration was higher than the Class I standard (Figure 5-4).

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Other Parameters

Concentrations of beryllium, cadmium, and nickel were elevated above the Class I standard (0.004 mg/L, 0.005 mg/L, and 0.1 mg/L respectively) in background monitoring well MW-23S during the fourth quarter of 2019. Time series plots for these parameters at MW-23S are shown in Figures 5-7 to 5-9.

2.3 Statistical Analyses

Analytical data were evaluated for trends following a three-step procedure:

1. Test for outliers using the Grubbs Outlier test.
2. Determine Sen's estimate of slope.
3. Perform a Mann-Kendall trend analysis for any cases (monitoring well/constituent) with a positive slope.

2.3.1 Outlier Analysis

The Grubbs outlier test determines whether or not there is statistical evidence that an extreme high or low observation does not fit the remaining data. The test methodology and results are listed in Appendix C1 and summarized in Table 2-3. The Grubbs test, like all statistical tests, provides statistical evidence of potential outliers, but cannot be used alone to determine whether or not a value is a true outlier that should be excluded from future statistical analysis. Corroborating evidence needed to exclude values includes a very high value relative to all other values for a particular monitoring well/parameter case—which suggests a discrete data reporting or analytical error, or numerous values from a single sample event that are higher than all other sample events for that parameter—which indicates potential laboratory bias. Absent corroborating evidence, the flagged values are considered true but extreme values in the data set. No results were eliminated from statistical analysis due to the Grubbs outlier evaluation.

2.3.2 Sen's Estimate of Slope

Sen's estimate of slope is a non-parametric estimator of trend. It is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed. The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar time. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. The test methodology and results are listed in Appendix C2 and summarized in Table 2-4.

Data collected in 2018-2019 show 25 cases with positive slopes, 16 cases with negative slopes, and 233 cases with no slope (Table 2-5). The 25 cases with positive slopes were tested using the Mann Kendall test to determine if the positive slopes represented statistically significant increasing trends.

2.3.3 Mann-Kendall Trend Analysis

The Mann-Kendall test is a non-parametric, two-sided test to determine whether or not a dataset has a statistically significant increasing or decreasing trend. The test methodology and results are listed in Appendix C3 and summarized in Table 2-5. Statistically significant increasing trends are flagged in Table 2-4.

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Thirteen cases with statistically significant increasing trends were identified in the analysis covering samples collected in 2018-2019.

- Boron: Wells with statistically significant increasing trend for boron include MW-23S and MW-115D. Boron concentrations at MW-115D were below Class I standard of 2.0 mg/L and at MW-23S boron concentrations exceeded once (Figure 4-1). Figure 5-1A-B shows time series plots for MW-115D, along with plots for wells that have exceeded the Class I manganese standard at some time since completion of closure activities (MW-6, MW-8, MW-23D, and MW-23S).
- Iron: Statistically significant increasing trend for iron was observed at wells MW-7, MW-11R, MW-14, MW-23D and MW-23S. Iron concentrations at wells MW-7, MW-11R, and MW-14 were below the Class I standard of 5.0 mg/L. Wells MW-23D and MW-23S had one exceedance during fourth quarter of 2019 (Figure 4-2A-B). Figure 5-2A-B shows time series plots for these wells.
- Manganese: MW-7 and MW-115S had a statistically significant increasing trend for manganese. Manganese concentrations at MW-115S exceeded the Class I standard (0.15 mg/L) for all sampling events whereas at MW-7 manganese concentrations were below Class I standard (Figure 4-3A-B). Figure 5-3A-B shows time series plots for MW-7, along with plots for wells that have exceeded the Class I manganese standard at some time since completion of closure activities (MW-6, MW-7D, MW-8, MW-14, MW-23D, MW-23S, MW-115S, and MW-115D).
- Sulfate: MW-115D was the only well with a statistically significant increasing trend for sulfate. Concentrations did not exceed the Class I sulfate standard of 400 mg/L. Figure 5-4A-B shows time series plots for MW-115D, along with plots for wells that have exceeded the Class I sulfate standard at some time since completion of closure activities (MW-7, MW-8, MW-11R, MW-23D, and MW-23S).
- TDS: Statistically significant increasing trend for TDS was only observed at MW-115D; however, the concentrations at this location did not exceed the Class I standard of 1,200 mg/L. Time series plot for MW-115D, along with plots for wells that have exceeded the Class I TDS standard at some time since completion of closure activities (MW-8, MW-11R, MW-23D, and MW-23S) is shown in Figure 5-6.
- Barium: MW-115D was the only well with a statistically significant positive trend for barium. All result at this well for barium were below the Class I standard of 2.0 mg/L. Figure 5-10 shows the time series plot for MW-115D.
- Copper: Copper at well MW-23S showed statistically significant positive trend; however, the concentrations at this location did not exceed the Class I standard of 200 mg/L. Figure 5-11 shows time series plot for this well.

2.4 Site Inspection

The Post-Closure Maintenance Program requires quarterly inspection for the first five years after closure. After five years, the inspection frequency can be reduced to semi-annually provided that semi-annual groundwater monitoring has been approved by Illinois EPA. After five years of semi-annual monitoring, the inspection frequency can be reduced to annually pending approval of annual groundwater monitoring. Discontinuance of Hutsonville site inspections will occur after Illinois EPA approval of the certified Post-Closure Care Report.

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Some minor gouging in the north terrace ditch was noted in both the March 21 and June 27, 2019 site inspections. Erosion of northwest toe embarkment was also noted in the June 27, 2019 site inspection. Monitoring well MW-7D was found open with J-plug removed during the September 26, 2019 site inspection and inspector closed and secured the well. Erosion of North terrace drainage was noted in December 4, 2019 site inspection. The inspection reports are included in Appendix B.

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3. EVALUATION OF COMPLIANCE

3.1 Review of Statistically Significant Increasing Trends

The post-closure groundwater monitoring began in January 2013. This report focuses on the eight quarters of groundwater quality data that were collected in 2018-2019. The Sens Estimate of Slope and Mann-Kendall Trend Analysis was performed at the upgradient monitoring wells (MW-23S and MW-23D) as well as at downgradient monitoring wells MW-6, MW-7, MW-7D, MW-8, MW11R, MW-14, MW-115S, MW-115D, and MW-121.

The following thirteen cases with statistically significant increasing trends, sorted by monitoring well location, were identified in the analysis covering samples collected in 2018-2019.

- MW-7: iron, manganese
- MW-11R: iron
- MW-14: iron
- MW-23D: iron
- MW-23S: boron, copper, iron
- MW-115S: manganese
- MW-115D: barium, boron, sulfate, TDS

Of these thirteen cases of statistically significant increasing trends, well locations MW-115S, MW-23D and MW-23S have constituent concentrations that exceed the Class I standard.

Concentrations of manganese at MW-115S exceeded the Class I standard for all sampling events during this reporting period. At background monitoring well MW-23D, concentration of iron was elevated above Class I standard only during the fourth quarter of 2019. Boron and iron concentrations were above Class I standard during the last quarter of 2019 at MW-23S.

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4. CONCLUSIONS

4.1 Demonstration of Compliance – On Site

Statistical analyses of concentration results for groundwater samples collected in 2018 and 2019 at the Hutsonville Ash Pond D identified thirteen cases of statistically significant increasing trends. The significantly increasing parameters exceeding the Class I standard, manganese at MW-115S, iron at MW-23D and MW-23S, and boron at MW-23S will continue to be evaluated to determine if this trend continues, as well as to determine whether the source is natural or anthropogenic.

MW-11R, located downgradient of the Collection Trench, routinely exceeded the Class I standard for manganese, sulfate, and TDS prior to operation of the Collection Trench. During the fourth quarter of 2019, concentrations of sulfate and TDS exceeded the Class I standard for the first time since the operation of Collection trench began in April 2015. Boron concentrations continued to exceed the Class I standards occasionally after the Collection Trench Operation began. Two instances of boron exceedance were observed at MW-11R during this reporting period. These parameters at MW-11R will continue to be evaluated to determine if this trend continues.

4.2 Demonstration of Compliance – Off Site

At the Hutsonville Site, all wells are considered on-site wells. There are no off-site wells as there is a deed restriction on the neighboring property to the south for groundwater use. Off-site compliance is determined at the downgradient compliance boundary as described in Section 1.3.2 and shown on Table 1-2. Statistically significant increasing trends are present at some Pond D downgradient/compliance wells for the reporting period, however they do not exceed Class I standards.

No action, other than submittal of this report, is required per Section 5.2.3 of the Groundwater Monitoring Plan (Compliance Determination). The Groundwater Monitoring Plan requires a hydrogeologic investigation if a statistically significant increasing trend occurs over a period of two or more consecutive years since closure and it cannot be attributed to a superseding cause.

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5. REFERENCES

Hansen, NRT, 2011. *Ash Pond D, Post-Closure Care Plan – Hutsonville Power Station*. July 26, 2011.

Hansen, NRT, 2011. *Ash Pond D, Groundwater Monitoring Plan – Hutsonville Power Station*. July 26, 2011.

35 Illinois Administrative Code 620: Groundwater Quality.

35 Illinois Administrative Code 840: Site-Specific Closures of Coal Combustion Waste Surface Impoundments.

765 Illinois Compiled Statutes 122: Uniform Environmental Covenants Act.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Frequency	Duration	Sampling Quarter	Report Due Date
Quarterly	Begins: January 2013 Ends: 5 years after approval of closure plan and upon demonstration that monitoring effectiveness is not compromised and that there are no statistically significant increasing trends attributable to Ash Pond D.	January- March (1) April - June (2) July - September (3) October - December (4)	May 31 August 31 November 30 February 28
Semiannual	Begins: after IEPA approves that quarterly monitoring requirements have been satisfied. Ends: 5 years after initiation of semiannual monitoring and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Ash Pond D.	April - June (2) October - December (4)	August 31 February 28
Annual	Begins: Five years after approval of semi-annual monitoring and after Illinois EPA approval. Ends: After successful completion of the post-closure activities required by 35 IAC 840.142 and approval of the Illinois EPA.	April - June (2)	August 31

Table 1-2. Groundwater Monitoring System Wells
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Well	Installation Date	Surface Elevation (ft, MSL[2])	TOC[1] Elevation (ft, MSL)	Top of Screen Elev (ft)	Bottom of Screen Elevation (ft)	Total Well Depth (ft, BGS)	Objective	Position	Monitoring Zone[3]
Ash Pond D Groundwater Monitoring System Wells: Water Quality and Groundwater Elevations									
MW-6	2/9/1984	438.7	443.17	433.9	427.5	11.2	Compliance	Downgradient	UZ - s&g, ss
MW-7	2/8/1984	439.9	442.28	422.9	412.9	27.0	Compliance	Downgradient	UZ - si s&g
MW-7D	10/5/1998	438.9	442.75	398.2	393.2	45.7	Compliance	Downgradient	LZ - si s&g
MW-8	2/8/1984	440.0	443.65	422.9	417.9	22.1	Compliance	Downgradient	UZ - si s
MW-107	10/7/1998	452.9	454.23	447.2	442.2	10.7	Background	Upgradient	UZ - si s&g, ss
MW-10D7	10/7/1998	452.9	454.65	436.6	431.6	21.3	Background	Upgradient	UZ - ss
MW-11R	10/3/2001	440.4	443.01	435.4	425.4	15.0	Compliance	Downgradient	UZ - s&g
MW-14	10/3/2001	440.1	442.89	412.9	407.9	32.2	Compliance	Downgradient	LZ - s&g
MW-23D7	11/28/2017	453.5	455.90	434.0	428.7	24.8	Background	Upgradient	UZ - ss, sh
MW-23S7	11/28/2017	453.4	456.03	444.2	438.9	14.5	Background	Upgradient	UZ - s si, si s, ss
MW-115S	5/1/2004	438.7	440.88	408.4	403.4	35.3	Compliance	Downgradient	LZ - s&g
MW-115D	5/1/2004	439.1	441.39	356.4	351.4	87.7	Compliance	Downgradient	LZ - s&g
MW-121	10/2/2001	439.2	440.23	403.8	398.8	40.3	Compliance	Downgradient	LZ - s&g
Other Monitoring Wells and Piezometers: Groundwater Elevations									
MW-2D	10/14/2015	452.9	455.42	435.1	430.4	23.1	- -	- -	UZ - ss
MW-2R	6/4/2012	453.0	455.37	446.0	435.3	17.8	- -	- -	UZ - s&g
MW-3	2/9/1984	453.7	454.84	447.7	442.7	11.0	- -	- -	UZ - s&g
MW-3D	10/6/1998	453.57	455.01	433.6	428.6	24.971	- -	- -	UZ - ss
MW-4	2/13/1984	454.0	456.76	449.4	441.9	12.1	- -	- -	UZ - s&g, ss
MW-5	2/13/1984	452.1	454.67	447.3	434.3	17.8	- -	- -	UZ - s&g, ss
MW-9	2/14/1984	451.7	454.38	443.5	433.5	18.2	- -	- -	UZ - s&g
MW-12	10/8/1998	455.5	456.74	448.6	438.6	16.9	- -	- -	UZ - s&g
MW-22S	10/14/2015	449.2	451.48	441.9	437.2	12.7	- -	- -	UZ - si s&g, ss
MW-22D	10/14/2015	449.1	451.36	431.7	427.0	22.7	- -	- -	UZ - si s&g, ss

Notes:

1. TOC = top of casing

2. BGS = below ground surface; MSL = mean sea level.

3. UZ = Upper Zone, LZ = Lower Zone (deep alluvial aquifer); s = sand or sandy, s&g = sand and gravel, si = silt or silty, ss = sandstone, sh = shale

4. Background wells MW-10 and MW-10D were damaged and replaced with background wells MW-23D and MW-23S.

- - Not applicable. Wells listed are for development of groundwater elevation contour maps only.

Table 1-3. Groundwater Monitoring Program Parameters
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Field Parameters	STORET Code
pH[2]	00400
Specific Conductance[2]	00094
Depth to Water (BMP)	72109
Elevation of GW Surface[2]	71993
Depth of Well (BGS)[2]	72008
Elevation of Measuring Point	72110
Laboratory Parameters[1]	**STORET Code**
Boron[2]	01020
Iron[2]	01046
Manganese[2]	01056
Sulfate[2]	00946
Total Dissolved Solids (TDS)[2]	70300
Antimony	01095
Arsenic	01000
Barium	01005
Beryllium	01010
Cadmium	01025
Chloride	00941
Chromium	01030
Cobalt	01035
Copper	01040
Cyanide	00720
Fluoride	00950
Lead	01049
Mercury	71890
Nickel	01065
Nitrate as N	00618
Selenium	01145
Silver	01075
Thallium	01057
Zinc	01090

Notes:

[1] Reported as dissolved (filtered) concentrations.

[2] Mandatory monitoring parameter per 35 IAC 840.114(a).

Table 2-1. Statistical Summary of Groundwater Monitoring Data
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Parameter	Units	Count	Minimum	Mean	Median	Maximum	% Non-Detects
Ag, diss	mg/L	85	0.0003	0.0003	0.0003	0.0003	100.0
As, diss	mg/L	85	0.0002	0.0018	0.0012	0.0092	37.7
B, diss	mg/L	85	0.025	2.3929	0.27	20.0	5.9
Ba, diss	mg/L	85	0.009	0.043	0.041	0.204	0.0
Be, diss	mg/L	85	0.0010	0.0011	0.0010	0.0082	98.8
Cd, diss	mg/L	85	0.0003	0.0003	0.0003	0.0051	97.7
Cl, diss	mg/L	85	2.1	16.6	15.5	141.00	0.0
CN, total	mg/L	85	0.01	0.01	0.01	0.01	100.0
Co, diss	mg/L	85	0.001	0.003	0.001	0.105	96.5
Cr, diss	mg/L	85	0.0003	0.0010	0.0010	0.0026	94.1
Cu, diss	mg/L	85	0.0005	0.0012	0.0005	0.0371	89.4
F, diss	mg/L	85	0.1	0.2	0.2	0.9	42.4
Fe, diss	mg/L	85	0.010	3.706	0.226	204.000	28.2
Hg, diss	mg/L	85	0.0001	0.0001	0.0001	0.0010	100.0
Mn, diss	mg/L	85	0.0005	0.5958	0.1600	13.5000	5.9
Ni, diss	mg/L	85	0.0002	0.0032	0.0008	0.1190	4.7
NO3, diss	mg/L	85	0.050	1.024	0.100	9.780	49.4
Pb, diss	mg/L	85	0.001	0.001	0.001	0.0100	97.7
pH (field)	STD	85	3.75	7.06	7.09	8.11	0.0
Sb, diss	mg/L	85	0.002	0.002	0.002	0.002	100.0
Se, diss	mg/L	85	0.0005	0.0008	0.0005	0.0050	87.1
SO4, diss	mg/L	85	13.5	189.0	46.1	2,060	0.0
Spec. Cond.	micromhos/cm	85	15	825	663	2,800	0.0
TDS	mg/L	85	64	553	378	2,800	0.0
Tl, diss	mg/L	85	0.0003	0.0003	0.0003	0.0025	100.0
Zn, diss	mg/L	85	0.01	0.01	0.01	0.60	96.5

Notes:
One-half the MDL was substituted for non-detects
Analytical data collected in 2017 and 2018

Table 2-2. Summary of Exceedances of Class I Groundwater Standards
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Parameters Submitted to the IEPA for Routine Groundwater Monitoring	Class 1 Standard	unit	Number of exceedances of Class 1 Groundwater Standards between January 2018 and December 2019 (and year of last exceedance)[1] Current Monitoring Wells Monitored Quarterly for Reporting to the IEPA										
			6	7	7D	8	11R	14	23D^{bck}	23S^{bck}	115S	115D	121
	Number of Samples		6	8	8	8	7	8	8	8	8	8	8
Antimony	0.006	mg/L	0	0	0	0	0	0	0	0	0	0	0
Arsenic	0.01**	mg/L	0	0	0	0	0	0	0	0	0	0	0
Barium	2.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Beryllium	0.0	mg/L	0	0	0	0	0	0	0	**1***	0	0	0
Boron	2.0	mg/L	**1**	0	0	**8**	**2**	0	**1***	**1***	0	0	0
Cadmium	0.005	mg/L	0	0	0	0	0	0	0	**1***	0	0	0
Chloride	200	mg/L	0	0	0	0	0	0	0	0	0	0	0
Chromium	0.1	mg/L	0	0	0	0	0	0	0	0	0	0	0
Cobalt	1.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Copper	0.65	mg/L	0	0	0	0	0	0	0	0	0	0	0
Cyanide, total	0.2	mg/L	0	0	0	0	0	0	0	0	0	0	0
Fluoride	4.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Iron	5.0	mg/L	0	0	0	0	0	0	**1***	**1***	0	0	0
Lead	0.0075	mg/L	0	0	0	0	0	0	0	0	0	0	0
Manganese	0.15	mg/L	**1**	0	**8**	**5**	0	**6**	**1***	**1***	**8**	**5**	**8**
Mercury	0.002	mg/L	0	0	0	0	0	0	0	0	0	0	0
Nickel	0.1	mg/L	0	0	0	0	0	0	0	**1***	0	0	0
Nitrate as N	10	mg/L	0	0	0	0	0	0	0	0	0	0	0
pH	6.50 / 9.00	Std.	0	0	0	0	0	0	**1***	**1***	0	0	0
Selenium	0.05	mg/L	0	0	0	0	0	0	0	0	0	0	0
Silver	0.05	mg/L	0	0	0	0	0	0	0	0	0	0	0
Sulfate	400	mg/L	0	**1**	0	**8***	**1**	0	**1***	**1***	0	0	0
Thallium	0.002	mg/L	0	0	0	0	0	0	0	0	0	0	0
Total Dissolved Solids	1,200	mg/L	0	0	0	**5**	**1**	0	**1***	**1***	0	0	0
Zinc	5.0	mg/L	0	0	0	0	0	0	0	0	0	0	0
Specific Conductivity	no Class 1 Standard		0	0	0	0	0	0	0	0	0	0	0

Notes:

[1] Based on 8 quarterly groundwater sampling events.
* Potential outlier.
** Class I groundwater standard for Arsenic changed from 0.05 to 0.01 mg/L on 10/05/12.
bck Background monitoring wells.

Last exceedance occurred in 2018
Last exceedance occurred in 2019

Table 2-3. Summary of Potential Outliers
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Constituent	Well	Date	Result (mg/L)	Non-detect?	Outlier Low	Outlier High	Action
Arsenic, dissolved, mg/L	MW23S	10/28/2019	0.0092	No		1	none
Barium, dissolved, mg/L	MW11R	10/28/2019	0.204	No		1	none
Barium, dissolved, mg/L	MW23S	10/28/2019	0.009	No	1		none
Beryllium, dissolved, mg/L	MW23S	10/28/2019	0.0082	No		1	none
Boron, dissolved, mg/L	MW23D	10/28/2019	8.02	No		1	none
Boron, dissolved, mg/L	MW23S	10/28/2019	5.24	No		1	none
Cadmium, dissolved, mg/L	MW23D	10/28/2019	0.0016	No		1	none
Cadmium, dissolved, mg/L	MW23S	10/28/2019	0.0051	No		1	none
Chloride, dissolved, mg/L	MW23D	10/28/2019	9.7	No		1	none
Chloride, dissolved, mg/L	MW23S	10/28/2019	10.1	No		1	none
Chromium, dissolved, mg/L	MW23S	10/28/2019	0.0003	No	1		none
Cobalt, dissolved, mg/L	MW23D	10/28/2019	0.105	No		1	none
Cobalt, dissolved, mg/L	MW23S	10/28/2019	0.091	No		1	none
Copper, dissolved, mg/L	MW14	08/26/2019	0.0371	No		1	none
Fluoride, dissolved, mg/L	MW23D	10/28/2019	0.6	No		1	none
Fluoride, dissolved, mg/L	MW23S	10/28/2019	0.9	No		1	none
Fluoride, dissolved, mg/L	MW8	03/12/2018	0.3	No		1	none
Iron, dissolved, mg/L	MW23D	10/28/2019	70	No		1	none
Iron, dissolved, mg/L	MW23S	10/28/2019	204	No		1	none
Lead, dissolved, mg/L	MW23D	10/28/2019	0.002	No		1	none
Lead, dissolved, mg/L	MW23S	08/26/2019	<0.01	Yes		1	none
Manganese, dissolved, mg/L	MW23D	10/28/2019	8.6	No		1	none
Manganese, dissolved, mg/L	MW23S	10/28/2019	13.5	No		1	none
Mercury, dissolved, mg/L	MW23S	08/26/2019	<0.001	Yes		1	none
Nickel, dissolved, mg/L	MW23D	10/28/2019	0.0465	No		1	none
Nickel, dissolved, mg/L	MW23S	10/28/2019	0.119	No		1	none
Nitrate nitrogen, dissolved, mg/L	MW8	03/12/2018	0.410	No		1	none
pH (field), STD	MW23D	10/28/2019	5.28	No	1		none
pH (field), STD	MW23S	10/28/2019	3.75	No	1		none
Selenium, dissolved, mg/L	MW23D	10/28/2019	<0.005	Yes		1	none
Selenium, dissolved, mg/L	MW23S	10/28/2019	<0.005	Yes		1	none
Specific Conductance (field), micromhos/cm	MW23D	10/28/2019	2,180	No		1	none
Specific Conductance (field), micromhos/cm	MW23S	10/28/2019	2,800	No		1	none
Sulfate, dissolved, mg/L	MW115S	10/28/2019	78.7	No		1	none
Sulfate, dissolved, mg/L	MW23D	10/28/2019	1,320	No		1	none
Sulfate, dissolved, mg/L	MW23S	10/28/2019	2,060	No		1	none
Sulfate, dissolved, mg/L	MW8	05/14/2018	1,120	No		1	none
Thallium, dissolved, mg/L	MW23S	08/26/2019	<0.0025	Yes		1	none
Total Dissolved Solids, mg/L	MW14	08/28/2018	289	No	1		none
Total Dissolved Solids, mg/L	MW23D	10/28/2019	1,790	No		1	none
Total Dissolved Solids, mg/L	MW23S	10/28/2019	2,800	No		1	none
Zinc, dissolved, mg/L	MW23D	10/28/2019	0.19	No		1	none
Zinc, dissolved, mg/L	MW23S	10/28/2019	0.60	No		1	none

Date range for potential outlier test is 1/1/1984-12/31/2019.

Table 2-4. Trend Analysis Results
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

	MW-6	MW-7	MW-7D	MW-8	MW-11R	MW-14	MW-23D	MW-23S	MW-115S	MW-115D	MW-121
Number of Samples	**6**	**8**	**8**	**8**	**7**	**8**	**8**	**8**	**8**	**8**	**8**
Antimony, dissolved	None	None	None	None	None	None	None	None	None	None	None
Arsenic, dissolved	None	None	None	None	None	None	None	None	None	None	None
Barium, dissolved	None	None	None	None	None	None	None	None	None	MK-Positive[1]	None
Beryllium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Boron, dissolved	Positive	Negative	Negative	Negative	Positive	Negative	None	MK-Positive	Positive	MK-Positive	None
Cadmium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Chloride, dissolved	None	None	None	Negative	None	None	None	None	None	None	None
Chromium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Cobalt, dissolved	None	None	None	None	None	None	None	None	None	None	None
Copper, dissolved	None	None	None	None	None	None	None	MK-Positive[1]	None	MK-Negative[3]	None
Cyanide, total	None	Positive[2]	Positive[2]	Positive[2]	Positive[2]	Positive[2]	Positive[2]	Positive[2]	Positive[2]	Positive[2]	Positive[2]
Fluoride, dissolved	None	None	None	None	None	None	None	None	None	None	None
Iron, dissolved	None	MK-Positive[1]	Positive	None	MK-Positive[1]	MK-Positive	MK-Positive	MK-Positive[1]	Positive	Positive	None
Lead, dissolved	None	None	None	None	None	None	None	None	None	None	None
Manganese, dissolved	None	MK-Positive	Positive	Positive	None	Positive	None	None	MK-Positive	Positive	Positive
Mercury, dissolved	None	None	None	None	None	None	None	None	None	None	None
Nickel, dissolved	None	None	MK-Negative[3]	None	None	None	None	None	None	MK-Negative[3]	MK-Negative[3]
Nitrate nitrogen, dissolved	Positive	Negative	None	None	Negative	None	Positive[2]	None	None	MK-Negative	Negative
Selenium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Silver, dissolved	None	None	None	None	None	None	None	None	None	None	None
Sulfate, dissolved	None	Negative	None	Negative	None	Negative	None	None	None	MK-Positive[1]	None
Thallium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	None	None	None	None	None	None	None	None	MK-Positive	None
Zinc, dissolved	None	None	None	None	None	None	None	None	None	None	None

Notes:
- "positive", "negative", and "none" describe the slope as calculated using Sen's estimate of slope; slopes that are statistically significant (see below) are indicated by the MK prefix
- MK trend analysis done with non-detects at one half the detection limit.

1 MANAGES 4.1 output displays 0.0 for the median slope; however the direction of the slope was confirmed to be positive by evaluating the data set.

2 MANAGES 4.1 output displays a statistically signficiant positive trend, but further investigation revealed that the designation was due to the reporting limit changes between subsequent sampling events. Therefore, these counts are included into the "none" category in Table 2-5 as there were no trends.

3 MANAGES 4.1 output displays 0.0 for the median slope; however the direction of the slope was confirmed to be negative by evaluating the data set.

- Green shading indicates increasing positive trends that are statistically significant as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration **lower** than the Class I groundwater quality standard
- Yellow shading indicates increasing positive trends that are statistically significant as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration higher than the Class I groundwater quality standard.

Table 2-5. Summary of Trend Analyses
2019 Annual Report
Former Hutsonville Power Station - Ash Pond D

Time Period	Slope			Statistically Significant Increasing Trends
	Negative	None	Positive	
2013-2014	87	85	68	7
2014-2015	135	57	48	2
2015-2016	113	110	41	1
2016-2017	103	72	41	2
2017-2018	80	133	51	8
2018-2019	16	223	25	13

Notes:
Trends based on data collected during the specified periods.
The number of samples per well location are noted on Table 2-4.

FIGURES

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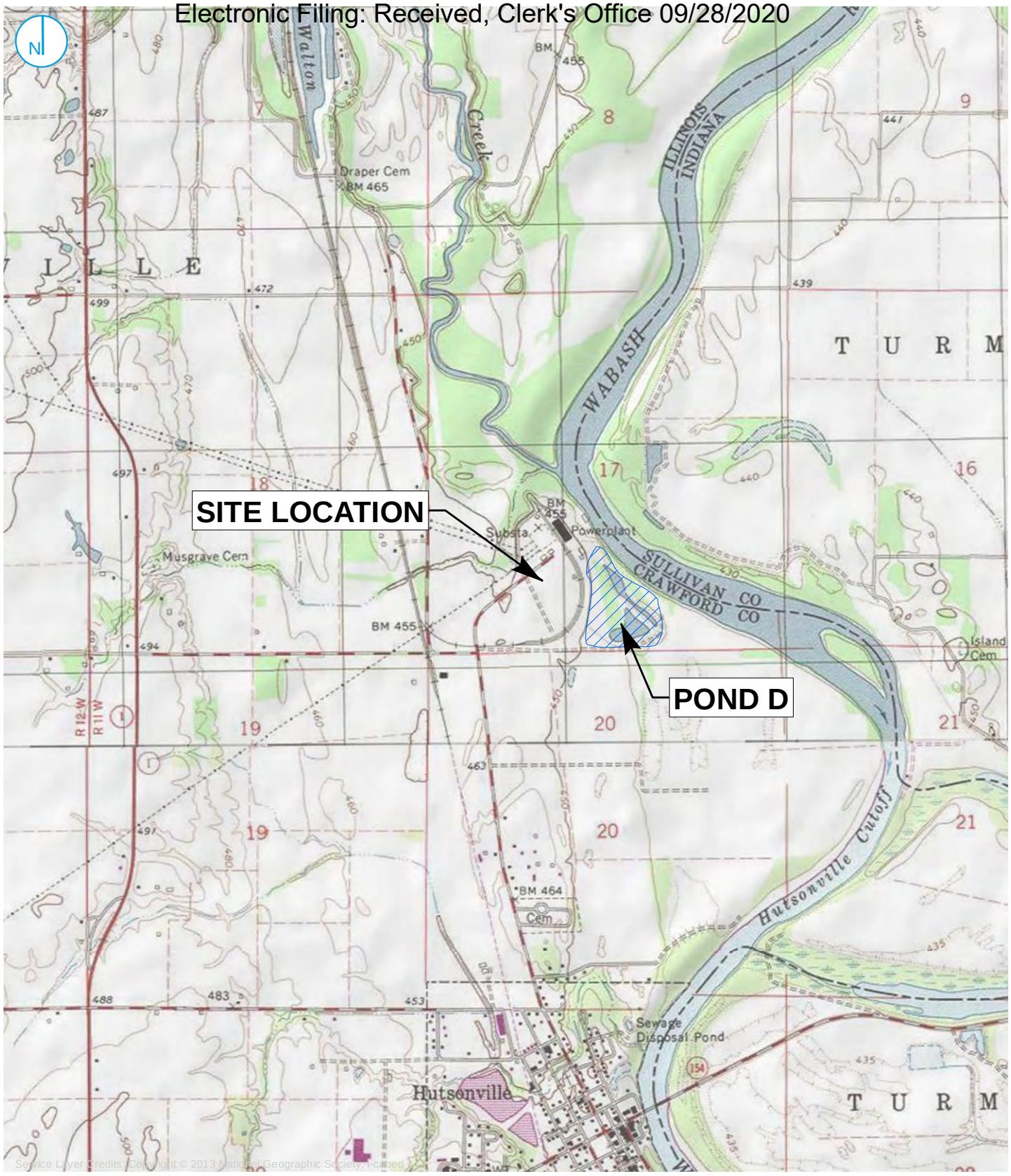

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Y:\Mapping\Projects\241420\MXDs\2019APD\Figure 1-1_Site Location Map Ash Pond D2_ramboll.mxd
PROJECT: 72971 | DATED: 1/14/2020 | DESIGNER: GALARNMC


KEY MAP

Map Scale: 1:1:24,000;
Map Center: 87°39'45"W 39°7'53"N

0 1,000 2,000 Feet

SITE LOCATION MAP

2019 ANNUAL REPORT
FORMER HUTSONVILLE
POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 1-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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Y:\Mapping\Projects\1242420\MXDs\2019APD\Figure 1-2_Site Basemap Ash Pond D2_ramboll.mxd

PROJECT: 169000XXXX | DATED: 1/14/2020 | DESIGNER: GALARNMC



- ASH POND D MONITORING WELL LOCATION
- NESTED ASH POND D MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- NESTED MONITORING WELL LOCATION
- ABANDONED NESTED MONITORING WELL LOCATION
- PROPERTY LINE
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

0 150 300 Feet

SITE BASEMAP

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 1-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

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Y:\Mapping\Projects\2412420\MXDs\2019APDIFigure 2-1_Q1_2019_GW_Elevation.mxd

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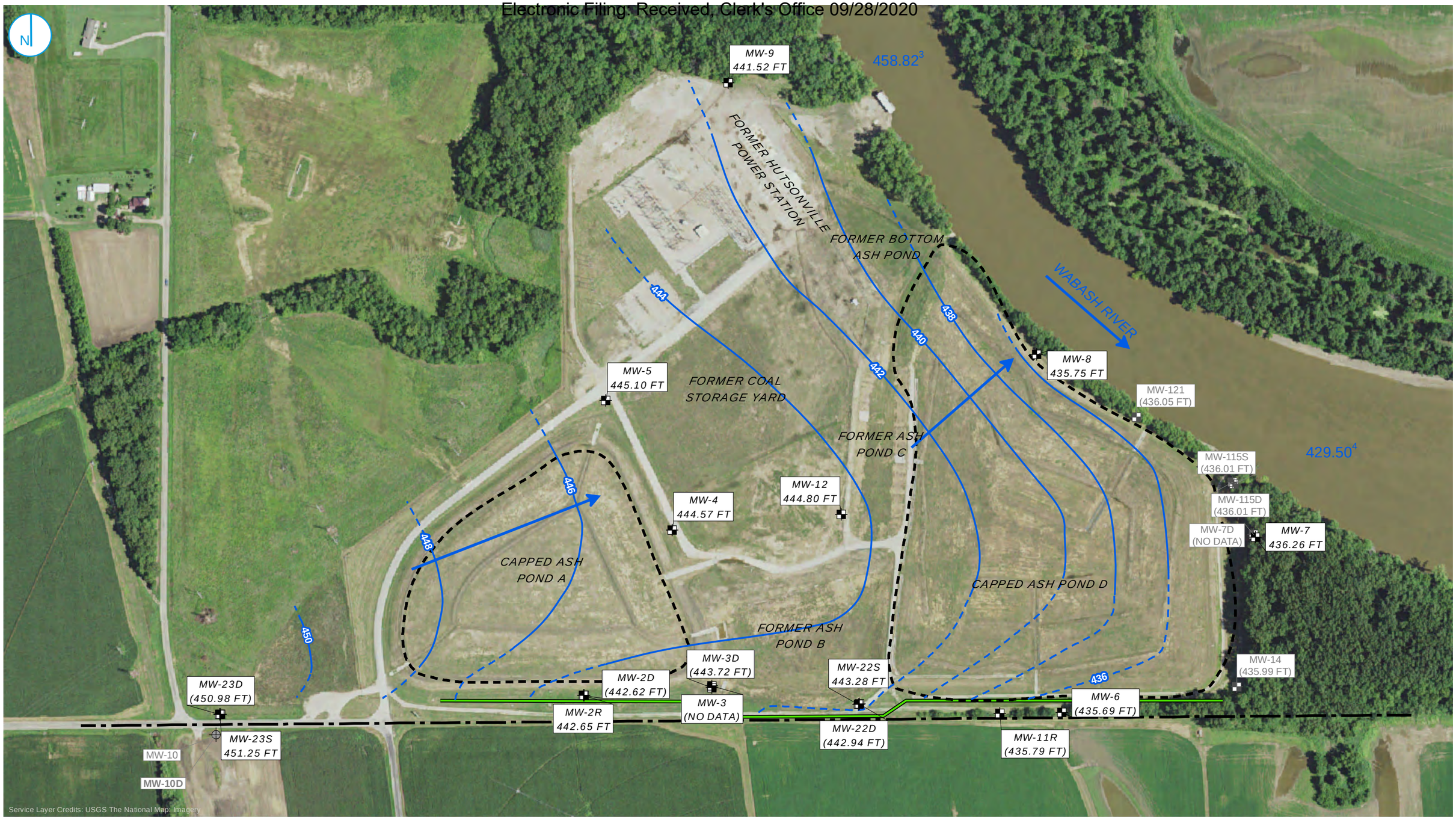

UPPER MIGRATION ZONE MONITORING WELL
DEEP MIGRATION ZONE MONITORING WELL
ABANDONED MONITORING WELL LOCATION
PROPERTY LINE

0 150 300 Feet

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
APPROXIMATE BOUNDARY OF CAPPED ASH POND
GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q1 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP FEBRUARY 25, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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Y:\Mapping\Projects\2412420\MXDs\2019APDIFigure 2-2_Q2_2019_GW_Elevation.mxd
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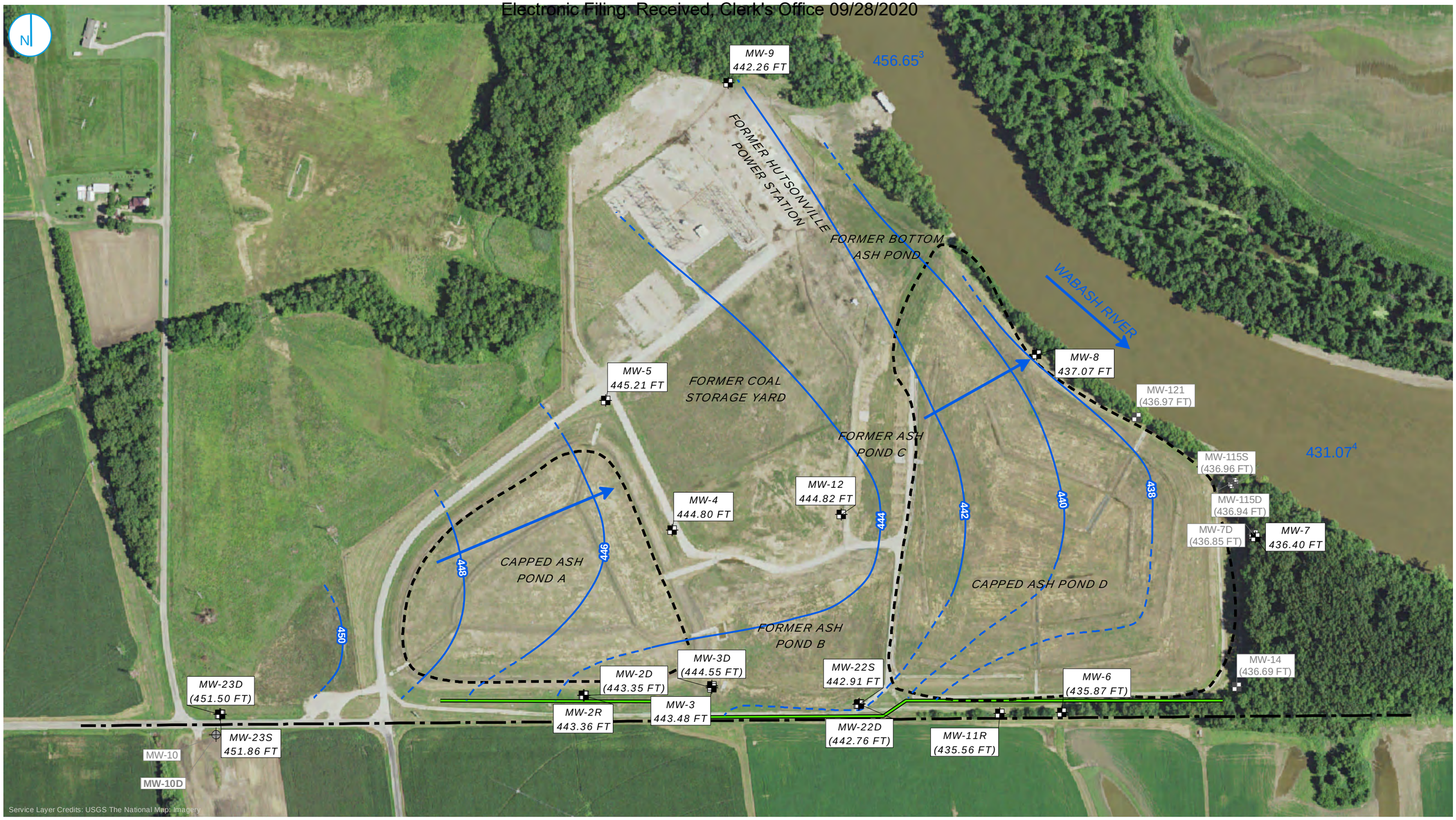

- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- ABANDONED MONITORING WELL LOCATION
- PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

0 150 300 Feet

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q2 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP JUNE 17, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

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Y:\Mapping\Projects\2412420MXDs\2019APDFs\Figure 2-3_Q3_2019_GW_Elevation.mxd

PROJECT: 169000XXXX | DATED: 1/21/2020 | DESIGNER: GALARNMC

N

MW-9
441.59 FT

447.73[3]

FORMER HUTSONVILLE POWER STATION

FORMER BOTTOM ASH POND

WABASH RIVER

MW-8
426.57 FT

MW-5
444.47 FT

FORMER COAL STORAGE YARD

MW-121
(426.08 FT)

FORMER ASH POND C

MW-115S
(426.06 FT)

419.39[4]

MW-115D
(425.97 FT)

MW-7D
(426.05 FT)

MW-4
444.59 FT

MW-12
444.37 FT

MW-7
427.56 FT

CAPPED ASH POND A

CAPPED ASH POND D

FORMER ASH POND B

MW-14
(426.07 FT)

MW-3D
(443.88 FT)

MW-2D
(443.52 FT)

MW-3
443.74 FT

MW-22S
442.68 FT

MW-23D
(449.63 FT)

MW-2R
443.52 FT

MW-6
(429.92 FT)

MW-22D
(442.32 FT)

MW-11R
(430.43 FT)

MW-23S
449.87 FT

MW-10

MW-10D

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UPPER MIGRATION ZONE MONITORING WELL

DEEP MIGRATION ZONE MONITORING WELL

ABANDONED MONITORING WELL LOCATION

PROPERTY LINE

0 150 300 Feet

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

APPROXIMATE BOUNDARY OF CAPPED ASH POND

GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q3 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP AUGUST 26, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-3

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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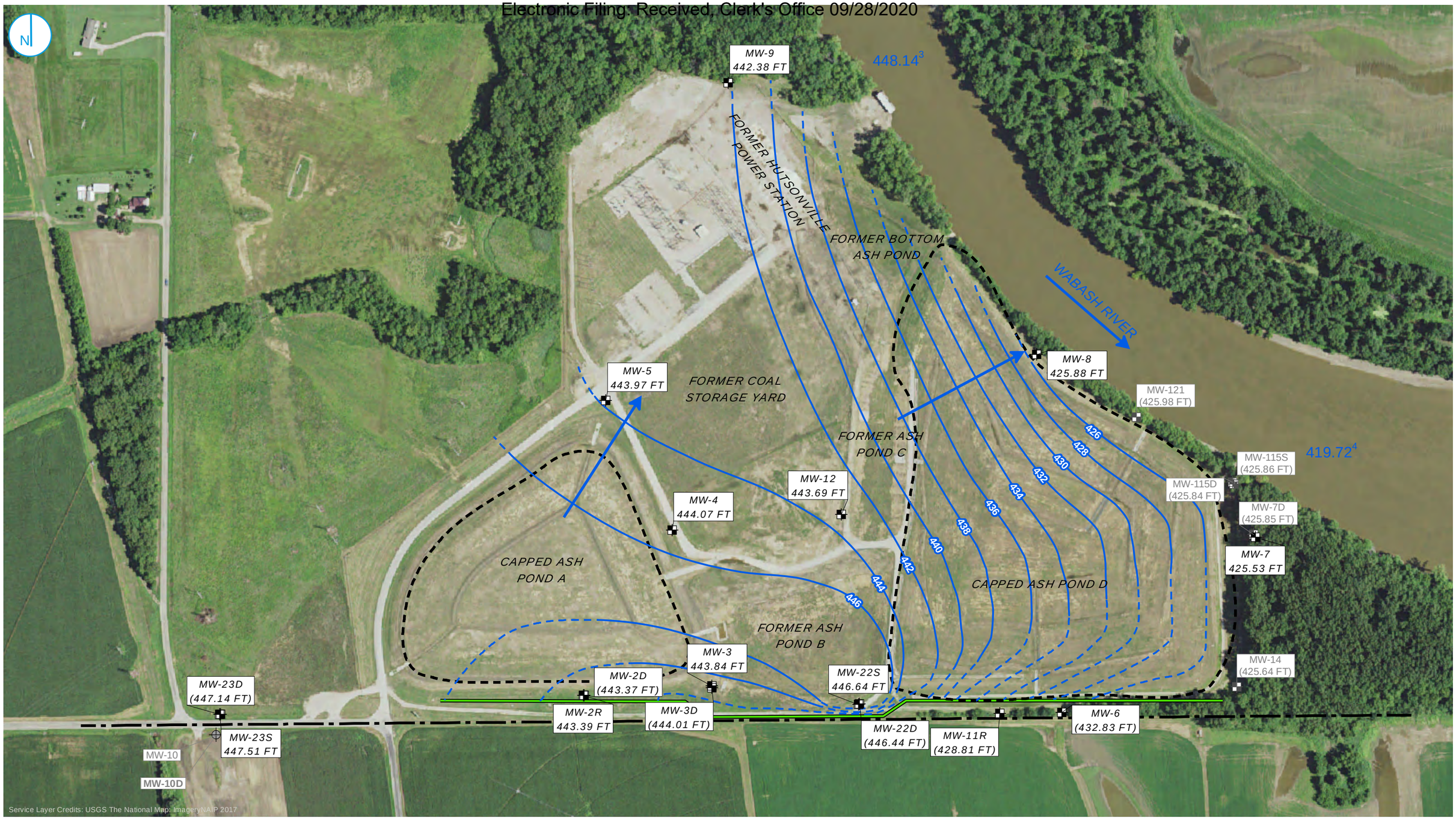

Y:\Mapping\Projects\2412420MXDs\2019APDIFigure 2-4_Q4_2019_GW_Elevation.mxd
PROJECT: 169000XXXX | DATED: 1/21/2020 | DESIGNER: GALARNMC

- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- ABANDONED MONITORING WELL LOCATION
- PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

0 150 300 Feet

Notes

1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03341500 WABASH RIVER AT TERRE HAUTE, IN. LOCATED APPROXIMATELY 39 RIVER MILES UPSTREAM OF THE FORMER HUTSONVILLE POWER STATION. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
4) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Q4 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP OCTOBER 28, 2019

2019 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 2-4

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

ENVIRONMENT
& HEALTH

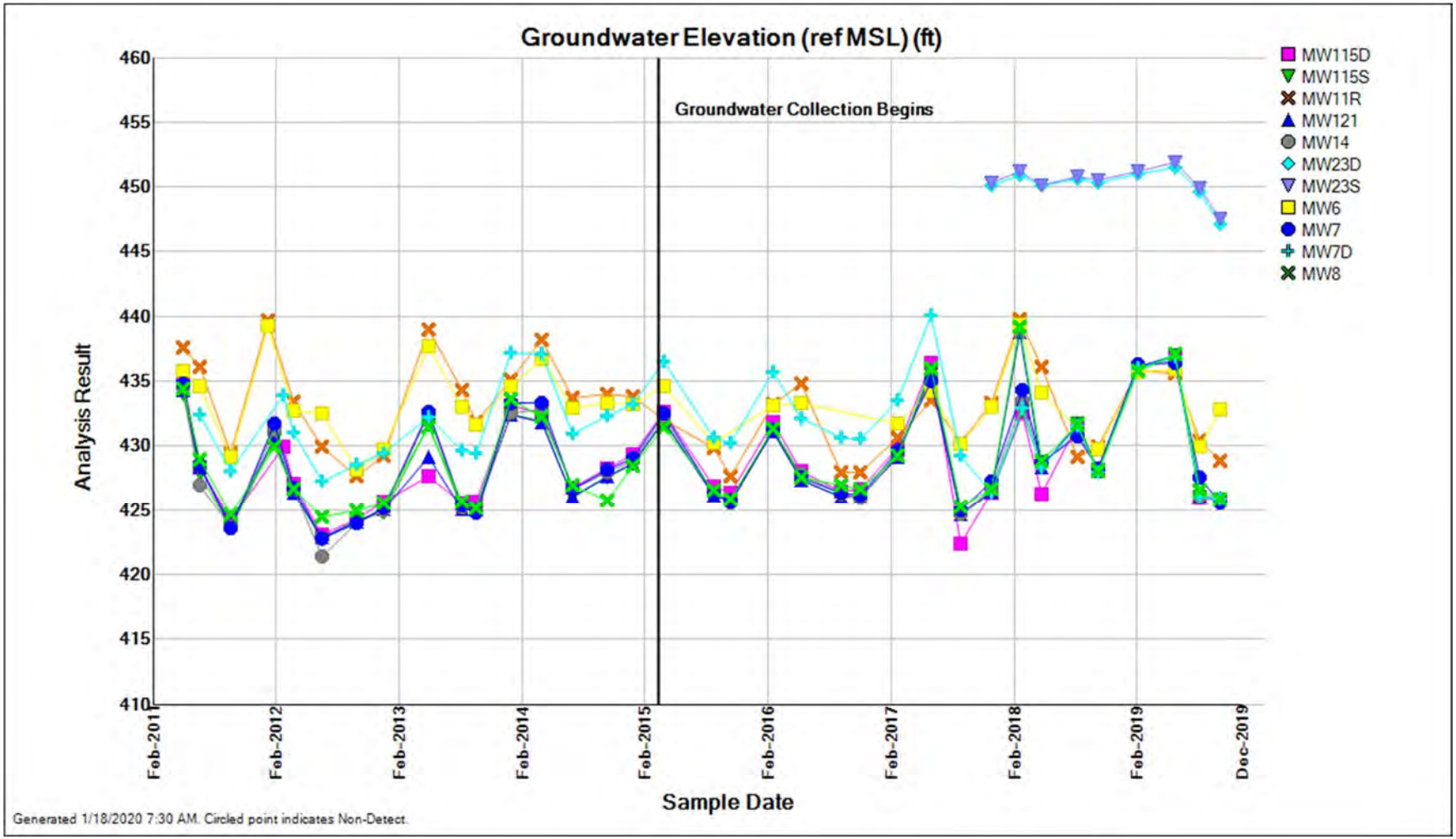

Figure 3. Groundwater elevations near groundwater collection trench

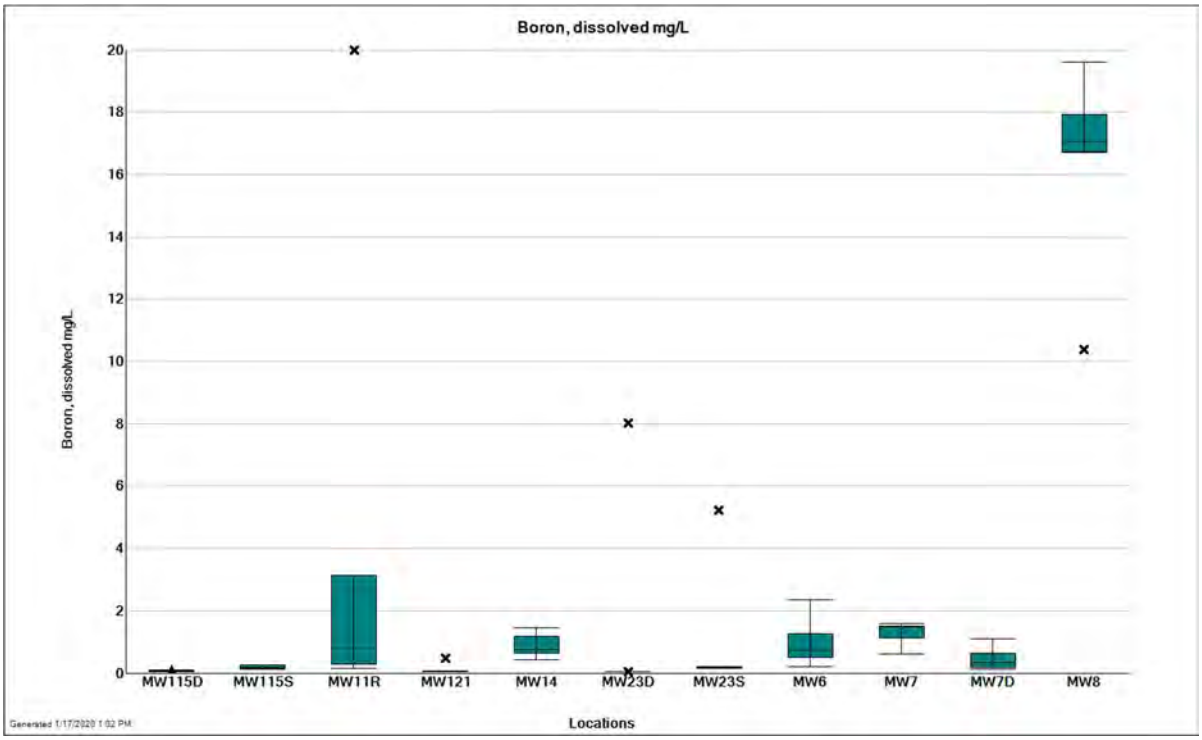

Figure 4-1. Box-whisker plot showing distribution of boron concentration by monitoring well for data collected in 2

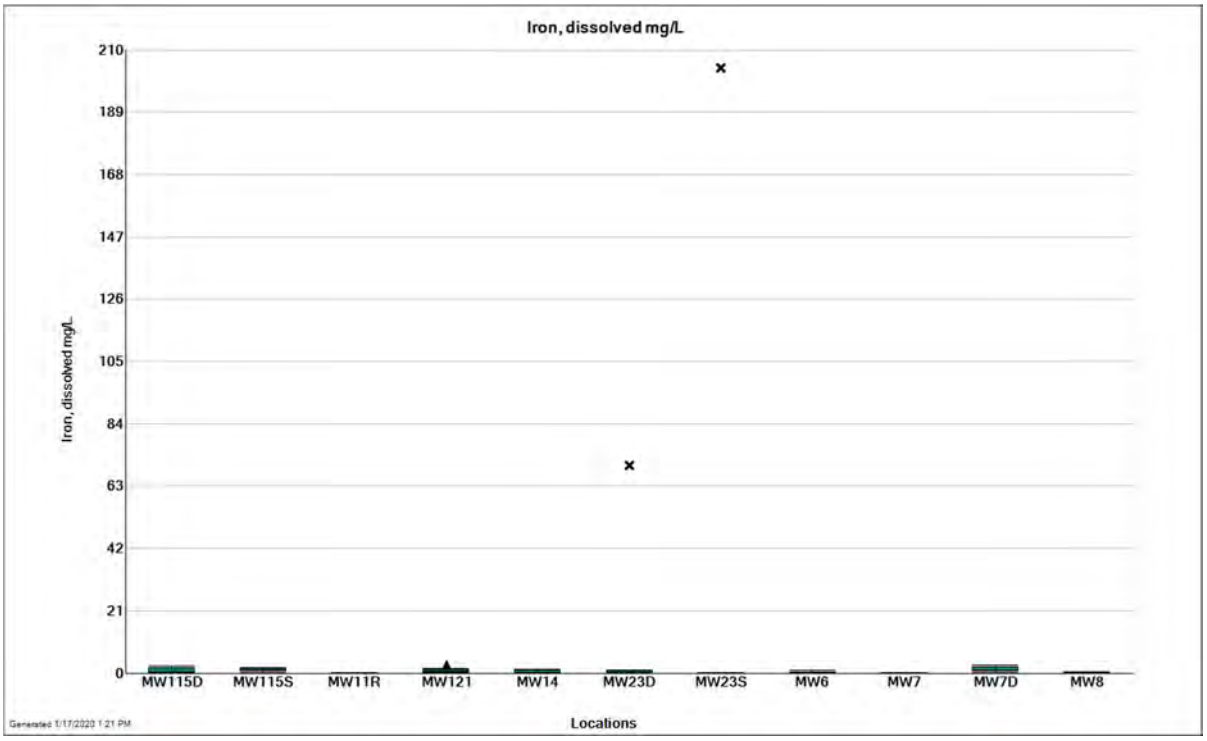

Figure 4-2A. Box-whisker plot showing distribution of iron concentration by monitoring well for data collected in 2018 and 2019.

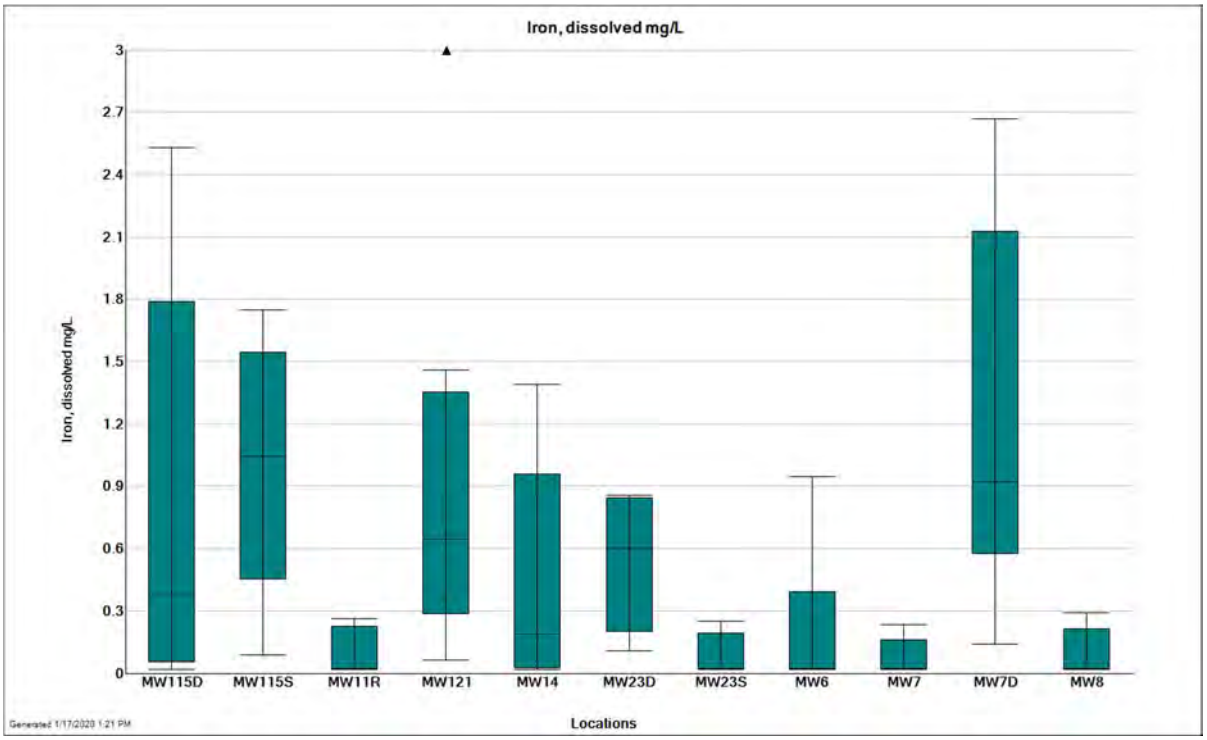

Figure 4-2B. Box-whisker plot showing distribution of iron concentration by monitoring well for data collected in 2018 and 2019 (zoomed in).

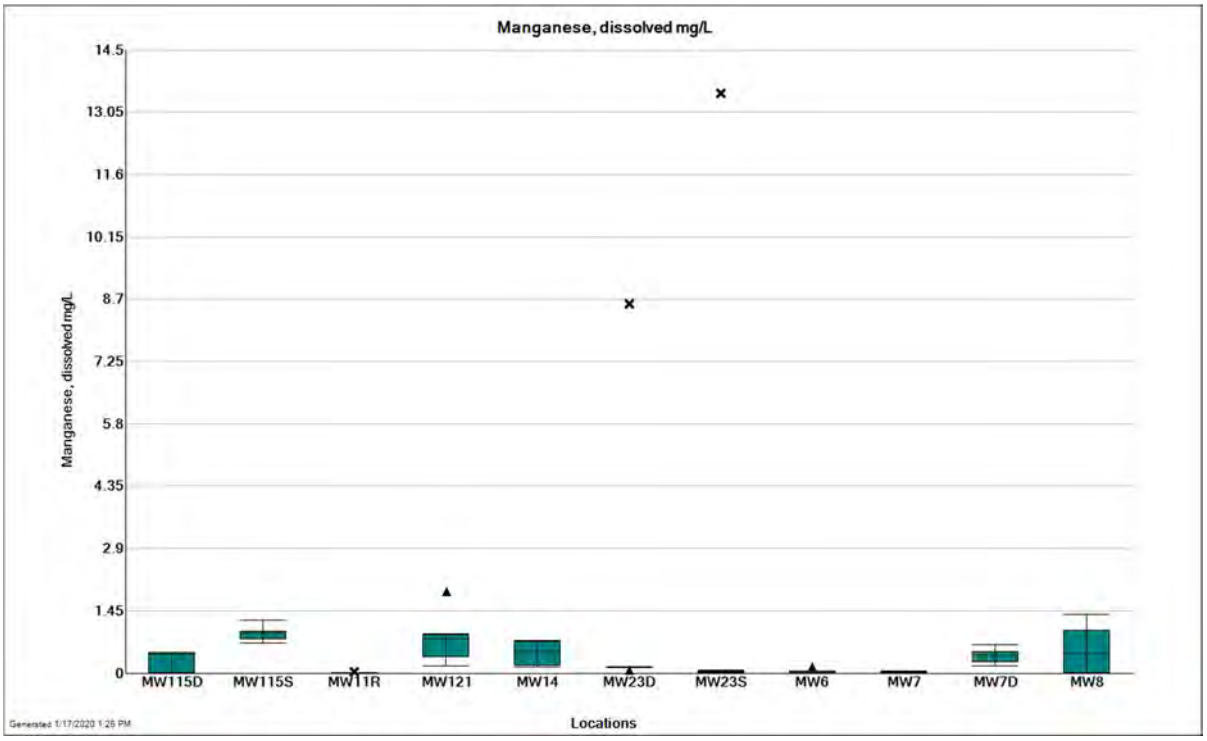

Figure 4-3A. Box-whisker plot showing distribution of manganese concentration by monitoring well for data collected in 2018 and 2019.

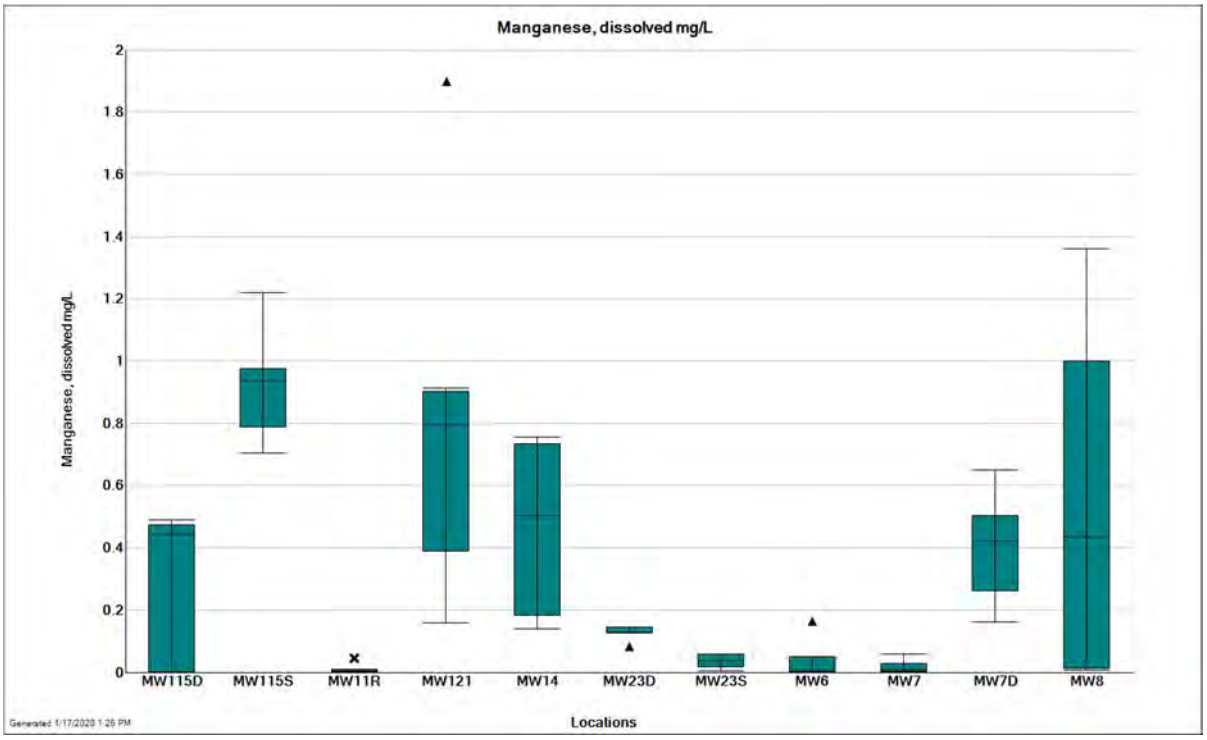

Figure 4-3B. Box-whisker plot showing distribution of arsenic concentration by monitoring well for data collected in 2018 and 2019 (zoomed in)

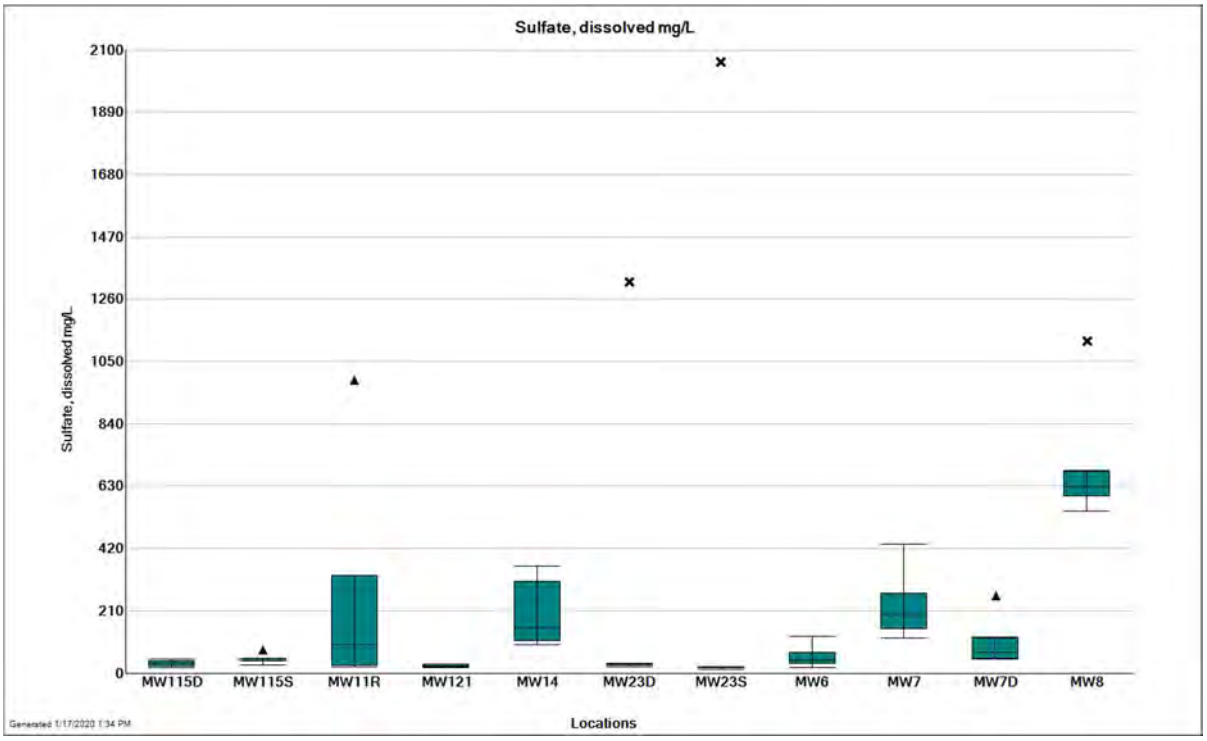

Figure 4-4. Box-whisker plot showing distribution of sulfate concentration by monitoring well for data collected in 2018 and 2019.

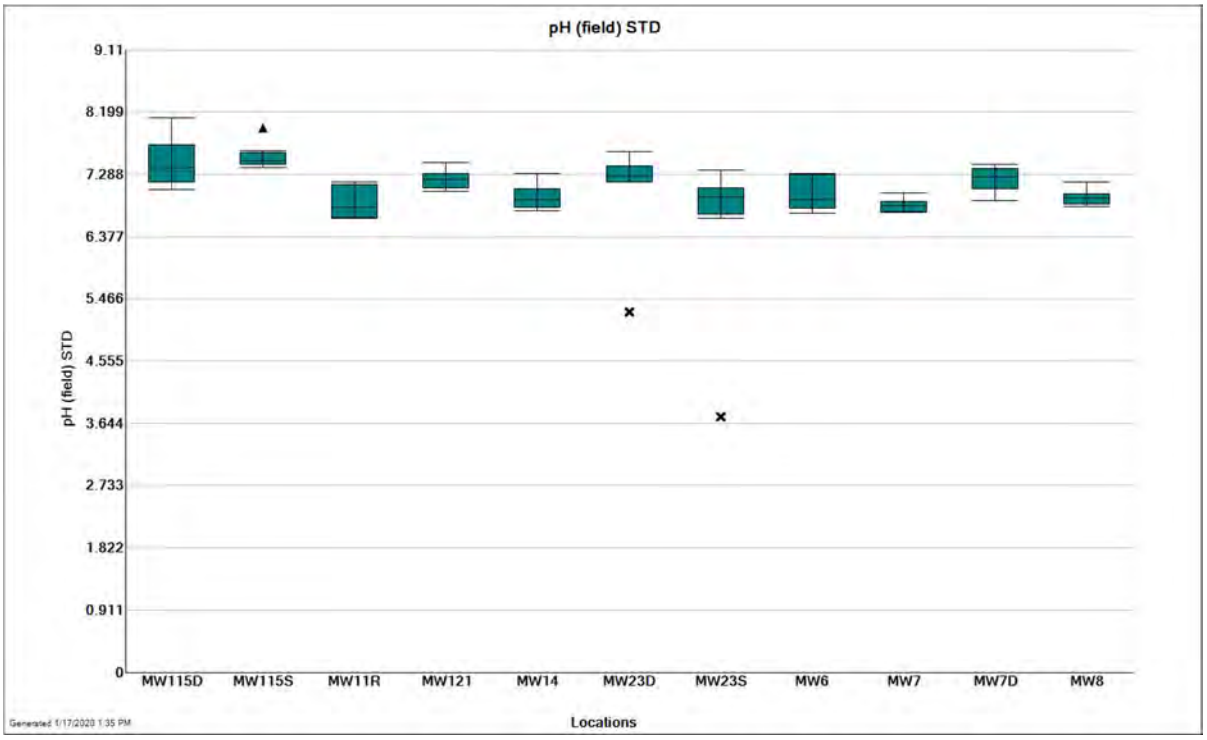

Figure 4-5. Box-whisker plot showing distribution of pH concentration by monitoring well for data collected in 2018 and 2019.

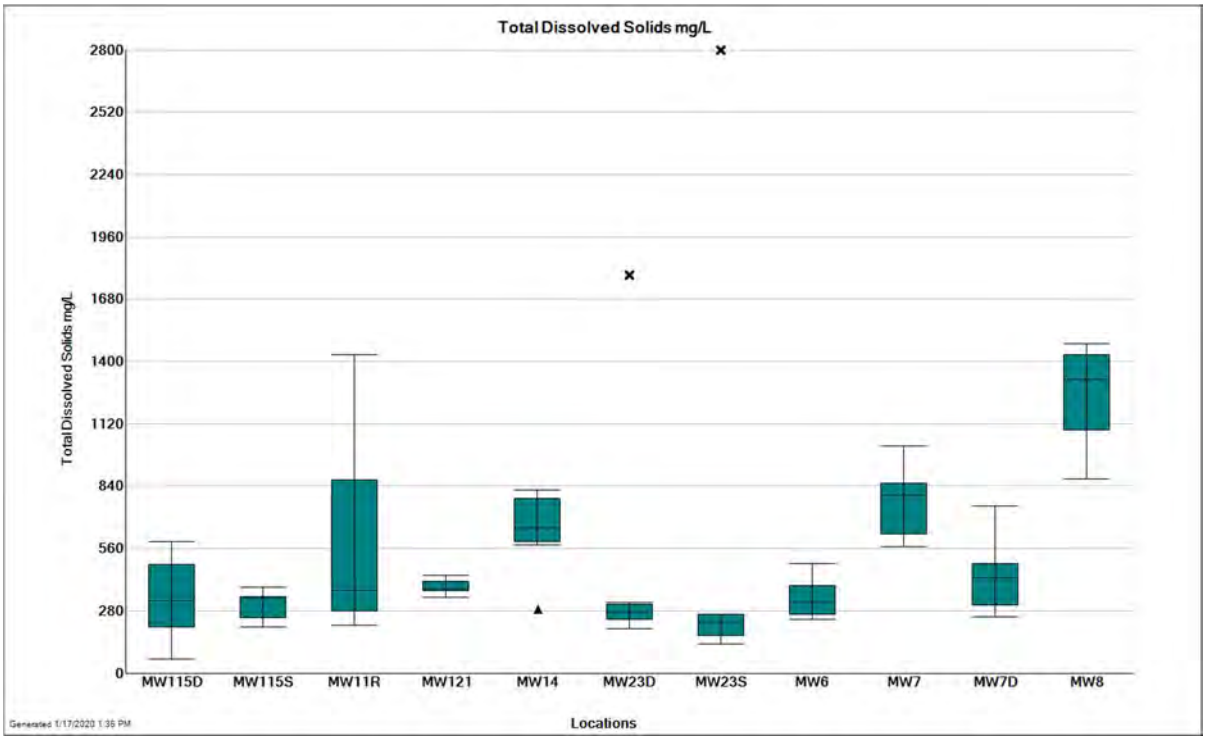

Figure 4-6. Box-whisker plot showing distribution of TDS concentration by monitoring well for data collected in 2018 and 2019.

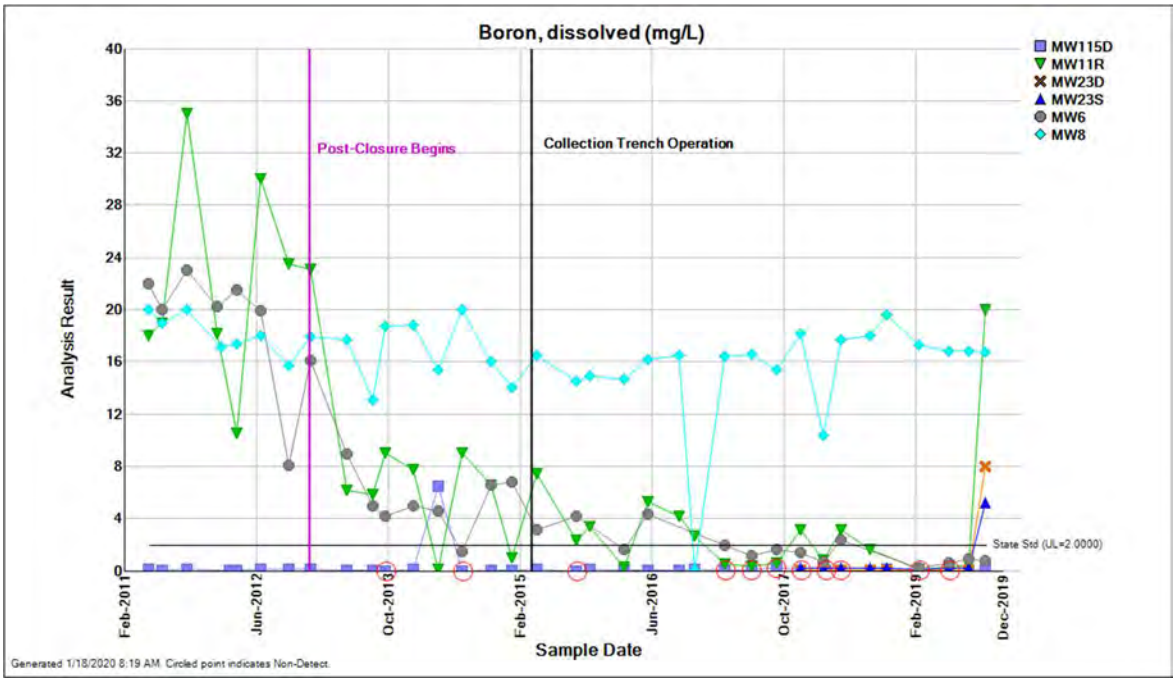

Figure 5-1A. Time series plot for boron at wells exceeding the Class I standard following closure activities (MW-6, MW-8, MW-11R, MW-23D, and MW-23S). MW-115D does not exceed the standard but has a statistically significant positive trend.

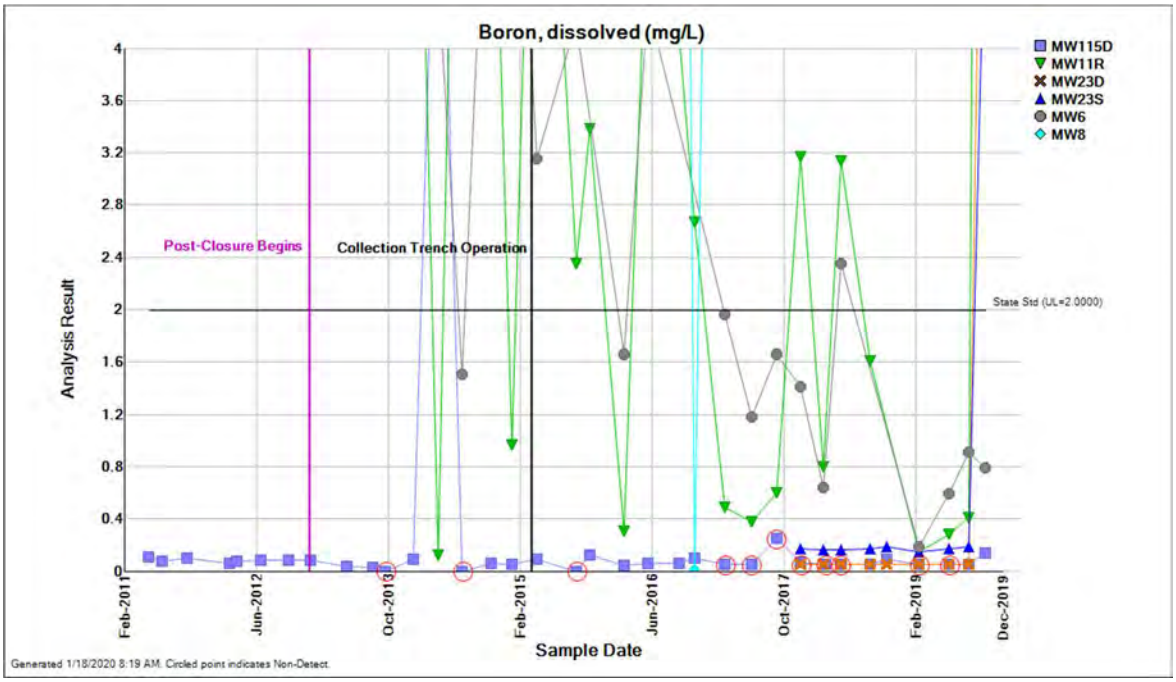

Figure 5-1B. Time series plot for boron at wells exceeding the Class I standard following closure activities (MW-6, MW-8, MW-11R, MW-23D, and MW-23S). MW-115D does not exceed the standard but has a statistically significant positive trend. Zoomed in to show the Class I standard.

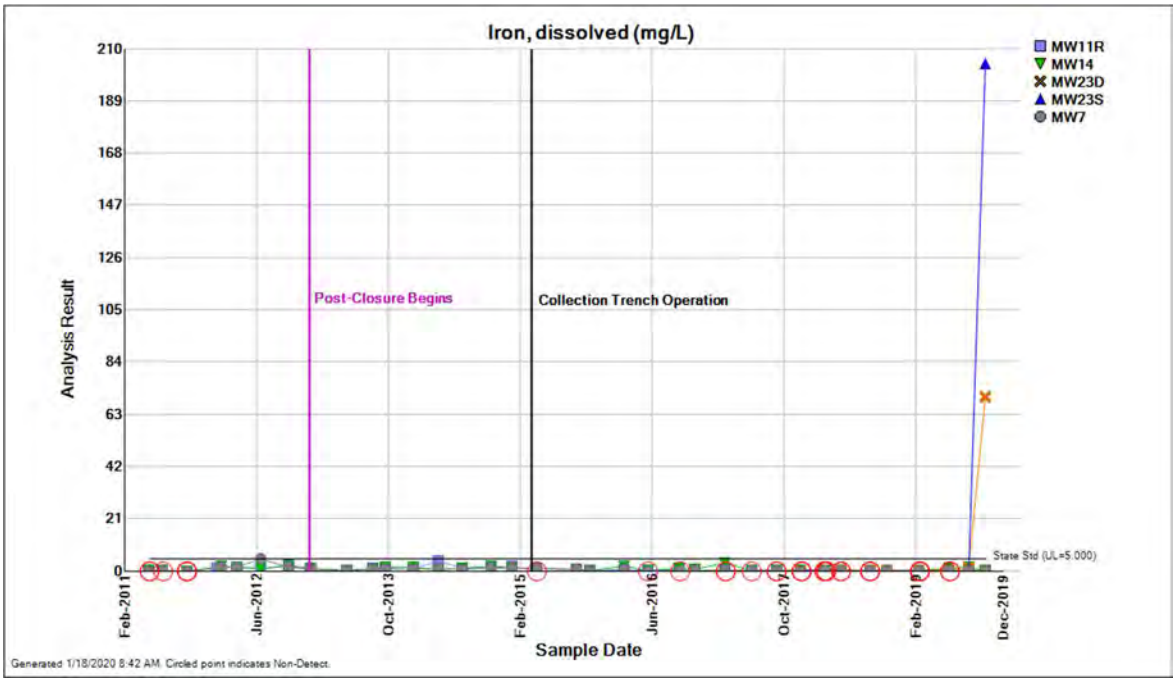

Figure 5-2A. Time series plot for iron at wells exceeding the Class I standard following closure activities (MW-23D and MW-23S). MW-11R, MW-14, and MW-7 do not exceed the standard but have a statistically significant positive trend.

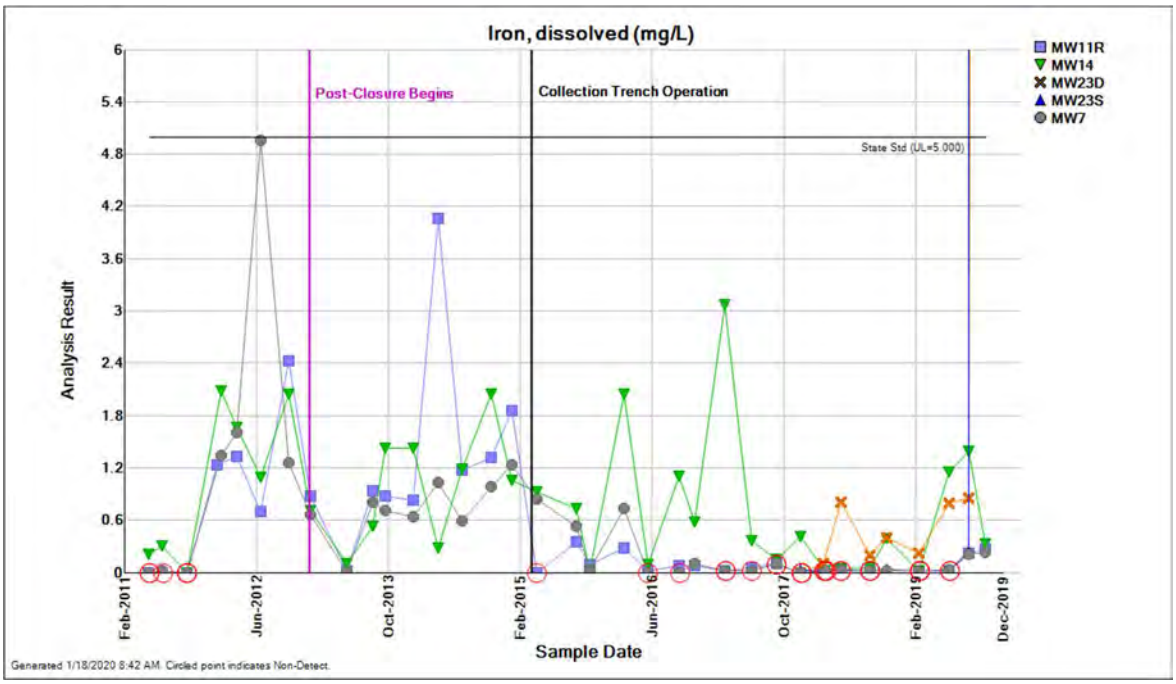

Figure 5-2B. Time series plot for iron at wells exceeding the Class I standard following closure activities (MW-23D and MW-23S). MW-11R, MW-14, and MW-7 do not exceed the standard but have a statistically significant positive trend. Zoomed in to show the Class I standard.

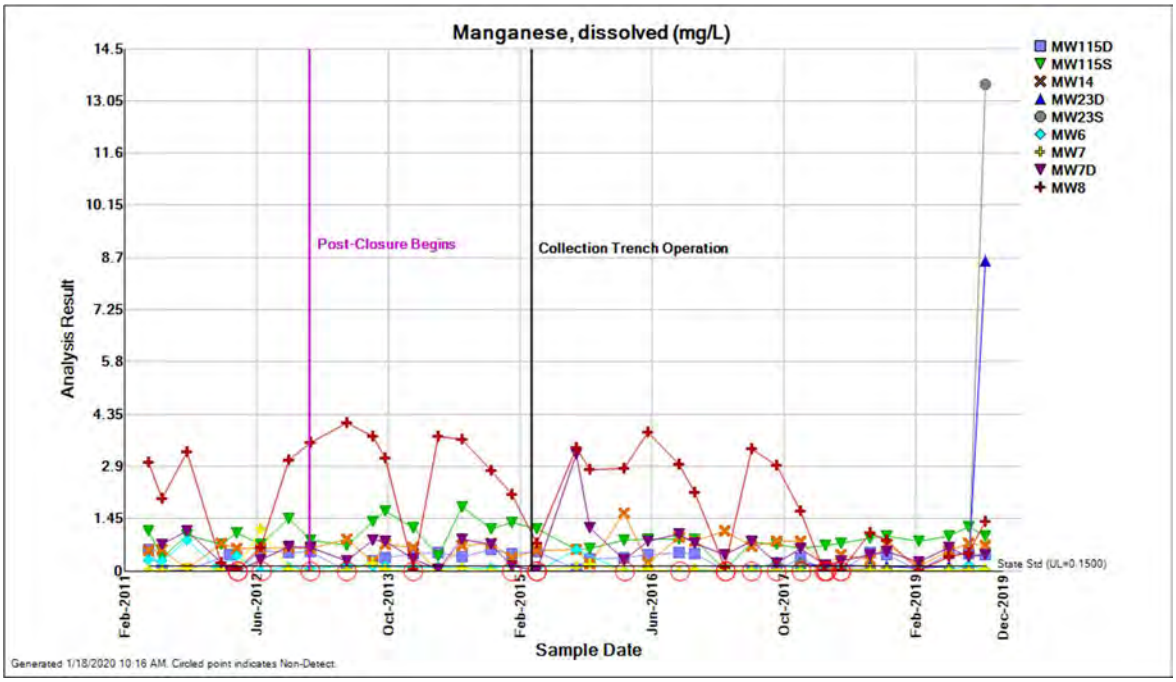

Figure 5-3A. Time series plot for manganese at wells exceeding the Class I standard following closure activities (MW-6, MW-7D, MW-14, MW-8, MW-115S, MW-115D, MW-23D, and MW-23S). MW-7 does not exceed the standard but has a statistically significant positive trend.

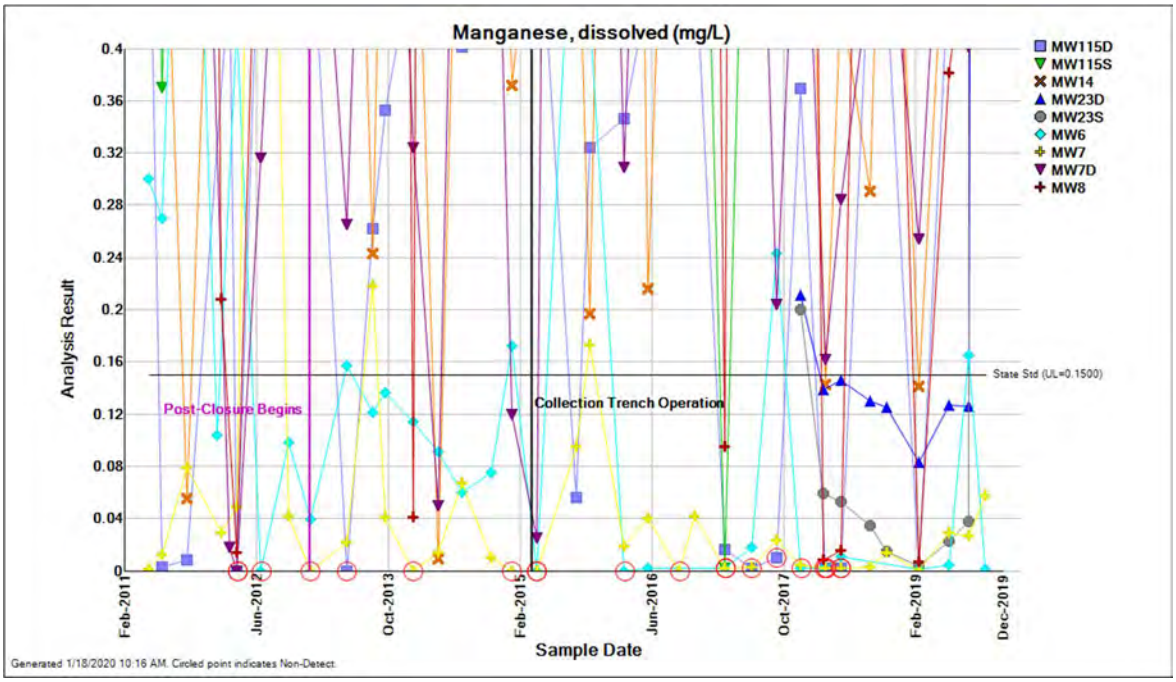

Figure 5-3B. Time series plot for manganese at wells exceeding the Class I standard following closure activities (MW-6, MW-7D, MW-14, MW-8, MW-115S, MW-115D, MW-23D, and MW-23S). MW-7 does not exceed the standard but has a statistically significant positive trend. Zoomed in to show the Class I standard.

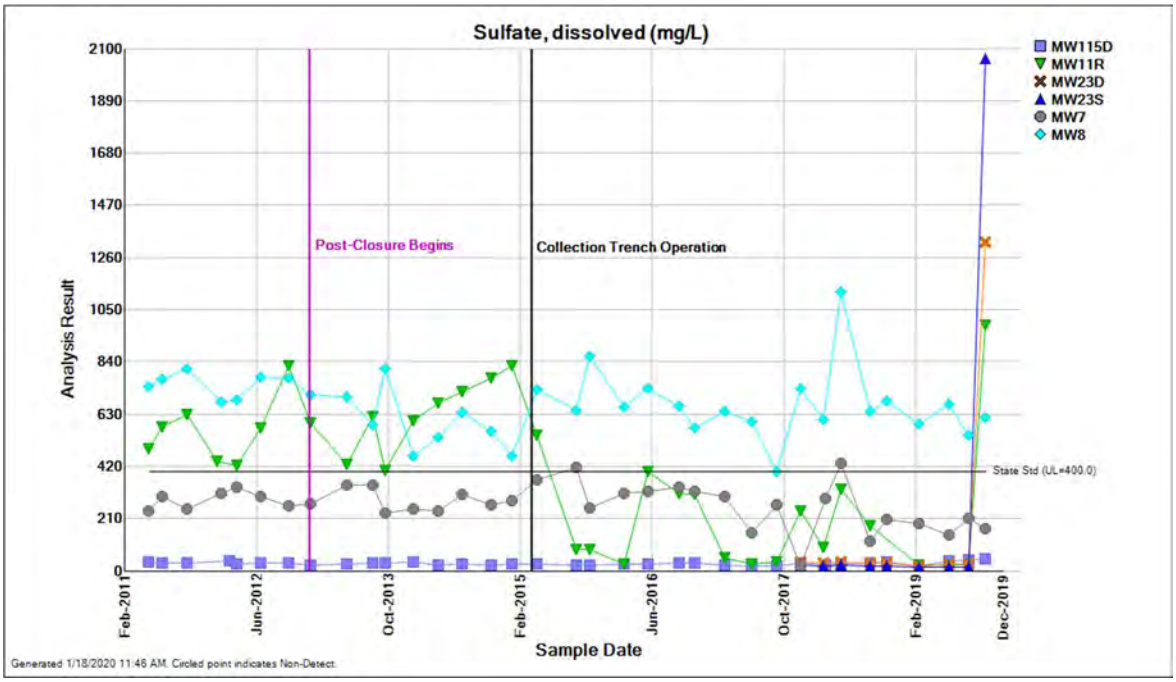

Figure 5-4A. Time series plot for sulfate at wells exceeding the Class I standard following closure activities (MW-7D, MW-8, MW-11R, MW-23D, and MW-23S). MW-115D does not exceed the standard but has a statistically significant positive trend.

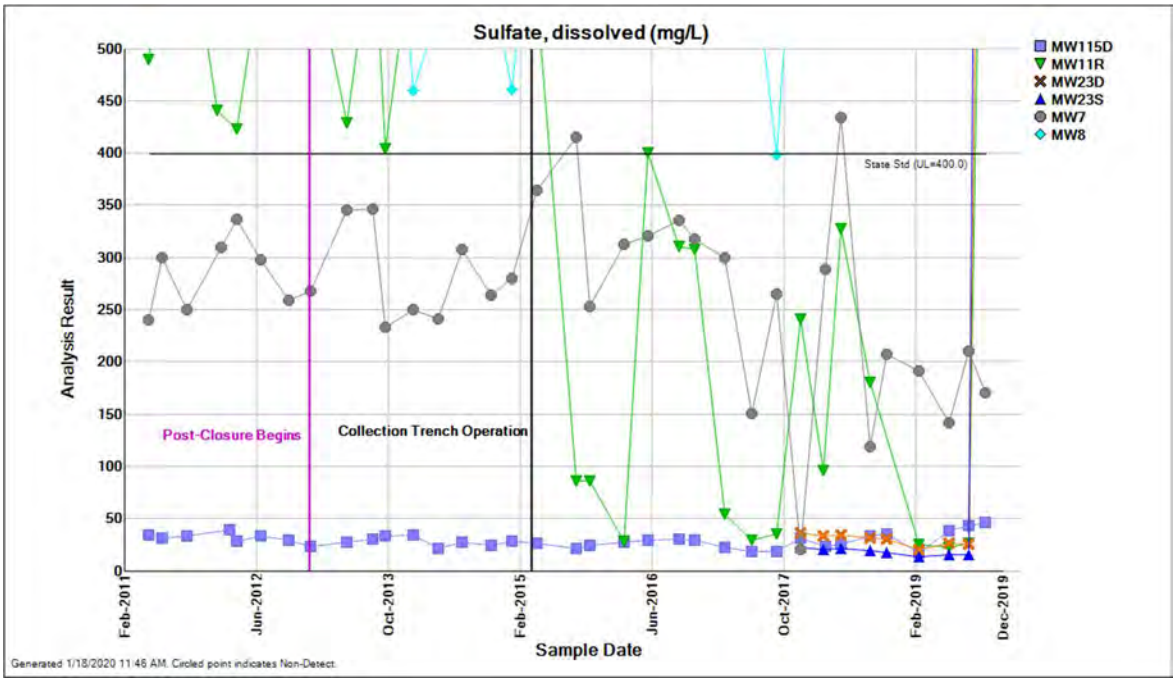

Figure 5-4B. Time series plot for sulfate at wells exceeding the Class I standard following closure activities (MW-7D, MW-8, MW-11R, MW-23D, and MW-23S). MW-115D does not exceed the standard but has a statistically significant positive trend. Zoomed in to show the Class I standard.

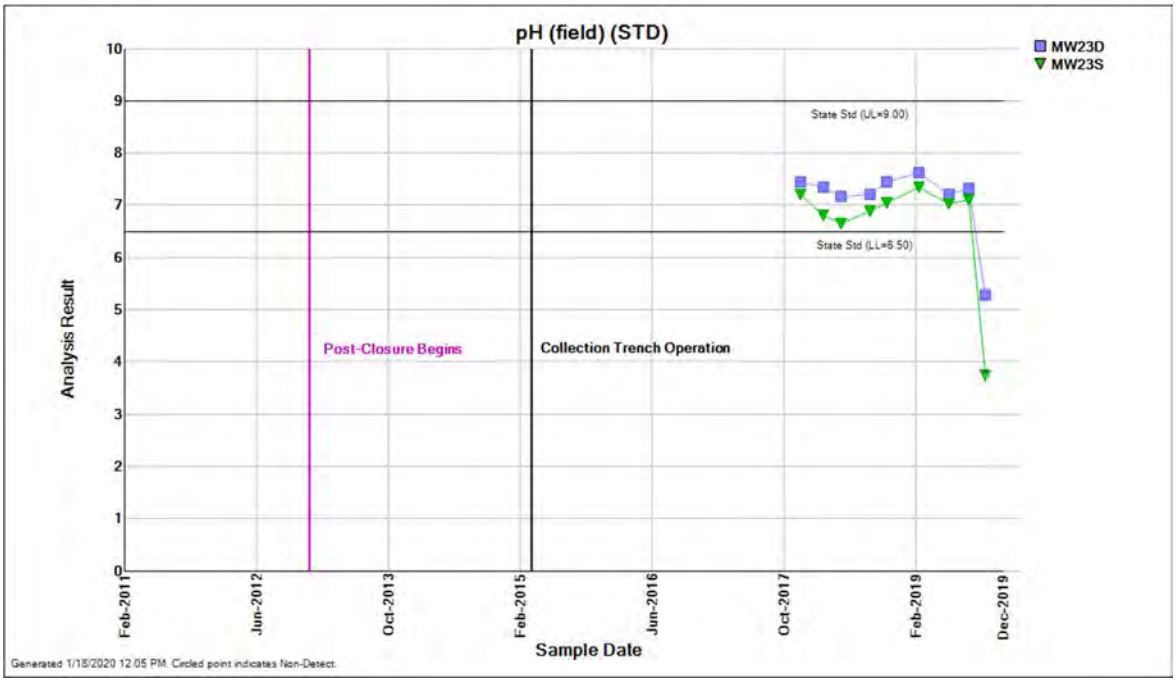

Figure 5-5. Time series plot for pH at wells exceeding the Class I standard following closure activities (MW-23D, and MW-23S).

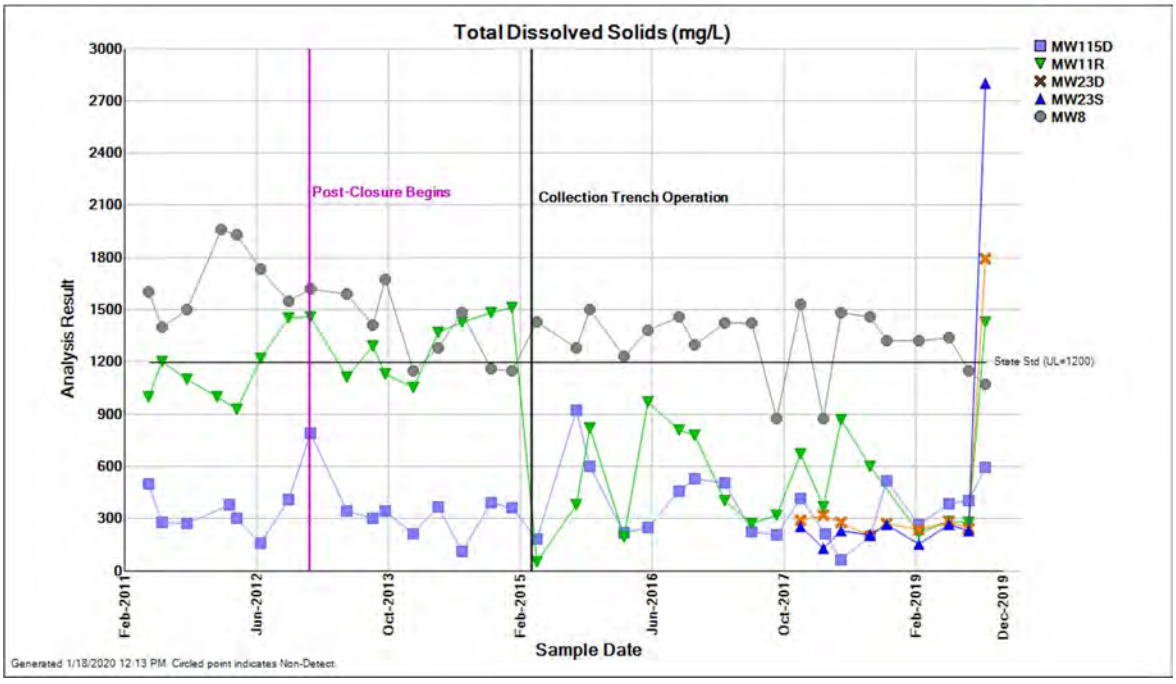

Figure 5-6. Time series plot for TDS at wells exceeding the Class I standard following closure activities (MW-8, MW-11R, MW-23D, and MW-23S). MW-115D does not exceed the standard but has a statistically significant positive trend.

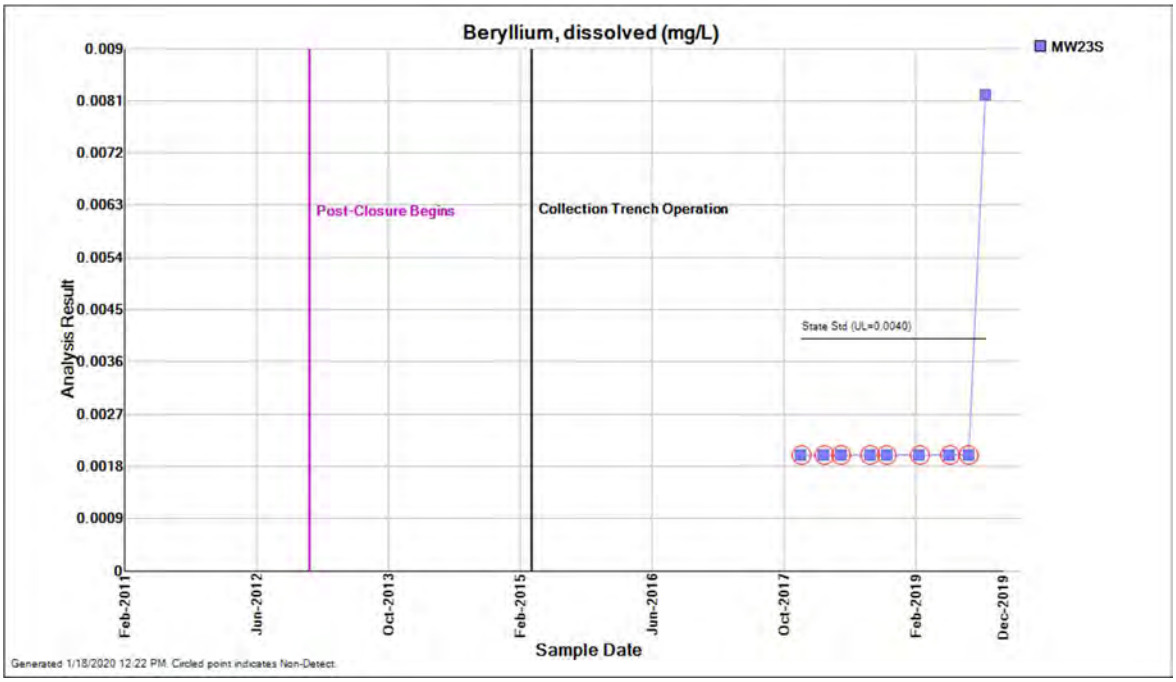

Figure 5-7. Time series plot for beryllium at wells exceeding the Class I standard following closure activities (MW-23S).

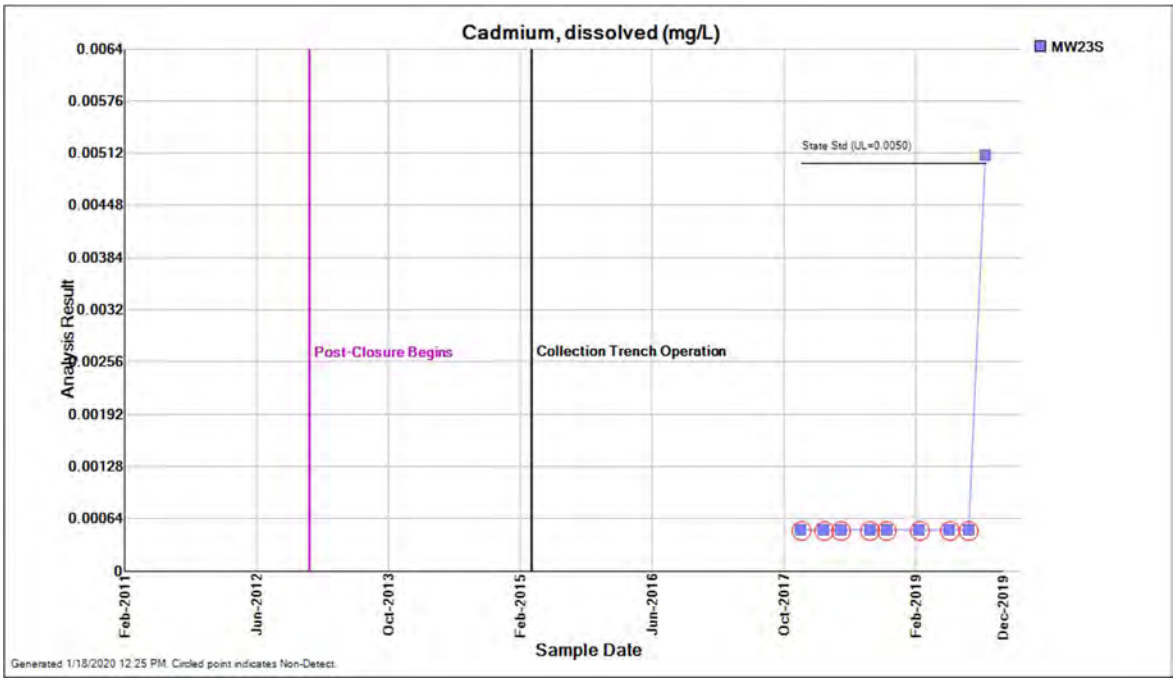

Figure 5-8. Time series plot for cadmium at wells exceeding the Class I standard following closure activities (MW-23S).

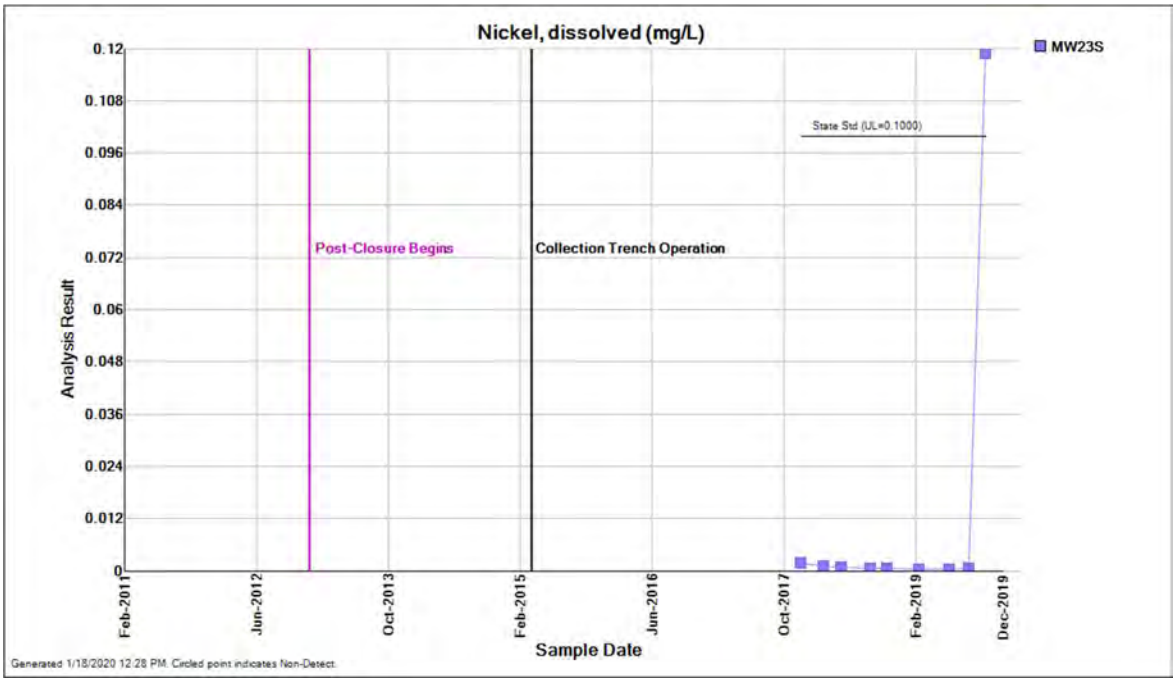

Figure 5-9. Time series plot for nickel at wells exceeding the Class I standard following closure activities (MW-23S).

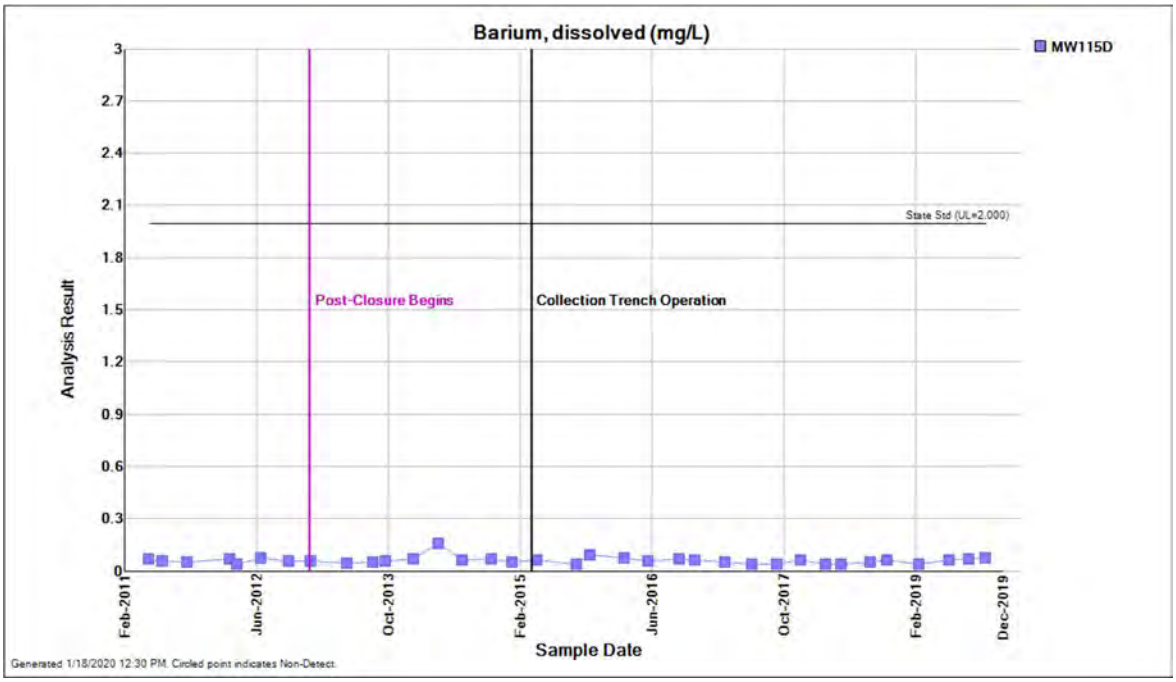

Figure 5-10 Time series plot for barium at MW-23 where Class I standard following closure activities does not exceed but has a statistically significant positive trend.

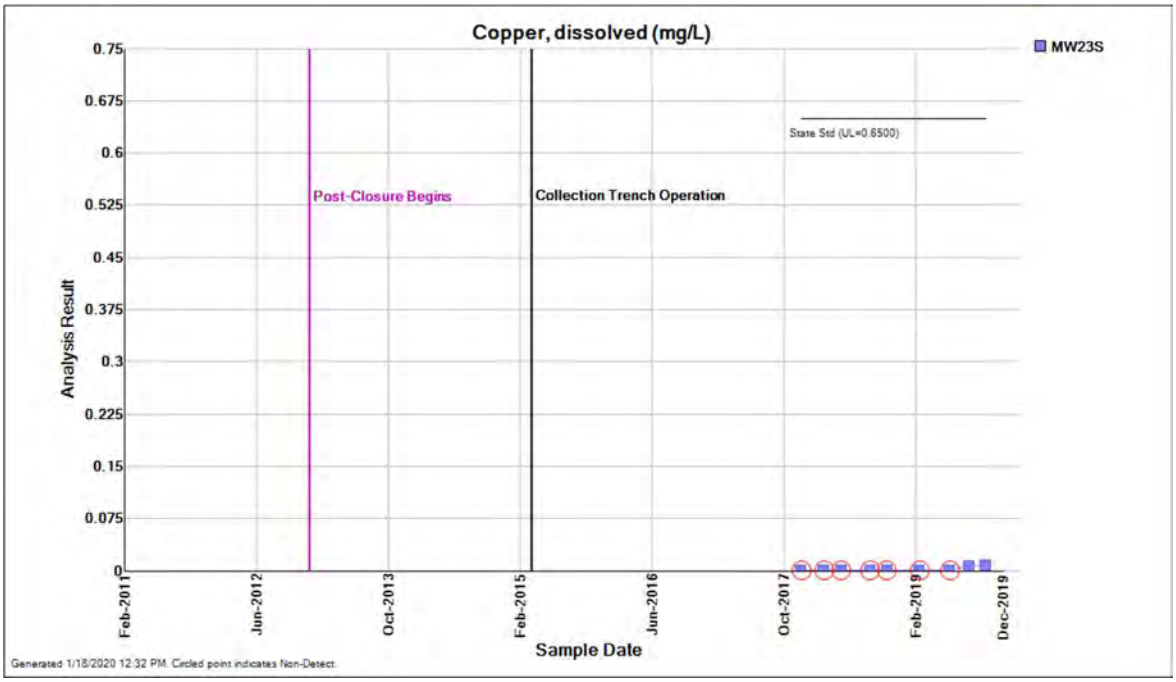

Figure 5-11 Time series plot for copper at MW-23 where Class I standard following closure activities does not exceed but has a statistically significant positive trend.

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APPENDIX A
GROUNDWATER MONITORING RESULTS 2018-2019

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW115D

	3/19/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0010	0.0010	0.0032	0.0028	0.0009	0.0030	0.0049	0.0032
B, diss, mg/L	<0.0500	<0.0500	0.0500	0.0900	<0.0500	0.0500	0.0500	0.1400
Ba, diss, mg/L	0.041	0.036	0.052	0.063	0.036	0.063	0.071	0.076
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	19.7	21.3	34.2	35.3	19.4	26.4	20.9	141.0
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	0.0017	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.4	0.2	0.2	0.2	<0.2	0.2	0.2	0.3
Fe, diss, mg/L	0.020	0.120	0.259	0.590	0.033	2.530	2.190	0.497
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	<0.0020	0.4910	0.4470	0.0007	0.4680	0.4770	0.4410
Ni, diss, mg/L	0.0026	0.0010	0.0014	0.0007	0.0011	0.0007	0.0008	0.0003
NO3, diss, mg/L	4.100	4.200	0.355	0.106	3.690	0.257	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.83	7.06	7.37	7.12	8.11	7.40	7.41	7.32
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	23.3	25.2	32.9	34.8	17.1	38.6	43.6	46.1
Spec. Cond. (field), micromho	436	339	602	938	449	679	670	1160
TDS, mg/L	209	64	201	514	264	382	404	592
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW115S

	3/19/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0045	0.0047	0.0015	0.0038	0.0041	0.0041	0.0051	0.0027
B, diss, mg/L	0.2100	0.1200	0.1400	0.1200	0.1900	0.2700	0.1800	0.2700
Ba, diss, mg/L	0.045	0.039	0.043	0.037	0.041	0.039	0.047	0.045
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	16.7	20.6	18.8	19.0	16.4	18.9	18.5	21.6
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.4	0.2	0.2	0.2	<0.2	0.2	0.2	0.2
Fe, diss, mg/L	1.020	1.070	0.087	0.576	1.080	1.700	1.750	0.409
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.7040	0.7770	0.9130	0.9730	0.8140	0.9770	1.2200	0.9640
Ni, diss, mg/L	0.0009	0.0013	0.0010	0.0005	0.0012	0.0010	0.0010	0.0008
NO3, diss, mg/L	0.380	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.97	7.43	7.46	7.54	7.63	7.42	7.52	7.38
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	42.0	38.4	45.6	39.1	28.4	49.5	37.9	78.7
Spec. Cond. (field), micromho	550	454	597	603	610	649	577	663
TDS, mg/L	329	207	219	322	342	384	342	340
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW11R

	3/12/2018	5/14/2018	8/28/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	0.8000	3.1400	1.6100	0.1500	0.2800	0.4100	20.0000
Ba, diss, mg/L	0.036	0.038	0.041	0.026	0.035	0.053	0.204
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	17.1	18.0	9.1	14.7	7.8	12.4	11.7
CN, total, mg/L	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0003	<0.0020
Cu, diss, mg/L	0.0032	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	0.2	<0.2	<0.2	0.2	0.2
Fe, diss, mg/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.226	0.264
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.0021	0.0021	0.0454	0.0017	0.0014	0.0016	0.0090
Ni, diss, mg/L	0.0007	0.0008	0.0005	0.0009	0.0003	0.0002	0.0013
NO3, diss, mg/L	2.200	9.700	9.400	3.410	3.520	9.780	0.206
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	6.81	6.72	6.85	7.14	6.65	7.18	6.64
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	0.0037	0.0026	<0.0010	0.0010	<0.0010	<0.0010
SO4, diss, mg/L	95.9	328.0	180.0	25.0	22.6	26.8	989.0
Spec. Cond. (field), micromho	636	965	881	434	460	538	2060
TDS, mg/L	369	869	602	216	286	278	1430
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW121

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0042	0.0034	0.0015	0.0059	0.0021	0.0049	0.0041	0.0026
B, diss, mg/L	0.0600	0.0600	0.0600	<0.5000	0.0600	0.0500	0.0500	0.0600
Ba, diss, mg/L	0.068	0.051	0.047	0.045	0.034	0.052	0.049	0.042
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	20.1	21.3	18.8	19.7	16.1	24.0	19.2	21.8
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.4	0.2	0.2	0.2	<0.2	0.2	0.2	0.2
Fe, diss, mg/L	1.460	0.523	0.063	0.771	0.234	3.000	1.030	0.430
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.7420	0.4860	0.8470	0.1600	0.3570	0.8730	1.9000	0.9120
Ni, diss, mg/L	0.0017	0.0015	0.0010	0.0012	0.0006	0.0010	0.0011	0.0005
NO3, diss, mg/L	0.590	0.370	<0.100	<0.100	0.521	0.166	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.31	7.06	7.22	7.21	7.46	7.26	7.04	7.16
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	30.9	31.3	29.5	26.2	18.1	18.9	23.2	24.2
Spec. Cond. (field), micromho	627	546	660	668	665	684	668	697
TDS, mg/L	369	419	440	398	370	376	378	340
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW14

	3/19/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0005	<0.0005	0.0012	0.0012	0.0005	0.0028	0.0022	0.0014
B, diss, mg/L	1.2900	1.4400	0.4100	0.7100	0.7300	0.5900	0.8300	0.7500
Ba, diss, mg/L	0.088	0.080	0.059	0.069	0.059	0.055	0.079	0.073
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	23.2	22.3	28.1	27.7	21.4	25.5	20.6	25.4
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0007	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0371	<0.0010
F, diss, mg/L	0.4	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	0.2
Fe, diss, mg/L	<0.020	0.042	0.052	0.392	<0.020	1.150	1.390	0.323
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.1430	0.4360	0.2910	0.7420	0.1410	0.5720	0.7550	0.7060
Ni, diss, mg/L	0.0016	0.0025	0.0017	0.0015	0.0009	0.0013	0.0021	0.0018
NO3, diss, mg/L	0.970	0.520	<0.100	0.100	0.104	<0.100	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.03	6.76	6.94	7.09	7.30	6.88	6.84	6.78
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	361.0	335.0	95.6	112.0	139.0	106.0	167.0	226.0
Spec. Cond. (field), micromho	1090	922	924	945	1020	1040	1140	1140
TDS, mg/L	805	722	289	574	646	634	822	660
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW23D

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0016	0.0041	0.0023	0.0037	0.0022	0.0036	0.0040	0.0017
B, diss, mg/L	0.0500	0.0500	0.0500	0.0500	0.0500	<0.0500	0.0500	8.0200
Ba, diss, mg/L	0.044	0.041	0.045	0.046	0.042	0.041	0.047	0.029
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016
Cl, diss, mg/L	5.8	6.2	5.5	6.1	5.4	6.4	5.9	9.7
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.105
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6
Fe, diss, mg/L	0.106	0.805	0.192	0.403	0.221	0.797	0.858	70.000
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.1390	0.1460	0.1300	0.1250	0.0832	0.1270	0.1260	8.6000
Ni, diss, mg/L	0.0005	<0.0005	<0.0005	<0.0005	0.0002	0.0003	0.0004	0.0465
NO3, diss, mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
pH (field), STD	7.34	7.17	7.21	7.44	7.62	7.20	7.32	5.28
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0100
SO4, diss, mg/L	32.9	34.0	31.6	30.6	20.0	26.4	25.5	1320.0
Spec. Cond. (field), micromho	472	401	483	478	488	495	455	2180
TDS, mg/L	317	276	200	274	238	282	244	1790
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.19

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW23S

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0092
B, diss, mg/L	0.1600	0.1600	0.1700	0.1900	0.1500	0.1700	0.1900	5.2400
Ba, diss, mg/L	0.024	0.025	0.033	0.030	0.031	0.033	0.040	0.009
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0082
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0051
Cl, diss, mg/L	3.0	2.9	2.4	3.2	2.1	7.0	2.7	10.1
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.091
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0003
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0064	0.0078
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.9
Fe, diss, mg/L	<0.020	<0.020	<0.020	0.029	<0.020	<0.020	0.249	204.000
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0020	<0.0002
Mn, diss, mg/L	0.0591	0.0530	0.0343	0.0144	0.0037	0.0230	0.0375	13.5000
Ni, diss, mg/L	0.0010	0.0008	0.0006	0.0005	0.0003	0.0003	0.0005	0.1190
NO3, diss, mg/L	0.450	<0.100	0.197	0.294	0.371	0.180	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	0.007
pH (field), STD	6.81	6.65	6.88	7.04	7.35	7.02	7.10	3.75
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0100
SO4, diss, mg/L	20.5	21.1	19.2	17.6	13.5	15.6	15.3	2060.0
Spec. Cond. (field), micromho	387	312	405	15	417	425	376	2800
TDS, mg/L	130	231	205	264	152	264	230	2800
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0050	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.60

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW6

	3/12/2018	5/14/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0015	<0.0005
B, diss, mg/L	0.6400	2.3500	0.1900	0.5900	0.9100	0.7900
Ba, diss, mg/L	0.012	0.027	0.010	0.014	0.029	0.016
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	14.2	15.5	14.7	15.2	14.3	11.2
CN, total, mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.4	0.2	<0.2	0.2	0.2	0.2
Fe, diss, mg/L	<0.020	<0.020	<0.020	<0.020	0.946	0.208
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	0.0110	0.0011	0.0047	0.1650	0.0013
Ni, diss, mg/L	0.0006	0.0006	0.0004	0.0004	0.0008	0.0011
NO3, diss, mg/L	1.000	4.200	1.830	5.280	4.910	4.660
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.30	6.72	7.28	6.86	6.98	6.80
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0035	0.0014	0.0010	<0.0010	<0.0010	0.0034
SO4, diss, mg/L	45.2	124.0	17.4	36.3	41.9	51.0
Spec. Cond. (field), micromho	463	595	466	591	582	587
TDS, mg/L	292	492	240	358	340	268
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW7

	3/19/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	1.4800	1.5100	0.6200	1.5800	1.5200	1.3200	1.5000	1.0500
Ba, diss, mg/L	0.057	0.051	0.033	0.053	0.052	0.040	0.058	0.041
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	18.9	10.9	16.2	12.2	6.6	9.2	8.0	15.3
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	0.2	0.2	<0.2	<0.2	<0.2	0.2
Fe, diss, mg/L	<0.020	0.027	<0.020	0.022	<0.020	0.024	0.203	0.234
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	<0.0020	<0.0020	0.0025	0.0142	0.0005	0.0288	0.0268	0.0575
Ni, diss, mg/L	<0.0005	0.0008	0.0005	0.0006	0.0004	0.0002	0.0006	0.0008
NO3, diss, mg/L	1.100	1.200	0.123	0.170	1.150	0.541	0.335	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	6.75	6.84	6.91	6.85	7.02	6.74	6.73	6.82
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	0.0028	0.0038	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	289.0	434.0	119.0	207.0	191.0	142.0	210.0	170.0
Spec. Cond. (field), micromho	1270	1040	913	1140	1320	1210	1240	989
TDS, mg/L	1020	837	568	760	854	764	852	576
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW7D

	3/19/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	0.0020	0.0028	0.0015	0.0025	0.0024	0.0043	0.0045	0.0016
B, diss, mg/L	0.6500	0.6300	0.1500	0.2000	1.1000	0.4400	0.2300	0.1300
Ba, diss, mg/L	0.057	0.042	0.036	0.032	0.058	0.043	0.042	0.036
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	13.9	17.7	17.9	18.7	9.0	16.4	17.1	21.2
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cu, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.4	0.2	0.2	0.2	<0.2	0.2	0.2	0.2
Fe, diss, mg/L	0.702	1.300	0.141	1.120	0.726	2.670	2.400	0.528
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.1620	0.2840	0.4600	0.5190	0.2540	0.6510	0.4010	0.4410
Ni, diss, mg/L	0.0019	0.0009	0.0007	0.0005	0.0006	0.0008	0.0006	0.0004
NO3, diss, mg/L	0.940	0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	7.34	6.90	7.38	7.44	7.05	7.11	7.32	7.17
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	112.0	122.0	47.0	48.9	261.0	59.8	49.6	79.1
Spec. Cond. (field), micromho	796	718	587	658	1220	820	643	634
TDS, mg/L	471	501	288	382	752	472	358	254
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2018 to 12/31/2019
Well: MW8

	3/12/2018	5/14/2018	8/28/2018	10/29/2018	2/25/2019	6/17/2019	8/26/2019	10/28/2019
Ag, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As, diss, mg/L	<0.0005	0.0005	0.0006	0.0003	<0.0005	<0.0005	<0.0005	<0.0005
B, diss, mg/L	10.4000	17.7000	18.0000	19.6000	17.3000	16.8000	16.8000	16.7000
Ba, diss, mg/L	0.018	0.016	0.019	0.017	0.017	0.014	0.018	0.020
Be, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cd, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cl, diss, mg/L	12.3	14.5	12.9	12.0	11.5	12.3	11.7	13.2
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Co, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cr, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0003	<0.0020
Cu, diss, mg/L	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
F, diss, mg/L	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fe, diss, mg/L	<0.020	<0.020	<0.020	0.025	<0.020	<0.020	0.290	0.278
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mn, diss, mg/L	0.0082	0.0156	1.0500	0.8450	0.0066	0.3810	0.4920	1.3600
Ni, diss, mg/L	0.0036	0.0057	0.0071	0.0067	0.0044	0.0056	0.0046	0.0062
NO3, diss, mg/L	0.410	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.200
Pb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
pH (field), STD	6.97	7.00	7.01	6.87	7.17	6.90	6.82	6.85
Sb, diss, mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Se, diss, mg/L	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SO4, diss, mg/L	606.0	1120.0	640.0	682.0	592.0	668.0	545.0	616.0
Spec. Cond. (field), micromho	1440	1380	1690	1640	1660	676	1590	1590
TDS, mg/L	872	1480	1460	1320	1320	1340	1150	1070
Tl, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01

APPENDIX B
SITE INSPECTION REPORTS

Hutsonville Power Station

Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	**03/21/2019**
Inspector	**HEC**
Temperature	**45 degrees F**
Weather	**Cloudy**

	Item	Condition Code *	Comments
Pond Cap	**Vent Pipes**	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	GC	*Some minor gouging in north terrace ditch*
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	**Vegetation**	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	**Control Panels**	NI	N/A - meters are being read remotely.
	Drainage Sumps / Manholes	NI	N/A - meters are being read remotely.
	Pumps	NI	N/A - meters are being read remotely.
	Groundwater Monitoring Wells	GC	
	Flow Meter Totalizer	GC	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	GC	N/A - meters are being read remotely.
	Other	GC	None

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.



West Collection Trough Looking South



West Collection Trough Looking North



West Face of Cap Looking East



Looking Northeast Across Northwest Cap



Looking Southeast Across Southwest Cap



Looking Northeast Across Lower Northwest Cap



Looking Northeast Up Lower Northwest Cap



West Drainage Drop



Looking North Across West Berm



Looking Northwest Across Northwest Toe



Looking Across Lower Northwest Terrace



Looking Down the Northwest Berm Toe



Looking East Across North Berm



Looking Easterly Across Northeast Berm



Looking South Up North Lower Terrace



Looking Southeast Across Upper North Terrace



Looking South Across Upper North Terrace



Looking Westerly Across Upper North Terrace



Looking Southeasterly Across Upper North Terrace



Looking Southwest Across Cap



Looking Southeast Across Cap



Looking Southwest Across Upper South Terrace



Looking South Across Upper South Terrace



Looking Southwest Across Lower South Terrace



Looking South Down Lower South Terrace



Looking South Down Upper South Drainage Ditch



Looking South Down Lower South Drainage Ditch



Looking Down South Drainage Drop



Looking West Across South Berm and Drainage Trough



Looking East Across South Berm and Drainage Trough



Looking Northeasterly Across Upper East Terrace



Drainage Trough Discharge to River



Looking Up Northeast Toe



Looking Westerly Across North Toe



Looking South Across East Berm and Drainage Collection Trough



Looking Up Lower Northeast Terrace



Looking Westerly Across North Berm Crown



Looking South Across Lower East Terrace



Looking Northeast Up Southwest Lower Terrace



North Drainage Drop



Looking South Up Lower North Drainage Ditch



Looking Southwest Across Upper North Terrace



Minor Erosion in North Lower Drainage Ditch



Looking South Across South Cap



Looking Southeast Across Upper South Terrace



Looking East Across Lower East Terrace



Looking South Across South Lower Terrace



Looking Southeasterly Down Southeast Toe



Looking Southeasterly Down Southeast Toe 2



Looking North Across East Lower Terrace



Looking West Across South Berm and Drainage Collection



Looking North Down East Drainage Collection

Hutsonville Power Station

Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	**6/27/2019**
Inspector	**HEC**
Temperature	**90 degrees F**
Weather	**Sunny**

	Item	Condition Code *	Comments
Pond Cap	**Vent Pipes**	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	GC	*Some minor gouging in north terrace ditch*
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	**Vegetation**	GC	
	Liner	GC	
	Erosion	MM	Erosion present on Northwest Toe embankment
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	**Control Panels**	NI	N/A - meters are being read remotely.
	Drainage Sumps / Manholes	NI	N/A - meters are being read remotely.
	Pumps	NI	N/A - meters are being read remotely.
	Groundwater Monitoring Wells	GC	
	Flow Meter Totalizer	NI	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	NI	N/A - meters are being read remotely.
	Other	NI	None

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.



Looking East Up West Side of Cap



Looking at West Drainage Drop



Looking Southeasterly Across North Lower Terrace to Cap



Looking Easterly Across North Berm



Looking Northerly at Northwest Toe Drainage to River



Erosion Down Northwest Toe Berm



Looking Southerly Up to Cap



Looking Southwesterly Across North Terraces to Cap



Looking Down North drainage Drop



Looking South Up North Terrace Drainage Ditch



Cap Collection Trough Discharge to River



Looking South Up East Cap Drainage Trough



Looking West Up East Side To Cap – Unmown



Looking North Across Southeast Toe



Looking West Across South Cap Collection Trough



Looking Up South Drainage Drop



Repaired Area at Bottom of South Cap Drainage Ditch



Looking Northeast Up Southwest Terraces to Cap

Hutsonville Power Station

Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	**09/26/2019**
Inspector	**HEC/LGH**
Temperature	**75 degrees F**
Weather	**Sunny**

	Item	Condition Code *	Comments
Pond Cap	**Vent Pipes**	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	GC	
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	**Vegetation**	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	**Control Panels**	NI	N/A - meters are being read remotely.
	Drainage Sumps / Manholes	NI	N/A - meters are being read remotely.
	Pumps	NI	N/A - meters are being read remotely.
	Groundwater Monitoring Wells	GC	Monitoring well MW-7D was open with J-plug removed. Inspector closed and secured well.
	Flow Meter Totalizer	NI	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	NI	N/A - meters are being read remotely.
	Other	NI	None

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.



Looking East Up West Side of Cap



Facing Southerly Down Stormwater Collection Trough along West Cap



Looking at West Drainage Drop



Looking Southeasterly Across North Cap



Looking Southeasterly Across North Berm



Looking Northerly at Northwest Toe Drainage to River



Erosion Down Northwest Toe Berm



Looking Southerly Up to Cap



Looking Down North drainage Drop



Looking South Up North Terrace Drainage Ditch



Cap Collection Trough Discharge to River



Looking at Cracks in East Cap Drainage Trough (Near Discharge to River)



Looking West Up East Side To Cap



Looking North Across Southeast Toe



Looking West Across South Cap Collection Trough



Looking Up South Drainage Drop



Repaired Area at Bottom of South Cap Drainage Ditch



Looking Northeast Up Southwest Terraces to Cap

Hutsonville Power Station

Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	12/04/2019
Inspector	LGH
Temperature	45 degrees F
Weather	Sunny

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion	MM	Erosion in north terrace drainage ditch,two areas to be repaired.
	Liner	GC	
	Water Control Features (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other	GC	
Groundwater Collection Trench and Discharge System	Control Panels	NI	N/A - meters are being read remotely.
	Drainage Sumps / Manholes	NI	N/A - meters are being read remotely.
	Pumps	NI	N/A - meters are being read remotely.
	Groundwater Monitoring Wells	GC	None
	Flow Meter Totalizer	NI	N/A - meters are being read remotely.
	Diver-Mate Data Collector (data download)	NI	N/A - meters are being read remotely.
	Other	NI	None

Condition Codes

IM = Item needing immediate maintenance. Remediation/repair should be completed within 1 month.
MM = Item needing minor maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No evidence of a problem.
NI = Not Inspected. Reason should be stated in comment.



Looking east up west side of cap



Facing southerly down stormwater collection trough along west cap



Looking at west drainage drop



Looking east across north cap



Erosion down northwest toe berm



Looking northerly at northwest toe drainage to river



Looking southeast along north berm



Looking down north drainage drop



Looking south up north terrace drainage ditch, small area of erosion observed.



Looking south up north terrace drainage ditch, area of erosion observed.



Facing south from top of cap



Cap Collection Trough Discharge to River



Looking at Cracks in East Cap Drainage Trough (Near Discharge to River)



Looking south along east berm



Looking west across cap (from east terrace)



Looking west along south berm and south cap collection trough



Looking north across south lower terrace



Looking south down southern drainage drop



Facing north up south cap drainage ditch



Looking northwest across cap



Looking east along south berm

APPENDIX C
STATISTICAL OUTPUT

APPENDIX C1
OUTLIER TEST

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Antimony, dissolved, mg/L
Location: MW115D

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 1.394
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW115S

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 1.394
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW11R

Mean of all data: 0.001
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.009
Test Statistic, high extreme of all data: Tn = 4.659
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.009	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Antimony, dissolved, mg/L
Location: MW121

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.004
Test Statistic, high extreme of all data: Tn = 2.934
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.004	False		1

Antimony, dissolved, mg/L
Location: MW14

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 1.394
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW23D

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Antimony, dissolved, mg/L
Location: MW23S

Mean of all data: 0.002
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 0.000
T Critical of all data: Tcr = 0.000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW6

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 2.189
T Critical of all data: Tcr = 2.759

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW7

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.006
Test Statistic, high extreme of all data: Tn = 3.979
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.006	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Antimony, dissolved, mg/L

Location: MW7D

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 1.365
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW8

Mean of all data: 0.001
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 4.977
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/18/2012	0.010	False		1

Arsenic, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0030
Standard Deviation of all data: 0.0037
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 3.2612
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/18/2012	0.0150	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0025
Standard Deviation of all data: 0.0029
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 4.2860
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/18/2012	0.0150	False		1

Arsenic, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0008
Standard Deviation of all data: 0.0019
Largest Observation Concentration of all data: Xn = 0.0090
Test Statistic, high extreme of all data: Tn = 4.3371
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0090	False		1

Arsenic, dissolved, mg/L

Location: MW121

Mean of all data: 0.0033
Standard Deviation of all data: 0.0030
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 2.9210
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0120	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Arsenic, dissolved, mg/L
Location: MW14

Mean of all data: 0.0013
Standard Deviation of all data: 0.0019
Largest Observation Concentration of all data: Xn = 0.0090
Test Statistic, high extreme of all data: Tn = 4.0201
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0090	False		1

Arsenic, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0027
Standard Deviation of all data: 0.0011
Largest Observation Concentration of all data: Xn = 0.0041
Test Statistic, high extreme of all data: Tn = 1.2301
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0012
Standard Deviation of all data: 0.0030
Largest Observation Concentration of all data: Xn = 0.0092
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0092	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Arsenic, dissolved, mg/L

Location: MW6

Mean of all data: 0.0004
Standard Deviation of all data: 0.0007
Largest Observation Concentration of all data: Xn = 0.0021
Test Statistic, high extreme of all data: Tn = 2.3180
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L

Location: MW7

Mean of all data: 0.0005
Standard Deviation of all data: 0.0014
Largest Observation Concentration of all data: Xn = 0.0080
Test Statistic, high extreme of all data: Tn = 5.3723
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0080	False		1

Arsenic, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0035
Standard Deviation of all data: 0.0037
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 2.8355
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/18/2012	0.0140	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Arsenic, dissolved, mg/L
Location: MW8

Mean of all data: 0.0005
Standard Deviation of all data: 0.0011
Largest Observation Concentration of all data: Xn = 0.0061
Test Statistic, high extreme of all data: Tn = 4.8722
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	0.0061	False		1

Barium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.061
Standard Deviation of all data: 0.021
Largest Observation Concentration of all data: Xn = 0.158
Test Statistic, high extreme of all data: Tn = 4.521
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.158	False		1

Barium, dissolved, mg/L
Location: MW115S

Mean of all data: 0.061
Standard Deviation of all data: 0.033
Largest Observation Concentration of all data: Xn = 0.206
Test Statistic, high extreme of all data: Tn = 4.442
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.206	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.034
Standard Deviation of all data: 0.037
Largest Observation Concentration of all data: Xn = 0.204
Test Statistic, high extreme of all data: Tn = 4.614
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.204	False		1

Barium, dissolved, mg/L

Location: MW121

Mean of all data: 0.060
Standard Deviation of all data: 0.028
Largest Observation Concentration of all data: Xn = 0.198
Test Statistic, high extreme of all data: Tn = 5.024
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.198	False		1

Barium, dissolved, mg/L

Location: MW14

Mean of all data: 0.079
Standard Deviation of all data: 0.021
Largest Observation Concentration of all data: Xn = 0.127
Test Statistic, high extreme of all data: Tn = 2.288
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Barium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.041
Standard Deviation of all data: 0.007
Largest Observation Concentration of all data: Xn = 0.047
Test Statistic, high extreme of all data: Tn = 0.974
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.028
Standard Deviation of all data: 0.009
Largest Observation Concentration of all data: Xn = 0.040
Test Statistic, high extreme of all data: Tn = 1.393
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.009	False	-1	

Barium, dissolved, mg/L

Location: MW6

Mean of all data: 0.022
Standard Deviation of all data: 0.011
Largest Observation Concentration of all data: Xn = 0.057
Test Statistic, high extreme of all data: Tn = 3.310
T Critical of all data: Tcr = 2.759

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.057	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Barium, dissolved, mg/L
Location: MW7

Mean of all data: 0.053
Standard Deviation of all data: 0.015
Largest Observation Concentration of all data: Xn = 0.119
Test Statistic, high extreme of all data: Tn = 4.447
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	0.119	False		1

Barium, dissolved, mg/L
Location: MW7D

Mean of all data: 0.050
Standard Deviation of all data: 0.017
Largest Observation Concentration of all data: Xn = 0.096
Test Statistic, high extreme of all data: Tn = 2.735
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW8

Mean of all data: 0.023
Standard Deviation of all data: 0.005
Largest Observation Concentration of all data: Xn = 0.033
Test Statistic, high extreme of all data: Tn = 1.910
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Beryllium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW115S

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW11R

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.4558
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Beryllium, dissolved, mg/L
Location: MW121

Mean of all data: 0.0004
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 2.9337
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.0020	False		1

Beryllium, dissolved, mg/L
Location: MW14

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Beryllium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0018
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0082
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0082	False		1

Beryllium, dissolved, mg/L

Location: MW6

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.4256
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L

Location: MW7

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Beryllium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.3645
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L

Location: MW8

Mean of all data: 0.0003
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW115D

Mean of all data: 0.2438
Standard Deviation of all data: 1.0698
Largest Observation Concentration of all data: Xn = 6.4800
Test Statistic, high extreme of all data: Tn = 5.8291
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	6.4800	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Boron, dissolved, mg/L

Location: MW115S

Mean of all data: 0.2772
Standard Deviation of all data: 0.9749
Largest Observation Concentration of all data: Xn = 5.9500
Test Statistic, high extreme of all data: Tn = 5.8190
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	5.9500	False		1

Boron, dissolved, mg/L

Location: MW11R

Mean of all data: 8.7537
Standard Deviation of all data: 9.8108
Largest Observation Concentration of all data: Xn = 35.0000
Test Statistic, high extreme of all data: Tn = 2.6753
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW121

Mean of all data: 0.2071
Standard Deviation of all data: 0.8962
Largest Observation Concentration of all data: Xn = 5.4300
Test Statistic, high extreme of all data: Tn = 5.8276
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	5.4300	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Boron, dissolved, mg/L
Location: MW14

Mean of all data: 0.7996
Standard Deviation of all data: 0.3708
Largest Observation Concentration of all data: Xn = 1.5100
Test Statistic, high extreme of all data: Tn = 1.9159
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW23D

Mean of all data: 0.9300
Standard Deviation of all data: 2.6588
Largest Observation Concentration of all data: Xn = 8.0200
Test Statistic, high extreme of all data: Tn = 2.6666
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	8.0200	False		1

Boron, dissolved, mg/L
Location: MW23S

Mean of all data: 0.7333
Standard Deviation of all data: 1.6901
Largest Observation Concentration of all data: Xn = 5.2400
Test Statistic, high extreme of all data: Tn = 2.6666
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	5.2400	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Boron, dissolved, mg/L

Location: MW6

Mean of all data: 7.5865
Standard Deviation of all data: 7.8170
Largest Observation Concentration of all data: Xn = 23.0000
Test Statistic, high extreme of all data: Tn = 1.9718
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW7

Mean of all data: 1.6833
Standard Deviation of all data: 0.9039
Largest Observation Concentration of all data: Xn = 6.6100
Test Statistic, high extreme of all data: Tn = 5.4503
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	6.6100	False		1

Boron, dissolved, mg/L

Location: MW7D

Mean of all data: 0.5075
Standard Deviation of all data: 0.3168
Largest Observation Concentration of all data: Xn = 1.3000
Test Statistic, high extreme of all data: Tn = 2.5014
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Boron, dissolved, mg/L
Location: MW8

Mean of all data: 16.2503
Standard Deviation of all data: 3.4932
Largest Observation Concentration of all data: Xn = 20.0000
Test Statistic, high extreme of all data: Tn = 1.0734
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/21/2016	0.0124	False	-1	

Cadmium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L
Location: MW115S

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Cadmium, dissolved, mg/L
Location: MW11R

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0015
Test Statistic, high extreme of all data: Tn = 4.3048
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/24/2011	0.0015	False		1

Cadmium, dissolved, mg/L
Location: MW121

Mean of all data: 0.0001
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 5.4674
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.0020	False		1

Cadmium, dissolved, mg/L
Location: MW14

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Cadmium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0004
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0016
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0016	False		1

Cadmium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0008
Standard Deviation of all data: 0.0016
Largest Observation Concentration of all data: Xn = 0.0051
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0051	False		1

Cadmium, dissolved, mg/L
Location: MW6

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.4256
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Cadmium, dissolved, mg/L
Location: MW7

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L
Location: MW7D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3027
T Critical of all data: Tcr = 2.7860

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L
Location: MW8

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Chloride, dissolved, mg/L

Location: MW115D

Mean of all data: 45.0
Standard Deviation of all data: 41.4
Largest Observation Concentration of all data: Xn = 213.0
Test Statistic, high extreme of all data: Tn = 4.1
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	213.0	False		1

Chloride, dissolved, mg/L

Location: MW115S

Mean of all data: 32.7
Standard Deviation of all data: 58.9
Largest Observation Concentration of all data: Xn = 373.0
Test Statistic, high extreme of all data: Tn = 5.8
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	373.0	False		1

Chloride, dissolved, mg/L

Location: MW11R

Mean of all data: 14.7
Standard Deviation of all data: 4.5
Largest Observation Concentration of all data: Xn = 25.0
Test Statistic, high extreme of all data: Tn = 2.3
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Chloride, dissolved, mg/L
Location: MW121

Mean of all data: 26.8
Standard Deviation of all data: 35.2
Largest Observation Concentration of all data: Xn = 230.0
Test Statistic, high extreme of all data: Tn = 5.8
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	230.0	False		1

Chloride, dissolved, mg/L
Location: MW14

Mean of all data: 19.0
Standard Deviation of all data: 5.8
Largest Observation Concentration of all data: Xn = 28.1
Test Statistic, high extreme of all data: Tn = 1.6
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW23D

Mean of all data: 6.3
Standard Deviation of all data: 1.3
Largest Observation Concentration of all data: Xn = 9.7
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	9.7	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Chloride, dissolved, mg/L

Location: MW23S

Mean of all data: 4.1
Standard Deviation of all data: 2.7
Largest Observation Concentration of all data: Xn = 10.1
Test Statistic, high extreme of all data: Tn = 2.2
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	10.1	False		1

Chloride, dissolved, mg/L

Location: MW6

Mean of all data: 17.6
Standard Deviation of all data: 5.2
Largest Observation Concentration of all data: Xn = 28.0
Test Statistic, high extreme of all data: Tn = 2.0
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW7

Mean of all data: 12.2
Standard Deviation of all data: 3.4
Largest Observation Concentration of all data: Xn = 21.3
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Chloride, dissolved, mg/L

Location: MW7D

Mean of all data: 18.3
Standard Deviation of all data: 7.5
Largest Observation Concentration of all data: Xn = 44.0
Test Statistic, high extreme of all data: Tn = 3.4
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/11/2011	44.0	False		1

Chloride, dissolved, mg/L

Location: MW8

Mean of all data: 12.9
Standard Deviation of all data: 3.2
Largest Observation Concentration of all data: Xn = 29.0
Test Statistic, high extreme of all data: Tn = 5.1
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/11/2011	29.0	False		1

Chromium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0025
Standard Deviation of all data: 0.0059
Largest Observation Concentration of all data: Xn = 0.0330
Test Statistic, high extreme of all data: Tn = 5.1504
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0330	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0018
Standard Deviation of all data: 0.0041
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 4.9667
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0220	False		1

Chromium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0010
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 4.9755
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0130	False		1

Chromium, dissolved, mg/L

Location: MW121

Mean of all data: 0.0014
Standard Deviation of all data: 0.0031
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 5.2877
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0180	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Chromium, dissolved, mg/L

Location: MW14

Mean of all data: 0.0016
Standard Deviation of all data: 0.0028
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 3.0517
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0100	False		1

Chromium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chromium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0009
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 0.3333
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0003	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW6

Mean of all data: 0.0014
Standard Deviation of all data: 0.0035
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 3.5648
T Critical of all data: Tcr = 2.7300

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	0.0140	False		1

Chromium, dissolved, mg/L

Location: MW7

Mean of all data: 0.0019
Standard Deviation of all data: 0.0039
Largest Observation Concentration of all data: Xn = 0.0190
Test Statistic, high extreme of all data: Tn = 4.4242
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.0190	False		1

Chromium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0030
Standard Deviation of all data: 0.0090
Largest Observation Concentration of all data: Xn = 0.0510
Test Statistic, high extreme of all data: Tn = 5.3141
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.0510	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Chromium, dissolved, mg/L

Location: MW8

Mean of all data: 0.0016
Standard Deviation of all data: 0.0034
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 4.2206
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	0.0160	False		1

Cobalt, Dis, mg/L

Location: MW115D

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 2.857
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.002	False		1

Cobalt, Dis, mg/L

Location: MW115S

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 2.789
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cobalt, Dis, mg/L

Location: MW11R

Mean of all data: 0.001
Standard Deviation of all data: 0.003
Largest Observation Concentration of all data: Xn = 0.015
Test Statistic, high extreme of all data: Tn = 4.931
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	0.015	False		1

Cobalt, Dis, mg/L

Location: MW121

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 3.630
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.003	False		1

Cobalt, Dis, mg/L

Location: MW14

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 2.958
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.003	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cobalt, Dis, mg/L

Location: MW23D

Mean of all data: 0.014
Standard Deviation of all data: 0.034
Largest Observation Concentration of all data: Xn = 0.105
Test Statistic, high extreme of all data: Tn = 2.652
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.105	False		1

Cobalt, Dis, mg/L

Location: MW23S

Mean of all data: 0.011
Standard Deviation of all data: 0.030
Largest Observation Concentration of all data: Xn = 0.091
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.091	False		1

Cobalt, Dis, mg/L

Location: MW6

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 3.009
T Critical of all data: Tcr = 2.759

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/11/2011	0.002	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cobalt, Dis, mg/L

Location: MW7

Mean of all data: 0.000
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 1.394
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW7D

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 3.392
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.003	False		1

Cobalt, Dis, mg/L

Location: MW8

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.005
Test Statistic, high extreme of all data: Tn = 4.638
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	0.005	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0012
Standard Deviation of all data: 0.0037
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 5.6785
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0220	False		1

Copper, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0016
Standard Deviation of all data: 0.0040
Largest Observation Concentration of all data: Xn = 0.0190
Test Statistic, high extreme of all data: Tn = 4.3080
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0190	False		1

Copper, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0009
Standard Deviation of all data: 0.0014
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 2.9108
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	0.0050	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Copper, dissolved, mg/L

Location: MW121

Mean of all data: 0.0009
Standard Deviation of all data: 0.0019
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 4.7117
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0100	False		1

Copper, dissolved, mg/L

Location: MW14

Mean of all data: 0.0019
Standard Deviation of all data: 0.0065
Largest Observation Concentration of all data: Xn = 0.0371
Test Statistic, high extreme of all data: Tn = 5.4438
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	0.0371	False		1

Copper, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0005
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0005
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Copper, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0020
Standard Deviation of all data: 0.0029
Largest Observation Concentration of all data: Xn = 0.0078
Test Statistic, high extreme of all data: Tn = 1.9900
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW6

Mean of all data: 0.0007
Standard Deviation of all data: 0.0009
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 2.5607
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW7

Mean of all data: 0.0007
Standard Deviation of all data: 0.0011
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 3.7224
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0050	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Copper, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0009
Standard Deviation of all data: 0.0019
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 4.8812
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0100	False		1

Copper, dissolved, mg/L

Location: MW8

Mean of all data: 0.0017
Standard Deviation of all data: 0.0052
Largest Observation Concentration of all data: Xn = 0.0307
Test Statistic, high extreme of all data: Tn = 5.6001
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2017	0.0307	False		1

Cyanide, total, mg/L

Location: MW115D

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 2.07
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cyanide, total, mg/L

Location: MW115S

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 2.00
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW11R

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.07
Test Statistic, high extreme of all data: Tn = 5.14
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	0.07	False		1

Cyanide, total, mg/L

Location: MW121

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 2.03
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cyanide, total, mg/L

Location: MW14

Mean of all data: 0.01
Standard Deviation of all data: 0.02
Largest Observation Concentration of all data: Xn = 0.12
Test Statistic, high extreme of all data: Tn = 5.83
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/21/2016	0.12	False		1

Cyanide, total, mg/L

Location: MW23D

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.05
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW23S

Mean of all data: 0.01
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.05
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Cyanide, total, mg/L
Location: MW6

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.02
Test Statistic, high extreme of all data: Tn = 3.22
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/30/2012	0.02	False		1

Cyanide, total, mg/L
Location: MW7

Mean of all data: 0.00
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.05
Test Statistic, high extreme of all data: Tn = 5.31
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/20/2013	0.05	False		1

Cyanide, total, mg/L
Location: MW7D

Mean of all data: 0.01
Standard Deviation of all data: 0.02
Largest Observation Concentration of all data: Xn = 0.15
Test Statistic, high extreme of all data: Tn = 5.82
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/20/2013	0.15	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cyanide, total, mg/L

Location: MW8

Mean of all data: 0.00
Standard Deviation of all data: 0.00
Largest Observation Concentration of all data: Xn = 0.01
Test Statistic, high extreme of all data: Tn = 1.98
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW115D

Mean of all data: 0.2
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.5
Test Statistic, high extreme of all data: Tn = 2.5
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW115S

Mean of all data: 0.2
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.6
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L
Location: MW11R

Mean of all data: 0.1
Standard Deviation of all data: 0.2
Largest Observation Concentration of all data: Xn = 0.6
Test Statistic, high extreme of all data: Tn = 3.2
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	0.6	False		1

Fluoride, dissolved, mg/L
Location: MW121

Mean of all data: 0.2
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.5
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW14

Mean of all data: 0.1
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.5
Test Statistic, high extreme of all data: Tn = 3.3
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	0.5	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Fluoride, dissolved, mg/L
Location: MW23D

Mean of all data: 0.2
Standard Deviation of all data: 0.2
Largest Observation Concentration of all data: Xn = 0.6
Test Statistic, high extreme of all data: Tn = 2.3
T Critical of all data: Tcr = 2.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.6	False		1

Fluoride, dissolved, mg/L
Location: MW23S

Mean of all data: 0.2
Standard Deviation of all data: 0.3
Largest Observation Concentration of all data: Xn = 0.9
Test Statistic, high extreme of all data: Tn = 2.4
T Critical of all data: Tcr = 2.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.9	False		1

Fluoride, dissolved, mg/L
Location: MW6

Mean of all data: 0.1
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.4
Test Statistic, high extreme of all data: Tn = 2.2
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Fluoride, dissolved, mg/L

Location: MW7

Mean of all data: 0.6
Standard Deviation of all data: 2.9
Largest Observation Concentration of all data: Xn = 17.4
Test Statistic, high extreme of all data: Tn = 5.8
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	17.4	False		1

Fluoride, dissolved, mg/L

Location: MW7D

Mean of all data: 0.2
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.5
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW8

Mean of all data: 0.1
Standard Deviation of all data: 0.1
Largest Observation Concentration of all data: Xn = 0.3
Test Statistic, high extreme of all data: Tn = 3.3
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.3	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Iron, dissolved, mg/L

Location: MW115D

Mean of all data: 1.455
Standard Deviation of all data: 1.635
Largest Observation Concentration of all data: Xn = 4.910
Test Statistic, high extreme of all data: Tn = 2.113
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW115S

Mean of all data: 1.854
Standard Deviation of all data: 3.307
Largest Observation Concentration of all data: Xn = 17.600
Test Statistic, high extreme of all data: Tn = 4.762
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	17.600	False		1

Iron, dissolved, mg/L

Location: MW11R

Mean of all data: 0.548
Standard Deviation of all data: 0.868
Largest Observation Concentration of all data: Xn = 4.060
Test Statistic, high extreme of all data: Tn = 4.046
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	4.060	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Iron, dissolved, mg/L
Location: MW121

Mean of all data: 1.600
Standard Deviation of all data: 1.380
Largest Observation Concentration of all data: Xn = 5.400
Test Statistic, high extreme of all data: Tn = 2.754
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L
Location: MW14

Mean of all data: 0.810
Standard Deviation of all data: 0.776
Largest Observation Concentration of all data: Xn = 3.070
Test Statistic, high extreme of all data: Tn = 2.913
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2017	3.070	False		1

Iron, dissolved, mg/L
Location: MW23D

Mean of all data: 8.154
Standard Deviation of all data: 23.195
Largest Observation Concentration of all data: Xn = 70.000
Test Statistic, high extreme of all data: Tn = 2.666
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	70.000	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Iron, dissolved, mg/L

Location: MW23S

Mean of all data: 22.707
Standard Deviation of all data: 67.985
Largest Observation Concentration of all data: Xn = 204.000
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	204.000	False		1

Iron, dissolved, mg/L

Location: MW6

Mean of all data: 0.414
Standard Deviation of all data: 0.495
Largest Observation Concentration of all data: Xn = 1.940
Test Statistic, high extreme of all data: Tn = 3.081
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	1.940	False		1

Iron, dissolved, mg/L

Location: MW7

Mean of all data: 0.471
Standard Deviation of all data: 0.866
Largest Observation Concentration of all data: Xn = 4.960
Test Statistic, high extreme of all data: Tn = 5.184
T Critical of all data: Tcr = 2.866

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	4.960	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Iron, dissolved, mg/L

Location: MW7D

Mean of all data: 1.553
Standard Deviation of all data: 1.207
Largest Observation Concentration of all data: Xn = 5.140
Test Statistic, high extreme of all data: Tn = 2.971
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	5.140	False		1

Iron, dissolved, mg/L

Location: MW8

Mean of all data: 1.083
Standard Deviation of all data: 1.207
Largest Observation Concentration of all data: Xn = 5.250
Test Statistic, high extreme of all data: Tn = 3.451
T Critical of all data: Tcr = 2.866

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	5.250	False		1

Lead, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 3.630
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.003	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Lead, dissolved, mg/L

Location: MW115S

Mean of all data: 0.001
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.011
Test Statistic, high extreme of all data: Tn = 4.958
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	0.011	False		1

Lead, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.003
Test Statistic, high extreme of all data: Tn = 3.583
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	0.003	False		1

Lead, dissolved, mg/L

Location: MW121

Mean of all data: 0.001
Standard Deviation of all data: 0.004
Largest Observation Concentration of all data: Xn = 0.022
Test Statistic, high extreme of all data: Tn = 5.715
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.022	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Lead, dissolved, mg/L
Location: MW14

Mean of all data: 0.000
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.001
Test Statistic, high extreme of all data: Tn = 1.394
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW23D

Mean of all data: 0.001
Standard Deviation of all data: 0.000
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 2.667
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.002	False		1

Lead, dissolved, mg/L
Location: MW23S

Mean of all data: 0.003
Standard Deviation of all data: 0.003
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 2.162
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.010	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Lead, dissolved, mg/L

Location: MW6

Mean of all data: 0.000
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.002
Test Statistic, high extreme of all data: Tn = 2.888
T Critical of all data: Tcr = 2.759

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.002	False		1

Lead, dissolved, mg/L

Location: MW7

Mean of all data: 0.001
Standard Deviation of all data: 0.002
Largest Observation Concentration of all data: Xn = 0.010
Test Statistic, high extreme of all data: Tn = 5.522
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	0.010	False		1

Lead, dissolved, mg/L

Location: MW7D

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.006
Test Statistic, high extreme of all data: Tn = 5.116
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.006	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Lead, dissolved, mg/L

Location: MW8

Mean of all data: 0.001
Standard Deviation of all data: 0.001
Largest Observation Concentration of all data: Xn = 0.004
Test Statistic, high extreme of all data: Tn = 3.562
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/11/2011	0.004	False		1

Manganese, dissolved, mg/L

Location: MW115D

Mean of all data: 0.3234
Standard Deviation of all data: 0.2228
Largest Observation Concentration of all data: Xn = 0.5900
Test Statistic, high extreme of all data: Tn = 1.1968
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW115S

Mean of all data: 0.9294
Standard Deviation of all data: 0.3510
Largest Observation Concentration of all data: Xn = 1.7800
Test Statistic, high extreme of all data: Tn = 2.4236
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW11R

Mean of all data: 0.6717
Standard Deviation of all data: 1.2742
Largest Observation Concentration of all data: Xn = 5.8700
Test Statistic, high extreme of all data: Tn = 4.0796
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/18/2012	5.8700	False		1

Manganese, dissolved, mg/L

Location: MW121

Mean of all data: 0.8529
Standard Deviation of all data: 0.4195
Largest Observation Concentration of all data: Xn = 1.9000
Test Statistic, high extreme of all data: Tn = 2.4962
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW14

Mean of all data: 0.5960
Standard Deviation of all data: 0.3124
Largest Observation Concentration of all data: Xn = 1.5900
Test Statistic, high extreme of all data: Tn = 3.1817
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/07/2016	1.5900	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Manganese, dissolved, mg/L
Location: MW23D

Mean of all data: 1.0764
Standard Deviation of all data: 2.8216
Largest Observation Concentration of all data: Xn = 8.6000
Test Statistic, high extreme of all data: Tn = 2.6665
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	8.6000	False		1

Manganese, dissolved, mg/L
Location: MW23S

Mean of all data: 1.5472
Standard Deviation of all data: 4.4827
Largest Observation Concentration of all data: Xn = 13.5000
Test Statistic, high extreme of all data: Tn = 2.6664
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	13.5000	False		1

Manganese, dissolved, mg/L
Location: MW6

Mean of all data: 0.1308
Standard Deviation of all data: 0.1916
Largest Observation Concentration of all data: Xn = 0.8400
Test Statistic, high extreme of all data: Tn = 3.7025
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/11/2011	0.8400	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW7

Mean of all data: 0.0634
Standard Deviation of all data: 0.1938
Largest Observation Concentration of all data: Xn = 1.1600
Test Statistic, high extreme of all data: Tn = 5.6571
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	1.1600	False		1

Manganese, dissolved, mg/L

Location: MW7D

Mean of all data: 0.6187
Standard Deviation of all data: 0.5807
Largest Observation Concentration of all data: Xn = 3.2300
Test Statistic, high extreme of all data: Tn = 4.4970
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2015	3.2300	False		1

Manganese, dissolved, mg/L

Location: MW8

Mean of all data: 2.0174
Standard Deviation of all data: 1.4107
Largest Observation Concentration of all data: Xn = 4.1100
Test Statistic, high extreme of all data: Tn = 1.4834
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Mercury, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 5.7731
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0020	False		1

Mercury, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0000
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0001
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 5.5956
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0020	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Mercury, dissolved, mg/L
Location: MW121

Mean of all data: 0.0000
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW14

Mean of all data: 0.0001
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 5.7057
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0020	False		1

Mercury, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0001
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Mercury, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0002
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0010	True		1

Mercury, dissolved, mg/L

Location: MW6

Mean of all data: 0.0001
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0009
Test Statistic, high extreme of all data: Tn = 5.1569
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0009	False		1

Mercury, dissolved, mg/L

Location: MW7

Mean of all data: 0.0000
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 3.9794
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	0.0003	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Mercury, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0000
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0002
Test Statistic, high extreme of all data: Tn = 2.8930
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	0.0002	False		1

Mercury, dissolved, mg/L

Location: MW8

Mean of all data: 0.0007
Standard Deviation of all data: 0.0037
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 5.8286
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0220	False		1

Nickel, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0028
Standard Deviation of all data: 0.0045
Largest Observation Concentration of all data: Xn = 0.0240
Test Statistic, high extreme of all data: Tn = 4.7302
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0240	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Nickel, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0037
Standard Deviation of all data: 0.0044
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 3.2171
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0180	False		1

Nickel, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0099
Standard Deviation of all data: 0.0111
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 2.8014
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L

Location: MW121

Mean of all data: 0.0032
Standard Deviation of all data: 0.0042
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 3.2760
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0170	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nickel, dissolved, mg/L
Location: MW14

Mean of all data: 0.0055
Standard Deviation of all data: 0.0050
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 2.2840
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0058
Standard Deviation of all data: 0.0153
Largest Observation Concentration of all data: Xn = 0.0465
Test Statistic, high extreme of all data: Tn = 2.6590
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0465	False		1

Nickel, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0139
Standard Deviation of all data: 0.0394
Largest Observation Concentration of all data: Xn = 0.1190
Test Statistic, high extreme of all data: Tn = 2.6665
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.1190	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Nickel, dissolved, mg/L

Location: MW6

Mean of all data: 0.0073
Standard Deviation of all data: 0.0088
Largest Observation Concentration of all data: Xn = 0.0300
Test Statistic, high extreme of all data: Tn = 2.5714
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L

Location: MW7

Mean of all data: 0.0079
Standard Deviation of all data: 0.0173
Largest Observation Concentration of all data: Xn = 0.1020
Test Statistic, high extreme of all data: Tn = 5.4473
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.1020	False		1

Nickel, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0112
Standard Deviation of all data: 0.0398
Largest Observation Concentration of all data: Xn = 0.2380
Test Statistic, high extreme of all data: Tn = 5.7003
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.2380	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Nickel, dissolved, mg/L

Location: MW8

Mean of all data: 0.0131
Standard Deviation of all data: 0.0098
Largest Observation Concentration of all data: Xn = 0.0370
Test Statistic, high extreme of all data: Tn = 2.4417
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW115D

Mean of all data: 1.451
Standard Deviation of all data: 1.904
Largest Observation Concentration of all data: Xn = 5.320
Test Statistic, high extreme of all data: Tn = 2.032
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW115S

Mean of all data: 0.382
Standard Deviation of all data: 0.698
Largest Observation Concentration of all data: Xn = 2.400
Test Statistic, high extreme of all data: Tn = 2.893
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/12/2011	2.400	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW11R

Mean of all data: 5.225
Standard Deviation of all data: 3.890
Largest Observation Concentration of all data: Xn = 17.000
Test Statistic, high extreme of all data: Tn = 3.027
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2015	17.000	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW121

Mean of all data: 0.468
Standard Deviation of all data: 1.023
Largest Observation Concentration of all data: Xn = 3.720
Test Statistic, high extreme of all data: Tn = 3.178
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	3.720	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW14

Mean of all data: 0.288
Standard Deviation of all data: 0.546
Largest Observation Concentration of all data: Xn = 2.720
Test Statistic, high extreme of all data: Tn = 4.455
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/02/2016	2.720	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Nitrate nitrogen, dissolved, mg/L
Location: MW23D

Mean of all data: 0.061
Standard Deviation of all data: 0.022
Largest Observation Concentration of all data: Xn = 0.100
Test Statistic, high extreme of all data: Tn = 1.764
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW23S

Mean of all data: 0.216
Standard Deviation of all data: 0.133
Largest Observation Concentration of all data: Xn = 0.450
Test Statistic, high extreme of all data: Tn = 1.763
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW6

Mean of all data: 3.789
Standard Deviation of all data: 3.242
Largest Observation Concentration of all data: Xn = 10.200
Test Statistic, high extreme of all data: Tn = 1.978
T Critical of all data: Tcr = 2.759

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Nitrate nitrogen, dissolved, mg/L
Location: MW7

Mean of all data: 0.865
Standard Deviation of all data: 0.540
Largest Observation Concentration of all data: Xn = 1.950
Test Statistic, high extreme of all data: Tn = 2.010
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW7D

Mean of all data: 0.287
Standard Deviation of all data: 0.582
Largest Observation Concentration of all data: Xn = 2.920
Test Statistic, high extreme of all data: Tn = 4.527
T Critical of all data: Tcr = 2.811

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	2.920	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW8

Mean of all data: 0.071
Standard Deviation of all data: 0.107
Largest Observation Concentration of all data: Xn = 0.410
Test Statistic, high extreme of all data: Tn = 3.166
T Critical of all data: Tcr = 2.823

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.410	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

pH (field), STD

Location: MW115D

Mean of all data: 7.42
Standard Deviation of all data: 0.34
Largest Observation Concentration of all data: Xn = 8.24
Test Statistic, high extreme of all data: Tn = 2.45
T Critical of all data: Tcr = 2.99

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/09/2009	6.30	False	-1	

pH (field), STD

Location: MW115S

Mean of all data: 7.41
Standard Deviation of all data: 0.33
Largest Observation Concentration of all data: Xn = 7.97
Test Statistic, high extreme of all data: Tn = 1.67
T Critical of all data: Tcr = 2.99

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/04/2009	6.00	False	-1	

pH (field), STD

Location: MW11R

Mean of all data: 6.81
Standard Deviation of all data: 0.40
Largest Observation Concentration of all data: Xn = 7.47
Test Statistic, high extreme of all data: Tn = 1.66
T Critical of all data: Tcr = 3.07

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	5.31	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

pH (field), STD

Location: MW121

Mean of all data: 7.35
Standard Deviation of all data: 0.27
Largest Observation Concentration of all data: Xn = 7.90
Test Statistic, high extreme of all data: Tn = 2.03
T Critical of all data: Tcr = 3.07

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/11/2009	6.40	False	-1	

pH (field), STD

Location: MW14

Mean of all data: 6.99
Standard Deviation of all data: 0.31
Largest Observation Concentration of all data: Xn = 7.89
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 3.07

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/11/2009	6.00	False	-1	

pH (field), STD

Location: MW23D

Mean of all data: 7.11
Standard Deviation of all data: 0.70
Largest Observation Concentration of all data: Xn = 7.62
Test Statistic, high extreme of all data: Tn = 0.72
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	5.28	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

pH (field), STD

Location: MW23S

Mean of all data: 6.65
Standard Deviation of all data: 1.11
Largest Observation Concentration of all data: Xn = 7.35
Test Statistic, high extreme of all data: Tn = 0.64
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	3.75	False	-1	

pH (field), STD

Location: MW6

Mean of all data: 6.88
Standard Deviation of all data: 0.27
Largest Observation Concentration of all data: Xn = 7.60
Test Statistic, high extreme of all data: Tn = 2.64
T Critical of all data: Tcr = 3.20

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

pH (field), STD

Location: MW7

Mean of all data: 6.93
Standard Deviation of all data: 0.24
Largest Observation Concentration of all data: Xn = 7.98
Test Statistic, high extreme of all data: Tn = 4.37
T Critical of all data: Tcr = 3.21

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/30/1999	7.98	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

pH (field), STD

Location: MW7D

Mean of all data: 7.30
Standard Deviation of all data: 0.36
Largest Observation Concentration of all data: Xn = 8.64
Test Statistic, high extreme of all data: Tn = 3.70
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	8.64	False		1

pH (field), STD

Location: MW8

Mean of all data: 7.10
Standard Deviation of all data: 0.26
Largest Observation Concentration of all data: Xn = 7.92
Test Statistic, high extreme of all data: Tn = 3.16
T Critical of all data: Tcr = 3.21

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/11/2009	6.00	False	-1	

Selenium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0007
Standard Deviation of all data: 0.0018
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.2420
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0100	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0006
Standard Deviation of all data: 0.0017
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.5055
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0100	False		1

Selenium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0021
Standard Deviation of all data: 0.0042
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 3.5596
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/12/2011	0.0170	False		1

Selenium, dissolved, mg/L

Location: MW121

Mean of all data: 0.0006
Standard Deviation of all data: 0.0018
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 5.6269
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0110	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW14

Mean of all data: 0.0017
Standard Deviation of all data: 0.0066
Largest Observation Concentration of all data: Xn = 0.0387
Test Statistic, high extreme of all data: Tn = 5.6344
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	0.0387	False		1

Selenium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0015
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.0050	True		1

Selenium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0010
Standard Deviation of all data: 0.0015
Largest Observation Concentration of all data: Xn = 0.0050
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.0050	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW6

Mean of all data: 0.0029
Standard Deviation of all data: 0.0034
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 2.6688
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW7

Mean of all data: 0.0016
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 3.4781
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/12/2011	0.0100	False		1

Selenium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0010
Standard Deviation of all data: 0.0035
Largest Observation Concentration of all data: Xn = 0.0210
Test Statistic, high extreme of all data: Tn = 5.6563
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2012	0.0210	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW8

Mean of all data: 0.0016
Standard Deviation of all data: 0.0035
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 4.1389
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0160	False		1

Silver, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0005
Standard Deviation of all data: 0.0022
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 5.7614
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0130	False		1

Silver, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Silver, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0005
Standard Deviation of all data: 0.0024
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 5.7400
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0140	False		1

Silver, dissolved, mg/L

Location: MW121

Mean of all data: 0.0001
Standard Deviation of all data: 0.0003
Largest Observation Concentration of all data: Xn = 0.0020
Test Statistic, high extreme of all data: Tn = 5.4674
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.0020	False		1

Silver, dissolved, mg/L

Location: MW14

Mean of all data: 0.0004
Standard Deviation of all data: 0.0017
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.8183
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0100	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Silver, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L

Location: MW6

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.4256
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Silver, dissolved, mg/L
Location: MW7

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW7D

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3645
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW8

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Specific Conductance (field), micromhos/cm
Location: MW115D

Mean of all data: 620
Standard Deviation of all data: 223
Largest Observation Concentration of all data: Xn = 1160
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW115S

Mean of all data: 583
Standard Deviation of all data: 187
Largest Observation Concentration of all data: Xn = 1390
Test Statistic, high extreme of all data: Tn = 4
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	1390	False		1

Specific Conductance (field), micromhos/cm
Location: MW11R

Mean of all data: 1174
Standard Deviation of all data: 530
Largest Observation Concentration of all data: Xn = 2100
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Specific Conductance (field), micromhos/cm
Location: MW121

Mean of all data: 578
Standard Deviation of all data: 93
Largest Observation Concentration of all data: Xn = 699
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW14

Mean of all data: 1012
Standard Deviation of all data: 209
Largest Observation Concentration of all data: Xn = 1270
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW23D

Mean of all data: 635
Standard Deviation of all data: 584
Largest Observation Concentration of all data: Xn = 2180
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2180	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Specific Conductance (field), micromhos/cm

Location: MW23S

Mean of all data: 599
Standard Deviation of all data: 835
Largest Observation Concentration of all data: Xn = 2800
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2800	False		1

Specific Conductance (field), micromhos/cm

Location: MW6

Mean of all data: 1003
Standard Deviation of all data: 311
Largest Observation Concentration of all data: Xn = 1566
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm

Location: MW7

Mean of all data: 1154
Standard Deviation of all data: 189
Largest Observation Concentration of all data: Xn = 1470
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Specific Conductance (field), micromhos/cm
Location: MW7D

Mean of all data: 788
Standard Deviation of all data: 268
Largest Observation Concentration of all data: Xn = 1340
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW8

Mean of all data: 1306
Standard Deviation of all data: 391
Largest Observation Concentration of all data: Xn = 1899
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	20	False	-1	

Sulfate, dissolved, mg/L
Location: MW115D

Mean of all data: 29.3
Standard Deviation of all data: 6.7
Largest Observation Concentration of all data: Xn = 46.1
Test Statistic, high extreme of all data: Tn = 2.5
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Sulfate, dissolved, mg/L
Location: MW115S

Mean of all data: 33.0
Standard Deviation of all data: 12.3
Largest Observation Concentration of all data: Xn = 78.7
Test Statistic, high extreme of all data: Tn = 3.7
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	78.7	False		1

Sulfate, dissolved, mg/L
Location: MW11R

Mean of all data: 399.1
Standard Deviation of all data: 280.0
Largest Observation Concentration of all data: Xn = 989.0
Test Statistic, high extreme of all data: Tn = 2.1
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW121

Mean of all data: 26.2
Standard Deviation of all data: 15.1
Largest Observation Concentration of all data: Xn = 96.6
Test Statistic, high extreme of all data: Tn = 4.7
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	96.6	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Sulfate, dissolved, mg/L

Location: MW14

Mean of all data: 187.2
Standard Deviation of all data: 70.5
Largest Observation Concentration of all data: Xn = 361.0
Test Statistic, high extreme of all data: Tn = 2.5
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L

Location: MW23D

Mean of all data: 173.0
Standard Deviation of all data: 430.1
Largest Observation Concentration of all data: Xn = 1320.0
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	1320.0	False		1

Sulfate, dissolved, mg/L

Location: MW23S

Mean of all data: 245.1
Standard Deviation of all data: 680.6
Largest Observation Concentration of all data: Xn = 2060.0
Test Statistic, high extreme of all data: Tn = 2.7
T Critical of all data: Tcr = 2.1

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2060.0	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Sulfate, dissolved, mg/L
Location: MW6

Mean of all data: 277.6
Standard Deviation of all data: 203.8
Largest Observation Concentration of all data: Xn = 610.0
Test Statistic, high extreme of all data: Tn = 1.6
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW7

Mean of all data: 267.9
Standard Deviation of all data: 81.8
Largest Observation Concentration of all data: Xn = 434.0
Test Statistic, high extreme of all data: Tn = 2.0
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	20.8	False	-1	

Sulfate, dissolved, mg/L
Location: MW7D

Mean of all data: 98.6
Standard Deviation of all data: 63.3
Largest Observation Concentration of all data: Xn = 261.0
Test Statistic, high extreme of all data: Tn = 2.6
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

Sulfate, dissolved, mg/L

Location: MW8

Mean of all data: 665.3
Standard Deviation of all data: 129.8
Largest Observation Concentration of all data: Xn = 1120.0
Test Statistic, high extreme of all data: Tn = 3.5
T Critical of all data: Tcr = 2.8

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	1120.0	False		1

Thallium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0002
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 5.6667
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0030	False		1

Thallium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.3944
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Thallium, dissolved, mg/L
Location: MW11R

Mean of all data: 0.0002
Standard Deviation of all data: 0.0007
Largest Observation Concentration of all data: Xn = 0.0039
Test Statistic, high extreme of all data: Tn = 5.6550
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	0.0039	False		1

Thallium, dissolved, mg/L
Location: MW121

Mean of all data: 0.0002
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 5.6667
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/03/2014	0.0030	False		1

Thallium, dissolved, mg/L
Location: MW14

Mean of all data: 0.0002
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 5.6667
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0030	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Thallium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0000
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 0.0000
T Critical of all data: Tcr = 0.0000

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Thallium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0005
Standard Deviation of all data: 0.0008
Largest Observation Concentration of all data: Xn = 0.0025
Test Statistic, high extreme of all data: Tn = 2.6667
T Critical of all data: Tcr = 2.1100

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0025	True		1

Thallium, dissolved, mg/L

Location: MW6

Mean of all data: 0.0001
Standard Deviation of all data: 0.0001
Largest Observation Concentration of all data: Xn = 0.0003
Test Statistic, high extreme of all data: Tn = 1.4256
T Critical of all data: Tcr = 2.7590

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Thallium, dissolved, mg/L

Location: MW7

Mean of all data: 0.0002
Standard Deviation of all data: 0.0005
Largest Observation Concentration of all data: Xn = 0.0030
Test Statistic, high extreme of all data: Tn = 5.6667
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.0030	False		1

Thallium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0003
Standard Deviation of all data: 0.0012
Largest Observation Concentration of all data: Xn = 0.0070
Test Statistic, high extreme of all data: Tn = 5.7172
T Critical of all data: Tcr = 2.8110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2012	0.0070	False		1

Thallium, dissolved, mg/L

Location: MW8

Mean of all data: 0.0001
Standard Deviation of all data: 0.0002
Largest Observation Concentration of all data: Xn = 0.0010
Test Statistic, high extreme of all data: Tn = 4.6024
T Critical of all data: Tcr = 2.8230

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0010	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Total Dissolved Solids, mg/L
Location: MW115D

Mean of all data: 376
Standard Deviation of all data: 167
Largest Observation Concentration of all data: Xn = 920
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2015	920	False		1

Total Dissolved Solids, mg/L
Location: MW115S

Mean of all data: 306
Standard Deviation of all data: 113
Largest Observation Concentration of all data: Xn = 684
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	684	False		1

Total Dissolved Solids, mg/L
Location: MW11R

Mean of all data: 995
Standard Deviation of all data: 381
Largest Observation Concentration of all data: Xn = 1510
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW121

Mean of all data: 337
Standard Deviation of all data: 98
Largest Observation Concentration of all data: Xn = 604
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	<0	True	-1	

Total Dissolved Solids, mg/L

Location: MW14

Mean of all data: 737
Standard Deviation of all data: 131
Largest Observation Concentration of all data: Xn = 1040
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	289	False	-1	

Total Dissolved Solids, mg/L

Location: MW23D

Mean of all data: 434
Standard Deviation of all data: 509
Largest Observation Concentration of all data: Xn = 1790
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	1790	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW23S

Mean of all data: 503
Standard Deviation of all data: 863
Largest Observation Concentration of all data: Xn = 2800
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2800	False		1

Total Dissolved Solids, mg/L

Location: MW6

Mean of all data: 840
Standard Deviation of all data: 301
Largest Observation Concentration of all data: Xn = 1660
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW7

Mean of all data: 859
Standard Deviation of all data: 139
Largest Observation Concentration of all data: Xn = 1320
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	1320	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Total Dissolved Solids, mg/L

Location: MW7D

Mean of all data: 476
Standard Deviation of all data: 185
Largest Observation Concentration of all data: Xn = 1010
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW8

Mean of all data: 1259
Standard Deviation of all data: 367
Largest Observation Concentration of all data: Xn = 1960
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Zinc, dissolved, mg/L

Location: MW115D

Mean of all data: 0.01
Standard Deviation of all data: 0.02
Largest Observation Concentration of all data: Xn = 0.12
Test Statistic, high extreme of all data: Tn = 5.52
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.12	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment

Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Zinc, dissolved, mg/L

Location: MW115S

Mean of all data: 0.01
Standard Deviation of all data: 0.02
Largest Observation Concentration of all data: Xn = 0.09
Test Statistic, high extreme of all data: Tn = 4.41
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.09	False		1

Zinc, dissolved, mg/L

Location: MW11R

Mean of all data: 0.02
Standard Deviation of all data: 0.03
Largest Observation Concentration of all data: Xn = 0.14
Test Statistic, high extreme of all data: Tn = 4.39
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	0.14	False		1

Zinc, dissolved, mg/L

Location: MW121

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.07
Test Statistic, high extreme of all data: Tn = 4.91
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.07	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Zinc, dissolved, mg/L
Location: MW14

Mean of all data: 0.00
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.04
Test Statistic, high extreme of all data: Tn = 4.88
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.04	False		1

Zinc, dissolved, mg/L
Location: MW23D

Mean of all data: 0.03
Standard Deviation of all data: 0.06
Largest Observation Concentration of all data: Xn = 0.19
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.19	False		1

Zinc, dissolved, mg/L
Location: MW23S

Mean of all data: 0.07
Standard Deviation of all data: 0.20
Largest Observation Concentration of all data: Xn = 0.60
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.60	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Zinc, dissolved, mg/L
Location: MW6

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.03
Test Statistic, high extreme of all data: Tn = 3.16
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.03	False		1

Zinc, dissolved, mg/L
Location: MW7

Mean of all data: 0.00
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.03
Test Statistic, high extreme of all data: Tn = 3.71
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.03	False		1

Zinc, dissolved, mg/L
Location: MW7D

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.05
Test Statistic, high extreme of all data: Tn = 3.93
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.05	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 12/31/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Zinc, dissolved, mg/L
Location: MW8

Mean of all data: 0.01
Standard Deviation of all data: 0.01
Largest Observation Concentration of all data: Xn = 0.06
Test Statistic, high extreme of all data: Tn = 4.45
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.06	False		1

Based on Grubbs one-sided outlier test

APPENDIX C2
SEN SLOPE AND MANN KENDALL TESTS

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	1	mg/L per period
R-Squared error of fit:	1	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	1	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	1	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-0.006	mg/L per period
R-Squared error of fit:	0.431	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-0.003	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.013	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-2.244
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Downward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.1	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.2	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.5	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	2.4
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.4439	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.3822
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.599	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	2.136
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0001	mg/L per period
R-Squared error of fit:	0.3418	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0002	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.7070
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2964	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5027	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	-1.9728	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Downward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.003	mg/L per period
R-Squared error of fit:	0.386	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.002	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.005	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.608
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0007	mg/L per period
R-Squared error of fit:	0.3526	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0015	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.4987
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5619	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	-1.9948	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Downward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115D**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.166	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.290
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.4
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.4
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0018	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.082	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.377
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0002	mg/L per period
R-Squared error of fit:	0.3729	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0002	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0004	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.1309
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.001	mg/L per period
R-Squared error of fit:	0.074	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.004	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.866
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0005	mg/L per period
R-Squared error of fit:	0.5569	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0006	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0012	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	2.1032	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Upward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0224	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.5094
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW115S**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	-1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	2	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.005	mg/L per period
R-Squared error of fit:	0.070	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.003	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.022	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.014	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.86	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.94
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.2
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.5	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.6	mg/L per period
Upper Confidence Limit of Slope, M2+1:	1.9	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.313	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.202
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0138	mg/L per period
R-Squared error of fit:	0.2016	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0012	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0058	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0370	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1729	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.7500
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3378	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.2500
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.547	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.901
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0364	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.4557
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0004	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3050	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.0047
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW11R**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**00515**
Location Class:	**Background**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**00618**
Location Class:	**Background**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.001	mg/L per period
R-Squared error of fit:	0.254	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.880
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**00720**
Location Class:	**Background**	**Parameter:**	**Cyanide, total**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**00941**
Location Class:	**Background**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**00946**
Location Class:	**Background**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.6	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**00950**
Location Class:	**Background**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01000**
Location Class:	**Background**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0007	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01005**
Location Class:	**Background**	**Parameter:**	**Barium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.282	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.361
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01010**
Location Class:	**Background**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01020**
Location Class:	**Background**	**Parameter:**	**Boron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.0265	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.8690
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01025**
Location Class:	**Background**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01030**
Location Class:	**Background**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01035**
Location Class:	**Background**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01040**
Location Class:	**Background**	**Parameter:**	**Copper, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01046**
Location Class:	**Background**	**Parameter:**	**Iron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.001	mg/L per period
R-Squared error of fit:	0.027	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.004	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.003	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01049**
Location Class:	**Background**	**Parameter:**	**Lead, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01056**
Location Class:	**Background**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0012	mg/L per period
R-Squared error of fit:	0.2543	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0007	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0009	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0030	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.3609
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01057**
Location Class:	**Background**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01065**
Location Class:	**Background**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.6075	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	-1.9948	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Downward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01075**
Location Class:	**Background**	**Parameter:**	**Silver, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01090**
Location Class:	**Background**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01095**
Location Class:	**Background**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**01145**
Location Class:	**Background**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW121**	**Parameter Code:**	**71890**
Location Class:	**Background**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	1	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.001	mg/L per period
R-Squared error of fit:	0.503	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.155
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.2	mg/L per period
R-Squared error of fit:	0.2	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.1	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.6	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.3	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.3
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.4906	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.6335
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.115	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0009	mg/L per period
R-Squared error of fit:	0.2848	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0007	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0016	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0007	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1827	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1827	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.002	mg/L per period
R-Squared error of fit:	0.439	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.001	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.003	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.745
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0007	mg/L per period
R-Squared error of fit:	0.3812	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0010	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0021	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.3609
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0300	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW14**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	1	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	2	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.547	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.833
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	1.1	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	1.4	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0045	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.197	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.249
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0069	mg/L per period
R-Squared error of fit:	0.2928	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.3288
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.289	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.061	mg/L per period
R-Squared error of fit:	0.300	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.002	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.080	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.103
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.294	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.309
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0074	mg/L per period
R-Squared error of fit:	0.2914	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0093	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.3712
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2932	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.7641
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.29	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.31
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23D**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00515**
Location Class:		**Parameter:**	**Total Dissolved Solids**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	2	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	3	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00618**
Location Class:		**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.182	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00720**
Location Class:		**Parameter:**	**Cyanide, total**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00941**
Location Class:		**Parameter:**	**Chloride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.4	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.6
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00946**
Location Class:		**Parameter:**	**Sulfate, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	1.8	mg/L per period
R-Squared error of fit:	0.3	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	2.2	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**00950**
Location Class:		**Parameter:**	**Fluoride, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01000**
Location Class:		**Parameter:**	**Arsenic, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01005**
Location Class:		**Parameter:**	**Barium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.003	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.997
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01010**
Location Class:		**Parameter:**	**Beryllium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01020**
Location Class:		**Parameter:**	**Boron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0044	mg/L per period
R-Squared error of fit:	0.2970	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0044	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.7732
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01025**
Location Class:		**Parameter:**	**Cadmium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01030**
Location Class:		**Parameter:**	**Chromium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01035**
Location Class:		**Parameter:**	**Cobalt, Dis**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.294	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.309
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01040**
Location Class:		**Parameter:**	**Copper, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5529	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.9728
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01046**
Location Class:		**Parameter:**	**Iron, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.178	mg/L per period
R-Squared error of fit:	0.295	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.003	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	1.863	
Z test:	1.645	
At the 95.0 % Confidence Level (two-tailed test):	Upward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01049**
Location Class:		**Parameter:**	**Lead, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.495	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.644
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01056**
Location Class:		**Parameter:**	**Manganese, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0117	mg/L per period
R-Squared error of fit:	0.2920	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0147	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01057**
Location Class:		**Parameter:**	**Thallium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01065**
Location Class:		**Parameter:**	**Nickel, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0001	mg/L per period
R-Squared error of fit:	0.2897	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.8796
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01075**
Location Class:		**Parameter:**	**Silver, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01090**
Location Class:		**Parameter:**	**Zinc, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.29	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.31
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01095**
Location Class:		**Parameter:**	**Antimony, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**01145**
Location Class:		**Parameter:**	**Selenium, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2940	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW23S**	**Parameter Code:**	**71890**
Location Class:		**Parameter:**	**Mercury, dissolved**
Location Type:		**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	-1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.005	mg/L per period
R-Squared error of fit:	0.415	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.003	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.005	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.016	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.127
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.89	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.62
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.8
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-0.1	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.2	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.5
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1528	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.5855
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.003	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.751
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0012	mg/L per period
R-Squared error of fit:	0.1714	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0003	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0031	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0039	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.4324	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.1711
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.001	mg/L per period
R-Squared error of fit:	0.260	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.002	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.353
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0001	mg/L per period
R-Squared error of fit:	0.1375	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0003	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.7515
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1823	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.7795
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0773	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.9564
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW6**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	-1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	-0.001	mg/L per period
R-Squared error of fit:	0.273	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-0.002	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.004	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.113
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.1
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.3	mg/L per period
R-Squared error of fit:	0.3	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.2	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.5	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.8
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2964	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.035	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.124
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0001	mg/L per period
R-Squared error of fit:	0.0083	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0002	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0013	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0005	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.3712
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.565	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.783
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0001	mg/L per period
R-Squared error of fit:	0.6985	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0001	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0001	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.9948
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0236	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.3770
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.5263	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.5768
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**00515**
Location Class:	**Background**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0	mg/L per period
Lower Confidence Limit of Slope, M1:	-1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**00618**
Location Class:	**Background**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.001	mg/L per period
R-Squared error of fit:	0.276	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.275
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**00720**
Location Class:	**Background**	**Parameter:**	**Cyanide, total**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**00941**
Location Class:	**Background**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**00946**
Location Class:	**Background**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.2	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**00950**
Location Class:	**Background**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.2	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.0
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01000**
Location Class:	**Background**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1571	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.6186
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01005**
Location Class:	**Background**	**Parameter:**	**Barium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.065	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.628
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01010**
Location Class:	**Background**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01020**
Location Class:	**Background**	**Parameter:**	**Boron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.0005	mg/L per period
R-Squared error of fit:	0.0953	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0006	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0025	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0006	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.1135
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01025**
Location Class:	**Background**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01030**
Location Class:	**Background**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01035**
Location Class:	**Background**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01040**
Location Class:	**Background**	**Parameter:**	**Copper, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01046**
Location Class:	**Background**	**Parameter:**	**Iron, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.002	mg/L per period
R-Squared error of fit:	0.167	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.001	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.002	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.006	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.371
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01049**
Location Class:	**Background**	**Parameter:**	**Lead, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01056**
Location Class:	**Background**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0004	mg/L per period
R-Squared error of fit:	0.2778	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0005	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0001	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0010	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.1135
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01057**
Location Class:	**Background**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01065**
Location Class:	**Background**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.4551	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period
Non-parametric Mann-Kendall Test for Trend		
S Statistic:	-1.9948	
Z test:	1.6449	
At the 95.0 % Confidence Level (two-tailed test):	Downward	

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01075**
Location Class:	**Background**	**Parameter:**	**Silver, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01090**
Location Class:	**Background**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.00	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.00
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01095**
Location Class:	**Background**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**01145**
Location Class:	**Background**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW7D**	**Parameter Code:**	**71890**
Location Class:	**Background**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Alluvial Aq.**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**00515**
Location Class:	**Downgradient**	**Parameter:**	**Total Dissolved Solids**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0	mg/L per period
R-Squared error of fit:	0	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	-1	mg/L per period
Lower Confidence Limit of Slope, M1:	-1	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1
Z test:	2
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**00618**
Location Class:	**Downgradient**	**Parameter:**	**Nitrate nitrogen, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.183	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.290
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**00720**
Location Class:	**Downgradient**	**Parameter:**	**Cyanide, total**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.81	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	2.17
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	Upward

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**00941**
Location Class:	**Downgradient**	**Parameter:**	**Chloride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.1	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.5
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**00946**
Location Class:	**Downgradient**	**Parameter:**	**Sulfate, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	-0.4	mg/L per period
R-Squared error of fit:	0.2	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.1	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.9	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.1	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.9
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**00950**
Location Class:	**Downgradient**	**Parameter:**	**Fluoride, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0	mg/L per period
R-Squared error of fit:	0.3	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-1.3
Z test:	1.6
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01000**
Location Class:	**Downgradient**	**Parameter:**	**Arsenic, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.2598	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.2901
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01005**
Location Class:	**Downgradient**	**Parameter:**	**Barium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.012	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.377
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01010**
Location Class:	**Downgradient**	**Parameter:**	**Beryllium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01020**
Location Class:	**Downgradient**	**Parameter:**	**Boron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0040	mg/L per period
R-Squared error of fit:	0.1058	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	-0.0017	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0036	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0117	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.7481
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01025**
Location Class:	**Downgradient**	**Parameter:**	**Cadmium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01030**
Location Class:	**Downgradient**	**Parameter:**	**Chromium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1818	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	-0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01035**
Location Class:	**Downgradient**	**Parameter:**	**Cobalt, Dis**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01040**
Location Class:	**Downgradient**	**Parameter:**	**Copper, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.3051	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-1.3093
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01046**
Location Class:	**Downgradient**	**Parameter:**	**Iron, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.545	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.001	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	1.577
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01049**
Location Class:	**Downgradient**	**Parameter:**	**Lead, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01056**
Location Class:	**Downgradient**	**Parameter:**	**Manganese, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0011	mg/L per period
R-Squared error of fit:	0.2193	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0010	mg/L per period
Lower Confidence Limit of Slope, M1:	-0.0008	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0035	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	1.1135
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01057**
Location Class:	**Downgradient**	**Parameter:**	**Thallium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01065**
Location Class:	**Downgradient**	**Parameter:**	**Nickel, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0104	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.1237
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01075**
Location Class:	**Downgradient**	**Parameter:**	**Silver, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01090**
Location Class:	**Downgradient**	**Parameter:**	**Zinc, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		
Date Range: 01/01/2018 to 12/31/2019			

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.00	mg/L per period
R-Squared error of fit:	0.09	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.00	mg/L per period
Lower Confidence Limit of Slope, M1:	0.00	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.00	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	0.44
Z test:	1.64
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01095**
Location Class:	**Downgradient**	**Parameter:**	**Antimony, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.000	mg/L per period
R-Squared error of fit:	0.000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.000
Z test:	1.645
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**01145**
Location Class:	**Downgradient**	**Parameter:**	**Selenium, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line		
Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.1905	
Sen's Non-parametric estimate of the slope (two-tailed test)		
Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend	
S Statistic:	-0.8729
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

Hutsonville Ash Impoundment
Mann-Kendall Trend Analysis

User Supplied Information

Location ID:	**MW8**	**Parameter Code:**	**71890**
Location Class:	**Downgradient**	**Parameter:**	**Mercury, dissolved**
Location Type:	**Upper Zone**	**Units:**	**mg/L**
Confidence Level:	**95.00%**		

Date Range: 01/01/2018 to 12/31/2019

Trend Analysis

Trend of the least squares straight line

Slope (fitted to data):	0.0000	mg/L per period
R-Squared error of fit:	0.0000	

Sen's Non-parametric estimate of the slope (two-tailed test)

Median Slope:	0.0000	mg/L per period
Lower Confidence Limit of Slope, M1:	0.0000	mg/L per period
Upper Confidence Limit of Slope, M2+1:	0.0000	mg/L per period

Non-parametric Mann-Kendall Test for Trend

S Statistic:	0.0000
Z test:	1.6449
At the 95.0 % Confidence Level (two-tailed test):	None

APPENDIX C3
TEST DESCRIPTIONS

Electronic Filing: Received, Clerk's Office 09/28/2020

ELECTRIC POWER
RESEARCH INSTITUTE

MANAGES

Groundwater Data Management and Evaluation Software

Software Manual Product ID #1012581

Software Manual, February 2010

EPRI Project Manager
K. Ladwig

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10
STATISTICAL ANALYSIS

Stand-Alone Statistical Tests

Statistical Evaluation Report

The Statistical Evaluation Report is comprised of a series of subreports as described below.

User Selections:

- One location.
- Sample date range for data selection.
- Interval length: the length of the averaging period in months (1,2,3,4, or 6).
- One parameter.
- Non-detect processing: multiplier between 0 and 1.
- One-sided confidence $(1-\alpha)$ level – 0.90, 0.95 or 0.99.
- Limit type: used in the statistical overview to determine exceedances.

Mann-Kendall Trend and Seasonal Analysis Tests

The Mann-Kendall test for trend is insensitive to the presence or absence of seasonality. The test is non-parametric and does not assume any type of data distribution. Nonetheless, two forms of the test are provided in MANAGES, one ignoring data seasonality even if it is present, and one considering data seasonality. In the test, the null hypothesis, H_0, is that the Sen trend is zero, and the alternate hypothesis, H_a, is that the trend is non-zero.

In general, the Mann-Kendall test considering seasonality indicates a larger range for allowable Sen estimate of trend when seasonality is actually present than the range indicated by the test performed ignoring seasonality.

In the Mann-Kendall Trend Analysis, available in under the Statistical Evaluation Report and in the Statistical Procedure for Detection Monitoring, and Mann-Kendall Seasonal Analysis, found under the Statistical Evaluation Report, MANAGES first calculates the Sen slope and the upper and lower confidence limits of the Sen slope, and then determines whether the Sen slope is statistically significant. Slope is statistically significant if it is non-zero.

Mann-Kendall Test for Sen Slope Significance – a two-sided, non-parametric method for data sets as small as 10, unless there are many tied (e.g., equal, NDs are treated as tieds) values (Gilbert, 1987; p. 208)	
Indicator Function $\mathrm{sgn}(x_{ij} - x_{jk})$	= 1 if $(x_{ij} - x_{jk}) > 0$ = 0 if $(x_{ij} - x_{jk}) = 0$ = -1 if $(x_{ij} - x_{jk}) < 0$ where $x_{i1}, x_{i2}, \ldots, x_{in}$ are the time ordered data (n_i is total of data in the i-th season).
Mann-Kendall Statistic, S_i	$= \sum_{k=1}^{n_i-1} \sum_{j=k+1}^{n_i} \mathrm{sgn}(x_{ij} - x_{jk})$
Variance of S_i $VAR(S_i)$	$VAR(S_i) =$ $\frac{1}{18}\left\{ n_i(n_i-1)(2n_i+5) - \sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(2t_{ip}+5) - \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(2u_{iq}+5) \right\}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(t_{ip}-2) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(u_{iq}-2)}{9n_i(n_i-1)(n_i-2)}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)}{2n_i(n_i-1)}.$ The variable g_i is the number of tied groups (equal-valued) data in the i-th season, t_{ip} is the number of tied data in the p-th group for the i-th season, h_i is the number of sampling times (or time periods) in the i-th season that contain multiple data, u_{iq} is the number of multiple data in the q-th time period in the i-th season, and n_i is the number of data values in the i-th season.

Test Statistic, Z	If $S' = \sum_{i=1}^{K} S_i$, where K is the number of seasons, then the test statistic Z is computed as: $$Z = \begin{cases} \dfrac{S'-1}{[VAR(S')]^{1/2}} & \text{iff } S' > 0 \\ 0 & \text{iff } S' = 0 \\ \dfrac{S'+1}{[VAR(S')]^{1/2}} & \text{iff } S' < 0 \end{cases}$$ Where "iff" is an acroym meaning: if-and-only-if. A positive Z value means an upward trend and a negative Z value means a negative trend.
Hypothesis Test: H_0 = no trend H_a = trend present This is a two-sided test at the α significance level.	Accept the null hypothesis H_0 of no trend if $\lvert Z \rvert \leq Z_{1-\alpha/2}$ Reject the null hypothesis H_0 if $\lvert Z \rvert > Z_{1-\alpha/2}$ where $Z_{1-\alpha/2}$ is obtained from Table A1 in Gilbert (1987; p. 254).

Kruskal-Wallis Analysis (Test for Seasonality)

To perform the Kruskal-Wallis test for data seasonality, data points are first segmented according to season (Gilbert, 1987). The null hypothesis, H_0, is that all seasons have the same mean value. The alternative hypothesis, H_a ,is that at least one season has a mean larger or smaller than the mean of at least one other season. Montgomery et al. (1987) provide additional information on groundwater data seasonality. This is a two-sided, non-parametric test.

In MANAGES, the Kruskal-Wallis Test for Seasonality is found under Data Review // Non-Parametric Methods // Kruskal-Wallis Analysis. It determines whether the seasonal means for the specified parameter at the specified location are statistically the same.

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	or $Z_i \geq SCL$.

Outlier Tests

Outlier tests are useful in detecting inconsistencies of measurement within a data set. An outlier is defined as an observation that appears to deviate markedly from other values of a sample set. There are many possible reasons for the presence of an outlier, including 1) the presence of a true but extreme value from a single population, resulting from random variability inherent in the data; 2) an improper identification of the underlying distribution describing the population from which the sample set comes from; 3) the occurrence of some unknown event(s) such as a spill, creating a mixture of two or more populations; 4) a gross deviation from prescribed sampling procedures or laboratory analysis; 5) a transcription error in the data value or data unit of measurement.

USEPA (1989; p. 8-11) states that the purpose of a test for outliers is to determine whether or not there is statistical evidence that an observation that appears extreme does not fit the distribution of the rest of the data. If an observation is identified as an outlier, then steps need to be taken to determine whether it is the result of an error or a valid extreme observation. If a true error, such as in transcription, dilution, or analytical procedure, can be identified, then the suspect value should be replaced with its corrected value. If the source of the error can be determined but no correction is possible, then the observation is deleted and the reason for deletion is reported along with any statistical analysis. If no source of error can be documented, then it must be assumed that the observation is a true but extreme value of the data set. If this is the case, the outlier observation(s) must not be altered or excluded from any statistical analysis. Identification of an observation as an outlier but with no error documented could be used to suggest resampling to confirm the value (USEPA, 1989; p. 8-13).

The outlier tests provided in MANAGES are based on either the single outlier test of Grubbs (1969), which is used by USEPA (1989; pp. 8-10 to 8-13) or the single outlier test of Dixon (1951, 1953), which is used by USEPA (2000; pp. 4-24) and by ASTM (1998). The outlier tests assume the data come from a normal distribution. Only one outlier, either an extreme low or an extreme high, can be detected during a single analysis of a data set. Additional outliers can be detected by temporarily removing a previously detected outlier from a data set and then repeating the test on the remaining, reduced, data set. During each pass of the outlier test, the sample mean, standard deviation, and sample size used in the test statistics are computed using only the data remaining in the set. The process can be continued until there is either an insufficient amount of data remaining (a minimum of 3 values) or when no additional outliers are found. When using MANAGES, the user will be asked how many outliers are to be checked and it will then automatically perform all of the recursive calls and data reductions with the Grubbs or Dixon routine. When done, a report can be generated that will show each outlier marked with a flag indicating the sequential order in which the outliers were identified.

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Critical values used in the one-sided Grubbs test are taken directly from those in Grubbs and Beck (1972) for sample sizes smaller than 147 observations. Critical values for sample sizes larger than 147 were generated numerically using a Monte Carlo routine, where each sampling event was simulated 100,000 times. Sample sizes ranging from 148 to 5,000 where used and then their resultant test statistic T_n curve fitted at specific significance levels. By this method, it was possible to match Grubbs results to at least four significant digits for corresponding tabulated values.

Critical values used in the one-sided Dixon outlier test are taken directly from tables given in Dixon (1951), Dixon (1953; page 89), and USEPA (2000; p. A-5, Table A-3). The critical values were then curve fitted for every sample size between 3 and 25 as a function of the significance level. By this method, it was possible to match Dixon's results to at least four significant digits for corresponding tabulated values. Note that the Dixon test assumes the data are either normally or lognormally distributed. Hence, sample sizes can only range between 3 and 25, inclusive. Dixon never developed an outlier test for sample sizes larger than 25.

User Selections:

- One or up to 100 locations: a separate test is performed for each location.
- One or up to 100 parameters: a separate test is performed for each parameter.
- Evaluation date range.
- Confidence $(1-\alpha)$ level: 0.90, 0.95 or 0.99.
- Non-detect processing: multiplier between 0 and 1.
- Data transformation option: none and log (base e).
- Number of outliers: one, two, first 5%, first 10%. Selecting any option other than one causes MANAGES to rerun the test, with outliers from prior tests removed, until either no outliers are detected or the specified number of outliers are detected.

Technical Details

Grubbs Outlier Test – The Grubbs outlier test determines whether there is statistical evidence that an observation does not fit the remaining data (USEPA, 1989; p. 8-11). This significance test looks at either the highest or the lowest observation in normal samples.	
The number of observations taken during a specified scoping period; n	*n*

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Mean of the observed data during the scoping period; $\overline{X}$	$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$ where X_i is the i-th observation.
Standard deviation of observed data; S_x.	$S_x = \sqrt{\frac{1}{(n-1)}\sum_{i=1}^{n}(X_i - \overline{X})^2}$
Test statistics: T_l & T_n	Sort the data into ascending order, then compute the statistics $T_l = (\overline{X} - X_l)/S_x$ $T_n = (X_n - \overline{X})/S_x$ where X_l is the smallest value of the n observations and X_n is the largest value of the n observations.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Grubbs single, one-sided test of either an extreme low outlier : X_l *is an outlier if* $T_l \geq T_{cr(1-\alpha,n)}$ or an extreme high outlier: X_n *is an outlier if* $T_n \geq T_{cr(1-\alpha,n)}$. The function $T_{cr(1-\alpha,n)}$ is the critical value, given in Grubbs and Beck (1972; Table 1) and USEPA (1989; p. B-11, Table 8) . Note that the critical value assumes that the mean and standard deviation are computed from the sample being tested.

Dixon Outlier Test – The Dixon outlier test determines whether there is statistical evidence that an extreme observation does not fit the remaining data (USEPA, 2000; p. 4-24 and ASTM D6312, 1998). This significance test looks at both the highest and the

lowest observations in a sample data set. However, the routine will only perform the outlier tests if several conditions are first satisfied. For example, the Dixon outlier algorithm checks the distribution of the sample data for both normality and lognormality using the Shapiro-Wilk W-test. The outlier routine will not proceed with a data set if the W-test fails. In addition, the Dixon outlier test is limited to a minimum of 3 and a maximum sample size n of 25 data values.	
The number of observations taken during a specified scoping period; n	Number of observations, n, where $3 \le n \le 25$.
Sorting the sample data	Sort the data into ascending order, with the minimum data value $X_{(1)}$ first and the maximum data value $X_{(n)}$ last. Use the natural log of the data values if data are lognormally distributed, i.e., $X_{(j)} = Ln[X_{(j)}]$.
Goodness-of fit tests	After temporarily excluding either the minimum or maximum value of the data set, the Shapiro-Wilk's W-test is used to determine if the remaining $n-1$ values are normally or lognormally distributed. If not, the Dixon outlier test can't be used.
Test statistic, T_s, for the minimum data value	Compute the T_s test statistic for $X_{(1)}$ as an outlier: $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}}$ *for* $14 \le n \le 25.$
Test statistic, T_s, for the maximum data value	Compute the T_s test statistic for $X_{(n)}$ as an outlier:

	$T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}}$ *for* $14 \le n \le 25$.
Critical value T_c	USEPA (2000; p. A-5, Table A-3) lists the critical values of the Dixon test as a function of sample size for a one-sided extreme value test at the significance levels α of 0.1, 0.05, and 0.01.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Dixon's single, one-sided test for statistical evidence of either an extreme low-valued outlier: $X_{(1)}$ *is an outlier if* $T_s \ge T_c$ or an extreme high-valued outlier: $X_{(n)}$ *is an outlier if* $T_s \ge T_c$. The function T_c is the critical value, given in Dixon (1953; page 89) and USEPA (2000; p. A-5, Table A-3). Note that the critical value assumes that the data are either normally or lognormally distributed.

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Other Statistical Calculations Used in MANAGES

Sen Estimate of Slope

The Sen estimate of slope is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed (Gilbert, 1987). The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar days. Sen's estimate of slope is a non-parametric estimator of trend. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. In contrast, linear regression and other least squares estimators of slope are significantly more sensitive, and more likely to give erroneous slope indications, even when only a few outlier values are present.

When data averaging is not activated, the Sen slope is calculated using individual data points and actual sampling dates. When data averaging is activated, multiple data points within each specified season period are reduced to one data point by arithmetic averaging over each of the season periods. These averaged values are then assigned to the day that corresponds to the middle of that season's period.

The approximate lower and upper confidence limits for the Sen slope can also be calculated using normal theory (Gilbert, 1987). It should be noted that confidence limits for the Sen slope are not necessarily symmetrical about the estimated slope since ranked values of slope are used in the calculation.

MANAGES calculates Sen slope in the Sen Slope Overlay Graph, Statistical Summary reports and in the two Mann-Kendall tests performed under the Statistical Evaluation Report.

Sen's Estimate of Slope – two-sided, non-parametric method that calculates the trend of a single data series. It is less sensitive to outliers and non-detect values than linear regression (Gilbert, 1987; p. 217).	
Slope, Q	$= \frac{x_{i'} - x_i}{i' - i}$ where $X_{i'}$ and x_i are data values at times i' and i, respectively, and where $i'>i$. Typically, i' and i are expressed in units of either days for trend analysis or years for seasonal analysis.
N′	Number of unique data point pairs that can be made for the observations in the data set, for $i'>i$. For n monitoring events, N′ is given as: N′ = n(n-1)/2

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Sen's Slope Estimate	Sen's slope estimator = median slope $= Q_{[(N'+1)/2]}$ if N' is odd $= \frac{1}{2}(Q_{[N'/2]} + Q_{[(N'+2)/2]})$ if N' is even where the Q values have first been ranked from smallest to largest.
$Z_{1-\alpha/2}$	Statistic for the cumulative normal distribution (Gilbert, 1987; p. 254) for the two-sided, α significance level.
Variance estimate of the Mann-Kendall S Statistic, VAR(S)	VAR(S) $= \frac{1}{18}\left[n(n-1)(2n+5) - \sum_{p=1}^{g} t_p(t_p-1)(2t_p+5)\right]$ where g is the number of tied groups, t_p is the number of data in the pth group, and n is the number of data values.
C_α	$= Z_{1-\alpha/2}\sqrt{VAR(S)}$
Sen's Slope , a two-sided test at the α significance level	$M_1 = \frac{(N'-C_\alpha)}{2}$ $M_2 = \frac{(N'+C_\alpha)}{2}$ Lower limit of confidence interval is the M_1-th largest slope, and upper limit of confidence interval is the (M_2+1)-th largest of the N′ ordered slope estimates.

Coefficient of Skewness for Normality

The coefficient of skewness is another measure for data normality (Gilbert, 1987). MANAGES provides the value of the coefficient of skewness in the Statistical Evalueation Report, Statistical Overview. Additional information on data normality is given by Montgomery, et al. (1987).

Exhibit 15

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AmerenEnergy Medina Valley CoGen, LLC

Date
March 31, 2020

Project No.
72974

2019 ANNUAL REPORT

MEREDOSIA POWER STATION

RAMBOLL Bright ideas. Sustainable change.

2019 ANNUAL REPORT
MEREDOSIA POWER STATION

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APPENDICES

Appendix A	Monitoring Well Boring and Construction Logs
Appendix B	2019 Groundwater Monitoring Results
Appendix C	Site Inspection Reports

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ACRONYMS AND ABBREVIATIONS

Ameren	AmerenEnergy Medina Valley Cogen, LLC
Class I Groundwater Standard	Groundwater Quality Standards for Class I: Potable Resource Groundwater (35 IAC 620.410)
GMZ	Groundwater management zone
HDPE	High-density polyethylene
IAC	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
Meredosia	Meredosia Power Station
mg/L	milligrams per liter
TDS	total dissolved solids

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1. INTRODUCTION

1.1 Background

This 2019 Annual Report has been prepared for AmerenEnergy Medina Valley Cogen, LLC (Ameren) for the Meredosia Power Station (Meredosia, Figure 1-1). Ameren completed closure activities for the Fly Ash Pond and Bottom Ash Pond in accordance with the site-specific closure requirements of Title 35 of the Illinois Administrative Code (IAC) Section 840 in December 2018. Closure activities, which included grading, placement of a high-density polyethylene (HDPE) geomembrane covered with ClosureTurf®/ArmorFill® synthetic turf, and construction of surface water control structures, began in March 2018 and were substantially completed as of December 5, 2018. This is the third annual report for Meredosia since groundwater monitoring was restarted in 2017. Seven rounds of pre-closure groundwater data and four rounds of post-closure data have been collected between June 2017 and December 2019 to satisfy requirements of the Groundwater Monitoring Plan, dated December 14, 2016 (Geotechnology, Inc).

The Groundwater Monitoring Plan, in accordance with 35 IAC 840.114 and 35 IAC 840.116, outlines groundwater monitoring and sampling procedures, establishes the parameters and methods to be used for analyzing the groundwater samples, and describes evaluation methods to assess post-closure groundwater quality and trends to demonstrate compliance with the applicable groundwater standards. The Groundwater Monitoring Program Schedule is provided in Table 1-1.

The current groundwater monitoring network comprises 12 monitoring wells, including five installed in October 2010 (APW-1 through APW-5), four installed in October 2015 (APW-6 through APW-9), and three installed in August 2018 (APW-10 through APW-12). From 2010 to 2012, monitoring wells APW-1 through APW-5 were sampled. Beginning in June 2017 and in accordance with the Groundwater Monitoring Plan, groundwater sampling was restarted and conducted quarterly at monitoring wells APW-1 through APW-9. Beginning in September 2018 and in accordance with the Groundwater Monitoring Plan, monitoring wells APW-10, APW-11, and APW-12 were incorporated into the well network and were sampled quarterly along with wells APW-1 through APW-9. The monitoring wells were installed to define the lateral extent of impacts on site, as well as to assist in future groundwater monitoring of remedial actions. Monitoring well boring and construction logs are included in Appendix A. Locations of all monitoring wells are shown on Figure 1-2. Monitoring well locations, installation dates, construction information, and the groundwater zone they monitor are provided in Table 1-2. Boring logs and construction forms are included in Appendix A. Field and laboratory parameters for evaluating groundwater quality are shown in Table 1-3.

In conjunction with Ameren's request for approval of the Closure Plan, Ameren submitted a Groundwater Management Zone Plan, Fly Ash Bottom Ash Pond, Meredosia Power Station (Geotechnology, Inc., December 2016) and a request to establish the groundwater management zone (GMZ) pursuant to 35 IAC 620.250(a)(2): Ash Ponds Closure, Groundwater Management Zone Application, dated October 17, 2017, which was approved by the Illinois Environmental Protection Agency (IEPA) on November 1, 2017.

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This annual report includes the following elements:

- Monitoring well boring and installation logs for the 12 currently installed wells, APW-1 through APW-12 (Appendix A)
- A summary of post-closure groundwater monitoring data collected on January 29, 2019; June 4, 2019; August 26, 2019; and December 9, 2019, including data tables (Appendix B)
- Recent Site Inspection Forms (Appendix C)

1.2 Demonstration of Compliance

Compliance will be based on attainment of post-closure groundwater quality that meets the Class I Groundwater Standards, as set forth in 35 IAC 620.410. Groundwater shall be in compliance when concentrations are below the Class I Groundwater Standards and there are no statistically significant increasing trends at the compliance boundary. The trend analysis shall be performed on a minimum of eight consecutive post-closure groundwater samples and use Sen's Estimate of Slope for assessing concentration trends.

Ameren completed closure of the inactive Fly Ash and Bottom Ash Ponds at Meredosia Power Station and the closure project was deemed substantially complete December 5, 2018 in accordance with the Closure Plan (Ameren letter to IEPA dated January 31, 2019). As of the 2019 Annual Report, there are only four rounds of post-closure groundwater data available. Statistical analysis to demonstrate compliance will begin when eight rounds of post-closure data are available. It is anticipated that eight rounds of post-closure data will be available for analysis in the 2020 Annual Report.

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2. DATA ANALYSIS

2.1 Groundwater Flow

The groundwater elevation contours for each quarterly sampling event shown on Figures 2-1 through 2-4 are based on groundwater measurements collected in 2019 and illustrate groundwater flow. During normal flow conditions, groundwater flow in the upper (shallow) zone is generally northwest and west towards the Illinois River, consistent with past evaluations (Figure 2-1, Figure 2-3 and Figure 2-4). In June 2019, groundwater elevation data was not collected from wells located near the west property boundary (APW-2, APW-3, APW-4, APW-7, APW-9, and APW-12) due to flooding (Figure 2-2). During June 2019 flood conditions, groundwater flow in the southeast corner of Meredosia flowed from APW-11 toward APW-1 in a southeasterly direction, away from the Illinois River.

Consistent with observations during January and December 2018, a minor groundwater inflection was seen at APW-2 during the January and December sampling events in 2019 (Figure 3-1). Groundwater elevation differences between well APW-2 and wells APW-9 and APW-3 ranged from 0.83 to 2.18 feet. APW-2 is screened predominantly in clay while the surrounding wells, including APW-3 and APW-9, are screened mostly in sand, making it likely that APW-2 is slower to react to changes in river elevation.

2.2 Summary of Analytical Data

This annual report presents four rounds of post-closure data collected on January 29, 2019; June 4, 2019; August 26, 2019; and December 9, 2019. Wells APW-2, APW-3, APW-4, APW-7, APW-9, and APW-12 were not sampled during the second quarter sampling event of 2019 due to flooding in the area. Note that total dissolved solids (TDS) was resampled on December 20, 2019 for the fourth quarter sampling event because the original samples were analyzed two days past hold time. All field and laboratory analytical results are tabulated in Appendix B.

As discussed in Section 1.2, and according to the Groundwater Monitoring Plan, eight samples are required to conduct trend analyses for compliance. Since only four rounds of post-closure data are currently available, and an additional four rounds of data are scheduled for collection in 2020, trend analysis will begin in the 2020 Annual Report. According to the Post-Closure Care Plan (Geotechnology, Inc., 2018), two years after the ash ponds have been closed, the groundwater monitoring network will be re-evaluated based on the changes in the groundwater impacts (December 2020).

2.3 Site Inspection

The Post-Closure Maintenance Program requires quarterly inspection for the first five years after closure. After five years, the inspection frequency can be reduced to semi-annually provided that semi-annual groundwater monitoring has been approved by IEPA. After five years of semiannual monitoring, the inspection frequency can be reduced to annually pending approval of annual groundwater monitoring. Discontinuance of site inspections will occur after IEPA approval of the certified Post-Closure Care Report.

Site inspections include assessment of the condition and need for repair of final cover and vegetation, as wells as fencing, monitoring points, and surface water control features. Following completion of closure activities in December 2018, the initial inspection occurred in December 2018 and quarterly inspections were done in 2019. The inspection reports from 2019 are included in Appendix D. Based on these reports, all the components of the closure turf are in good condition.

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3. CONCLUSIONS

This annual report presents four rounds of post-closure data. The Groundwater Monitoring Plan requires eight consecutive rounds of post-closure data to be collected before statistical analysis of trends can be made for compliance. Once eight rounds of post-closure data have been collected, statistical analysis will be run using all eight samples and used to determine compliance. It is anticipated that eight rounds of post-closure data will be available for analysis in the 2020 Annual Report. No action, other than submittal of this report, is required per Section 5.2 of the Groundwater Monitoring Plan (Compliance Determination).

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4. REFERENCES

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Geotechnology, Inc., 2018. *Post-Closure Care Plan, Meredosia Power Station*. March 12, 2018.

Illinois Environmental Protection Agency (IEPA), 1991. *Groundwater Quality Standards for Class I: Potable Resource Groundwater*, Title 35 of the Illinois Administrative Code Part 620: Groundwater Quality, amended 2013.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
2019 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

Frequency	Duration	Sampling Quarter
Quarterly	Begins: June 2017	January- March (1) April - June (2) July - September (3) October - December (4)
	Ends: After successful completion of the post-closure activities required and approval of the Illinois EPA; or Acceptance of reduced frequency by IEPA based on successful demonstration under Semi-Annual or Annual Frequency	
Semi-Annual or Annual	Begins: Upon demonstration that monitoring effectiveness will not be compromised by reduced frequency, adequate data has been collected to characterize groundwater, and concentration of constituents monitored at downgradient boundaries do not demonstrate statistically significant increasing trends that can be attributed to the former ash ponds	April - June (2) October - December (4)
	Ends: After successful completion of the post-closure activities required and approval of the Illinois EPA	

[O: YD/SJC, C: YD/SJC]

Table 1-2. Groundwater Monitoring System Wells
2019 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

Monitoring Well Number	Installation Date	Surface Elevation (ft, MSL)	TOC Elevation (ft, MSL)	Top of Screen Elev (ft)	Bottom of Screen Elevation (ft)	Total Well Depth (ft, BGS)	Objective	Position	Monitoring Zone
APW-1	10/26/2010	446.1	449.26	431.4	421.4	24.7	Compliance	Upgradient	Uppermost Aquifer
APW-2	10/25/2010	434.0	436.87	421.1	411.1	22.9	Compliance	Downgradient	Uppermost Aquifer
APW-3	10/25/2010	433.4	436.28	420.8	410.8	22.6	Compliance	Downgradient	Uppermost Aquifer
APW-4	10/26/2010	431.9	434.86	415.8	409.3	26.1	Compliance	Downgradient	Uppermost Aquifer
APW-5	10/26/2010	450.5	453.20	431.0	421.0	29.5	Compliance	Upgradient	Uppermost Aquifer
APW-6	10/1/2015	448.6	451.90	431.1	421.1	28.0	Compliance	Midgradient	Uppermost Aquifer
APW-7	10/1/2015	435.0	438.7	429.0	419.0	16.5	Compliance	Midgradient	Uppermost Aquifer
APW-8	10/1/2015	460.5	463.9	431.9	421.9	39.1	Compliance	Midgradient	Uppermost Aquifer
APW-9	10/1/2015	445.0	448.1	426.2	416.2	29.3	Compliance	Downgradient	Uppermost Aquifer
APW-10	8/20/2018	454.1	457.5	424.9	414.9	39.4	Compliance	Midgradient	Uppermost Aquifer
APW-11	8/22/2018	461.9	465.4	427.64	417.64	44.45	Compliance	Upgradient	Uppermost Aquifer
APW-12	8/21/2018	431.9	435.5	422.1	412.1	20.04	Compliance	Downgradient	Uppermost Aquifer

[U: RSD 3/12/2020, C: RAB 3/13/2020]

Notes:

TOC = top of casing (i.e. top of riser pipe)

MSL = mean sea level

BGS = below ground surface

ft = feet

Table 1-3. Groundwater Monitoring Program Parameters
2019 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

Field Parameters	STORET Code	
pH[2]	00400	
Specific Conductance[2]	00094	
Temperature (Fahrenheit)	00011	
Depth to Water (from TOC)	72109	
Elevation of GW Surface[2]	71993	
Depth of Well (BGS)[2]	72008	
Elevation of Measuring Point	72110	
Laboratory Parameters[1]	**STORET Code-Diss**	**STORET Code-Total**
Boron[2]	01020	01022
Iron[2]	01046	01045
Manganese[2]	01056	01055
Sulfate[2]	00946	- -
Total Dissolved Solids (TDS)[2]	70300	- -
Antimony	01095	01097
Arsenic	01000	01002
Barium	01005	01007
Beryllium	01010	01012
Cadmium	01025	01027
Chloride	00941	- -
Chromium	01030	01034
Cobalt	01035	01037
Copper	01040	01042
Cyanide	- -	00720
Fluoride	00950	- -
Lead	01049	01051
Mercury	71890	71900
Nickel	01065	01067
Nitrate as N	00613	- -
Nitrite as N	00618	- -
Selenium	01145	01147
Silver	01075	01077
Thallium	01057	01059
Vanadium	01085	01087
Zinc	01090	01092

[O: YD/SJC, C: YD/SJC]

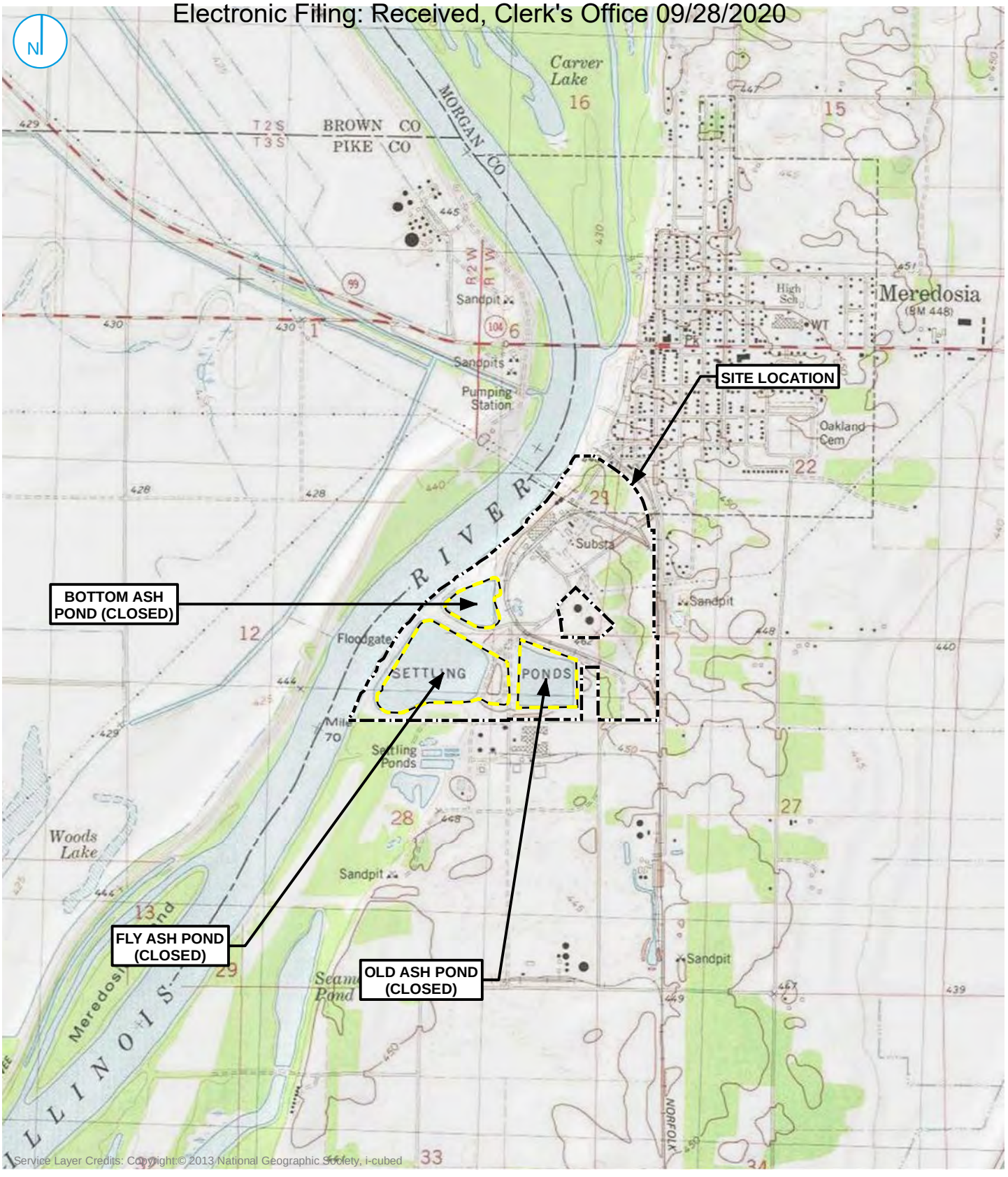
Notes:
[1] Reported as dissolved (filtered) concentrations.
[2] Mandatory monitoring parameter per 35 IAC 840.114(a).
BGS: Below Ground Surface
TOC: Top of Casing

FIGURES

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\667815\mxd\2020\Figure 1-1_Site Location Map.mxd

DATED: 2/14/2020 | DESIGNER: STOLZSD





KEY MAP

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

Map Scale: 1:1:24,000;
Map Center: 90°34'10"W 39°49'15"N

0 1,000 2,000 Feet

SITE LOCATION MAP

2019 ANNUAL REPORT
AMEREN ENERGY RESOURCES MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 1-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\6\67815\mxd\2020\Figure 1-2_Site_Base_Map.mxd

PROJECT: 72694 | DATED: 2/14/2020 | DESIGNER: STOLZSD

N

ILLINOIS RIVER

BOTTOM ASH POND (CLOSED)

FLY ASH POND (CLOSED)

OLD ASH POND (CLOSED)

APW-1
APW-2
APW-3
APW-4
APW-5
APW-6
APW-7
APW-8
APW-9
APW-10
APW-11
APW-12

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

MONITORING WELL LOCATION
APPROXIMATE PROPERTY BOUNDARY
LIMITS OF CCP MANAGEMENT
APPROXIMATE GROUNDWATER MONITORING ZONE

0 240 480 Feet

SITE BASE MAP

2019 ANNUAL REPORT
AMEREN ENERGY RESOURCES MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 1-2

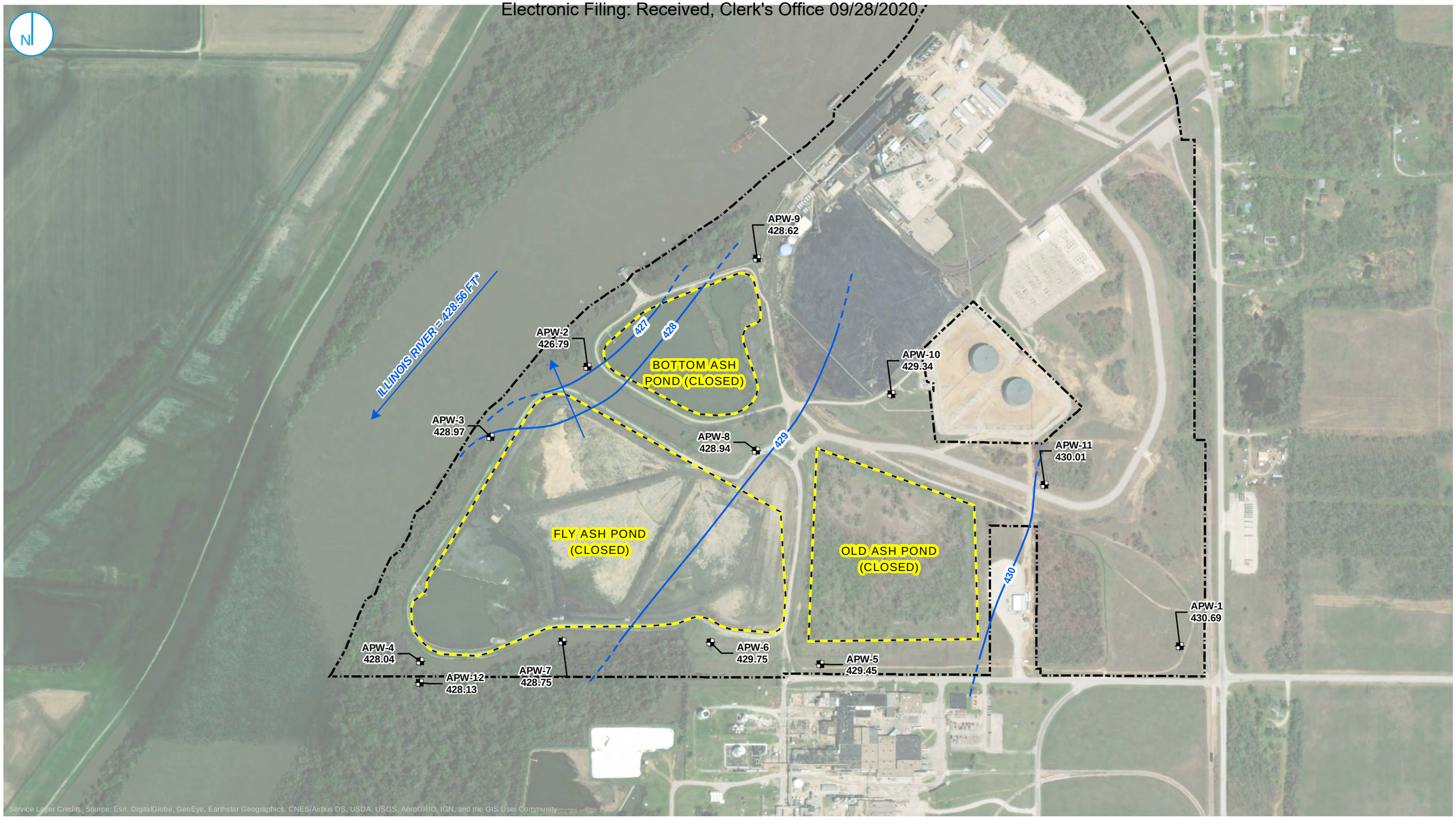
RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\6\67815\mxd\2020\Figure 2-1_MW GWEs_1901.mxd

PROJECT: 72694 | DATED: 3/5/2020 | DESIGNER: GALARNMC



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

0 240 480 Feet

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.

GROUNDWATER ELEVATIONS - JANUARY 29, 2019

2019 ANNUAL REPORT
AMEREN ENERGY RESOURCES MEREDOSIA
POWER STATION
MORGAN COUNTY, ILLINOIS

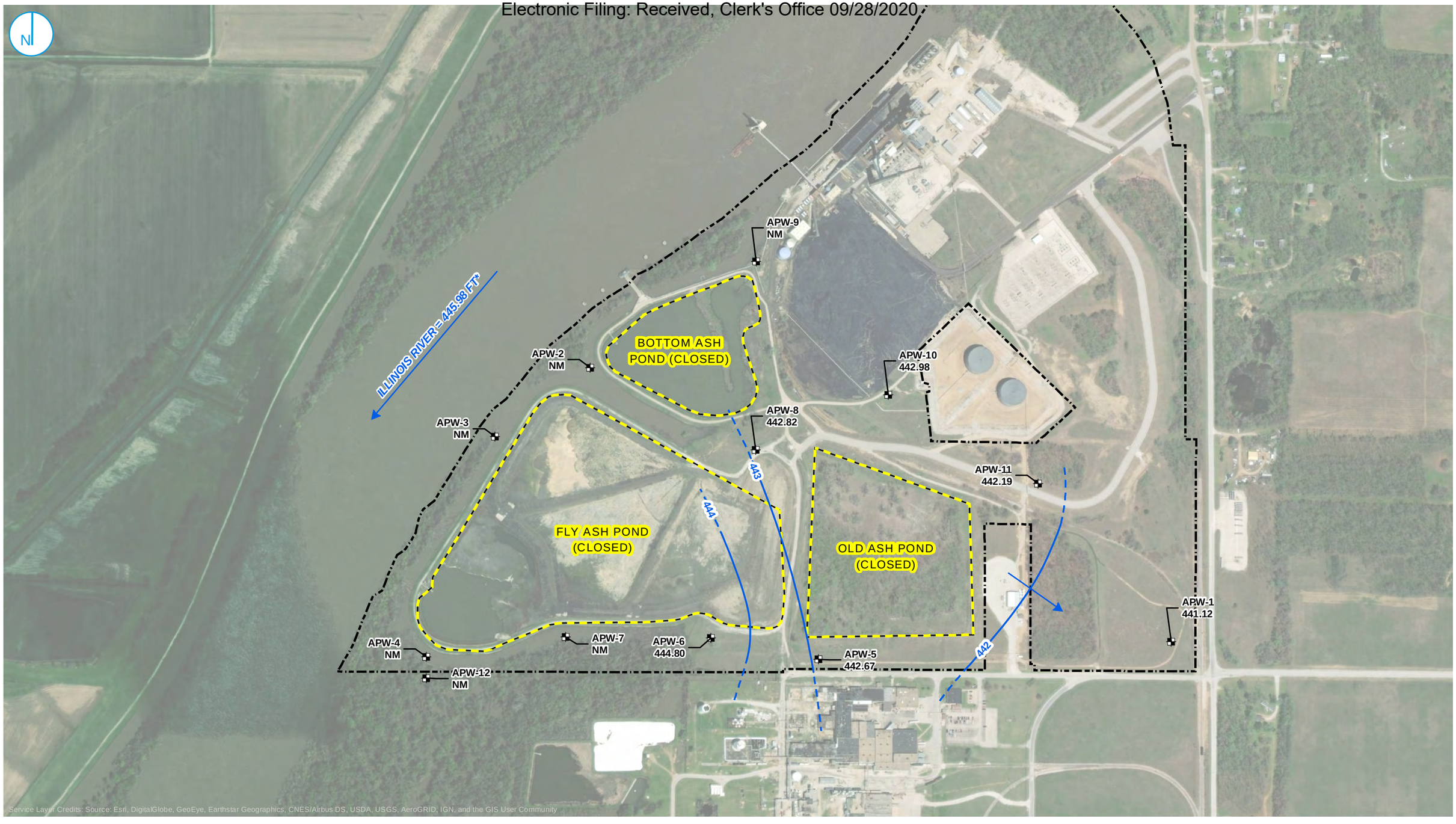
FIGURE 2-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\6\67815\mxd\2020\Figure 2-2_MW GWEs_1906.mxd



PROJECT: 72694 | DATED: 3/5/2020 | DESIGNER: GALARNMC

- MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 240 480 Feet

- APPROXIMATE PROPERTY BOUNDARY
- LIMITS OF CCP MANAGEMENT

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.
NM = Not Measured, surrounding area flooded

GROUNDWATER ELEVATIONS - JUNE 4, 2019

2019 ANNUAL REPORT
AMEREN ENERGY RESOURCES MEREDOSIA
POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 2-2

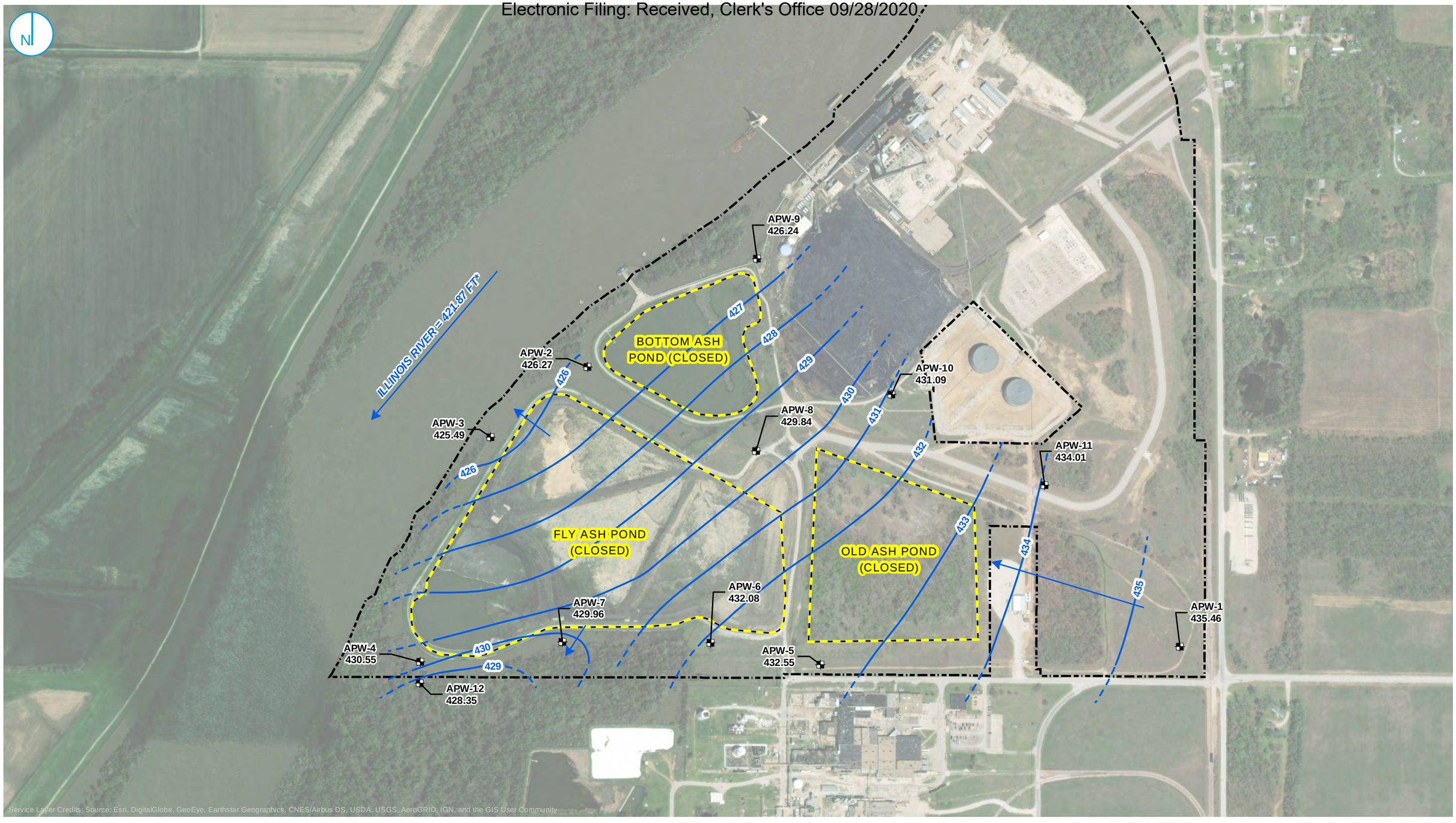
RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\6\67815\mxd\2020\Figure 2-3_MW GWEs_1908.mxd

PROJECT: 72694 | DATED: 3/5/2020 | DESIGNER: GALARNMC



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

0 240 480 Feet

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.

GROUNDWATER ELEVATIONS - AUGUST 26-27, 2019

2019 ANNUAL REPORT
AMEREN ENERGY RESOURCES MEREDOSIA
POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 2-3

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Electronic Filing: Received, Clerk's Office 09/28/2020

Y:\Mapping\Projects\6\67815\mxd\2020\Figure 2-4_MW GWEs_1912.mxd

PROJECT: 72694 | DATED: 3/5/2020 | DESIGNER: GALARNMC

N

ILLINOIS RIVER = 428.28 FT*

APW-9
429.18

APW-2
427.42

APW-3
428.25

APW-8
429.94

APW-10
430.40

APW-11
431.97

APW-1
432.34

APW-4
428.74

APW-12
428.98

APW-7
429.61

APW-6
430.90

APW-5
430.75

BOTTOM ASH POND (CLOSED)

FLY ASH POND (CLOSED)

OLD ASH POND (CLOSED)

428

429

430

431

432

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

0 240 480 Feet

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.

GROUNDWATER ELEVATIONS - DECEMBER 9, 2019

2019 ANNUAL REPORT
AMEREN ENERGY RESOURCES MEREDOSIA
POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 2-4

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

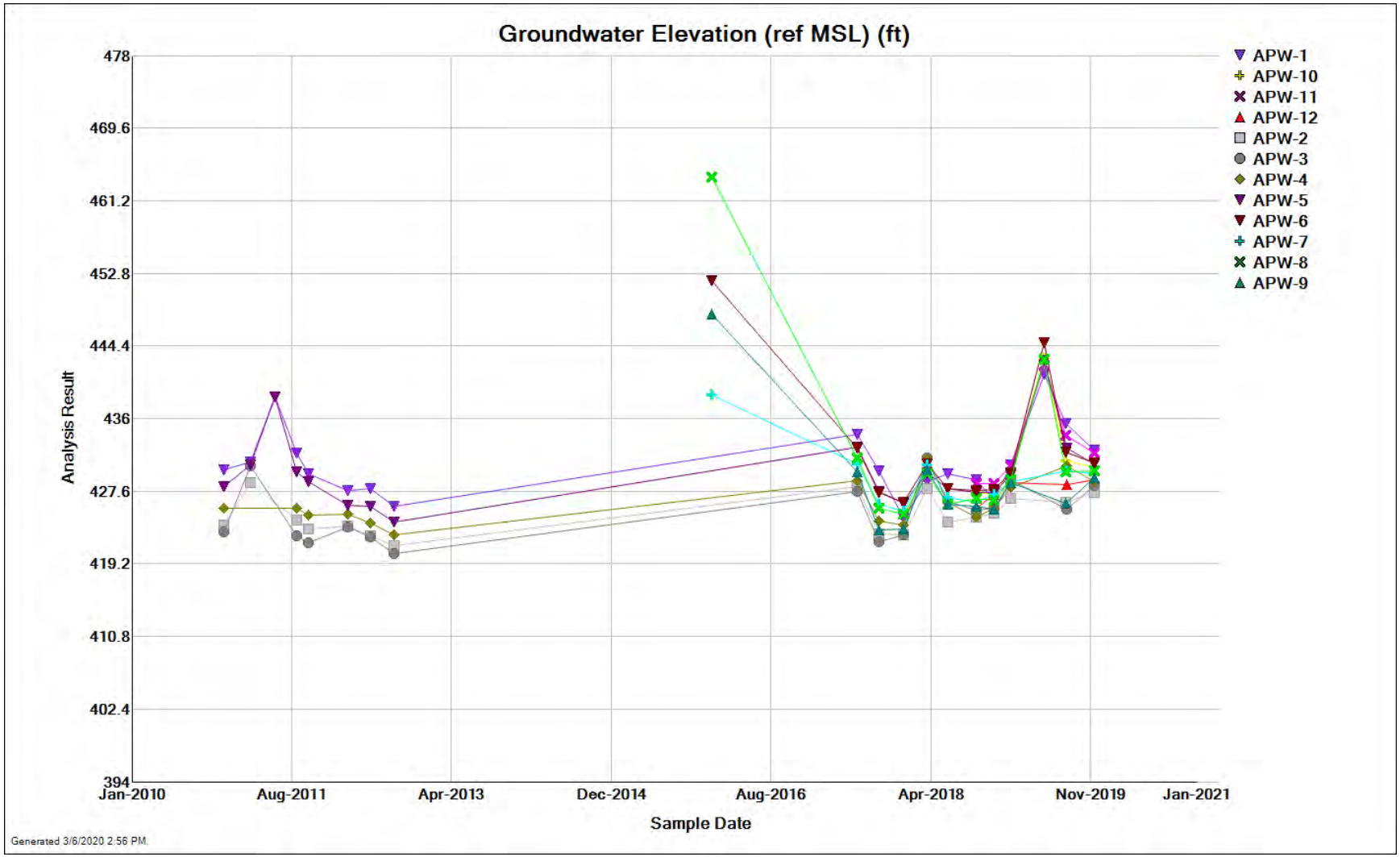


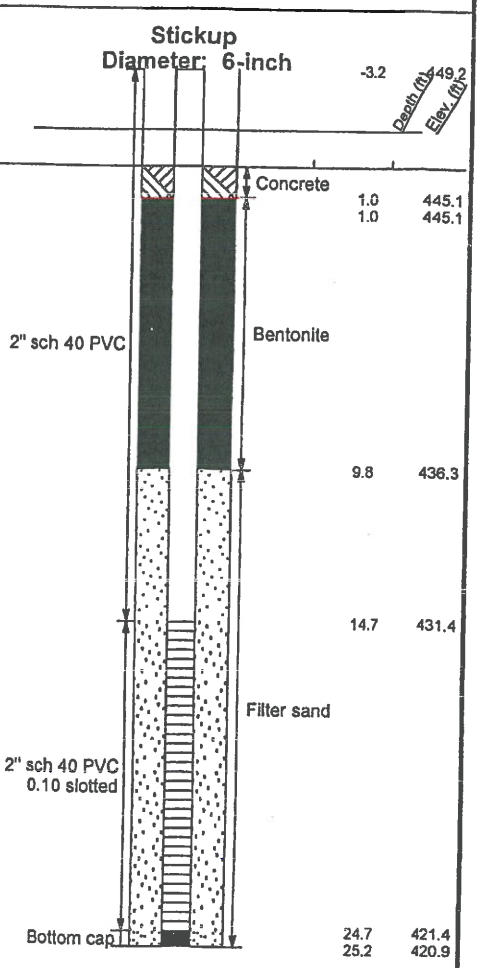
Figure 3-1. Groundwater elevation

APPENDIX A
MONITORING WELL BORING AND CONSTRUCTION LOGS

Surface Elevation: 446.06 | Completion Date: 10/26/10
Datum msl | Northing: 1147018.68 | Easting: 2185605.2

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP		1-1-1	SS1
5			2-2-1	SS2
			2-4-4	SS3
10			3-3-3	SS4
	Loose, brown fine to coarse SAND, trace gravel - SP ▽		1-1-2	SS5
15				
20			1-1-2	SS6
	Loose, brown, fine SAND - SP		0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 1/11/11

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

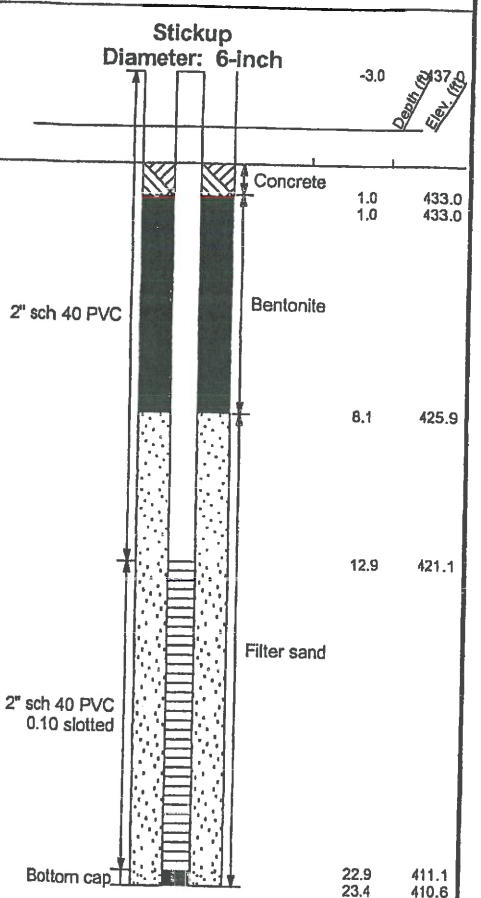
LOG OF BORING: APW-1

Project No. J017150.01

Surface Elevation: 433.97
Datum msl
Completion Date: 10/25/10
Northing: 1148489.69
Easting: 2182485.19

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY, trace sand - CH			
			2-2-2	SS1
5			2-2-2	SS2
			2-2-4	SS3
10			0-2-3	SS4
15			2-2-3	SS5
	Soft, gray, silty CLAY with shells, trace to some sand - CL			
20			0-1-1	SS6
	Very loose, brown, fine to medium SAND - SP			
25	Boring terminated at 25 feet.		0-0-1	SS7
30				
35				

WELL DIAGRAM



GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KGP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-2/MW-2

Project No. J017150.01

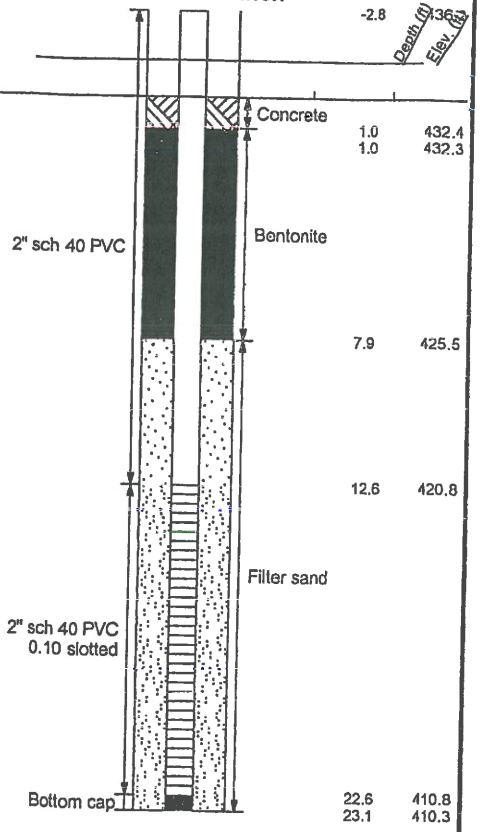
NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 433.35
Datum msl
Completion Date: 10/25/10
Northing: 1148118.6
Easting: 2181973.76

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff, brown and gray CLAY, trace sand and wood - CH			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10				
	Gray, silty CLAY, trace sand - CL		95	ST5
15				
	Soft, gray, silty SAND with shells and silty clay seams - SM			
			0-1-1	SS6
20				
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DK	App'vd. by: RGP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-3/B-10

Project No. J017150.01

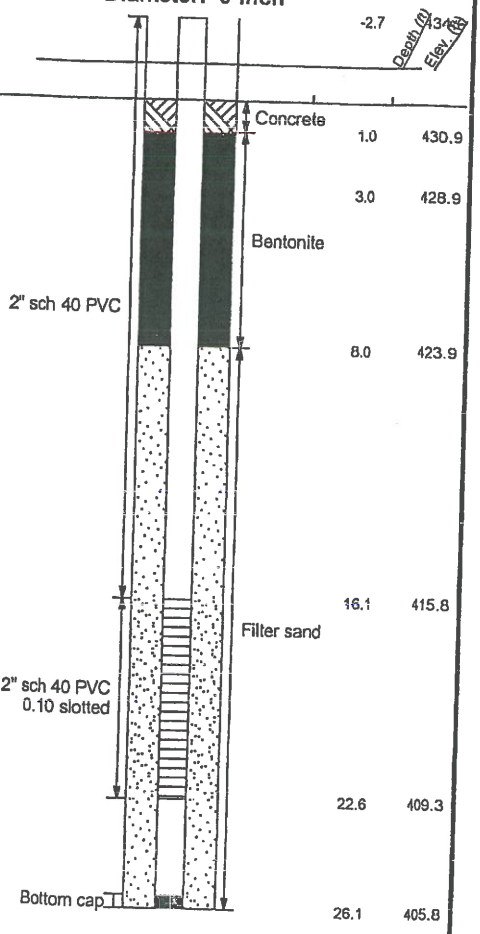
NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 431.90
Datum msl
Completion Date: 10/26/10
Northing: 1146935.94
Easting: 2181602.97

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray CLAY, trace sand and wood - CH			
			0-0-4	SS1
5			2-4-4	SS2
			1-1-1	SS3
10			1-1-2	SS4
	Loose, brown, fine SAND - SP			
15			3-6-7	SS5
			0-2-2	SS6
20				
25	Boring terminated at 25 feet.		0-0-0	SS7
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 11.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DK	App'vd. by: MBE
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-4

Project No. J017150.01

Surface Elevation: 450.48
Datum msl
Completion Date: 10/26/10
Northing: 1146922.64
Easting: 2183711.11

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP		3-3-3	SS1
5			2-2-2	SS2
			1-3-4	SS3
10			2-3-3	SS4
15			2-3-4	SS5
20	Loose, brown, fine to coarse SAND, trace to some gravel - SP		2-1-2	SS6
25			3-3-3	SS7
30	Boring terminated at 30 feet.		1-1-1	SS8
35				

WELL DIAGRAM

Stickup
Diameter: 6-inch

	Depth (ft)	Elev. (ft)
	-2.8	453
Concrete	1.0	449.5
	1.0	449.5
2" sch 40 PVC / Bentonite	14.8	435.7
Filter sand	19.5	431.0
2" sch 40 PVC 0.10 slotted		
Bottom cap	29.5	421.0
	30.3	420.2

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: [illegible]	App'vd. by: [illegible]
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-5

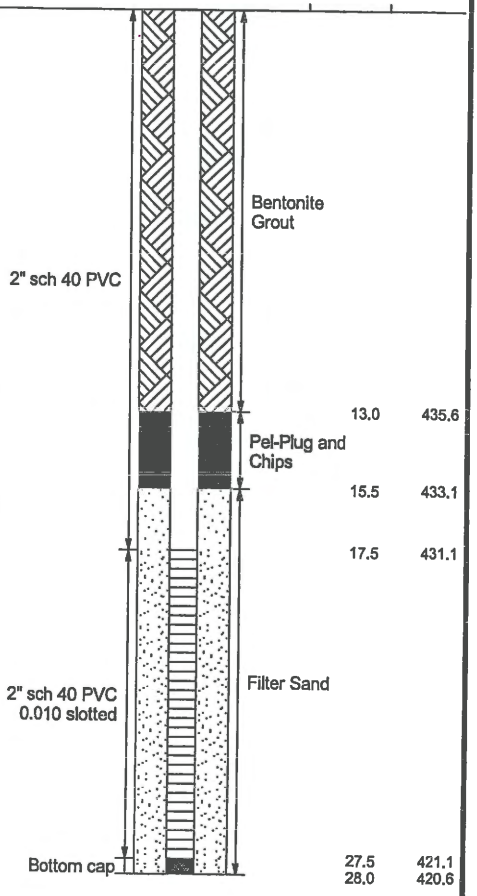
Project No. J017150.01

Surface Elevation: 448.55
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.570556

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained SAND - SP		0-3-4	SS1
			3-4-6	SS2
5			2-3-1	SS3
			2-2-2	SS4
			3-3-5	SS5
10			4-5-6	SS6
			1-3-3	SS7
			1-2-3	SS8
15			4-6-7	SS9
	Brown, medium grained SAND - SP ▽		4-3-4	SS10
20			1-2-2	SS11
	Blind drilled - heaving sands			
25				
	Boring terminated at 28 feet.			
30				
35				

WELL DIAGRAM

Stickup = 3.3 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: [illegible]	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-6

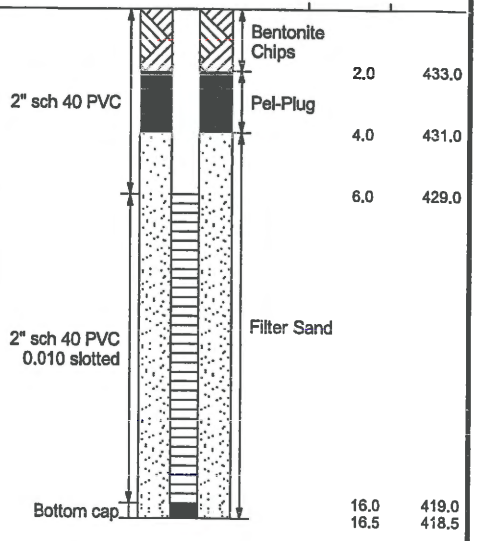
Project No. J024917.01

Surface Elevation: 435.03
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.573333

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Black, silty CLAY - CL		2-4-3	SS1
	Brown, silty CLAY - CL		2-3-4	SS2
5			1-2-1	SS3
	Brown, fine grained SAND - SP		1-1-1	SS4
			0-0-1	SS5
10	Blind drilled - heaving sands			
15				
	Boring terminated at 17 feet.			
20				
25				
30				
35				

WELL DIAGRAM

Stickup = 3.7 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

GROUNDWATER DATA

ENCOUNTERED AT 6 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date: 8/5/16	Date: 8/5-/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-7

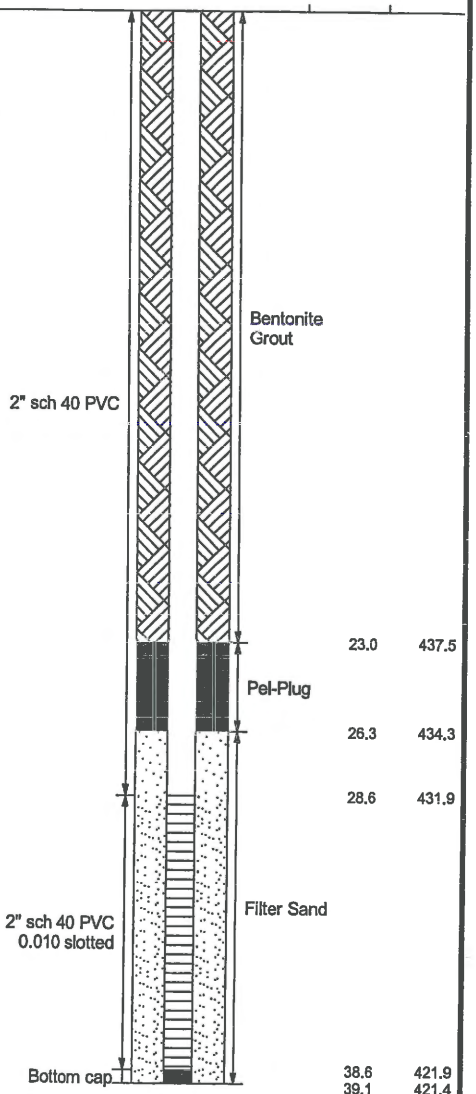
Project No. J024917.01

Surface Elevation: 460.54
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.818611
Longitude: -90.5697222

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Brown, fine grained, poorly graded SAND - SP		3-9-9	SS1
			7-11-12	SS2
5			3-4-5	SS3
			2-3-3	SS4
			2-3-4	SS5
10			2-3-5	SS6
			3-5-9	SS7
15			5-7-7	SS8
			5-7-8	SS9
			5-7-8	SS10
20			9-15-16	SS11
			7-12-13	SS12
25			8-13-14	SS13
			9-10-11	SS14
	Brown, medium grained, poorly graded SAND - SP		6-6-9	SS15
30			5-8-9	SS16
			4-5-6	SS17
	Blind drilled - heaving sands			
35				
40	Boring terminated at 40 feet.			

WELL DIAGRAM

Stickup = 3.4 ft
Diameter: 8 1/2 inch



GROUNDWATER DATA

ENCOUNTERED AT 32 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: [illegible]	App'vd. by: [illegible]
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-8

Project No. J024917.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

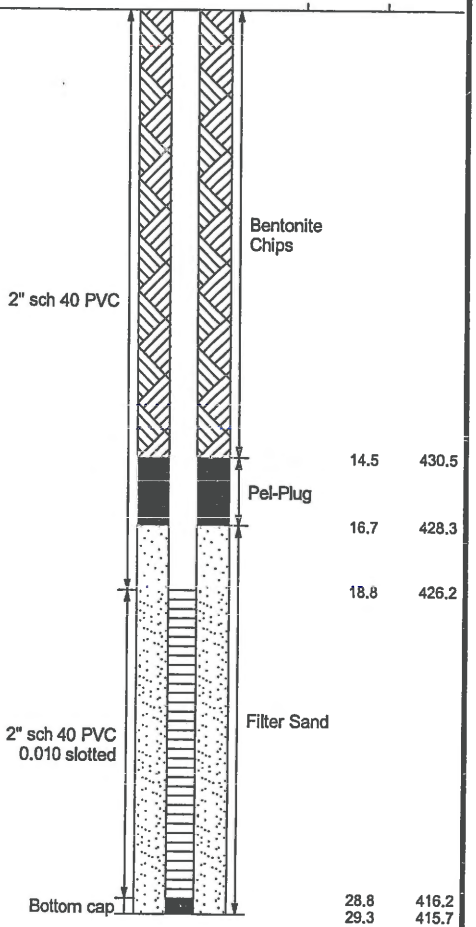
LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/AND

Surface Elevation: 444.97
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.821388
Longitude: -90.569722

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: black, silty sand with coal CCR		4-3-2	SS1
			2-3-3	SS2
5			3-8-8	SS3
			2-4-1	SS4
			2-3-10	SS5
10	Gray SILT - ML		4-3-2	SS6
	Brown, fine grained SAND - SP		5-6-5	SS7
15			3-4-3	SS8
			3-3-4	SS9
	Brown, medium grained SAND - SP		3-3-4	SS10
20	▽		1-2-1	SS11
			2-2-4	SS12
25	Blind drilled - heaving sands			
30	Boring terminated at 30 feet.			
35				

WELL DIAGRAM

Stickup = 3.1 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

GROUNDWATER DATA

ENCOUNTERED AT 20 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:
CCR = Coal Combustion Residuals

Drawn by: AGB	Checked by:	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-9

Project No. J024917.01

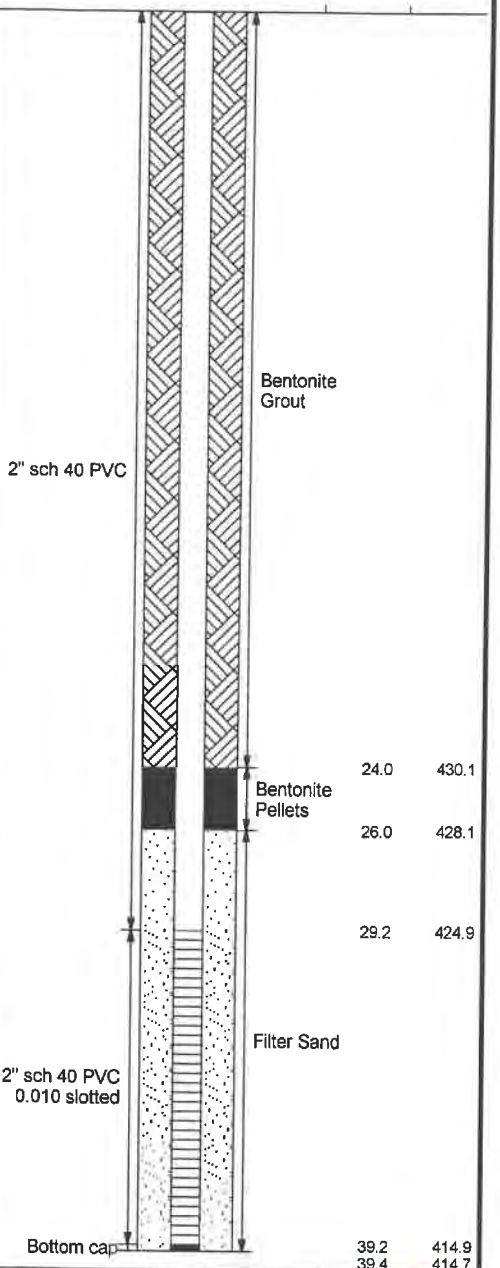
Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 454.1
Datum: NAVD88
Completion Date: 8/20/18
Northing: 1148344.9
Easting: 2184086

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: coal residuals		2-4-3-3	SS1
	Brown, fine SAND - SP		4-5-4-4	SS2
5			3-2-2-1	SS3
	Brown, clayey SAND - SC			
	Brown, fine SAND - SP		2-3-3-4	SS4
			2-3-3-3	SS5
10			2-2-3-3	SS6
			2-5-7-7	SS7
15	Gray, brown, FAT CLAY - CH		3-5-5-5	SS8
	Brown, fine to medium SAND - SP		1-2-3-3	SS9
			2-3-3-3	SS10
20			2-2-3-2	SS11
			3-6-6-4	SS12
25			5-7-8-10	SS13
	Medium to coarse SAND - SW		7-10-7-6	SS14
			5-6-7-5	SS15
30			4-6-9-10	SS16
35				
	Boring terminated at 38.5 feet.			

WELL DIAGRAM

Aboveground = 3.35 feet
Diameter: 8 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

2014 ENVIRO LOG N/E J024917.05 - MEREDOSIA.GPJ 00 CLONE ME.GPJ 1/7/19

GROUNDWATER DATA

ENCOUNTERED AT 27.5 FEET ▽
AT 28.11 FEET AFTER 360 HOURS ▽

DRILLING DATA

4 1/4" HOLLOW STEM FROM 0 TO 38.5 FEET
WASHBORING FROM ___ FEET
TPD DRILLER JYG LOGGER
CME 55LC DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: JYG	App'vd. by: AMS
Date: 12/28/18	Date: 1-7-2019	Date: 1/7/2019

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station

LOG OF BORING: APW-10

Project No. J024917.05

Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 461.89 | Completion Date: 8/22/18
Datum: NAVD88 | Northing: 1147868 | Easting: 2184891

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine SAND - SP		1-2-4-4	SS1
			2-2-2-2	SS2
5			2-2-3-3	SS3
			1-2-3-3	SS4
10			1-2-4-2	SS5
			1-2-4-3	SS6
			2-2-2-2	SS7
15			2-2-3-3	SS8
			2-2-3-5	SS9
			5-4-5-6	SS10
20			4-6-6-4	SS11
	light gray, lean clay seam		2-4-7-11	SS12
			10-12-14 -12	SS13
25			7-9-9-9	SS14
			2-4-2-5	SS15
30			2-4-8-6	SS16
			3-6-6-6	SS17
	Brown, medium to coarse SAND, trace gravel - SW		3-5-6-8	SS18
35			2-4-6-8	SS19

WELL DIAGRAM

Aboveground = 3.50 feet
Diameter: 8 inch

Depth (ft) | Elev. (ft)

2" sch 40 PVC

Bentonite Grout

Bentonite Pellets 30.0 431.9 / 32.0 429.9

Filter Sand 34.3 427.6

2" sch 40 PVC 0.010 slotted

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

2014 ENVIRO LOG W/E J024917.05 - MEREDOSIA.GPJ 00 CLONE ME.GPJ 1/7/19

GROUNDWATER DATA

ENCOUNTERED AT 34 FEET ▽
AT 34.58 FEET AFTER 360 HOURS ▽

DRILLING DATA

4 1/4" HOLLOW STEM FROM 0 TO 44 FEET
WASHBORING FROM ___ FEET
TPD DRILLER JYG LOGGER
CME 55LC DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB | Checked by: JYG | App'vd. by: AMS
Date: 12/28/18 | Date: 1-7-2019 | Date: 1/7/2019

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station

LOG OF BORING: APW-11

Project No. J024917.05

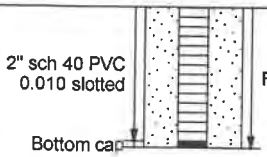
Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 461.89 | Completion Date: 8/22/18
Datum: NAVD88 | Northing: 1147868 | Easting: 2184891

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, medium to coarse SAND, trace gravel - SW *(continued)*			
45	Boring terminated at 44 feet.			

WELL DIAGRAM

Aboveground = 3.50 feet
Diameter: 8 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

GROUNDWATER DATA

ENCOUNTERED AT 34 FEET ▽
AT 34.58 FEET AFTER 360 HOURS ▽

DRILLING DATA

4 1/4" HOLLOW STEM FROM 0 TO 44 FEET
WASHBORING FROM ___ FEET
TPD DRILLER JYG LOGGER
CME 55LC DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: JYG	App'vd. by: AMS
Date: 12/28/18	Date: 1-7-2019	Date: 1/7/2019

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station

CONTINUATION OF LOG OF BORING: APW-11

Project No. J024917.05

2014 ENVIRO LOG N/E J024917.05 - MEREDOSIA.GPJ 00 CLONE ME.GPJ 1/7/19

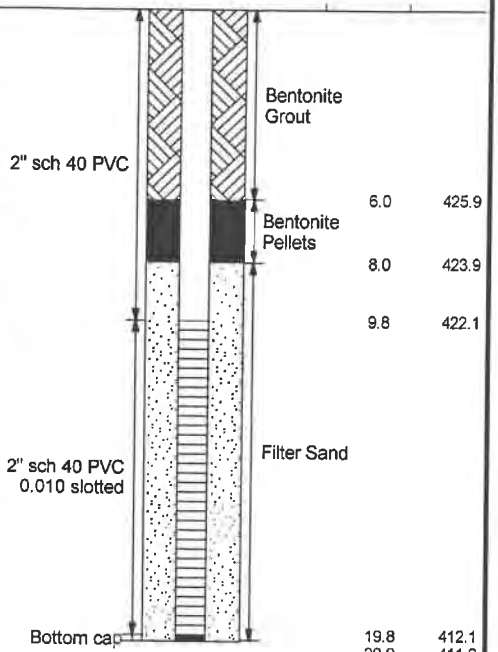
Electronic Filing: Received, Clerk's Office 09/28/2020

Surface Elevation: 431.94
Datum: NAVD88
Completion Date: 8/21/18
Northing: 1146822.6
Easting: 2181602

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Dark brown. LEAN CLAY - CL		1-1-4-3	SS1
			2-2-2-2	SS2
5			3-3-4-4	SS3
	Brown, clayey SAND - SC		3-2-1-2	SS4
	Brown, fine SAND - SP		1-1-3-2	SS5
10	Brown, medium SAND - SW		1-1-2-1	SS6
			1-1-2-2	SS7
15			1-0-1-1	SS8
20	Boring terminated at 20 feet.			
25				
30				
35				

WELL DIAGRAM

Aboveground = 3.62 feet
Diameter: 8 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

2014 ENVIRO LOG N/E J024917.05 - MEREDOSIA.GPJ 00 CLONE ME.GPJ 1/7/19

GROUNDWATER DATA

ENCOUNTERED AT 8 FEET ▽
AT 7.71 FEET AFTER 360 HOURS ▽

DRILLING DATA

4 1/4" HOLLOW STEM FROM 0 TO 20 FEET
WASHBORING FROM ___ FEET
TPD DRILLER JYG LOGGER
CME 55LC DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: JYG	App'vd. by: AMS
Date: 12/28/18	Date: 1-7-2019	Date: 1/7/2019

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station

LOG OF BORING: APW-12

Project No. J024917.05

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency — **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station, Meredosia, Illinois — Well #: APW-6

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 48' 57" Longitude: -90° 34' 14" — Borehole #: APW-6

Surveyed by: Gateway Land Services, Inc. — IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. — Driller: Steven Parker, Geotechnology, Inc.

Consulting Firm: Geotechnology, Inc. — Geologist: Stephanie Kline-Tissi, Geotechnology, Inc.

Drilling Method: Hollow Stem Auger — Drilling Fluid (Type): N/A

Logged By: Stephanie Kline-Tissi, Geotechnology, Inc. — Date Started: Oct. 1, 2015 Date Finished: Oct. 1, 2015

Report Form Completed By: _____ — Date: December 29, 2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Grout

Installation Method: Tremmie

Setting Time: 72 Hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Tremmie

Setting Time: 72 Hours

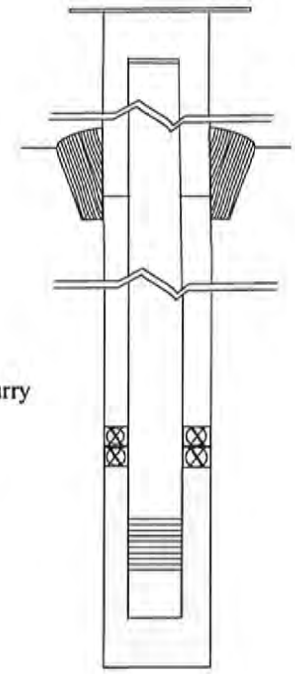
Type of Sand Pack: Silica

Grain Size: 0.010 (Sieve Size)

Installation Method: Tremmie

Type of Backfill Material: N/A (if applicable)

Installation Method: N/A



Elevations (MSL)*	Depths (BGS)	(.01ft.)
452.3	3.7	Top of Protective Casing
451.9	3.3	Top of Riser Pipe
448.6	0.0	Ground Surface
448.6	0.0	Top of Annular Sealant
____	____	Static Water Level (After Completion)
435.6	13.0	Top of Seal
433.1	15.5	Top of Sand Pack
431.1	17.5	Top of Screen
421.1	27.5	Bottom of Screen
420.6	28.0	Bottom of Well
420.6	28.0	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.5"
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	20.6
Bottom of Screen to End Cap (feet)	0.5
Screen Length (1st slot to last slot) (feet)	9.68
Total Length of Casing (feet)	20.6
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) _____ Buried Slab? _____

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven No

e. Hole Diameter (in.) 8.5 to (ft.) 28 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Grout	3		13	0	13
Pel-Plug	1.5		15.5	13	15.5

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Silica	0.010 Unimum	28	15.5

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Oct 1, 2015 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: _____

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ **9.** Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IL 482-0126
Revised 6/09

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

13. Property Owner: Medina Valley Cogen LLC Well # APW-6

14. Driller: Steven Parker License # _____

15. Name of Drilling Company : Geotechnology, Inc. **16.** Permit Number: _____

Date Issued: _____ **17.** Date Drilling Started Oct 1, 2015

18. Well Site Address: 800 SOUTH WASHINGTON STREET

19. Township Name: _____ Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Moran b. Site Elevation _____ ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 39 Minutes 48 Seconds 57 N

Lon: Degrees -90 Minutes 34 Seconds 14 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC, threaded	28	0

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	28	18

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Brown, fine-grained SAND - SP	0	17
Brown, medium-grained SAND - SP	17	22
Blind drilled - heaving sands	22	28

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # _____
Licensed Water Well Contractor Signature

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station, Meredosia, Illinois Well #: APW-7

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 48' 57" Longitude: -90° 34' 24" Borehole #: APW-7

Surveyed by: Gateway Land Services, Inc. IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. Driller: Steven Parker, Geotechnology, Inc.

Consulting Firm: Geotechnology, Inc. Geologist: Stephanie Kline-Tissi, Geotechnology, Inc.

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): N/A

Logged By: Stephanie Kline-Tissi, Geotechnology, Inc. Date Started: Oct. 1, 2015 Date Finished: Oct. 1, 2015

Report Form Completed By: Anna Saindon, Geotechnology, Inc. Date: December 29, 2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: 72 Hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Tremmie

Setting Time: 72 Hours

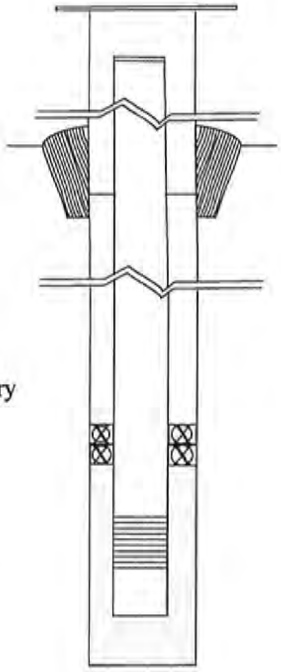
Type of Sand Pack: Silica

Grain Size: 0.010 (Sieve Size)

Installation Method: Tremmie

Type of Backfill Material: N/A (if applicable)

Installation Method: N/A



Elevations (MSL)*	Depths (BGS)	(.01ft.)
439.1	4.1	Top of Protective Casing
438.7	3.7	Top of Riser Pipe
435	0.0	Ground Surface
435	0.0	Top of Annular Sealant
		Static Water Level (After Completion)
433	2.0	Top of Seal
431	4.0	Top of Sand Pack
429	6.0	Top of Screen
419	16.0	Bottom of Screen
418.5	16.5	Bottom of Well
418.5	16.5	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.5"
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	9.7
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.68
Total Length of Casing (feet)	9.7
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) _____ Buried Slab? _____

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven No

e. Hole Diameter (in.) 8.5 to (ft.) 16.5 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Grout	3		2	0	
Pel-Plug	1		4	2	4

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Silica	0.010 Unimum	16.5	14

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Oct 1, 2015 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: _____

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ **9.** Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IL 482-0126
Revised 6/09

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

13. Property Owner: Medina Valley Cogen LLC Well # APW-7

14. Driller: Steven Parker License # _____

15. Name of Drilling Company : Geotechnology, Inc. **16.** Permit Number: _____

Date Issued: _____ **17.** Date Drilling Started Oct 1, 2015

18. Well Site Address: 800 SOUTH WASHINGTON STREET

19. Township Name: _____ Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Moran b. Site Elevation _____ ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 39 Minutes 48 Seconds 57 N

Lon: Degrees -90 Minutes 34 Seconds 14 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC, threaded	16.5	0

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	16.5	6.5

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Black, silty CLAY - CL	0	2
Brown, silty CLAY - CL	2	6
Brown, fine-grained SAND - SP	6	10
Blind drilled - heaving sands	10	16.5

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # _____
Licensed Water Well Contractor Signature

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station, Meredosia, Illinois Well #: APW-8

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 49' 07" Longitude: -90° 34' 11" Borehole #: APW-8

Surveyed by: Gateway Land Services, Inc. IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. Driller: Steven Parker, Geotechnology, Inc.

Consulting Firm: Geotechnology, Inc. Geologist: Stephanie Kline-Tissi, Geotechnology, Inc.

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): N/A

Logged By: Stephanie Kline-Tissi, Geotechnology, Inc. Date Started: Oct. 1, 2015 Date Finished: Oct. 1, 2015

Report Form Completed By: Anna Saindon, Geotechnology, Inc. Date: December 29, 2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Grout

Installation Method: Tremmie

Setting Time: 72 Hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Tremmie

Setting Time: 72 Hours

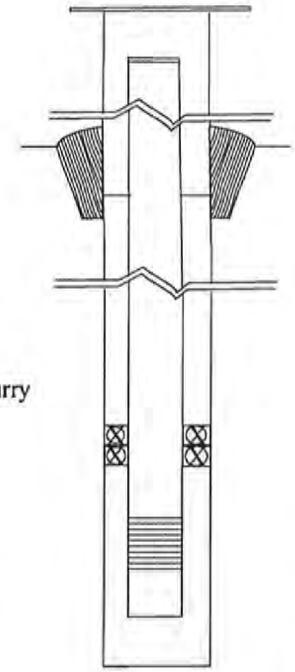
Type of Sand Pack: Silica

Grain Size: 0.010 (Sieve Size)

Installation Method: Tremmie

Type of Backfill Material: N/A (if applicable)

Installation Method: N/A



Elevations (MSL)*	Depths (BGS)	(.01ft.)
464.4	3.9	Top of Protective Casing
463.9	3.4	Top of Riser Pipe
460.5	0.0	Ground Surface
460.5	0.0	Top of Annular Sealant
		Static Water Level (After Completion)
437.5	23	Top of Seal
434.3	26.3	Top of Sand Pack
431.9	28.6	Top of Screen
421.9	38.6	Bottom of Screen
421.4	39.1	Bottom of Well
421.4	39.1	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.5"
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	32.7
Bottom of Screen to End Cap (feet)	0.5
Screen Length (1st slot to last slot) (feet)	9.68
Total Length of Casing (feet)	32.7
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) _____ Buried Slab? _____

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven No

e. Hole Diameter (in.) 8.5 to (ft.) 39.1 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Grout	3		23	0	23
Pel-Plug	1		26.3	23	26.3

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Silica	0.010 Unimum	39.1	23

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Oct 1, 2015 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: _____

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ 9. Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Medina Valley Cogen LLC Well # APW-8

14. Driller: Steven Parker License # _____

15. Name of Drilling Company : Geotechnology, Inc. 16. Permit Number: _____

Date Issued: _____ 17. Date Drilling Started Oct 1, 2015

18. Well Site Address: 800 SOUTH WASHINGTON STREET

19. Township Name: _____ Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Moran b. Site Elevation _____ ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 39 Minutes 48 Seconds 57 N

Lon: Degrees -90 Minutes 34 Seconds 14 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC, threaded	39.1	0

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	39.1	29.1

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Brown, fine-grained, poorly graded SAND -SP	0	23
Brown, medium-grained, poorly graded - SP	23	34
Blind drilled - heaving sands	34	39.1

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # _____
Licensed Water Well Contractor Signature

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station, Meredosia, Illinois Well #: APW-9

State Plane Coordinate: X ____ Y ____ (or) Latitude: 39° 49' 17" Longitude: -90° 34' 11" Borehole #: APW-9

Surveyed by: Gateway Land Services, Inc. IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. Driller: Steven Parker, Geotechnology, Inc.

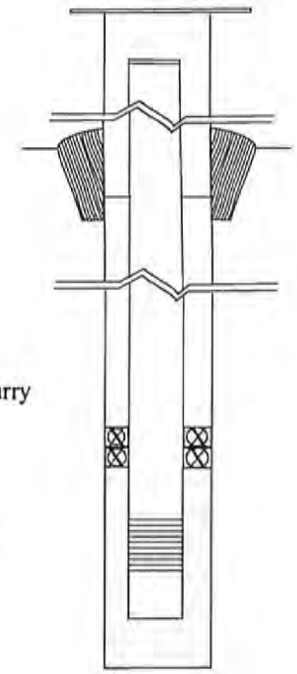
Consulting Firm: Geotechnology, Inc. Geologist: Stephanie Kline-Tissi, Geotechnology, Inc.

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): N/A

Logged By: Stephanie Kline-Tissi, Geotechnology, Inc. Date Started: Oct. 1, 2015 Date Finished: Oct. 1, 2015

Report Form Completed By: Anna Saindon, Geotechnology, Inc. Date: December 29, 2015

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(.01ft.)
448.6	3.6	Top of Protective Casing
448.1	3.1	Top of Riser Pipe
445.0	0.0	Ground Surface
445.0	0.0	Top of Annular Sealant
		Static Water Level (After Completion)
430.5	14.5	Top of Seal
428.3	16.7	Top of Sand Pack
426.2	18.8	Top of Screen
416.2	28.8	Bottom of Screen
415.7	29.3	Bottom of Well
415.7	29.3	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Tremmie

Setting Time: 72 Hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Tremmie

Setting Time: 72 Hours

Type of Sand Pack: Silica

Grain Size: 0.010 (Sieve Size)

Installation Method: Tremmie

Type of Backfill Material: N/A (if applicable)

Installation Method: N/A

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8.5"
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	22.1
Bottom of Screen to End Cap (feet)	0.5
Screen Length (1st slot to last slot) (feet)	9.68
Total Length of Casing (feet)	22.1
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) _____ Buried Slab? _____

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven No

e. Hole Diameter (in.) 8.5 to (ft.) 39.1 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Grout	3		14.5	0	14.5
Pel-Plug	1		16.7	14.5	16.7

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Silica	0.010 Unimum	29.3	16.7

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Oct 1, 2015 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: _____

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ **9.** Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IL 482-0126
Revised 6/09

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

13. Property Owner: Medina Valley Cogen LLC Well # APW-9

14. Driller: Steven Parker License # _____

15. Name of Drilling Company : Geotechnology, Inc. **16.** Permit Number: _____

Date Issued: _____ **17.** Date Drilling Started Oct 1, 2015

18. Well Site Address: 800 SOUTH WASHINGTON STREET

19. Township Name: _____ Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Moran b. Site Elevation _____ ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 39 Minutes 48 Seconds 57 N

Lon: Degrees -90 Minutes 34 Seconds 14 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC, threaded	29.3	0

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	29.3	19.3

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
FILL: black, silty sand with coal CCR	0	10
Gray SILT - ML	10	12.7
Brown, fine-grained SAND - SP	12.7	18
Brown, medium-grained SAND - SP	18	24
Blind drilled - heaving sands	24	29.3

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # _____
Licensed Water Well Contractor Signature

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station Well #: APW-10

State Plane Coordinate: X 2184086.395 Y 1148344.943 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___ Borehole #: _____

Surveyed by: David Mason & Associates IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. Driller: Thomas Dwyer

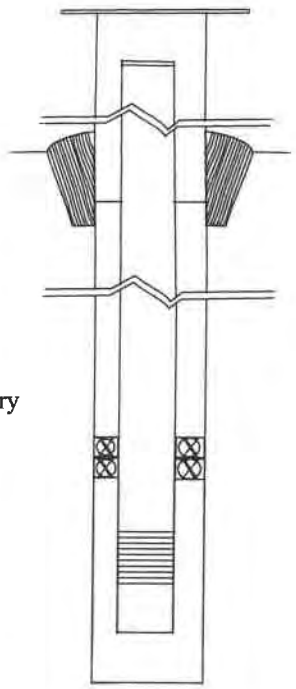
Consulting Firm: Geotechnology, Inc. Geologist: Anna Saindon

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): None

Logged By: Jessie Goodwin Date Started: 8/20/2018 Date Finished: 8/20/2018

Report Form Completed By: Jessie Goodwin Date: 12/26/2018

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Grout Slurry

Installation Method: Tremie

Setting Time: N/A

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Gravity

Setting Time: N/A

Type of Sand Pack: Silica

Grain Size: 10-20 Mesh (Sieve Size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: _____

	Elevations (MSL)*	Depths (BGS)	(.01ft.)
Top of Protective Casing	457.93	-3.83	
Top of Riser Pipe	457.45	-3.35	
Ground Surface	454.10	0.00	
Top of Annular Sealant	453.60	0.50	
Static Water Level (After Completion)	425.99	28.11	
Top of Seal	430.10	24.00	
Top of Sand Pack	428.10	26.00	
Top of Screen	424.90	29.20	
Bottom of Screen	414.90	39.20	
Bottom of Well	414.70	39.40	
Bottom of Borehole	414.70	39.40	

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8
ID of Riser Pipe (inches)	2.0
Protective Casing Length (feet)	5.0
Riser Pipe Length (feet)	32.55
Bottom of Screen to End Cap (feet)	0.40
Screen Length (1st slot to last slot) (feet)	10.0
Total Length of Casing (feet)	42.75
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station Well #: APW-11

State Plane Coordinate: X 2184890.914 Y 1147868.023 (or) Latitude: ____ ____ ____ Longitude: ____ ____ ____ Borehole #: _____

Surveyed by: David Mason & Associates IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. Driller: Thomas Dwyer

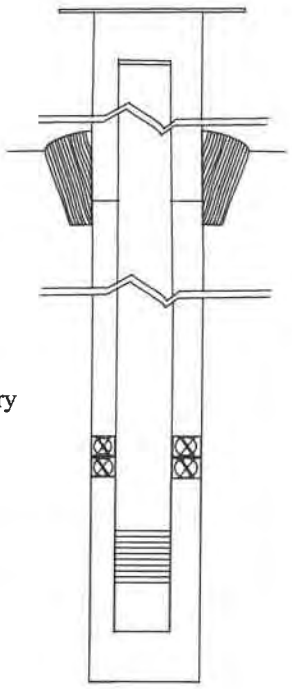
Consulting Firm: Geotechnology, Inc. Geologist: Anna Saindon

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): None

Logged By: Jessie Goodwin Date Started: 8/22/2018 Date Finished: 8/22/2018

Report Form Completed By: Jessie Goodwin Date: 12/26/2018

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(.01ft.)
465.94	-4.05	Top of Protective Casing
465.40	-3.51	Top of Riser Pipe
461.89	0.00	Ground Surface
461.39	0.50	Top of Annular Sealant
427.31	34.58	Static Water Level (After Completion)
431.89	30.00	Top of Seal
429.89	32.00	Top of Sand Pack
427.64	34.25	Top of Screen
417.64	44.25	Bottom of Screen
417.44	44.45	Bottom of Well
417.44	44.45	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Grout Slurry

Installation Method: Tremie

Setting Time: N/A

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Gravity

Setting Time: N/A

Type of Sand Pack: Silica

Grain Size: 10-20 Mesh (Sieve Size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: _____

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8
ID of Riser Pipe (inches)	2.0
Protective Casing Length (feet)	5.0
Riser Pipe Length (feet)	37.76
Bottom of Screen to End Cap (feet)	0.40
Screen Length (1st slot to last slot) (feet)	10.0
Total Length of Casing (feet)	47.96
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: Morgan

Site Name: Meredosia Power Station Well #: APW-12

State Plane Coordinate: X 2181601.52 Y 1146822.618 (or) Latitude: ____ ____ ____ Longitude: ____ ____ ____ Borehole #: _____

Surveyed by: David Mason & Associates IL Registration #: _____

Drilling Contractor: Geotechnology, Inc. Driller: Thomas Dwyer

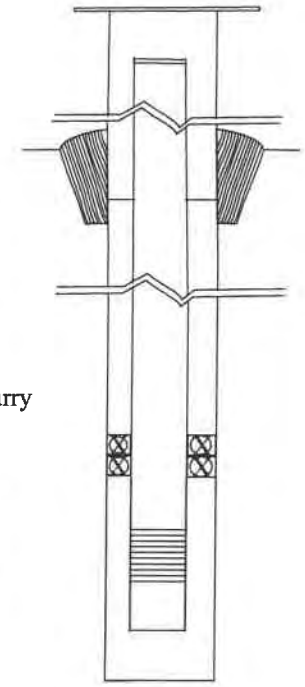
Consulting Firm: Geotechnology, Inc. Geologist: Anna Saindon

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): None

Logged By: Jessie Goodwin Date Started: 8/21/2018 Date Finished: 8/21/2018

Report Form Completed By: Jessie Goodwin Date: 12/26/2018

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(.01ft.)
436.02	-4.08	Top of Protective Casing
435.52	-3.58	Top of Riser Pipe
431.94	0.00	Ground Surface
431.44	0.50	Top of Annular Sealant
424.23	7.71	Static Water Level (After Completion)
425.94	6.00	Top of Seal
493.94	8.00	Top of Sand Pack
422.10	9.84	Top of Screen
412.10	19.84	Bottom of Screen
411.90	20.04	Bottom of Well
411.90	20.04	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Grout Slurry

Installation Method: Tremie

Setting Time: N/A

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Gravity

Setting Time: N/A

Type of Sand Pack: Silica

Grain Size: 10-20 Mesh (Sieve Size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: _____

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	8
ID of Riser Pipe (inches)	2.0
Protective Casing Length (feet)	5.0
Riser Pipe Length (feet)	13.42
Bottom of Screen to End Cap (feet)	0.40
Screen Length (1st slot to last slot) (feet)	10.0
Total Length of Casing (feet)	23.62
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Electronic Filing: Received, Clerk's Office 09/28/2020

APPENDIX B
2019 GROUNDWATER MONITORING RESULTS

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-1

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
As, tot, mg/L	0.0019	<0.0010	0.0011	0.0010	
B, diss, mg/L	0.0730	0.0486	0.0559	0.0679	
B, tot, mg/L	0.0787	0.0644	0.0629	0.0692	
Ba, diss, mg/L	0.0120	0.0142	0.0122	0.0075	
Ba, tot, mg/L	0.0221	0.0171	0.0181	0.0125	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	28.0	26.0	27.0	11.0	
CN, total, mg/L	<0.005	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.15	0.16	0.14	0.18	
Fe, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Fe, tot, mg/L	2.3600	0.8820	1.3000	1.3000	
GW Elv, ft	430.69	441.12	435.46	432.34	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	<0.0070	<0.0070	<0.0070	
Mn, tot, mg/L	0.2010	0.0884	0.1050	0.0947	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	0.0081	<0.0050	0.0058	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	<0.05	
NO3, diss, mg/L	4.060	4.150	3.340	3.890	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	0.0030	0.0011	0.0015	0.0015	
pH (field), STD	6.86	6.87	6.63	7.04	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	

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Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-1

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	13	17	11	15	
Spec. Cond. (field), micromho	326	378	326	248	
TDS, mg/L	202	200	168		130
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	0.0162	
Zn, tot, mg/L	0.0100	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-2

	1/29/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	0.0036	0.0032	
As, tot, mg/L	0.0026	0.0036	0.0042	
B, diss, mg/L	1.9100	2.2100	2.0200	
B, tot, mg/L	2.1100	2.2600	2.1500	
Ba, diss, mg/L	0.0626	0.0574	0.0552	
Ba, tot, mg/L	0.0902	0.0659	0.0631	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	19.0	25.0	20.0	
CN, total, mg/L	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.24	0.26	0.26	
Fe, diss, mg/L	0.7400	0.3400	0.1180	
Fe, tot, mg/L	3.4100	1.0700	0.8540	
GW Elv, ft	426.79	426.27	427.42	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	0.2700	0.5090	0.3700	
Mn, tot, mg/L	0.5000	0.5120	0.4080	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	
NO3, diss, mg/L	<0.050	0.077	<0.050	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	
pH (field), STD	6.66	6.95	6.85	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-2

	1/29/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	49	26	24	
Spec. Cond. (field), micromho	866	904	815	
TDS, mg/L	542	526		508
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-3

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	
As, diss, mg/L	0.1900	0.2040	0.1850	
As, tot, mg/L	0.2150	0.2310	0.2310	
B, diss, mg/L	19.5000	14.9000	15.8000	
B, tot, mg/L	21.4000	15.4000	16.6000	
Ba, diss, mg/L	0.0686	0.0764	0.0370	
Ba, tot, mg/L	0.0847	0.0978	0.0845	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	20.0	29.0	28.0	
CN, total, mg/L	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.23	0.21	0.20	
Fe, diss, mg/L	1.9800	2.6200	<0.0400	
Fe, tot, mg/L	2.7500	3.8500	3.2500	
GW Elv, ft	428.97	425.49	428.25	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	0.6990	0.6130	0.7040	
Mn, tot, mg/L	0.7620	0.6910	0.7830	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	
NO3, diss, mg/L	<0.050	<0.050	<0.050	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	
pH (field), STD	7.41	7.51	7.45	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-3

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	141	68	65	
Spec. Cond. (field), micromho	993	949	985	
TDS, mg/L	716	598		604
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	

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Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-4

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	
As, diss, mg/L	0.0203	0.0265	0.0128	
As, tot, mg/L	0.0198	0.0278	0.0187	
B, diss, mg/L	1.4700	1.0200	1.1300	
B, tot, mg/L	1.6100	0.9950	1.2700	
Ba, diss, mg/L	0.0432	0.0382	0.0202	
Ba, tot, mg/L	0.0502	0.0612	0.0496	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	23.0	42.0	36.0	
CN, total, mg/L	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.40	0.44	0.43	
Fe, diss, mg/L	11.3000	9.4800	4.9300	
Fe, tot, mg/L	12.4000	14.7000	11.4000	
GW Elv, ft	428.04	430.55	428.74	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	2.1200	1.4300	1.8000	
Mn, tot, mg/L	2.2800	1.6100	1.9400	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	0.0051	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	
NO3, diss, mg/L	<0.050	<0.050	<0.050	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	0.0022	<0.0010	
pH (field), STD	6.82	6.91	6.89	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-4

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	37	20	27	
Spec. Cond. (field), micromho	869	746	816	
TDS, mg/L	558	402		468
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	0.0132	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-5

	1/29/2019	6/4/2019	8/27/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
As, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
B, diss, mg/L	0.1060	0.0912	0.0897	0.0856	
B, tot, mg/L	0.1190	0.1070	0.0950	0.0893	
Ba, diss, mg/L	0.0091	0.0108	0.0066	0.0079	
Ba, tot, mg/L	0.0109	0.0118	0.0075	0.0090	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	8.0	22.0	5.0	<5.0	
CN, total, mg/L	<0.005	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	<0.10	0.12	0.10	0.11	
Fe, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Fe, tot, mg/L	0.2730	0.2140	0.1600	0.2610	
GW Elv, ft	429.45	442.67	432.55	430.75	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	<0.0070	<0.0070	<0.0070	
Mn, tot, mg/L	0.0336	0.0312	0.0202	0.0259	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	<0.05	
NO3, diss, mg/L	2.290	1.070	1.580	1.870	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
pH (field), STD	7.20	7.19	7.17	7.41	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-5

	1/29/2019	6/4/2019	8/27/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	70	25	19	48	
Spec. Cond. (field), micromho	535	707	454	513	
TDS, mg/L	330	382	224		282
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-6

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
As, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
B, diss, mg/L	0.5280	0.5500	1.0600	1.4000	
B, tot, mg/L	0.5680	0.5510	1.1100	1.4300	
Ba, diss, mg/L	0.0157	0.0198	0.0188	0.0152	
Ba, tot, mg/L	0.0179	0.0211	0.0214	0.0162	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	8.0	25.0	8.0	8.0	
CN, total, mg/L	<0.005	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.15	0.17	0.13	0.15	
Fe, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Fe, tot, mg/L	0.0735	0.3100	0.0744	0.1520	
GW Elv, ft	429.75	444.80	432.08	430.90	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	<0.0070	<0.0070	<0.0070	
Mn, tot, mg/L	<0.0070	0.0220	<0.0070	0.0071	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	<0.05	
NO3, diss, mg/L	0.442	0.824	0.184	2.130	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
pH (field), STD	7.09	7.13	7.05	7.27	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-6

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	23	15	24	15	
Spec. Cond. (field), micromho	568	729	650	557	
TDS, mg/L	356	398	354		256
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-7

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	<0.0010	<0.0010	
As, tot, mg/L	<0.0010	<0.0010	<0.0010	
B, diss, mg/L	0.2540	0.1330	0.1680	
B, tot, mg/L	0.2950	0.1400	0.1780	
Ba, diss, mg/L	0.0295	0.0373	0.0337	
Ba, tot, mg/L	0.0343	0.0405	0.0356	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	40.0	39.0	39.0	
CN, total, mg/L	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.20	0.31	0.24	
Fe, diss, mg/L	<0.0400	0.0486	<0.0400	
Fe, tot, mg/L	0.2490	0.0982	0.0540	
GW Elv, ft	428.75	429.96	429.61	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	0.1130	0.0730	
Mn, tot, mg/L	0.0098	0.1240	0.1010	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	
NO3, diss, mg/L	4.400	<0.050	0.055	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	
pH (field), STD	6.75	7.08	7.01	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-7

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	41	24	17	
Spec. Cond. (field), micromho	779	641	694	
TDS, mg/L	464	330		370
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-8

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	<0.007	
As, diss, mg/L	0.0013	0.0012	0.0012	0.0013	
As, tot, mg/L	0.0015	0.0015	0.0018	0.0301	
B, diss, mg/L	7.9400	7.5300	6.7600	7.6300	
B, tot, mg/L	8.6100	7.7200	7.1200	8.0200	
Ba, diss, mg/L	0.0692	0.0662	0.0696	0.0629	
Ba, tot, mg/L	0.0753	0.0680	0.0784	0.1850	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	0.0009	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	<5.0	5.0	10.0	18.0	
CN, total, mg/L	<0.005	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	0.0771	
Cr, diss, mg/L	0.0126	0.0117	0.0085	0.0117	
Cr, tot, mg/L	0.0142	0.0124	0.0102	0.0438	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	0.0815	
F, diss, mg/L	0.11	0.15	0.15	0.19	
Fe, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Fe, tot, mg/L	0.1420	0.1350	0.9010	41.7000	
GW Elv, ft	428.94	442.82	429.84	429.94	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	<0.0070	<0.0070	<0.0070	
Mn, tot, mg/L	0.0151	0.0140	0.0556	2.7100	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	0.1200	
NO2, diss, mg/L	<0.05	<0.05	<0.05	<0.05	
NO3, diss, mg/L	3.860	3.890	4.070	5.390	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	0.0016	0.0484	
pH (field), STD	7.23	7.36	7.36	7.56	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-8

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	0.0011	0.0057	
Se, diss, mg/L	0.0809	0.0524	0.0616	0.0839	
Se, tot, mg/L	0.0822	0.0517	0.0672	0.0815	
SO4, diss, mg/L	304	249	367	389	
Spec. Cond. (field), micromho	888	891	1110	1140	
TDS, mg/L	678	600	766		760
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	0.0522	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	0.1450	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-9

	1/29/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	
As, diss, mg/L	0.0012	0.0012	0.0013	
As, tot, mg/L	0.0018	0.0015	0.0017	
B, diss, mg/L	0.6460	1.3000	1.2600	
B, tot, mg/L	0.6680	1.3400	1.3600	
Ba, diss, mg/L	0.0190	0.0348	0.0339	
Ba, tot, mg/L	0.0224	0.0371	0.0380	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	22.0	19.0	43.0	
CN, total, mg/L	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	0.0052	
Co, tot, mg/L	<0.0050	<0.0050	0.0068	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.31	0.22	0.24	
Fe, diss, mg/L	<0.0400	0.0565	<0.0400	
Fe, tot, mg/L	0.3320	0.3590	0.4460	
GW Elv, ft	428.62	426.24	429.18	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	0.0080	<0.0070	
Mn, tot, mg/L	0.0316	0.0291	0.0378	
Ni, diss, mg/L	<0.0050	<0.0050	0.0119	
Ni, tot, mg/L	<0.0050	0.0059	0.0138	
NO2, diss, mg/L	<0.05	<0.05	<0.05	
NO3, diss, mg/L	2.580	3.970	3.140	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	
pH (field), STD	7.02	6.79	7.00	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-9

	1/29/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	229	468	600	
Spec. Cond. (field), micromho	988	1520	1520	
TDS, mg/L	722	1130		1330
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-10

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	<0.007	
As, diss, mg/L	0.0019	0.0014	0.0015	0.0016	
As, tot, mg/L	0.0036	0.0023	0.0025	0.0025	
B, diss, mg/L	1.1000	1.0200	0.8210	0.8190	
B, tot, mg/L	1.2000	1.0400	0.8890	0.8790	
Ba, diss, mg/L	0.0217	0.0189	0.0158	0.0156	
Ba, tot, mg/L	0.0261	0.0221	0.0199	0.0200	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	<5.0	<5.0	<5.0	<5.0	
CN, total, mg/L	<0.005	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	0.0063	<0.0050	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	<0.10	<0.10	<0.10	<0.10	
Fe, diss, mg/L	0.5350	<0.0400	<0.0400	<0.0400	
Fe, tot, mg/L	2.1500	1.0600	1.0400	1.0700	
GW Elv, ft	429.79	442.98	431.09	430.40	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	0.0452	<0.0070	<0.0070	<0.0070	
Mn, tot, mg/L	0.1640	0.0985	0.0773	0.0722	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	0.0067	<0.0050	<0.0050	<0.0050	
NO2, diss, mg/L	<0.05	<0.05	<0.05	<0.05	
NO3, diss, mg/L	4.300	3.030	2.500	3.800	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	0.0028	0.0018	0.0013	0.0013	
pH (field), STD	7.44	7.55	7.61	7.74	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-10

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	63	58	46	49	
Spec. Cond. (field), micromho	482	539	479	445	
TDS, mg/L	336	304	256		264
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-11

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
As, tot, mg/L	0.0012	0.0010	0.0011	0.0371	
B, diss, mg/L	2.0600	0.4960	1.8800	2.6600	
B, tot, mg/L	2.3000	0.5270	2.0600	2.9000	
Ba, diss, mg/L	0.0147	0.0130	0.0132	0.0115	
Ba, tot, mg/L	0.0181	0.0147	0.0161	0.0970	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	0.0014	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	<5.0	<5.0	<5.0	<5.0	
CN, total, mg/L	<0.005	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	<0.0050	<0.0050	<0.0050	0.0860	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	0.0465	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	0.1070	
F, diss, mg/L	<0.10	0.13	<0.10	<0.10	
Fe, diss, mg/L	<0.0400	0.1440	<0.0400	<0.0400	
Fe, tot, mg/L	0.6330	0.5680	0.8710	56.8000	
GW Elv, ft	430.55	442.19	434.01	431.97	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	<0.0070	0.0900	<0.0070	<0.0070	
Mn, tot, mg/L	0.0572	0.2260	0.1820	3.6900	
Ni, diss, mg/L	<0.0050	<0.0050	<0.0050	<0.0050	
Ni, tot, mg/L	<0.0050	<0.0050	<0.0050	0.1520	
NO2, diss, mg/L	<0.05	<0.05	<0.05	<0.05	
NO3, diss, mg/L	3.140	1.870	2.590	2.470	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	<0.0010	<0.0010	<0.0010	0.0605	
pH (field), STD	7.37	7.50	7.42	7.48	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-11

	1/29/2019	6/4/2019	8/26/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	0.0026	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	74	19	48	80	
Spec. Cond. (field), micromho	558	412	568	622	
TDS, mg/L	362	238	304		406
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	0.0790	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	0.1890	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-12

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Ag, diss, mg/L	<0.007	<0.007	<0.007	
Ag, tot, mg/L	<0.007	<0.007	<0.007	
As, diss, mg/L	<0.0010	<0.0010	<0.0010	
As, tot, mg/L	0.0029	0.0013	0.0011	
B, diss, mg/L	0.2410	0.1370	0.1310	
B, tot, mg/L	0.2540	0.1610	0.1270	
Ba, diss, mg/L	0.2460	0.1190	0.1680	
Ba, tot, mg/L	0.2850	0.1210	0.1840	
Be, diss, mg/L	<0.0005	<0.0005	<0.0005	
Be, tot, mg/L	<0.0005	<0.0005	<0.0005	
Cd, diss, mg/L	<0.0020	<0.0020	<0.0020	
Cd,tot, mg/L	<0.0020	<0.0020	<0.0020	
Cl, diss, mg/L	75.0	39.0	44.0	
CN, total, mg/L	<0.005	<0.005	<0.005	
Co, diss, mg/L	<0.0050	<0.0050	<0.0050	
Co, tot, mg/L	0.0054	<0.0050	<0.0050	
Cr, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cr, tot, mg/L	<0.0050	<0.0050	<0.0050	
Cu, diss, mg/L	<0.0050	<0.0050	<0.0050	
Cu, tot, mg/L	<0.0050	<0.0050	<0.0050	
F, diss, mg/L	0.25	0.40	0.33	
Fe, diss, mg/L	<0.0400	<0.0400	<0.0400	
Fe, tot, mg/L	2.2000	0.7910	0.6220	
GW Elv, ft	428.61	428.35	428.98	
Hg, diss, mg/L	<0.0002	<0.0002	<0.0002	
Hg, tot, mg/L	<0.0002	<0.0002	<0.0002	
Mn, diss, mg/L	1.1200	1.0000	1.1800	
Mn, tot, mg/L	1.3800	1.1100	1.3500	
Ni, diss, mg/L	<0.0050	0.0058	0.0085	
Ni, tot, mg/L	0.0129	0.0086	0.0099	
NO2, diss, mg/L	<0.05	<0.05	<0.05	
NO3, diss, mg/L	5.500	<0.050	0.107	
Pb, diss, mg/L	<0.0010	<0.0010	<0.0010	
Pb, tot, mg/L	0.0023	<0.0010	<0.0010	
pH (field), STD	6.73	7.02	7.00	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	

Meredosia Power Station
2019 Groundwater Monitoring Results

Date Range: 01/01/2019 to 12/31/2019
Well: APW-12

	1/29/2019	8/27/2019	12/9/2019	12/20/2019
Sb, tot, mg/L	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.0400	<0.0400	<0.0400	
Se, tot, mg/L	<0.0400	<0.0400	<0.0400	
SO4, diss, mg/L	96	25	70	
Spec. Cond. (field), micromho	1138	640	853	
TDS, mg/L	730	326		516
Tl, diss, mg/L	<0.0020	<0.0020	<0.0020	
Tl, tot, mg/L	<0.0020	<0.0020	<0.0020	
V, diss, mg/L	<0.0100	<0.0100	<0.0100	
V, tot, mg/L	<0.0100	<0.0100	<0.0100	
Zn, diss, mg/L	<0.0100	<0.0100	<0.0100	
Zn, tot, mg/L	<0.0100	<0.0100	<0.0100	

APPENDIX C
SITE INSPECTION REPORTS

Inspection Form for Closed Ponds at Ameren Facilities

Projcet Name: Quarterly Ash Pond Cap Inspection

Location: Meredosia Power Plant

System Description: Fly Ash Pond
Bottom Ash Embankment

Engineer/Inspectors: Mike Wagstaff

Inspection Date: 3/29/2019
Temperature: 40's
Weather: cloudy

River Level 436.3'
at Meredosia
Gage 0' = 418.00' MSL
Bottom Ash Pond bottom
is at 430.00' MSL

Owner Representative: n/a

Overall System Rating: Acceptable

System Rating Codes

Acceptable System: Nearly all items or components are rated as GC or NE.

Minimally Acceptable System: One or more items are rated as MM or one or more items are rated as IM or EC and an engineering determination concludes that the IM or EC items would not prevent the system from performing as intended.

Unacceptable System: One or more items are rated as IM or EC and would prevent the system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

Condition Codes

EC = Emergency Condition. A serious dam safety condition exists that needs immediate action. Emergency measures implemented as instructed by Supervising Engineer, Dam Safety; i.e. pool draw down, work stoppage, or plant stoppage.

IM = Item needing Immediate Maintenance to restore or ensure its safety or integrity. Remediation should be completed within an appropriate timeframe as determined by the Supervising Engineer, Dam Safety.

MM = Item needing Minor Maintenance and/or repairs within the year. The safety or integrity of the item is not yet imperiled.

OB = Condition requires regular Observation to ensure that the condition does not become worse.

GC = Good Condition.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Fly Ash Pond Cap - ClosureTurf
Quarterly Site Inspection Checksheet

Date	3/29/2019
Inspector	Mike Wagstaff
Temperature	40's
Weather	cloudy

	Item	Condition Code *	Comments
Closure Cap	Drainage Ditch/ArmorFill	GC	ArmorFill has not yet been applied to ditches. This work will be done Spring of 2019.
	Sand on Cap	GC	Sand has been applied to 100% of cap and swept into turf for 80% of cap. Remaining sweeping will be done in Spring 2019.
	ClosureTurf	GC	No damage or degradation evident.
	Riprap Outlet Flumes	GC	No vegetation in riprap outlet flumes.
	Other	--	
Embankment	Riprap	GC	Riprap placed during cap construction and is in good condition.
	Vegetation in riprap	GC	No weeds in riprap.
	Vegetation at Toe	GC	Vegetation has been mowed a minimum of 20' from berm toe.
	Debris/Logs	GC	All debris/logs were removed from the berm during closure construction.
	Erosion	GC	None.
	Other	--	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Bottom Ash Embankment - ClosureTurf
Quarterly Site Inspection Checksheet

Date	3/29/2019
Inspector	Mike Wagstaff
Temperature	40's
Weather	cloudy

	Item	Condition Code *	Comments
Roadway	**Gravel Road**	**GC**	Roadway gravel is compacted and smooth.
	Drainage	**GC**	No drainage problems at this time.
	Other	**GC**	No issues.
Embankment	**Vegetation at Toe**	**GC**	Vegetation has been mowed a minimum of 20' from berm toe.
	ClosureTurf	**GC**	Turf in excellent condition. No signs of wear or damage.
	ArmorFill	**GC**	ArmorFill has been applied and is in good condtion.
	Riprap at Toe	**GC**	No vegetation in riprap.
	Riprap Outlet Flumes	**GC**	Flume at northeast end of berm is in good condition.
	Other	**--**	
Remaining Basin	**Side Slopes**	**GC**	Sedimentation logs are in place, site has been seeded and mulched.
	Bottom	**GC**	Seed has germinated and started growing prior to winter weather.
	Outlet Riprap	**GC**	No weeds in riprap.
	Toe Riprap	**GC**	No weeds in riprap.
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Fly Ash Pond Cap – Northeast Corner looking northwest



Fly Ash Pond Cap – Northeast corner looking northwest



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Fly Ash Pond Cap – East side looking south



Bottom Ash Pond embankment – East face looking south



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Bottom Ash Pond Embankment – north berm looking east



Bottom Ash Pond Embankment – Roadway looking south



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Bottom Ash Pond Embankment – West berm looking south



Bottom Ash Pond Embankment – South berm looking south



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Fly Ash Pond Cap – Southeast corner looking west



Fly Ash Pond Embankment – South central side looking west



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Fly Ash Pond Cap – Southwest corner looking west



Bottom Ash Pond Cap – West side looking north



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

Fly Ash Pond Cap – North side looking east



View of Bottom Ash Pond Embankment from Fly Ash Pond Cap



Meredosia Quarterly Ash Pond Inspection
1st Quarter – March 29, 2019

View of Bottom Ash Pond East Embankment from Fly Ash Pond Cap



Electronic Filing: Received, Clerk's Office 09/28/2020

Inspection Form for Closed Ponds at Ameren Facilities

Projcet Name: Quarterly Ash Pond Cap Inspection

Location: Meredosia Power Plant

System Description: Fly Ash Pond
Bottom Ash Embankment

Engineer/Inspectors: Mike Wagstaff

Owner Representative: n/a

Inspection Date: 04/17/2019
Temperature: 60's
Weather: cloudy

River Level 434.5'
at Meredosia
Gage 0' = 418.00' MSL
Bottom Ash Pond bottom
is at 430.00' MSL

Overall System Rating: **Acceptable**

System Rating Codes

Acceptable System: Nearly all items or components are rated as GC or NE.

Minimally Acceptable System: One or more items are rated as MM or one or more items are rated as IM or EC and an engineering determination concludes that the IM or EC items would not prevent the system from performing as intended.

Unacceptable System: One or more items are rated as IM or EC and would prevent the system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

Condition Codes

EC = Emergency Condition. A serious dam safety condition exists that needs immediate action. Emergency measures implemented as instructed by Supervising Engineer, Dam Safety; i.e. pool draw down, work stoppage, or plant stoppage.

IM = Item needing Immediate Maintenance to restore or ensure its safety or integrity. Remediation should be completed within an appropriate timeframe as determined by the Supervising Engineer, Dam Safety.

MM = Item needing Minor Maintenance and/or repairs within the year. The safety or integrity of the item is not yet imperiled.

OB = Condition requires regular Observation to ensure that the condition does not become worse.

GC = Good Condition.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Fly Ash Pond Cap - ClosureTurf
Quarterly Site Inspection Checksheet

Date	04/17/2019
Inspector	Mike Wagstaff
Temperature	60's
Weather	cloudy

	Item	Condition Code *	Comments
Closure Cap	**Drainage Ditch/ArmorFill**	**GC**	ArmorFill has not yet been applied to ditches.
	Sand on Cap	**GC**	Sand has been applied to 100% of cap and swept into turf for 80% of cap. Remaining sweeping will be done after floodwater recedes.
	ClosureTurf	**GC**	No damage or degradation evident.
	Riprap Outlet Flumes	**GC**	Portion of flume that is visible is in good condiiton.
	Other	**--**	
Embankment	**Riprap**	**GC**	Visible riprap is in good condition.
	Vegetation in riprap	**GC**	No weeds in upper portion of riprap.
	Vegetation at Toe	**NI**	Toe underwater.
	Debris/Logs	**NI**	Flooded.
	Erosion	**GC**	Half of berm underwater.
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Bottom Ash Embankment - ClosureTurf
Quarterly Site Inspection Checksheet

Date	04/17/2019
Inspector	Mike Wagstaff
Temperature	60's
Weather	cloudy

	Item	Condition Code *	Comments
Roadway	**Gravel Road**	**GC**	Roadway gravel is compacted and smooth.
	Drainage	**GC**	No drainage problems at this time.
	Other	**GC**	No issues.
Embankment	**Vegetation at Toe**	**NI**	Toe is underwater.
	ClosureTurf	**GC**	Visible turf is in good condition.
	ArmorFill	**GC**	Half of the berm is currently covered in floodwater.
	Riprap at Toe	**NI**	Toe is underwater..
	Riprap Outlet Flumes	**GC**	Visible flume is in good condition.
	Other	**--**	
Remaining Basin	**Side Slopes**	**GC**	Visible sedimentation logs are in good condition. BAP wetland area is currently flooded.
	Bottom	**NI**	Flooded.
	Outlet Riprap	**NI**	Flooded.
	Toe Riprap	**NI**	Flooded..
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Quarterly Ash Pond Inspection
2nd Quarter – April 17, 2019

Fly Ash Pond Cap – Looking northwest



Fly Ash Pond Cap – South embankment looking east



Meredosia Quarterly Ash Pond Inspection
2nd Quarter – April 17, 2019

Fly Ash Pond Cap – Southeast side looking west



Bottom Ash Pond embankment – East face looking northwest



Meredosia Quarterly Ash Pond Inspection
2nd Quarter – April 17, 2019

Bottom Ash Pond Embankment – southwest corner of berm looking north



Fly Ash Pond Outlet – Southwest outfall looking west



Meredosia Quarterly Ash Pond Inspection
2nd Quarter – April 17, 2019

East Stockpile Area – Looking north



Bottom Ash Pond Embankment – Looking northwest



Fly Ash Pond Cap – Southeast corner looking northwest



Electronic Filing: Received, Clerk's Office 09/28/2020

Inspection Form for Closed Ponds at Ameren Facilities

Projcet Name: Quarterly Ash Pond Cap Inspection

Location: Meredosia Power Plant

System Description: Fly Ash Pond
Bottom Ash Embankment

Engineer/Inspectors: Mike Wagstaff

Owner Representative: n/a

Inspection Date: 08/28/2019
Temperature: 80's
Weather: sunny

River Level 424.5'
at Meredosia
Gage 0' = 418.00' MSL
Bottom Ash Pond bottom
is at 430.00' MSL

Overall System Rating: **Acceptable**

System Rating Codes

Acceptable System: Nearly all items or components are rated as GC or NE.

Minimally Acceptable System: One or more items are rated as MM or one or more items are rated as IM or EC and an engineering determination concludes that the IM or EC items would not prevent the system from performing as intended.

Unacceptable System: One or more items are rated as IM or EC and would prevent the system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

Condition Codes

EC = Emergency Condition. A serious dam safety condition exists that needs immediate action. Emergency measures implemented as instructed by Supervising Engineer, Dam Safety; i.e. pool draw down, work stoppage, or plant stoppage.

IM = Item needing Immediate Maintenance to restore or ensure its safety or integrity. Remediation should be completed within an appropriate timeframe as determined by the Supervising Engineer, Dam Safety.

MM = Item needing Minor Maintenance and/or repairs within the year. The safety or integrity of the item is not yet imperiled.

OB = Condition requires regular Observation to ensure that the condition does not become worse.

GC = Good Condition.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Fly Ash Pond Cap - ClosureTurf
Quarterly Site Inspection Checksheet

Date	08/28/2019
Inspector	Mike Wagstaff
Temperature	80's
Weather	sunny

	Item	Condition Code *	Comments
Closure Cap	**Drainage Ditch/ArmorFill**	**GC**	ArmorFill in good condition in ditches.
	Sand on Cap	**GC**	Sand is in good condition.
	ClosureTurf	**GC**	No damage or degradation evident.
	Riprap Outlet Flumes	**MM**	Flumes are in good condiiton. Weeds require spraying.
	Other	**--**	
Embankment	**Riprap**	**GC**	Riprap is in good condition.
	Vegetation in riprap	**MM**	Weeds in riprap should be sprayed.
	Vegetation at Toe	**MM**	Mowing required.
	Debris/Logs	**MM**	Some debris on embankment and at toe of embankment.
	Erosion	**GC**	Erosion not evident.
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Bottom Ash Embankment - ClosureTurf
Quarterly Site Inspection Checksheet

Date	08/28/2019
Inspector	Mike Wagstaff
Temperature	80's
Weather	sunny

	Item	Condition Code *	Comments
Roadway	**Gravel Road**	**GC**	Roadway gravel is compacted and smooth.
	Drainage	**GC**	No drainage problems at this time.
	Other	**GC**	No issues.
Embankment	**Vegetation at Toe**	**MM**	Mowing required.
	ClosureTurf	**MM**	Turf is in good condition. Sand requires re-sweeping.
	ArmorFill	**MM**	Binder has washed out of the sand. Maintenance required.
	Riprap at Toe	**MM**	Riprap at toes has minor vegetation. Spraying required.
	Riprap Outlet Flumes	**GC**	Flumes are in good condition.
	Other	**--**	
Remaining Basin	**Side Slopes**	**GC**	Sedimentation logs are in good condition. Vegetation trying to get established.
	Bottom	**MM**	Vegetaion is re-establishing in bottom of basin.
	Outlet Riprap	**MM**	Weeds need to be sprayed.
	Toe Riprap	**MM**	Riprap in good condition, Weeds need to be sprayed.
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Quarterly Ash Pond Inspection
3rd Quarter – August 28, 2019

Fly Ash Pond Cap – East side looking north



Fly Ash Pond Cap West embankment looking north



Meredosia Quarterly Ash Pond Inspection
3rd Quarter – August 28, 2019

Fly Ash Pond Cap – Southwest outfall looking south



Bottom Ash Pond embankment – East face looking northwest



Meredosia Quarterly Ash Pond Inspection
3rd Quarter – August 28, 2019

Bottom Ash Pond Embankment – West berm looking north



Bottom Ash Pond Embankment – East berm looking Southeast



Bottom Ash Embankment – East berm looking north



Bottom Ash Pond Embankment – South end of berm looking east



Meredosia Quarterly Ash Pond Inspection
3rd Quarter – August 28, 2019

Bottom Ash Embankment – Southwest end looking north at oil unloading facility



Inspection Form for Closed Ponds at Ameren Facilities

Projcet Name: Quarterly Ash Pond Cap Inspection

Location: Meredosia Power Plant

System Description: Fly Ash Pond
Bottom Ash Embankment

Engineer/Inspectors: Mike Wagstaff

Owner Representative: n/a

Inspection Date: 11/20/2019
Temperature: 35-50
Weather: sunny

River Level 429.5'
at Meredosia
Gage 0' = 418.00' MSL
Bottom Ash Pond bottom
is at 430.00' MSL

Overall System Rating: Acceptable

System Rating Codes

Acceptable System: Nearly all items or components are rated as GC or NE.

Minimally Acceptable System: One or more items are rated as MM or one or more items are rated as IM or EC and an engineering determination concludes that the IM or EC items would not prevent the system from performing as intended.

Unacceptable System: One or more items are rated as IM or EC and would prevent the system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

Condition Codes

EC = Emergency Condition. A serious dam safety condition exists that needs immediate action. Emergency measures implemented as instructed by Supervising Engineer, Dam Safety; i.e. pool draw down, work stoppage, or plant stoppage.

IM = Item needing Immediate Maintenance to restore or ensure its safety or integrity. Remediation should be completed within an appropriate timeframe as determined by the Supervising Engineer, Dam Safety.

MM = Item needing Minor Maintenance and/or repairs within the year. The safety or integrity of the item is not yet imperiled.

OB = Condition requires regular Observation to ensure that the condition does not become worse.

GC = Good Condition.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Fly Ash Pond Cap - ClosureTurf
Quarterly Site Inspection Checksheet

Date	11/20/2019
Inspector	Mike Wagstaff
Temperature	35-50
Weather	sunny

	Item	Condition Code *	Comments
Closure Cap	**Drainage Ditch/ArmorFill**	**GC**	ArmorFill in good condition in ditches.
	Sand on Cap	**GC**	Sand is in good condition.
	ClosureTurf	**GC**	No damage or degradation evident.
	Riprap Outlet Flumes	**MM**	Flumes are in good condiiton. Weeds require spraying.
	Other	**--**	
Embankment	**Riprap**	**GC**	Riprap is in good condition.
	Vegetation in riprap	**MM**	Weeds in riprap should be sprayed.
	Vegetation at Toe	**MM**	Mowing required. Logs have floated onto the vegetated area at toe of berm, so mower could not access.
	Debris/Logs	**MM**	Some debris on embankment and at toe of embankment. This needs to be removed in Spring of 2020.
	Erosion	**GC**	Erosion not evident.
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Power Station
Bottom Ash Embankment - ClosureTurf
Quarterly Site Inspection Checksheet

Date	11/20/2019
Inspector	Mike Wagstaff
Temperature	35-50
Weather	sunny

	Item	Condition Code *	Comments
Roadway	**Gravel Road**	**GC**	Roadway gravel is compacted and smooth.
	Drainage	**GC**	No drainage problems at this time.
	Other	**GC**	No issues.
Embankment	**Vegetation at Toe**	**GC**	Vegetation at toe looks good.
	ClosureTurf	**GC**	Turf is in good condition. Sand has been re-swept and Polyurethane is being applied today.
	ArmorFill	**GC**	Binder has washed out of the sand. Polyurethane is being applied today.
	Riprap at Toe	**GC**	Riprap at toe looks good.
	Riprap Outlet Flumes	**GC**	Flumes are in good condition.
	Other	**--**	
Remaining Basin	**Side Slopes**	**GC**	Sedimentation logs are in good condition. Vegetation trying to get established.
	Bottom	**MM**	Vegetaion is re-establishing in bottom of basin.
	Outlet Riprap	**GC**	Riprap looks good.
	Toe Riprap	**GC**	Riprap in good condition,
	Other	**--**	

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.
MM = Item needing Minor Maintenance and/or repairs within the year.
OB = Condition requires regular observation to ensure that the condition does not become worse.
GC = Good Condition. Working properly.
NE = No Evidence of a problem.
NI = Not Inspected. Reason should be stated in comment

Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

East Stockpile Area – Standing on Road, looking Northwest



East Stockpile Area – Standing on Road, looking Southwest



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Fly Ash Pond Cap - South embankment looking west



Fly Ash Pond Cap - south outlet looking south



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Fly Ash Pond Cap - South embankment looking west



Fly Ash Pond Cap – south embankment looking west



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Fly Ash Pond Cap - West embankment looking north



Fly Ash Pond Cap - West embankment looking south



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Fly Ash Pond Cap – Northwest outlet looking northeast



Fly Ash Pond Cap – Northwest outfall looking north



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Fly Ash Pond Cap – North embankment looking northeast



Fly Ash Pond Cap – North berm looking east



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Fly Ash Pond Cap – Eastern side looking South



Bottom Ash Embankment – East berm looking south during Polyurethane application



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Bottom Ash Pond Embankment – East face of berm looking Southwest



Bottom Ash Embankment – West face of berm looking south towards oil unloading facility



Meredosia Quarterly Ash Pond Inspection
4th Quarter – November 20, 2019

Bottom Ash Embankment – West face of berm looking north



Exhibit 16

Ameren MISSOURI

March 31, 2020

Mr. Bill Buscher
Hydrogeology Unit Manager
Division of Water Pollution Control
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

<submitted electronically at bill.buscher@illinois.gov>

Dear Mr. Buscher,

Re: **2019 Annual Post-Closure Care Report**
Ameren Missouri's Venice Energy Center's Ash Ponds

As required per the approved closure plan, Union Electric Company d/b/a Ameren Missouri is submitting the 2019 Annual Post-Closure Care Report for the Venice Energy Center. This report includes compilation of groundwater monitoring data and trend analysis to demonstrate compliance per Section 5 of the Closure Plan, which was approved by the Agency on May 6, 2011.

Please note that due to the corona virus, our staff does not have the capability to use printing services. We plan to send you hard copies when we are able. Thanks for your understanding as we are trying to limit our staff from potential exposure to this virus.

Please contact me at 314-554-3143 if there are any questions regarding this 2019 Annual Report.

Sincerely,

Julianne Epplin

Julianne Epplin, PMP, PWS, CE
Environmental Scientist
Ameren Missouri
Jepplin2@ameren.com

Cc: L. Dunaway, IEPA C. Giesmann N. Morgan M. Wagstaff M. Kohlbusch

File: SharePoint

Electronic Filing: Received, Clerk's Office 09/28/2020

Intended for
Ameren Missouri

Date
March 31, 2020

Project No.
73136

2019 ANNUAL REPORT

FORMER VENICE POWER PLANT – ASH PONDS 2 & 3

RAMBOLL Bright ideas. Sustainable change.

Electronic Filing: Received, Clerk's Office 09/28/2020

2019 ANNUAL REPORT
FORMER VENICE POWER PLANT – ASH PONDS 2 & 3

Project name	**Former Venice Power Plant**
Project no.	**73136**
Recipient	**Ameren Missouri**
Document type	**2019 Annual Report**
Revision	**0**
Version	**FINAL**
Date	**March 31, 2020**
Prepared by	**Rachel Banoff, EIT**
Checked by	**Kristin A. Drucquer**
Approved by	**Frances Ackerman, PE**

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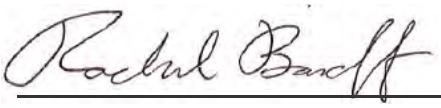

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ACRONYMS AND ABBREVIATIONS

Ameren	Ameren Missouri
bgs	below ground surface
GMZ	Groundwater Management Zone
IAC	Illinois Administrative Code
ILCS	Illinois Compiled Statutes
IEPA	Illinois Environmental Protection Agency
mg/L	milligrams per liter
NRT	Natural Resource Technology, Inc
PVC	polyvinyl chloride
TDS	total dissolved solids

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1. INTRODUCTION

1.1 Background

In May 2011, the Illinois Environmental Protection Agency (IEPA) approved Ameren Missouri's (Ameren) Closure Plan (Natural Resource Technology, Inc. (NRT), 2011) for Venice Power Plant Ash Ponds 2 & 3 and established a Groundwater Management Zone (GMZ) for the site. The Closure Plan included specifications for construction of a cover system over the ash ponds that conformed to the standards for final cover set forth in Illinois Landfill Regulations and a site-specific rulemaking governing closure of an ash pond at The Hutsonville Power Station, owned by an Ameren-affiliated company. See, generally, 35 Illinois Administrative Code (IAC) 840.126 and 35 IAC 811.314. Cover construction was completed in October 2012.

Groundwater quality has been monitored at this site since 1996. The Closure Plan included a summary of the groundwater quality at the site as of 2009 and a revised groundwater monitoring plan that outlined a schedule for monitoring five field and 24 laboratory parameters at 12 monitoring wells (Tables 1-1, 1-2, and 1-3, Figure 1-1). The new monitoring plan was initiated in March 2011 with existing monitoring wells. In accordance with the approved Closure Plan, additional monitoring wells were installed in July 2011. In 2019, IEPA approved a request to change the groundwater monitoring schedule from quarterly to semi-annually and to cease monitoring for beryllium, mercury, and thallium.

This Annual Report is submitted per Section 5.4 of the Closure Plan and includes a ten-year review of the groundwater quality at the site as of 2019 to provide an overview of the effectiveness of the cover system in improving groundwater quality downgradient from the former ponds. This report also includes the following groundwater monitoring plan compliance elements:

- A summary of groundwater monitoring data collected during August 2017 through September 2019. Data collected in 2017 and 2018 were included for completeness because they are used in the statistical analysis of groundwater data. Data tables are included in Appendix A.
- Annual trend analysis results per Section 3.4 of the Closure Plan.
- Groundwater monitoring field data worksheets which note a description of any maintenance or replacement activities performed (Appendix B).
- Final cover site inspection reports and a description of any maintenance activities performed on the cover (Appendix C).

1.2 Groundwater quality overview – 2019

1.2.1 Summary of Cover System Construction and Maintenance

As part of closure activities, Ameren removed all standing surface waters from Ash Ponds 2 & 3 and a geosynthetic cover was constructed to provide a barrier to infiltration and subsequent generation and release of leachate from the ponds (NRT, 2011). The cover system consists of (from bottom up) a 40-mil polyvinyl chloride (PVC) geomembrane; a geocomposite drainage layer constructed of high-density polyethylene geonet encapsulated in geotextile; and a 3-foot thick protective soil layer placed over re-graded ash in the ponds. The geocomposite was provided to drain surface water that infiltrates the protective soil layer. Storm water precipitation

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is routed away from the cover system toward two low areas at the north and south ends of the cover, then pumped over the levee to the Mississippi River. The cover is graded such that there is no off-site contribution, or run-on, of storm water from areas outside of the ash ponds.

Inspections of the cover system are performed simultaneously with groundwater sampling. Routine maintenance activities are performed at the site, as needed and as soon as practicable after issues are identified, and include recontouring the ground surface, repairing drainage channels, repairing and replacing lining material, revegetating areas, and removing woody vegetation. Maintenance activities can be found in more detail in the Closure Plan (NRT, 2011).

1.2.2 Summary of 2019 Groundwater Quality

Groundwater quality data since completion of pond closure in 2012 were reviewed to assess the overall condition of the groundwater and the performance of the cover system. This review was performed independently from the compliance evaluations required by the Groundwater Monitoring Plan (NRT, 2011), which are focused on specific compliance criteria and proposed mitigation actions. This review is intended as a big-picture view of groundwater quality over time since closure.

The Closure Plan identified boron as the primary indicator constituent for coal ash impacts to groundwater at the site because it is found at relatively high concentrations in coal ash leachate and is mobile in sand and gravel environments similar to the aquifer at Venice. As such, boron was selected for this groundwater quality data review. Boron concentrations over time from closure completion (2012) to the present are presented in Figures 1-2 through 1-7. On the figures, the lines through the concentration data represent the best fit linear regressions for boron concentrations in each well. The regression lines provide a convenient means of evaluating general concentration “trends” over time and are not equivalent to the statistical trends discussed in the groundwater compliance section of this report.

Generally, boron concentrations in most compliance monitoring wells have decreased since 2012 and are currently below Class I Groundwater Standard in **seven** of the ten compliance groundwater monitoring wells (MW-2, MW-2D, MW-3, MW-3D, MW-5, MW-11 and MW-11D). Boron concentrations in three wells (MW-6, MW-6D and MW-10) exhibit slight increases over time at levels above the Class I Groundwater Standard. Note that no statistically-determined increasing trends have been identified for boron for the reporting period. In addition, there are a total of 31 decreasing trends identified of various analytical parameters since completion of closure in 2012, as discussed in Section 3.1 and summarized on Table 3-1.

1.2.3 Conclusion

The decreasing boron concentrations in the majority of compliance monitoring wells across the site is a strong indication that the cover system is functioning to improve overall groundwater quality beneath the ponds. This observation is consistent with the results of groundwater modeling performed in 2010 to simulate changes in groundwater quality resulting from pond closure. Modeling results suggested that boron concentrations in all monitoring wells would stabilize at levels below the Class I Groundwater Standard within 14 to 20 years, with the exception of on-site well MW-6, where boron concentrations were predicted to persist for a longer time period.

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2. GROUNDWATER MONITORING PLAN COMPLIANCE

2.1 Applicable Groundwater Quality Standards

As described in Section 3.3 of the Closure Plan:

- On site, prior to the completion of the post-closure care period, the applicable groundwater quality standards at the Venice ash ponds are the concentrations as determined by groundwater monitoring, if such concentrations exceed the numeric standards for Class I: Potable Resource Groundwater set forth in 35 IAC 620.410.
- After completion of the post-closure care period, the on-site concentrations of contaminants from the Venice ash ponds as determined by groundwater monitoring, are the applicable groundwater standards if such concentrations exceed the numeric standards for Class I Potable Resource Groundwater set forth in 35 IAC 620.410, and if:
  - To the extent practicable, the exceedance has been minimized and beneficial use, as appropriate for the class of groundwater, has been returned on-site.
  - Any threat to public health or the environment on-site has been minimized.
  - An institutional control prohibiting potable uses of groundwater is placed on the Former Venice Power Plant site in accordance with the Uniform Environmental Covenants Act [765 Illinois Compiled Statutes (ILCS) 122] or an alternative instrument authorized for environmental uses under Illinois law and approved by IEPA is in effect. Existing potable uses of groundwater may be preserved as long as such uses are consistent with human consumption in accordance with accepted water supply principles.

Off-site standards were not proposed because: 1) Ameren did not receive permission from the adjacent property owner to monitor groundwater on that property; 2) the impoundment has been covered, which minimizes exceedances of groundwater quality standards to the extent practical; 3) there are no groundwater receptors in this area; and 4) there is a groundwater restriction ordinance in effect for this area.

2.2 Demonstration of Compliance

As described in Section 3.4 of the Closure Plan:

- Compliance with on-site groundwater quality standards will be achieved when no statistically significant increasing trend that can be attributed to the Venice ash ponds is detected in the concentrations of all constituents monitored at the downgradient boundaries of the Venice site for four consecutive years after changing to an annual monitoring frequency (see Table 1-1).
- If the Sen's non-parametric estimate of slope shows a positive slope at any compliance monitoring well located at the downgradient boundaries of the Venice site GMZ as specified in Table 1-2, or any parameter (Table 1-3) a Mann-Kendall test will be performed at 95 percent confidence to determine whether the positive slope represents a statistically significant increasing trend. Ameren will investigate the cause of a statistically significant increasing trend as described below. If the statistically significant increasing trend occurs during post-closure care, the investigation will include more frequent inspection of the surface of the cover system and evaluation of background concentrations.

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  - If the investigation attributes a statistically significant increasing trend to a superseding cause, Ameren will notify IEPA in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.
  - If there is no superseding cause for the statistically significant increasing trend and sampling frequency has been reduced to semi-annual or annual sampling, a quarterly sampling schedule will be reestablished. After four consecutive quarterly samples show no statistically significant increasing trend, the frequency of groundwater monitoring will return to either semi-annual or annual, whichever frequency was utilized prior to the return to quarterly sampling.
  - Notifications concerning statistically significant increasing trends and revisions of the sampling frequency will be reported to IEPA in writing within 30 days after making the determinations.
- If a statistically significant increasing trend is observed to continue over a period of two or more consecutive years and there are no superseding causes for the trend, then Ameren will perform the following:
  - A hydrogeologic investigation
  - Additional site investigation, if necessary

Based on the outcome of the investigation above, Ameren may take action to mitigate statistically significant increasing trends. Such actions will be proposed as a modification to the Post-Closure Care Plan within 180 days after completion of the investigation activities described above.

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3. DATA ANALYSIS

3.1 Groundwater Flow

Groundwater flow contours for the two semi-annual monitoring events which occurred in February 2019 and September 2019 are illustrated in Figures 3-1 and 3-2. Groundwater was encountered at depths between 10 to 30 feet below ground surface (bgs). Groundwater flow in the region is controlled by the Mississippi River, and water levels within the monitoring wells rise and fall with river stage. Groundwater flow in February 2019 and September 2019 was generally from northeast to southwest (toward the Mississippi River) under gradients of 0.03 feet/foot and 0.04 feet/foot. This is the predominant flow pattern during most of the year. During periods of high river stage groundwater flow reversals can occur, with groundwater flowing from northwest to southeast (away from the river).

3.2 Review of Analytical Data

Groundwater samples were collected on August 23, 2017; October 23, 2017; February 12, 2018; May 1, 2018; August 27, 2018; November 5, 2018; February 4, 2019; and September 10, 2019. All field and laboratory analytical results are tabulated in Appendix A. Selected analytes are discussed below.

- Boron was identified as the primary indicator constituent for coal ash impacts to groundwater at the site (see Closure Plan Appendix C). As in past monitoring periods, the highest boron concentrations in 2017-2019 monitoring period were detected in monitoring wells MW-10, MW-11D, and MW-3D (Figure 3-3). MW-10 is located to the north of the covered ash ponds and MW-11D and MW-3D are located to the west of the covered ash ponds; MW-11D and MW-3D are deep wells.
- Chloride is not a coal ash indicator constituent. It is noted here because it has historically had, and continues to have, higher concentrations in background monitoring wells MW-8 and MW-9 than in the compliance monitoring wells (Figure 3-4).
- Sulfate can be an indicator constituent for coal ash; however, there are other anthropogenic sources for elevated sulfate concentrations in groundwater, and sulfate concentrations can decrease in groundwater under strongly reducing conditions. These caveats make sulfate a less reliable indicator for coal ash impacts than boron. As in past monitoring periods, sulfate concentrations at the Venice ash ponds were highest at MW-10 and MW-11D (Figure 3-5) in 2017, 2018, and 2019, where boron concentrations were also highest. However, there are also differences between the sulfate distribution and the boron distribution. For example, MW-6 had boron concentrations greater than 4 milligrams per liter (mg/L), suggesting coal ash impacts, but sulfate concentrations were very low in this monitoring well. Conversely, background monitoring wells MW-8 and MW-9 had low boron concentrations because these wells are not affected by coal ash leachate, yet sulfate concentrations were similar to some of the wells with elevated boron concentrations. Due to these differences, which are consistent with previous monitoring periods, boron appears to be a more reliable indicator of coal ash constituents in groundwater and will, therefore, continue to be used as the primary indicator constituent for Venice Ash Ponds 2 and 3.

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- Arsenic, boron, iron, lead, manganese, nitrate, sulfate, and total dissolved solids (TDS) exceeded their Class I Groundwater Standards in one or more samples in during the 2017-2019 monitoring period.

3.3 Statistical Analysis

Analytical data were evaluated for trends following a three-step procedure:

- Test for outliers using the Grubbs Outlier test.
- Determine Sen's estimate of slope (Section 3.4 of the Closure Plan).
- Perform a Mann-Kendall trend analysis for any cases (monitoring well/constituent) with a positive slope (Section 3.4 of the Closure Plan).

3.3.1 Outlier Analysis

The Grubbs outlier test determines whether there is statistical evidence of a high or low observation that differs significantly from the other data and provides statistical evidence of potential outliers. The test methodology and results are listed in Appendix D. Outliers identified by the Grubbs outlier test based on the date range of 1996-2019 were eliminated from further statistical analysis.

3.3.2 Sen's Estimate of Slope

Sen's estimate of slope is a non-parametric estimator of trend. It is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed. The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar time. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. The test methodology and results are listed in Appendix D.

Data collected in within the 2017-2019 monitoring period show 23 cases with positive slopes, 35 cases with negative slopes, and 194 cases with no slope (Table 3-1). The 23 cases with positive slopes were tested using the Mann-Kendall test to determine if the positive slopes represented statistically significant increasing or decreasing trends.

3.3.3 Mann-Kendall Trend Analysis

The Mann-Kendall test is a non-parametric, one-tailed test to determine whether a dataset has a statistically significant increasing or decreasing trend. The test methodology and results are listed in Appendix D. Increasing trends are identified in Table 3-2.

The Mann-Kendall test detected three cases of increasing trends in the 2017-2019 dataset, compared to two cases in the previous monitoring period. One of the three cases of increasing trends during the 2017-2019 monitoring period had concentrations exceeding its respective Class I Groundwater Quality Standard and two cases were below the Class I Groundwater Quality Standard. The three increasing trends identified in the 2017-2019 dataset were:

- Manganese: MW-10
- Nitrate Nitrogen: MW-11
- TDS: MW-3D

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There were no repeat cases of increasing trends from the 2017-2018 monitoring period to the 2017-2019 monitoring period.

None of the cases were indicative of potential release from Ash Ponds 2 and 3 and the trends associated with the 2017-2019 data set are discussed further in Section 4.

3.4 Groundwater Monitoring System Maintenance and Inspection

The monitoring wells are inspected during each sampling event. Groundwater monitoring field data worksheets which contain inspection records for 2017, 2018, and 2019 are included in Appendix B. Monitoring wells MW-11 and MW-11D were redeveloped and repairs were made to their protective covers and surface completions in September and October 2017. Repair documentation is also included in Appendix B.

3.5 Cover Inspection and Maintenance

Fly Ash Pond Final Cover Inspection Reports (Appendix C) are shared with the Venice plant by Ameren upon completion. The plant responds promptly to correct issues as they are reported. No maintenance activities were required or performed on the ash pond cover system in 2017. The South drain appeared to not be draining properly in March of 2018. The South drain was then repaired and observed to be functioning normally in September of 2018.

In the June 2019 cover inspection report, it was noted that the top of the fence near the barbed wire needed minor repair at both pump stations and that more gravel was needed on the South Pump Station to help prevent erosional damage. The fence was repaired at both pump stations and additional gravel was placed at the South Pump Station in one area September of 2019. The September 2019 cover inspection report noted that additional gravel was needed at two locations at the South Pump Station to help prevent further erosion. The December 2019 cover inspection report noted the additional gravel was added to the two locations and ongoing temporary construction related to the removal and replacement of the Cahokia-Rockford Transmission Line Structure 161. The construction activities include removing the existing steel lattice tower, drilling and pouring the new concrete foundation, and installing the new steel monopole as described in a letter written by Ameren to the IEPA dated August 20, 2019 (Appendix C). The temporary construction disturbed the soil profile, impacted vegetation, and required piercing the membrane and sealing the cover against the foundation using a boot design. The December 2019 report noted that the affected area will have to be reseeded. Planned repair documentation for the Cahokia-Rockford Transmission Line Structure 161 is also included in Appendix C.

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4. EVALUATION OF COMPLIANCE

4.1 Review of Increasing Trends Within the GMZ

The increasing trends are grouped by parameter and graphed along with concentrations in background wells (MW-8 and MW-9), in Figures 4-1 through 4-3.

4.1.1 Manganese: MW-10

An increasing trend for manganese above the Class I Groundwater Standard occurred at compliance monitoring well MW-10 (Figure 4-1). This is the first occurrence of such a trend at MW-10; increasing trends of manganese have been observed for MW-5 in 2016 and MW-11 in 2017. The solubility of manganese in groundwater is sensitive to redox conditions and concentrations often change due to natural variation, as evidenced by the sporadic increasing trends observed at various monitoring wells in the past. Since MW-10 does not have increasing boron or sulfate trends, the increasing trend for manganese does not indicate that a release from the ponds has occurred.

4.1.2 Nitrate Nitrogen: MW-11

An increasing trend below the Class I Groundwater Standard for nitrate nitrogen occurred at compliance monitoring well MW-11. Increasing trends for nitrate nitrogen have not been observed at the site since 2014, when such trends were noted at wells MW-2D, MW-3D, MW-8 and MW-11D. During this monitoring period, well MW-11 had higher concentrations of nitrate nitrogen than background monitoring wells MW-8 and MW-9, where concentrations are generally stable (Figure 4-2). Elevated nitrate nitrogen concentrations are usually indicative of contamination from fertilizers, sewage, ammonia, or leaking from septic tanks rather than ash leachate.

4.1.3 Total Dissolved Solids: MW-3D

An increasing trend for TDS with concentrations below the Class I Groundwater Quality Standard occurred at compliance monitoring well MW-3D during the 2017-2019 monitoring period (Figure 4-3). Such increasing trends of TDS have been observed intermittently at MW-6D and MW-9 during previous monitoring periods. TDS is a non-specific measure of dissolved concentrations in groundwater. Detectable concentrations ranging from 500 mg/L to 740 mg/L were observed in MW-3D, however there were no increasing trends of this parameter at MW-3D in past monitoring events.

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5. CONCLUSIONS

Statistical analyses of analytical results for groundwater samples collected in 2017, 2018 and 2019 at the Venice Ash Ponds identified increasing concentration trends for three parameters, none of which is indicative of a release from the ponds. The three cases of increasing trends in the 2017-2019 dataset were:

- Manganese: MW-10
- Nitrate Nitrogen: MW-11
- TDS: MW-3D

This represents a small increase from the two increasing trends identified during the previous monitoring period (2017 – 2018).

As discussed in Section 3, the three cases of increases are not indicative of potential releases from the ash ponds.

- One increasing trend was for manganese at MW-10. Manganese is geochemically dependent on local redox conditions and MW-10 does not have increasing boron or sulfate trends, thus the increasing trend for manganese does not indicate that a release from the ponds has occurred.
- One increasing trend for nitrate nitrogen at well MW-11 does not indicate a release has occurred because elevated nitrate nitrogen concentrations are usually indicative of contamination from fertilizers, sewage, ammonia, or leaking from septic tanks rather than ash leachate.
- One increasing trend for TDS was observed at MW-3D. The TDS concentrations at MW-3D are lower than those detected in both background monitoring well MW-8 and MW-9 and the absence of increasing trends of this parameter at MW-3D in past monitoring events suggests that the TDS trend is not indicative of a release from the ash ponds.

Based on the increasing trends for manganese at well MW-10, nitrate nitrogen at well MW-11, and TDS at MW-3D, and in compliance with Section 3.4 of the Closure Plan, the semi-annual sampling schedule will be continued.

No additional action is required per section 3.4.2 of the Closure Plan (Demonstration of Compliance):

- Monitoring had been reduced to a semi-annual frequency in 2019; a continuation of semi-annual sampling is recommended.

No additional action is required per Section 3.5 of the Closure Plan (Proposed Mitigation Actions) because none of the increasing trends have been observed to continue over a period of two or more consecutive years. Further hydrogeologic and site investigation is not prescribed at this time.

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6. REFERENCES

Natural Resource Technology, Inc. (2011). *Closure Plan, Venice Power Plant Ash Ponds 2 & 3,* dated February 4, 2011 and revised on March 25, 2011.

OBG, Part of Ramboll (2019). *2018 Annual Report, Ash Ponds 2 & 3, Former Venice Power Plant, Venice, Illinois.* March 26, 2019.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
2019 Annual Report
Former Venice Power Plant, Ash Ponds 2 and 3

Frequency	Duration
Quarterly	Begins: March 2011
	Ends: 5 years after completion of cap and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Venice ash ponds.
Semiannual	Begins: after IEPA approves that quarterly monitoring requirements have been satisfied.
	Ends: 5 years after initiation of semiannual monitoring and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Venice ash ponds.
Annual	Begins: after IEPA approves that semiannual monitoring requirements have been satisfied.
	Ends: upon IEPA approval of a certified post-closure care report.

[O: SJC, C: YAD 3/9/18]

Table 1-2. Groundwater Monitoring System Wells
2019 Annual Report
Former Venice Power Plant, Ash Ponds 2 and 3

Monitoring Well	Latitude	Longitude	Date Drilled	Surface Elevation (ft.)	Top of Well Casing Elevation (ft.)	Top of Screen Elevation (ft.)	Bottom of Screen Elevation (ft.)	Objective
MW-02	38-39-12.84	90-10-28.39	4/15/1996	412.75	412.31	394	384	Compliance
MW-02D	38-39-12.83	90-10-29.09	7/21/2011	412.61	412.36	370	365	Compliance
MW-03	38-39-03.34	90-10-30.00	4/15/1996	411.41	410.91	397	387	Compliance
MW-03D	38-39-03.40	90-10-30.00	7/20/2011	411.70	411.48	370	365	Compliance
MW-05	38-39-08.97	90-10-11.93	10/14/1997	433.16	432.93	394	384	Compliance
MW-06	38-39-02.24	90-10-18.17	10/15/1997	433.56	433.09	392	382	Compliance
MW-06D	38-39-02.24	90-10-18.09	7/19/2011	433.85	433.55	370	365	Compliance
MW-08	38-39-14.68	90-10-08.46	7/2/1999	416.50	416.27	383	373	Background
MW-09	39-39-27.23	90-10-15.93	7/2/1999	413.65	413.40	382	372	Background
MW-10	38-39-34.84	90-10-33.78	7/21/2011	422.11	424.99	391	381	Compliance
MW-11	38-39-22.64	90-10-32.25	7/22/2011	413.04	412.74	394	384	Compliance
MW-11D	38-39-22.58	90-10-32.24	7/22/2011	412.84	412.50	369	364	Compliance

[O: SJC, C: YAD 3/9/18]

Note:
Surface and well casing elevations based on survey of July 2012, vertical datum is NAVD 1988.

Table 1-3. Groundwater Monitoring Program Parameters
2019 Annual Report
Former Venice Power Plant, Ash Ponds 2 and 3

Field Parameters	Method
pH	Field
Electrical conductance	Field
Temperature	Field
Water level	Field
Well depth	Field
Laboratory Parameters	**Method**
Antimony	SW-846 #3015 and #6020
Arsenic	SW-846 #3015 and #6020
Barium	EPA 200.7
Beryllium[1]	EPA 200.7
Boron	EPA 200.7
Cadmium	SW-846 #3015 and #6020
Chloride	ASTM D4327
Chromium	EPA 200.7
Cobalt	EPA 200.7
Copper	EPA 200.7
Cyanide	Std. Meth. 4500-CN
Fluoride	Std. Meth. 4500-F
Iron	EPA 200.7
Lead	SW-846 #3015 and #6020
Manganese	EPA 200.7
Mercury[1]	SW-846 #3015 and #6020
Nickel	EPA 200.7
Nitrate as N	ASTM D4327
Selenium	SW-846 #3015 and #6020
Silver	EPA 200.7
Sulfate	ASTM D4327
Thallium[1]	SW-846 #3015 and #6020
Total Dissolved Solids	EPA 160.1
Zinc	EPA 200.7

[O: SJC, C: YAD 3/9/18]

Notes:

[1] Eliminated from the monitoring program June 5, 2019 by IEPA approval.

Table 3-1. Trend Analysis Results
2019 Annual Report
Former Venice Power Plant, Ash Ponds 2 and 3

	MW-2	MW-2D	MW-3	MW-3D	MW-5	MW-6	MW-6D	MW-8	MW-9	MW-10	MW-11	MW-11D
Number of Samples	7	8	7	8	8	8	8	8	8	8	8	8
Antimony, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Arsenic, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Barium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Boron, dissolved	-	-	-	-	none	none	+	none	none	-	-	-
Cadmium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Chloride, dissolved	-	+	+	-	decrease	decrease	+	+	+	-	+	-
Chromium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Cobalt, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Copper, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Cyanide, total	none	none	none	none	none	none	none	none	none	none	none	none
Fluoride, dissolved	none	none	none	none	none	none	decrease	none	none	-	none	none
Iron, dissolved	none	-	none	+	none	-	none	none	+	+	none	-
Lead, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Manganese, dissolved	none	none	none	none	+	-	none	none	none	increase	none	decrease
Nickel, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Nitrate nitrogen, dissolved	+	none	none	none	none	none	none	+	none	none	increase	none
Selenium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Silver, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Sulfate, dissolved	-	-	-	decrease	+	+	decrease	-	-	+	decrease	-
Total Dissolved Solids	-	-	-	increase	+	none	-	+	+	+	decrease	-
Zinc, dissolved	none	none	none	none	none	none	none	none	none	none	none	none

[O: RAB 3/20/2020, C: MIK 3/20/2020]

Notes:
- "+" indicates that the Sen's non-parametric estimate of the median slope is positive.
- "-" indicates that the Sen's non-parametric estimate of the median slope is negative.
- Statistically significant positive/negative slopes are hereby referred to as increasing/decreasing trends.
- Mann Kendall Trend analysis done with non-detects at one half the detection limit.
- The most recent eight sampling events were used for analysis; date range for this analysis is 8/1/2017-12/31/2019
- Green shading indicates increasing trends as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration lower than the Class I groundwater quality standard.
- Yellow shading indicates increasing trends as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration higher than the Class I groundwater quality standard.

Table 3-2. Summary of Trend Analyses
2019 Annual Report
Former Venice Power Plant, Ash Ponds 2 and 3

Reporting Date	Short Term Increasing Trends	Long Term Decreasing Trends
2012	15	-
2013	14	-
2014	6	-
2015	1	-
2016	20	-
2017	10	-
2018	2	-
2019	3	31

[O: RAB 3/2/2020, C: MIK 3/2/2020, U: RAB 3/20/2020, C: MIK 3/20/2020]

Notes:
Calculations of long term trends began in 2019
Short term trends were calculated on the basis of eight consecutive sampling events.
Long terms trends were calculated with data since completion of closure in 2012.

FIGURES

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PROJECT: 68755 | DATED: 3/11/2020 | DESIGNER: GALARNMC

Y:\Mapping\Projects\23\2344\MXD\2019AR\Figure 1-1_Site Map.mxd



MONITORING WELL LOCATION

GROUNDWATER MANAGEMENT ZONE

0 150 300 Feet

SITE MAP

2019 ANNUAL REPORT
VENICE POWER PLANT ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

FIGURE 1-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

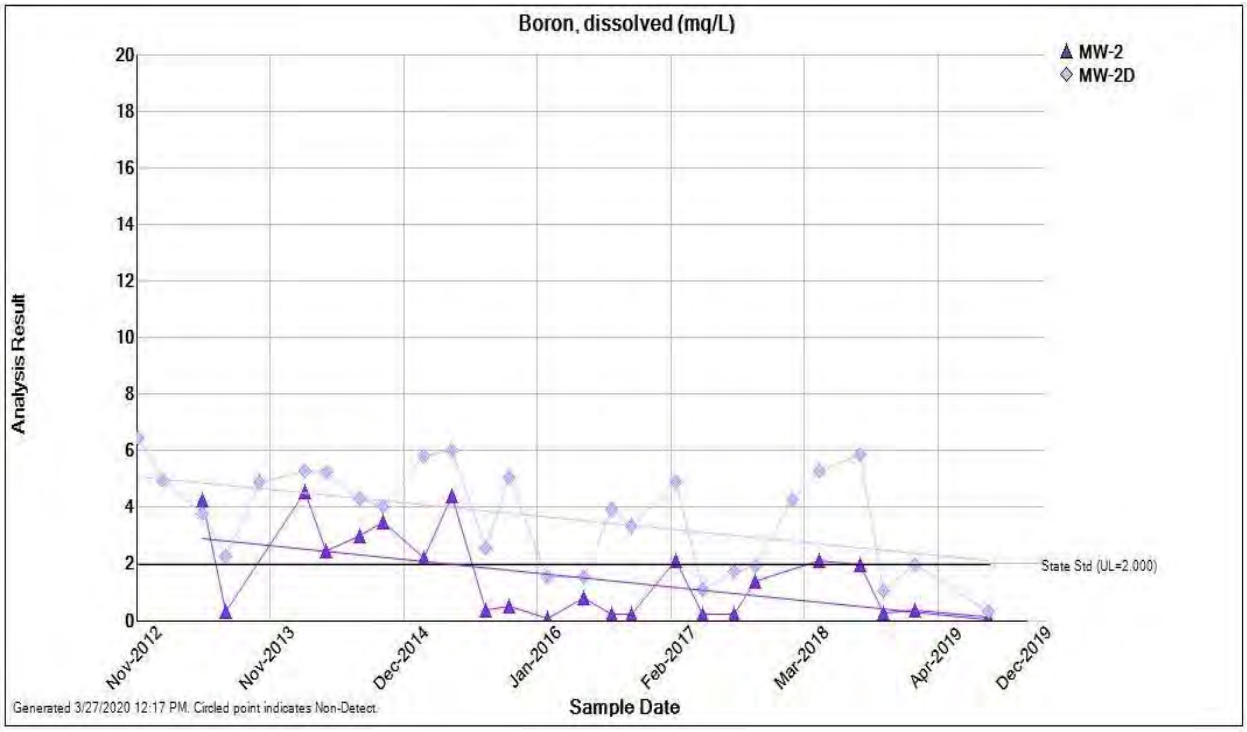

Figure 1-2. Boron concentrations over time since closure completion (2012) at compliance wells MW-2 and MW-2D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

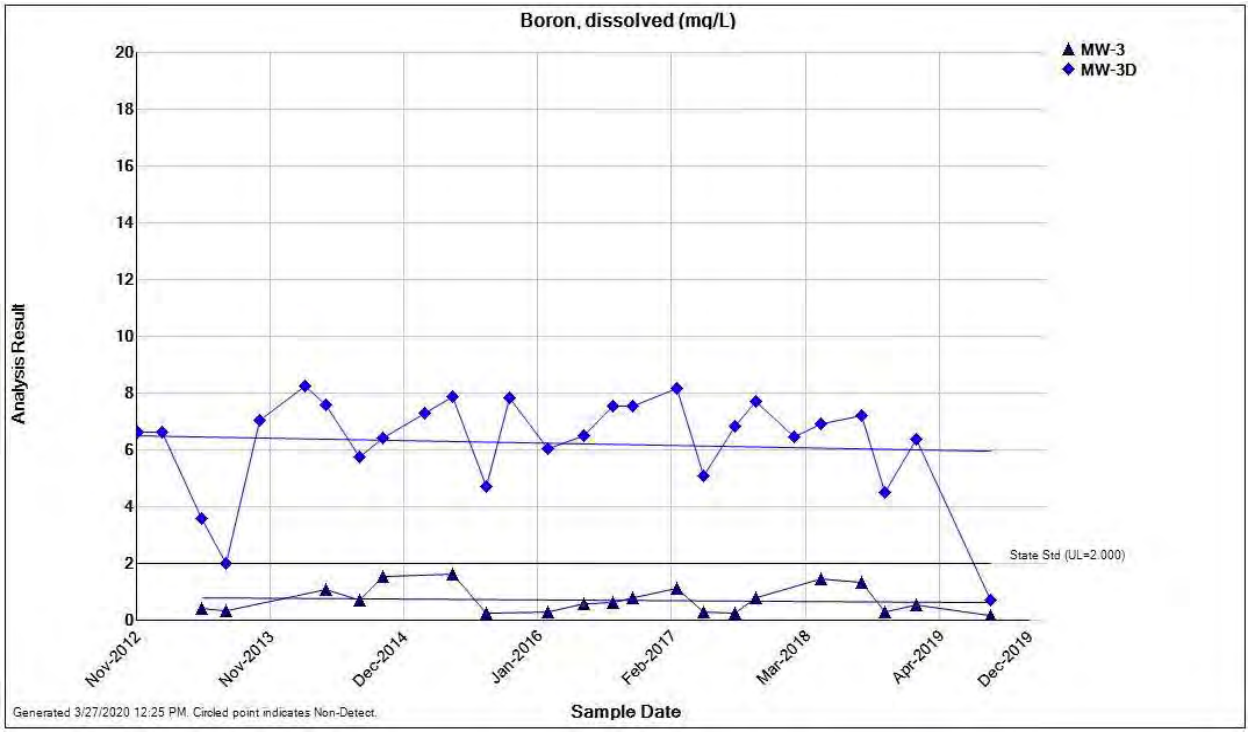

Figure 1-3. Boron concentrations over time since closure completion (2012) at compliance wells MW-3 and MW-3D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

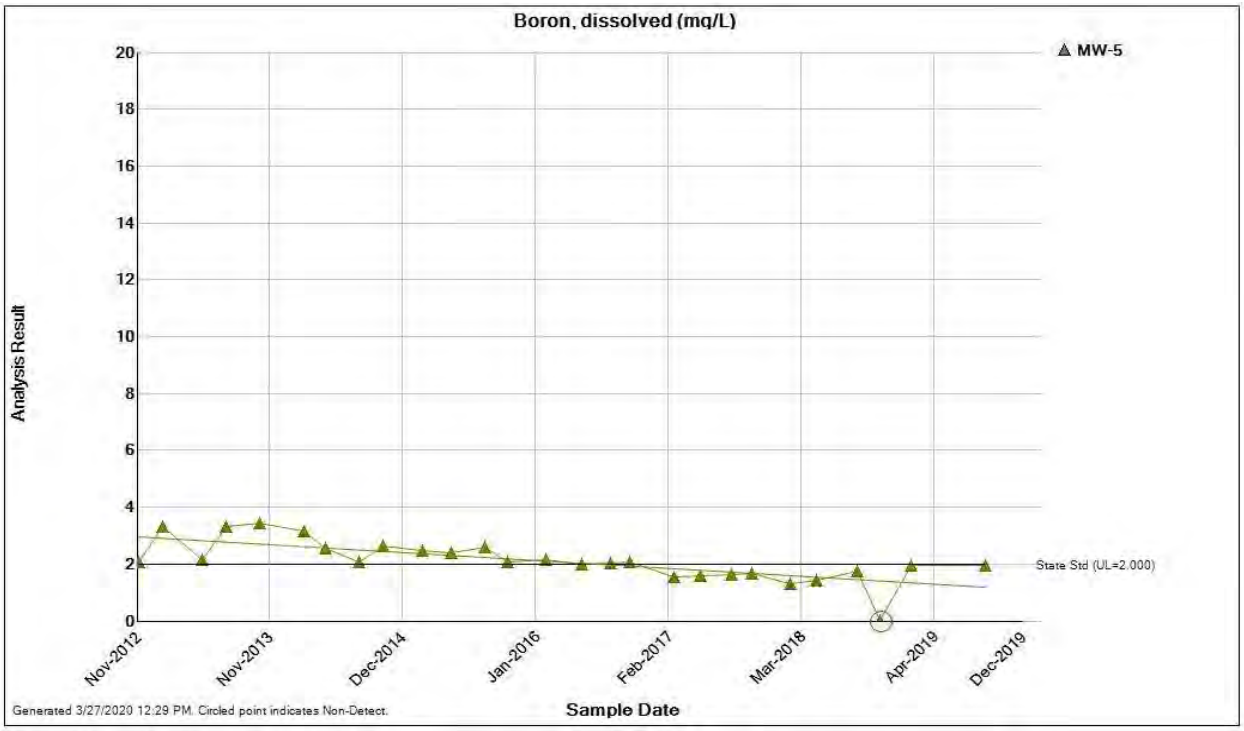

Figure 1-4. Boron concentrations over time since closure completion (2012) at compliance well MW-5. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

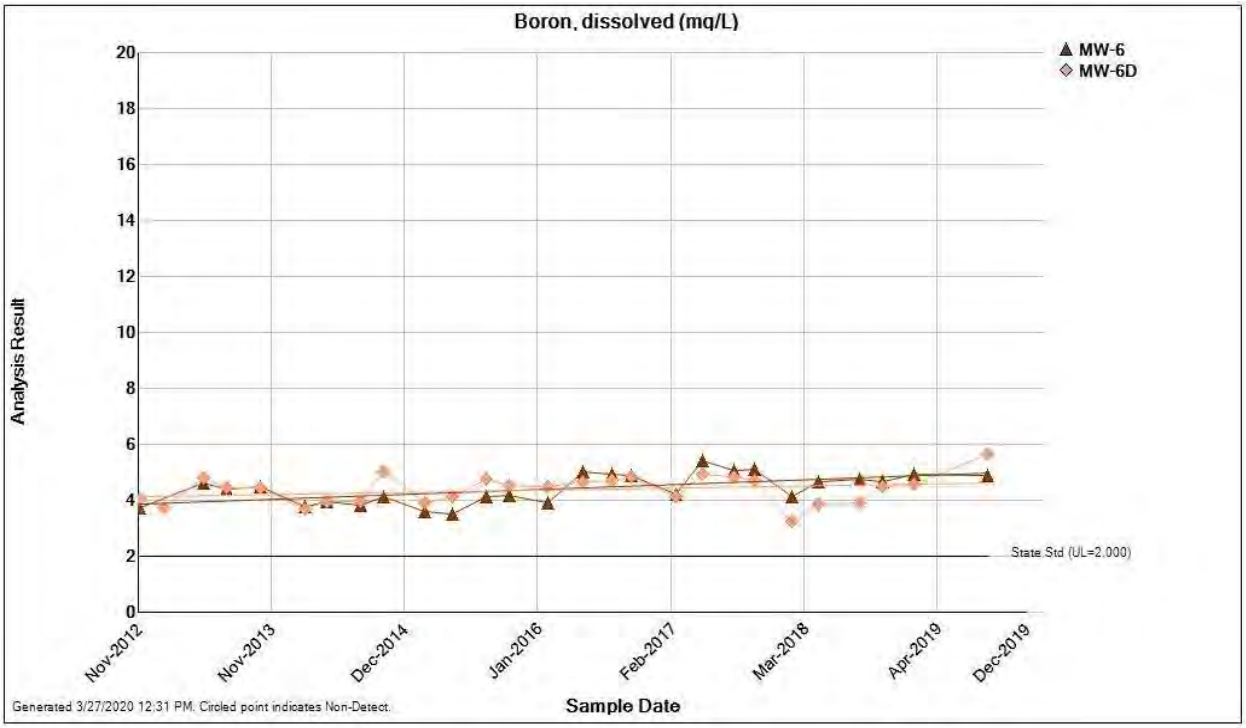

Figure 1-5. Boron concentrations over time since closure completion (2012) at compliance well MW-6 and MW-6D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

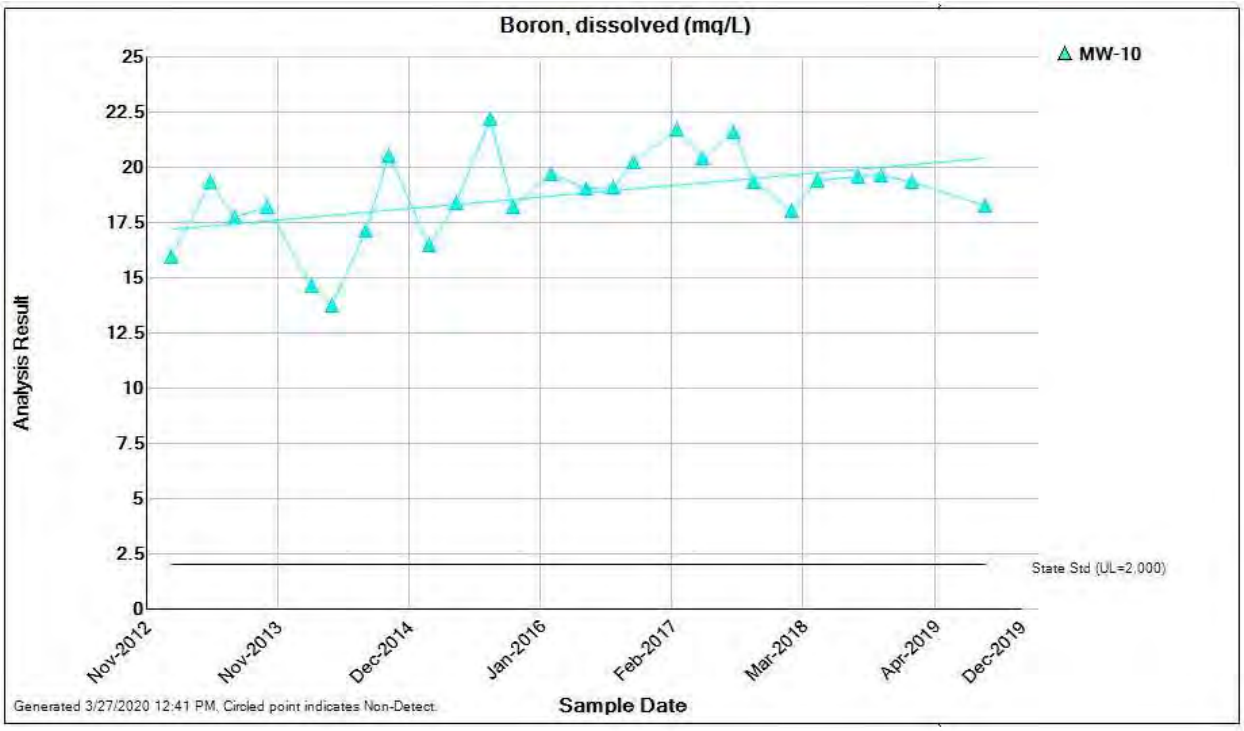

Figure 1-6. Boron concentrations over time since closure completion (2012) at compliance well MW-10. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

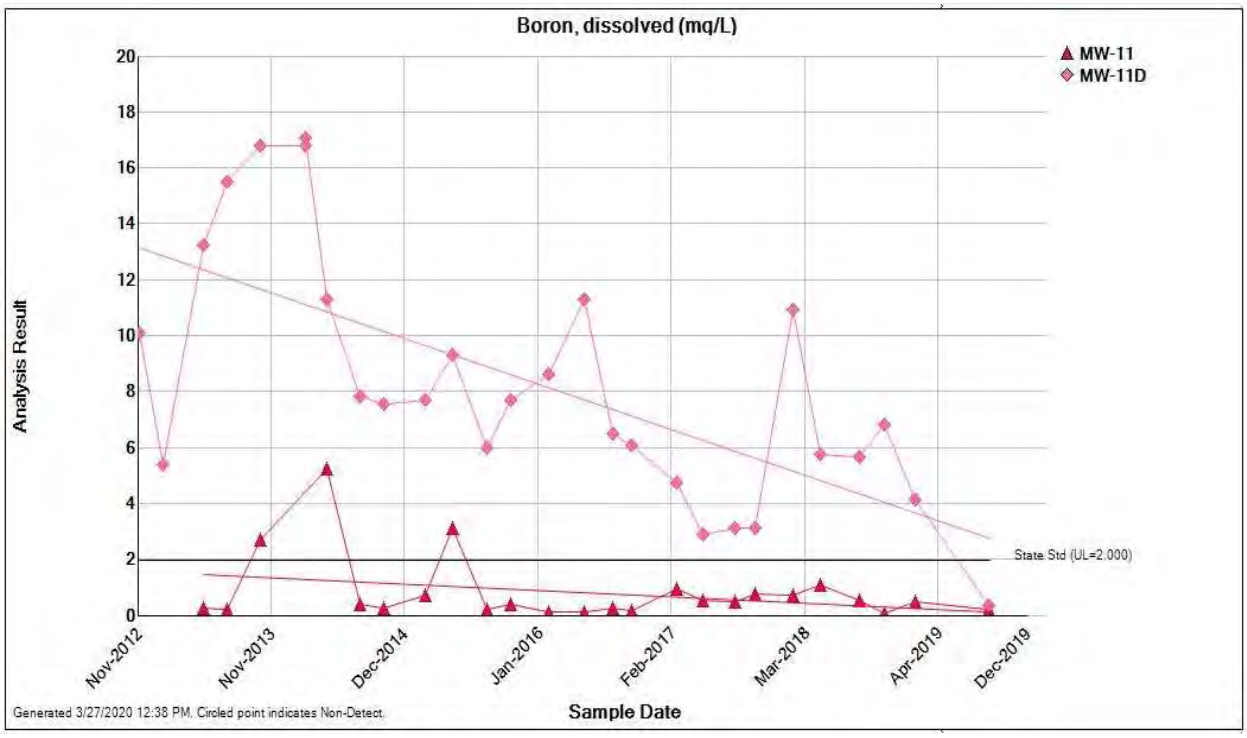

Figure 1-7. Boron concentrations over time since closure completion (2012) at compliance wells MW-11 and MW-11D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

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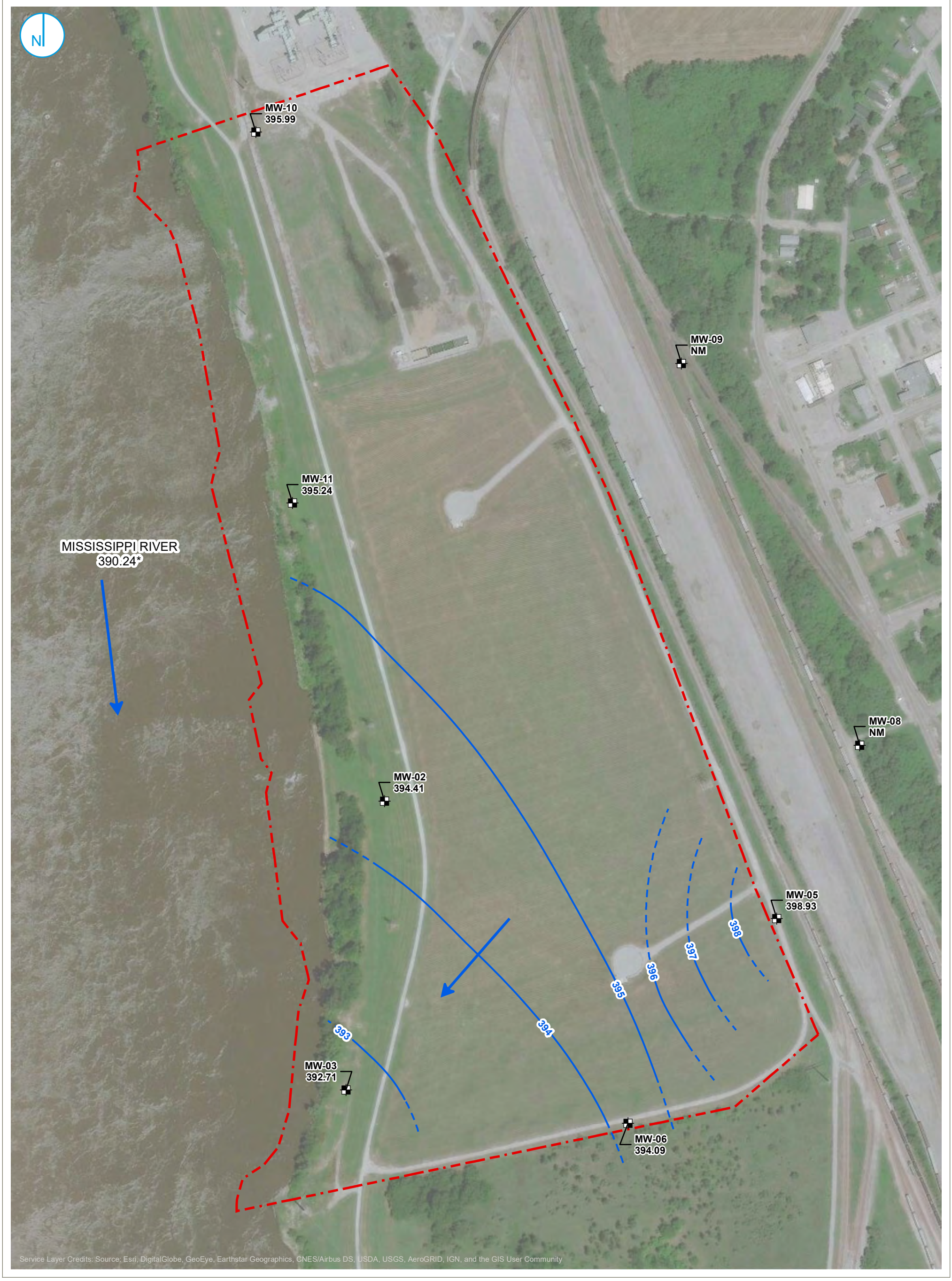
PROJECT: 68755 | DATED: 3/30/2020 | DESIGNER: galarnmc

Y:\Mapping\Projects\23\2344\MXD\2019AR\Figure 3-1_GW Elev Cont Feb2019.mxd



MONITORING WELL LOCATION

GROUNDWATER MANAGEMENT ZONE

GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL, NAVD 88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

0 150 300 Feet

*RIVER ELEVATION OBTAINED FROM UNITED STATES GEOLOGICAL SURVEY MISSISSIPPI RIVER NEAR ST. LOUIS, MO GAUGING STATION (07010000). AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE.
NM = NOT MEASURED

GROUNDWATER ELEVATION CONTOURS
FEBRUARY 2, 2019

2019 ANNUAL REPORT
VENICE POWER PLANT ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

FIGURE 3-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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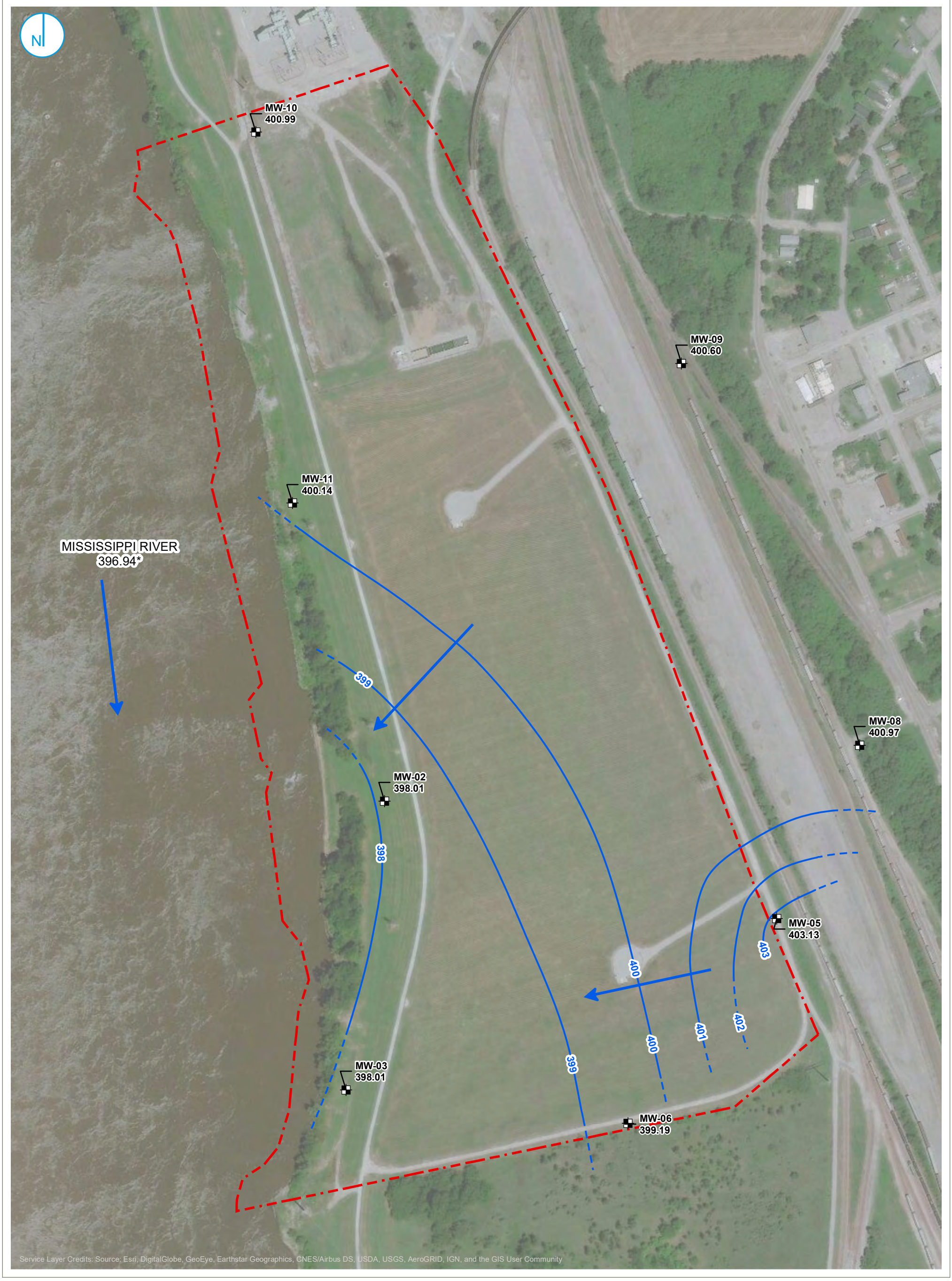
PROJECT: 68755 | DATED: 3/30/2020 | DESIGNER: galarnmc
Y:\Mapping\Projects\23\2344\MXD\2019AR\Figure 3-2_GW Elev Cont Sept2019.mxd



MONITORING WELL LOCATION
GROUNDWATER MANAGEMENT ZONE
GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL, NAVD 88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 150 300 Feet

*RIVER ELEVATION OBTAINED FROM UNITED STATES GEOLOGICAL SURVEY MISSISSIPPI RIVER NEAR ST. LOUIS, MO GAUGING STATION (07010000). AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE.

GROUNDWATER ELEVATION CONTOURS
SEPTEMBER 10, 2019

2019 ANNUAL REPORT
VENICE POWER PLANT ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

FIGURE 3-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

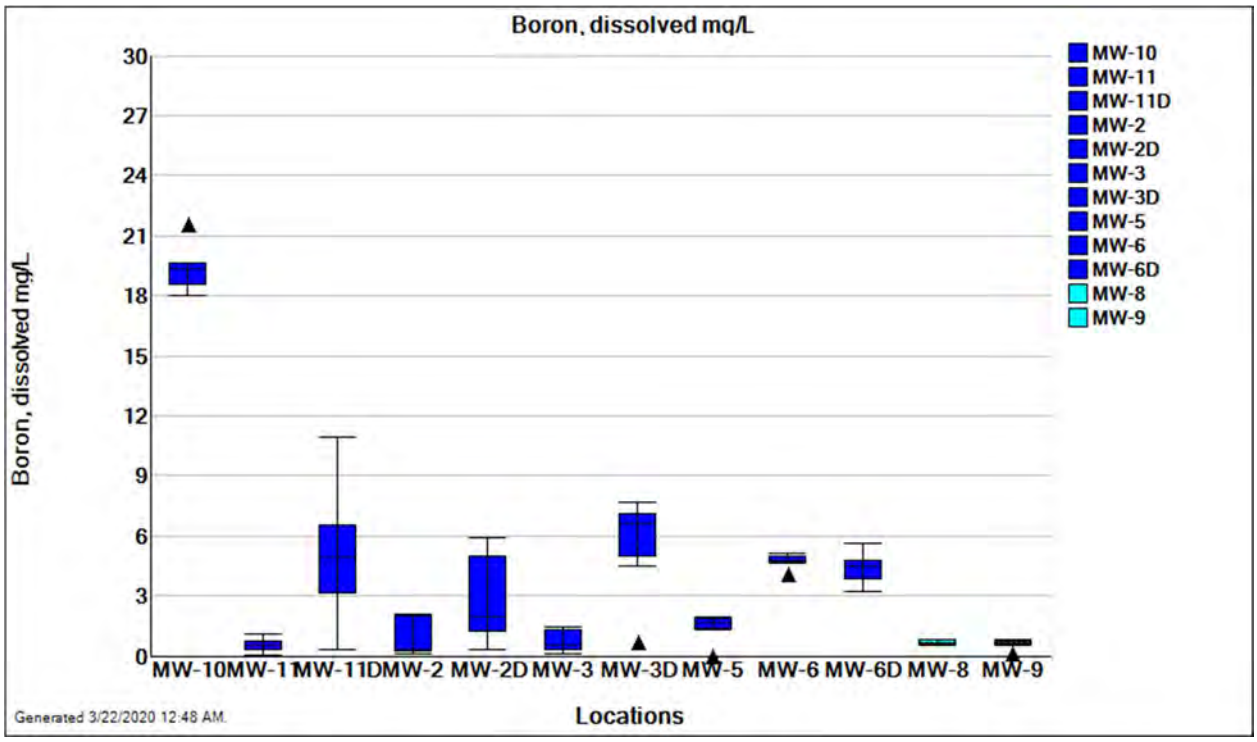


Figure 3-3. Box-whisker plot showing the distribution of boron concentrations by monitoring well for data collected during August 2017 through September 2019.

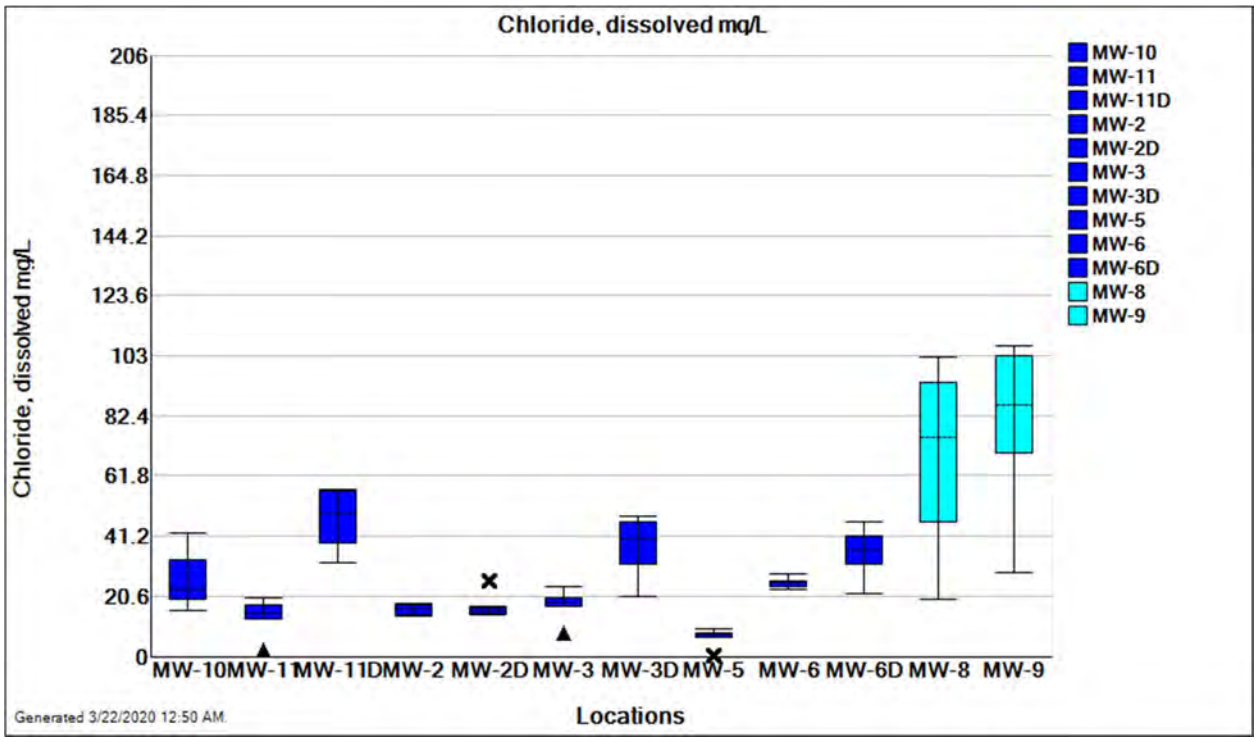


Figure 3-4. Box-whisker plot showing the distribution of chloride concentrations by monitoring well for data collected during August 2017 through September 2019. Background monitoring wells MW-8 and MW-9 had relatively high chloride concentrations.

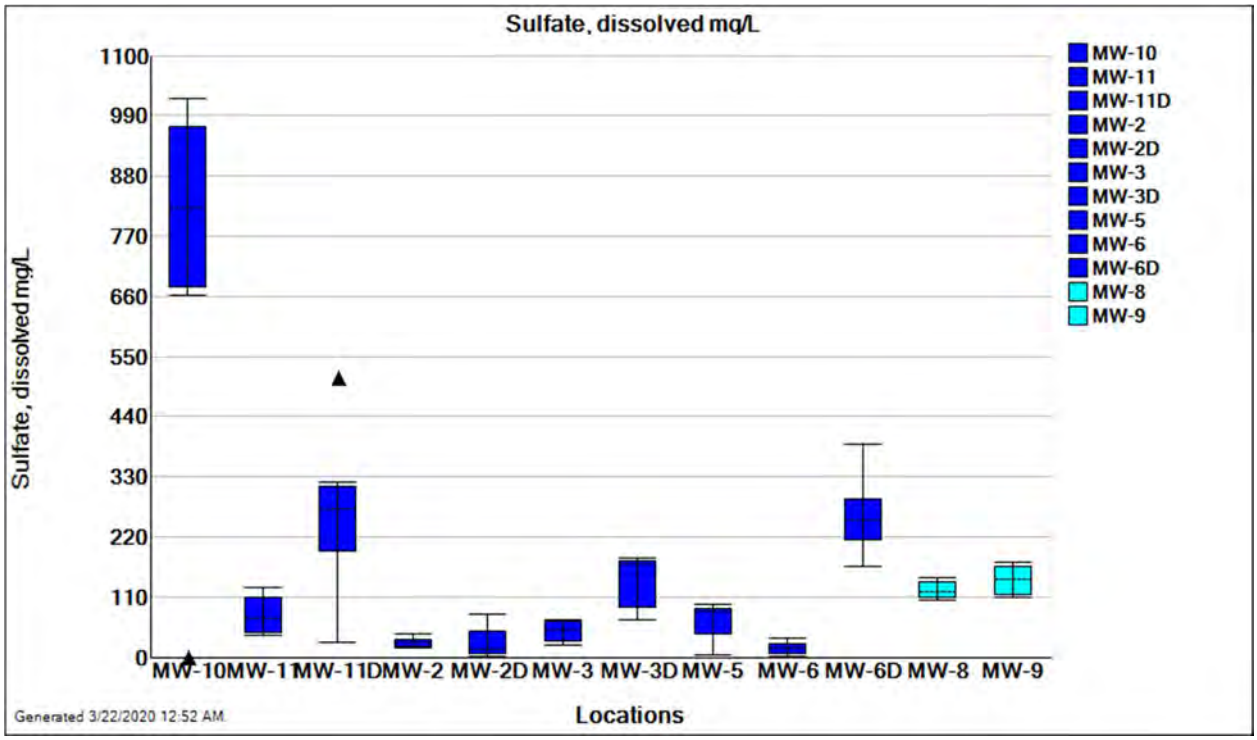


Figure 3-5. Box-whisker plot showing distribution of sulfate concentrations by monitoring well for data collected during August 2017 through September 2019. Similar to boron, the highest sulfate concentrations occurred in MW-10 and MW-11D; however, this plot is dissimilar to the boron plot because background monitoring wells MW-8 and MW-9 had similar or higher sulfate concentrations than MW-11, MW-2, MW-2D, MW-3, MW-3D, MW-5, and MW-6.

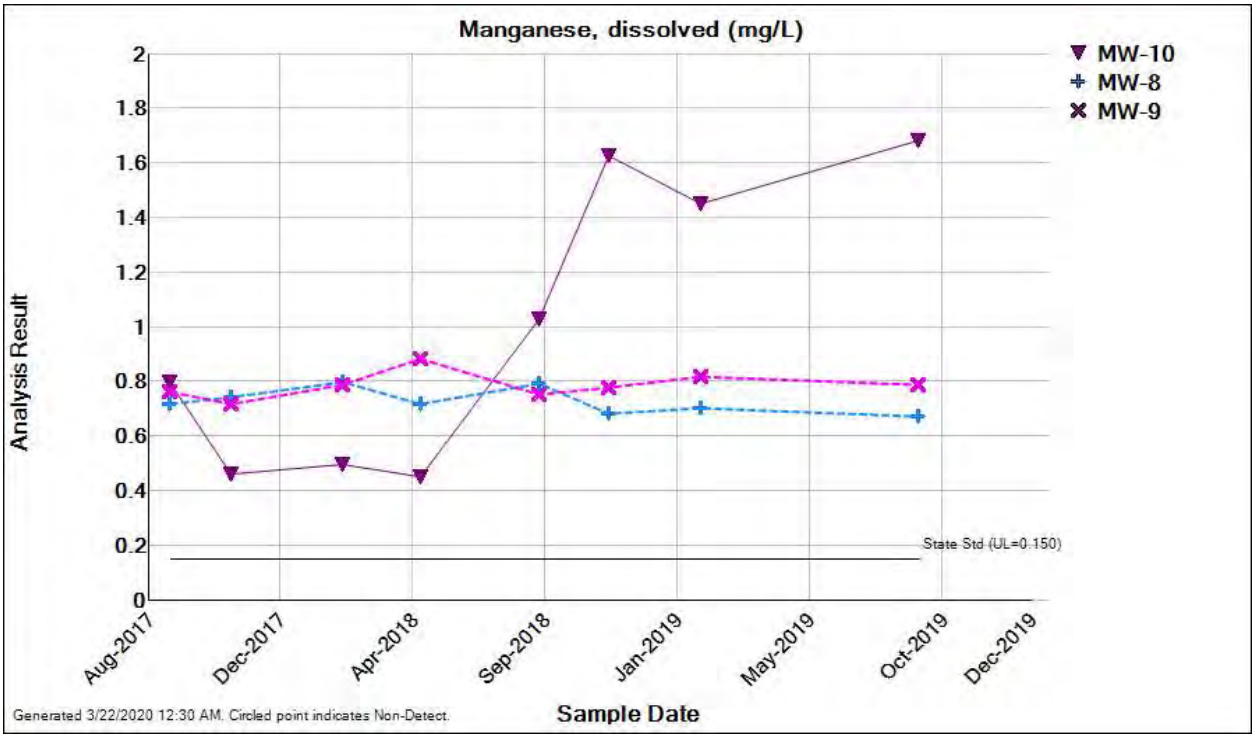


Figure 4-1. Increasing trends for manganese at compliance well MW-10 compared to background wells M-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

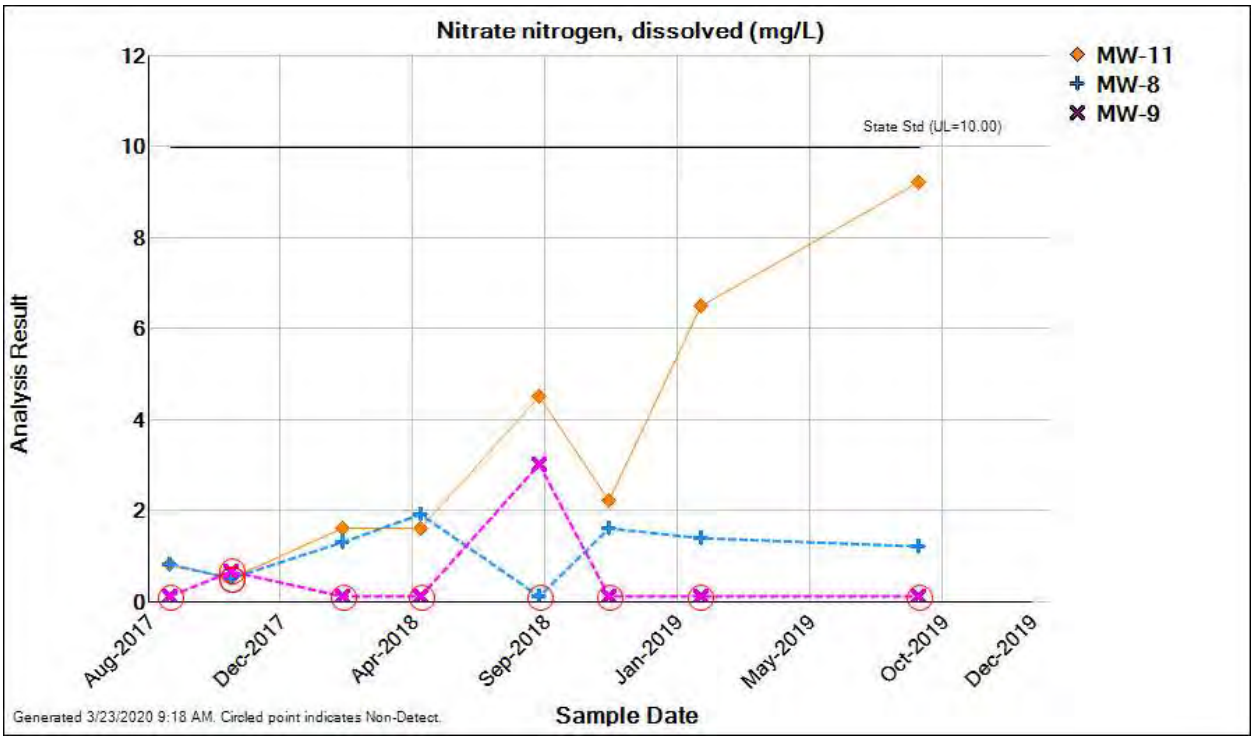


Figure 4-2. Increasing trends for nitrate nitrogen at compliance well MW-11 compared to background wells M-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Red circles indicate values below the detection limit.

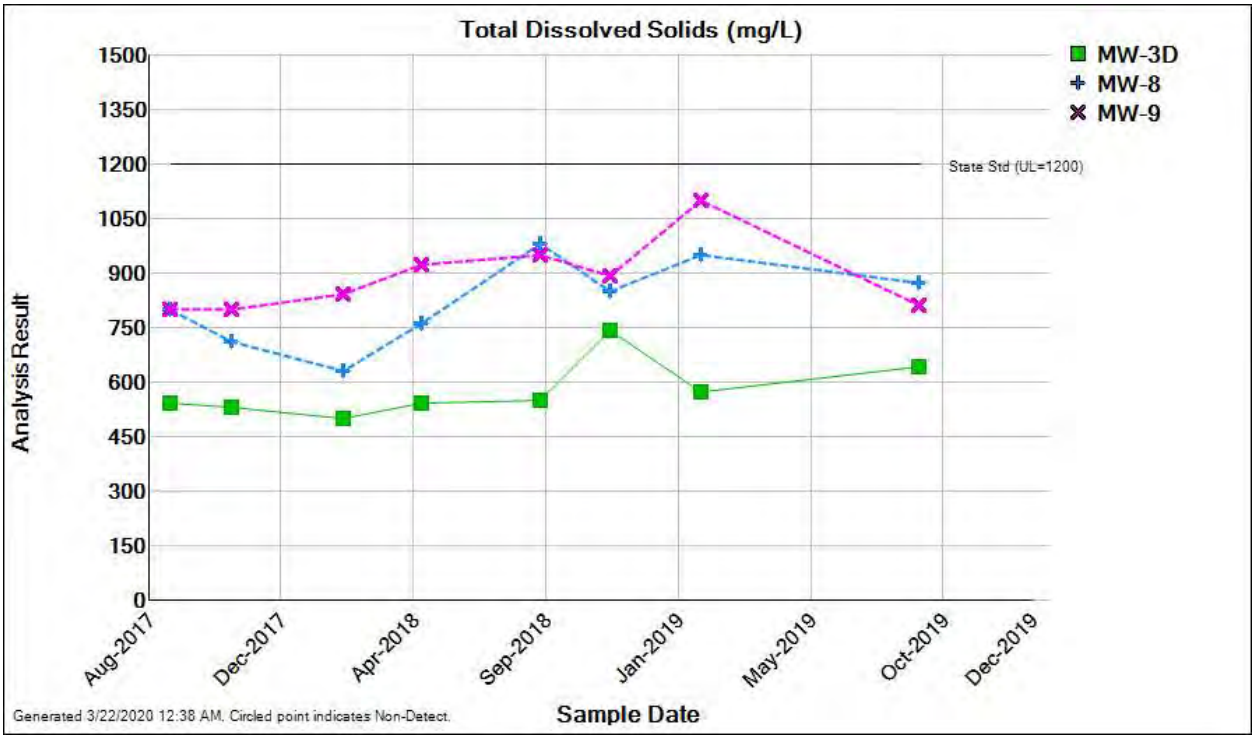


Figure 4-3. Increasing trends for total dissolved solids at compliance well MW-3D compared to background wells M-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

APPENDICES

Electronic Filing: Received, Clerk's Office 09/28/2020

APPENDIX A
GROUNDWATER MONITORING RESULTS
2017-2019 MONITORING PERIOD

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-2

	8/23/2017	10/23/2017	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001
As, diss, mg/L	0.009	0.013	0.045	<0.008	<0.008	<0.008	0.008
B, diss, mg/L	0.209	1.380	2.122	1.984	0.270	0.344	0.104
Ba, diss, mg/L	0.210	0.218	0.254	0.313	0.256	0.248	0.197
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	17.7	16.0	16.5	14.8	18.1	13.6	13.9
CN, total, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	0.003	0.009	0.003	0.003	<0.001	<0.001
Cr, diss, mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.002
Cu, diss, mg/L	0.006	<0.001	0.002	0.002	0.001	0.001	0.001
F, diss, mg/L	0.29	0.21	0.23	0.19	0.28	0.23	0.22
Fe, diss, mg/L	0.041	0.067	3.834	0.011	0.203	0.423	0.250
GW Depth (TOC), ft	20.90	18.60	17.20	17.50	10.00	17.90	14.30
GW Elv, ft	391.41	412.15	395.11	394.81	402.31	394.41	398.01
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.012	0.158	0.831	0.295	0.259	0.033	0.007
Ni, diss, mg/L	0.006	0.004	0.015	0.013	0.005	0.003	<0.003
NO3, diss, mg/L	9.40	<0.50	<0.10	1.20	3.80	2.90	9.50
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.80	6.78	6.88	6.69	6.90	6.86	7.00
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	42.8	28.0	18.4	16.3	31.3	30.8	26.8
Spec. Cond. (field), micromho	902	933	1075	1135	777	901	783
TDS, mg/L	680	600	720	700	500	580	480
Temp (Celcius), degrees C	16.60	16.30	16.50	16.50	16.50	16.20	16.40
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.055	0.003	0.002	0.002	0.002	0.003	0.004

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-2D

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	<0.001	0.002	0.003	0.002	<0.001	0.002	<0.001
As, diss, mg/L	0.024	0.021	0.019	0.024	0.022	0.011	0.002	0.014
B, diss, mg/L	1.734	1.902	4.247	5.269	5.888	1.044	1.984	0.318
Ba, diss, mg/L	0.350	0.354	0.386	0.407	0.396	0.348	0.393	0.227
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	0.001	<0.001	0.001	0.002	0.002	0.001	0.001	<0.001
Cl, diss, mg/L	16.8	14.0	14.8	14.6	16.9	16.3	15.2	26.2
CN, total, mg/L	<0.0010	<0.0010	0.0062	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001
Cu, diss, mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001
F, diss, mg/L	0.30	0.25	0.32	0.16	0.16	0.15	0.15	0.17
Fe, diss, mg/L	19.180	20.720	16.740	17.580	15.750	15.220	20.390	14.810
GW Depth (TOC), ft	22.60	18.60	28.60	16.90	19.00	10.80	18.80	13.80
GW Elv, ft	389.76	412.20	383.76	395.46	393.36	401.56	393.56	398.56
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	1.057	1.122	0.990	1.182	0.989	0.892	1.084	0.611
Ni, diss, mg/L	<0.003	<0.003	<0.003	0.004	0.003	<0.003	<0.003	<0.003
NO3, diss, mg/L	<0.10	<0.50	<0.10	<0.10	<0.10	1.20	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.93	7.01	7.14	6.99	7.08	7.00	6.99	7.00
Sb, diss, mg/L	<0.0010	0.0013	0.0015	<0.0010	0.0013	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	14.6	3.6	30.7	53.3	78.2	12.6	1.4	13.7
Spec. Cond. (field), micromho	1099	1124	1243	1342	1252	1065	1173	736
TDS, mg/L	780	740	680	880	840	680	740	430
Temp (Celcius), degrees C	16.30	16.40	15.70	16.40	17.20	15.40	15.90	15.40
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.012	0.004	<0.002	<0.002	0.002	0.002	0.004	0.003

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-3

	8/23/2017	10/23/2017	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.004	0.002	0.001	<0.001	0.002	0.003
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	0.242	0.783	1.438	1.300	0.251	0.523	0.127
Ba, diss, mg/L	0.165	0.195	0.174	0.188	0.090	0.259	0.120
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	18.4	17.0	18.4	20.2	8.2	17.1	24.0
CN, total, mg/L	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010
Co, diss, mg/L	0.001	0.002	0.003	0.005	<0.001	0.003	0.001
Cr, diss, mg/L	<0.001	0.001	<0.001	<0.001	0.003	<0.001	<0.001
Cu, diss, mg/L	0.018	<0.001	0.001	0.001	0.006	0.001	0.001
F, diss, mg/L	0.23	0.29	0.16	0.18	0.09	0.13	0.18
Fe, diss, mg/L	0.291	2.391	0.389	0.466	1.744	1.308	0.386
GW Depth (TOC), ft	21.30	17.00	15.40	18.20	10.00	18.20	12.90
GW Elv, ft	389.61	410.75	395.51	392.71	400.91	392.71	398.01
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.440	1.055	0.990	1.147	0.063	0.972	0.366
Ni, diss, mg/L	0.012	0.014	0.018	0.019	<0.003	0.011	0.006
NO3, diss, mg/L	<0.10	<0.50	<0.10	<0.10	2.70	1.30	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	0.008	<0.007	<0.007	<0.007
pH (field), STD	6.60	6.56	6.40	6.56	6.60	7.61	6.90
Sb, diss, mg/L	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	49.0	67.0	54.1	64.7	20.7	34.3	28.5
Spec. Cond. (field), micromho	1037	1144	1025	1160	800	1061	763
TDS, mg/L	660	750	680	740	290	700	440
Temp (Celcius), degrees C	17.30	16.90	16.90	16.80	15.40	16.50	16.90
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.052	0.006	0.003	0.005	0.014	0.008	0.002

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-3D

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.001	0.002	0.001	0.004	<0.001	0.004	<0.001
As, diss, mg/L	<0.008	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	6.792	7.700	6.429	6.893	7.196	4.469	6.364	0.674
Ba, diss, mg/L	0.172	0.152	0.176	0.136	0.139	0.269	0.178	0.283
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001
Cl, diss, mg/L	45.8	41.0	37.0	46.4	48.1	30.0	39.6	20.5
CN, total, mg/L	<0.0010	<0.0010	0.0076	<0.0010	0.0013	<0.0010	<0.0010	0.0017
Co, diss, mg/L	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	<0.001	0.001	0.001	0.001	<0.001	0.001	<0.001
F, diss, mg/L	0.38	0.34	0.35	0.11	0.12	0.10	0.11	0.16
Fe, diss, mg/L	5.591	4.693	2.990	2.947	2.649	7.245	5.076	13.330
GW Depth (TOC), ft	21.90	17.60	29.00	16.00	18.80	9.80	19.00	13.10
GW Elv, ft	389.58	411.32	382.48	395.48	392.68	401.68	392.48	398.38
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.377	0.325	0.310	0.275	0.232	0.562	0.361	0.745
Ni, diss, mg/L	0.004	<0.003	0.003	0.004	<0.003	<0.003	<0.003	<0.003
NO3, diss, mg/L	<0.10	<0.50	<0.10	<0.10	<0.10	1.40	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.96	7.10	7.40	7.28	7.38	6.70	7.13	6.70
Sb, diss, mg/L	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	168.4	180.0	176.7	175.4	171.2	67.4	156.7	69.4
Spec. Cond. (field), micromho	820	750	913	779	778	1112	840	1108
TDS, mg/L	540	530	500	540	550	740	570	640
Temp (Celcius), degrees C	16.50	16.40	15.50	16.60	16.90	15.40	16.20	15.80
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.012	0.003	<0.002	0.002	<0.002	0.002	0.002	0.002

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-5

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.002	0.004	0.002	0.003	<0.001	0.003	<0.001
As, diss, mg/L	0.082	0.079	0.077	0.092	0.086	<0.008	0.081	0.099
B, diss, mg/L	1.642	1.661	1.305	1.433	1.760	<0.011	1.953	1.945
Ba, diss, mg/L	0.077	0.069	0.070	0.060	0.082	0.019	0.111	0.096
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	9.4	8.1	8.0	6.8	7.4	0.6	6.3	7.5
CN, total, mg/L	0.0063	0.0076	0.0097	0.0069	0.0056	<0.0010	0.0049	0.0058
Co, diss, mg/L	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	0.004	<0.001	0.001
Cu, diss, mg/L	0.001	<0.001	0.001	0.001	0.001	0.002	0.001	0.002
F, diss, mg/L	0.43	0.45	0.45	0.27	0.25	0.07	0.26	0.28
Fe, diss, mg/L	1.767	1.387	1.715	1.473	2.166	0.944	1.184	2.314
GW Depth (TOC), ft	36.70	38.60	44.00	36.40	36.00	30.00	34.00	29.80
GW Elv, ft	396.23	432.75	388.93	396.53	396.93	402.93	398.93	403.13
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	1.940	1.696	1.833	1.665	2.086	0.044	2.210	2.530
Ni, diss, mg/L	0.006	<0.003	0.003	0.004	0.005	<0.003	0.004	<0.003
NO3, diss, mg/L	<0.10	<0.50	<0.10	<0.10	<0.10	1.50	<0.10	11.40
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.43	7.43	7.49	7.53	7.44	9.00	7.44	7.40
Sb, diss, mg/L	<0.0010	0.0017	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	0.0017
Se, diss, mg/L	<0.009	<0.009	0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	83.5	82.0	40.8	42.0	87.6	3.2	95.4	88.7
Spec. Cond. (field), micromho	981	1000	1028	985	1125	60	1121	1073
TDS, mg/L	620	710	750	620	740	50	800	690
Temp (Celcius), degrees C	17.00	16.80	15.70	17.40	17.20	12.10	16.20	17.70
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	<0.013	0.005	<0.002	0.006	<0.002	0.010	0.003	0.006

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-6

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	<0.001	0.001	<0.001	0.002	<0.001	<0.001	<0.001
As, diss, mg/L	0.062	0.074	0.081	0.080	0.077	0.052	0.066	0.052
B, diss, mg/L	5.028	5.105	4.132	4.655	4.744	4.663	4.924	4.865
Ba, diss, mg/L	0.276	0.320	0.333	0.338	0.308	0.264	0.291	0.267
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	0.001	0.001	0.002	0.003	0.002	0.001	0.001	<0.001
Cl, diss, mg/L	28.0	26.0	25.7	25.6	24.8	24.8	23.2	23.1
CN, total, mg/L	<0.0010	<0.0010	0.0016	<0.0010	0.0025	<0.0010	<0.0010	0.0012
Co, diss, mg/L	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	<0.001	0.001	0.002	0.001	<0.001	0.001	0.001
Cu, diss, mg/L	0.001	<0.001	0.001	0.020	0.001	<0.001	<0.001	<0.001
F, diss, mg/L	0.74	0.66	0.61	0.44	0.43	0.43	0.45	0.47
Fe, diss, mg/L	17.980	22.190	27.060	23.370	20.160	14.160	17.540	12.860
GW Depth (TOC), ft	41.40	39.60	47.20	38.00	39.50	32.00	39.00	33.90
GW Elv, ft	391.69	432.91	385.89	395.09	393.59	401.09	394.09	399.19
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	2.467	2.851	2.750	2.979	2.680	2.070	2.446	2.240
Ni, diss, mg/L	0.007	0.005	0.003	0.015	0.009	0.005	0.006	0.004
NO3, diss, mg/L	0.30	<0.50	1.20	<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	0.008	0.008	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.15	7.24	7.23	7.23	7.22	7.30	7.21	7.30
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	21.3	2.9	0.7	11.3	13.0	34.9	18.3	24.7
Spec. Cond. (field), micromho	773	835	931	843	838	762	807	735
TDS, mg/L	450	520	420	550	520	490	520	440
Temp (Celcius), degrees C	16.30	16.10	14.80	16.70	16.60	15.30	15.60	16.90
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.016	0.005	0.002	0.006	0.003	0.002	0.003	0.002

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-6D

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	<0.001	0.007	0.005	0.004	<0.001	0.001	0.004
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	0.008	<0.008	<0.008	<0.008
B, diss, mg/L	4.838	4.671	3.217	3.833	3.898	4.485	4.555	5.603
Ba, diss, mg/L	0.246	0.274	0.322	0.293	0.297	0.277	0.252	0.194
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	40.5	34.0	21.3	32.6	31.0	46.2	38.4	41.7
CN, total, mg/L	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	0.0016
Co, diss, mg/L	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001
Cu, diss, mg/L	<0.001	<0.001	0.001	0.001	0.001	0.001	<0.001	0.001
F, diss, mg/L	0.38	0.34	0.41	<0.10	0.06	<0.05	<0.05	<0.10
Fe, diss, mg/L	0.471	0.606	0.868	0.664	0.639	0.448	0.460	0.210
GW Depth (TOC), ft	41.80	40.00	48.40	38.20	40.00	32.00	39.00	34.20
GW Elv, ft	391.75	433.37	385.15	395.35	393.55	401.55	394.55	399.35
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.170	0.204	0.274	0.232	0.221	0.166	0.169	0.094
Ni, diss, mg/L	<0.003	<0.003	<0.003	0.005	0.003	<0.003	<0.003	<0.003
NO3, diss, mg/L	<0.10	<0.50	1.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	0.005	0.008	<0.007	<0.007	<0.007
pH (field), STD	8.01	7.98	7.96	8.02	7.96	8.10	8.02	8.20
Sb, diss, mg/L	<0.0010	0.0016	0.0022	<0.0010	0.0011	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	0.010	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	262.9	250.0	389.8	252.0	299.0	215.7	212.2	165.3
Spec. Cond. (field), micromho	914	1019	1179	1140	1128	1036	957	725
TDS, mg/L	750	730	940	820	850	740	680	470
Temp (Celcius), degrees C	16.10	16.10	15.30	16.30	16.90	15.30	15.60	17.60
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.012	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-8

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.001	0.004	0.004	0.001	<0.001	<0.001	0.001
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	0.848	0.699	0.513	0.642	0.602	0.648	0.837	0.834
Ba, diss, mg/L	0.106	0.128	0.099	0.196	0.140	0.117	0.112	0.107
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	<0.001	0.002	0.002	<0.001	<0.001	<0.001
Cl, diss, mg/L	41.2	70.0	19.4	80.1	102.5	94.9	58.5	90.0
CN, total, mg/L	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	0.0016
Co, diss, mg/L	0.002	0.001	0.003	0.002	0.001	0.002	0.003	0.002
Cr, diss, mg/L	<0.001	0.001	<0.001	0.006	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001
F, diss, mg/L	0.47	0.41	0.48	0.35	0.22	0.33	0.34	0.28
Fe, diss, mg/L	0.016	13.550	0.032	0.020	15.450	0.021	0.035	0.012
GW Depth (TOC), ft	21.90	22.50	28.60	20.50	18.30	14.50		15.30
GW Elv, ft	394.37	416.10	387.67	395.77	397.97	401.77		400.97
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.716	0.743	0.797	0.716	0.790	0.679	0.703	0.670
Ni, diss, mg/L	0.012	0.005	0.016	0.017		0.009	0.011	0.010
NO3, diss, mg/L	0.80	<0.50	1.30	1.90	<0.10	1.60	1.40	1.20
Pb, diss, mg/L	<0.007	<0.007	<0.007	0.010	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.83	6.79	6.82	6.90	6.89	6.80	6.92	6.80
Sb, diss, mg/L	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
Se, diss, mg/L	<0.009	<0.009	0.011	0.013	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	145.0	120.0	136.8	105.1	136.7	105.4	117.1	120.1
Spec. Cond. (field), micromho	1107	1227	1120	1203	1287	1306	1190	1243
TDS, mg/L	800	710	630	760	980	850	950	870
Temp (Celcius), degrees C	16.70	15.70	15.40	17.10	16.90	15.50	17.10	16.50
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.006	0.007	<0.002	<0.002	0.002	0.002	0.007	0.003

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-9

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.002	<0.001	0.002	0.001	<0.001	<0.001	<0.001
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.012
B, diss, mg/L	0.673	0.800	0.175	0.558	0.611	0.629	0.722	0.743
Ba, diss, mg/L	0.135	0.114	0.151	0.138	0.110	0.155	0.157	0.146
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	<0.001	0.002	0.001	0.001	0.001	<0.001
Cl, diss, mg/L	67.1	92.0	80.6	100.5	106.2	104.0	77.8	28.5
CN, total, mg/L	0.0010	<0.0010	0.0038	0.0018	<0.0010	<0.0010	<0.0010	0.0017
Co, diss, mg/L	<0.001	0.003	<0.001	<0.001	0.003	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001
F, diss, mg/L	0.36	0.47	0.43	0.21	0.33	0.24	0.22	0.22
Fe, diss, mg/L	15.580	0.050	17.880	15.040	0.039	16.780	17.760	17.500
GW Depth (TOC), ft	19.60	19.50	26.30	17.50	21.10	11.60		12.80
GW Elv, ft	393.80	413.23	387.10	395.90	392.30	401.80		400.60
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.761	0.714	0.787	0.881	0.750	0.776	0.816	0.786
Ni, diss, mg/L	0.005	0.010	0.004	0.007		<0.003	0.004	<0.003
NO3, diss, mg/L	<0.10	<0.67	<0.10	<0.10	3.00	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.86	6.94	6.82	6.93	6.82	6.90	6.98	6.80
Sb, diss, mg/L	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	173.7	110.0	170.7	122.4	108.9	154.9	154.2	130.2
Spec. Cond. (field), micromho	1111	1005	1328	1288	1276	1331	1291	1169
TDS, mg/L	800	800	840	920	950	890	1100	810
Temp (Celcius), degrees C	16.70	15.80	15.00	16.80	16.60	15.80	16.80	17.00
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.017	0.006	<0.002	<0.002	<0.002	0.002	0.005	0.005

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-10

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	0.002	0.002	0.001	0.001	<0.001	<0.001	0.002
As, diss, mg/L	0.035	<0.008	0.013	0.014	0.030	0.014	0.030	0.052
B, diss, mg/L	21.550	19.290	18.000	19.350	19.550	19.620	19.340	18.240
Ba, diss, mg/L	0.051	0.048	0.044	0.035	0.044	0.060	0.060	0.046
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	24.1	34.0	42.0	15.9	20.9	29.4	21.6	18.6
CN, total, mg/L	<0.0010	0.0016	0.0069	0.0014	0.0012	<0.0010	<0.0010	0.0022
Co, diss, mg/L	0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.001	0.001
Cr, diss, mg/L	<0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.005	0.002	0.002	0.001	0.001	0.001	0.001	0.001
F, diss, mg/L	0.76	0.66	0.79	0.19	0.18	0.15	0.17	0.23
Fe, diss, mg/L	0.515	0.018	0.013	0.134	0.406	0.221	0.539	2.077
GW Depth (TOC), ft	31.30	30.50	39.50	28.50	30.00	21.40	29.00	24.00
GW Elv, ft	393.69	424.82	385.49	396.49	394.99	403.59	395.99	400.99
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.796	0.461	0.496	0.451	1.026	1.627	1.449	1.679
Ni, diss, mg/L	<0.003	<0.003	0.004	0.004	0.004	0.003	<0.003	<0.003
NO3, diss, mg/L	<0.10	<0.50	2.00	<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.86	7.13	7.51	8.32	7.52	7.30	7.39	7.40
Sb, diss, mg/L	0.0015	0.0022	0.0019	0.0014	0.0039	0.0014	0.0016	0.0022
Se, diss, mg/L	<0.009	<0.009	<0.009	0.004	<0.009	<0.009	0.006	<0.009
SO4, diss, mg/L	890.1	720.0	<0.2	751.1	977.3	1021.7	954.0	662.9
Spec. Cond. (field), micromho	1484	1725	1778	1458	1784	1986	1947	1500
TDS, mg/L	1440	1540	1590	1360	1780	1750	1860	1280
Temp (Celcius), degrees C	17.60	16.30	15.10	17.70	17.00	15.80	16.00	17.10
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.005	0.003	<0.002	<0.002	<0.002	0.002	<0.002	0.002

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-11

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.002	0.004
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	0.473	0.764	0.704	1.106	0.509	0.048	0.487	0.198
Ba, diss, mg/L	0.193	0.188	0.282	0.175	0.161	0.137	0.183	0.187
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	13.1	2.2	12.7	15.2	18.2	20.0	14.4	16.4
CN, total, mg/L	0.0136	<0.0010	0.0018	0.0020	<0.0010	<0.0010	<0.0010	0.0010
Co, diss, mg/L	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.004	<0.001	0.002	0.002	0.001	0.001	0.001	0.001
F, diss, mg/L	0.28	0.30	0.23	0.21	0.25	0.37	0.28	0.28
Fe, diss, mg/L	0.084	0.346	1.732	0.047	0.005	0.011	0.026	0.013
GW Depth (TOC), ft	19.20	19.60	26.90	17.90	18.40	9.40	17.50	12.60
GW Elv, ft	393.54	412.57	385.84	394.84	394.34	403.34	395.24	400.14
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	0.006	0.057	1.244	0.129	0.001	0.001	0.001	0.002
Ni, diss, mg/L	0.003	0.005	0.009	0.010	0.006	0.003	0.003	<0.003
NO3, diss, mg/L	0.80	<0.50	1.60	1.60	4.50	2.20	6.50	9.20
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.67	6.79	6.79	6.61	6.79	6.80	6.74	6.80
Sb, diss, mg/L	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	0.010	<0.009	0.009	<0.009
SO4, diss, mg/L	92.4	73.0	127.8	114.4	66.5	41.1	45.4	42.0
Spec. Cond. (field), micromho	1044	1061	1244	1139	950	731	890	927
TDS, mg/L	2770	680	1010	780	690	450	680	640
Temp (Celcius), degrees C	16.30	16.30		16.20	16.40	17.10	16.10	16.20
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.010	0.017	0.003	0.002	<0.002	0.003	0.002	<0.002

Venice
Groundwater Monitoring Results 2017-2019 Monitoring Period

Date Range: 08/01/2017 to 12/31/2019
Well: MW-11D

	8/23/2017	10/23/2017	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019
Ag, diss, mg/L	<0.001	<0.001	0.002	0.003	0.001	<0.001	0.002	<0.001
As, diss, mg/L	0.014	0.009	0.012	0.014	<0.008	<0.008	0.009	0.012
B, diss, mg/L	3.104	3.106	10.910	5.738	5.678	6.814	4.153	0.346
Ba, diss, mg/L	0.172	0.166	0.201	0.171	0.175	0.177	0.161	0.068
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cd, diss, mg/L	0.001	0.001	0.001	0.002	0.002	0.001	0.001	<0.001
Cl, diss, mg/L	57.3	48.0	35.9	47.8	49.8	56.9	56.7	31.9
CN, total, mg/L	0.0037	0.0037	0.0146	0.0132	0.0102	0.0067	0.0041	0.0026
Co, diss, mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	<0.001	<0.001	0.001	0.001	0.001	0.001	<0.001	<0.001
F, diss, mg/L	0.47	0.50	0.35	0.19	0.21	0.20	0.20	0.26
Fe, diss, mg/L	16.890	16.370	22.630	20.060	18.690	17.610	17.230	5.673
GW Depth (TOC), ft	22.60	18.40	29.80	16.80	19.60	11.00	19.50	12.60
GW Elv, ft	389.90	412.34	382.70	395.70	392.90	401.50	393.00	399.90
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Mn, diss, mg/L	2.831	2.684	3.331	3.065	2.827	2.657	2.532	0.908
Ni, diss, mg/L	0.004	<0.003	<0.003	0.006	0.003	0.004	0.003	<0.003
NO3, diss, mg/L	<0.10	<0.50	<0.10	<0.10	<0.10	1.20	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.95	6.95	7.09	6.53	6.98	6.90	6.96	7.10
Sb, diss, mg/L	0.0015	0.0014	0.0014	<0.0010	0.0011	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	270.4	220.0	511.0	320.3	291.8	272.7	184.6	26.0
Spec. Cond. (field), micromho	1309	1287	1637	1522	1479	1456	1364	522
TDS, mg/L	970	960	1500	1220	1230	1090	960	280
Temp (Celcius), degrees C	16.00	15.80	15.20	16.10	16.70	15.00	15.70	16.20
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn, diss, mg/L	0.003	0.003	<0.002	<0.002	0.002	<0.002	0.007	<0.002

APPENDIX B
GROUNDWATER MONITORING
FIELD DATA WORKSHEETS
2017-2019 MONITORING PERIOD

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 08/23/17

River Level: 07.4 **feet** 379.94+7.4=387.34

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	20.9	22.6	21.3	21.9	36.7	41.4
Total Well Depth (±0.01 feet)	28.7	47.5	25	47.0	49.0	51.0
Time purging began (24-hour clock)	14:15	14:30	15:00	15:10	16:35	15:40
Conductivity after 10 minutes µS/cm	903	1106	1005	809	956	746
Temperature °C	17.0	16.4	17.9	17.4	17.6	17.3
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	902	1099	1037	820	981	773
Time to reach final conductivity (min)	5	5	5	5	5	5
Temperature °C	16.6	16.3	17.3	16.5	17.0	16.3
pH (on site) (±0.01)	6.80	6.93	6.6	6.96	7.43	7.15

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

1 pm

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)		✓	✓		not marked	no cap
Casing and concrete pad in good condition (note any deficiency)		✓	✓		✓	no
Internal piping unobstructed and in good condition (note any deficiency)		✓	✓		Piping above ground →	
Water Level (±0.01 feet, from top of casing mark)	41.8	21.9	19.6	31.3	19.2	22.6
Total Well Depth (±0.01 feet)	68.4	42.7	41.4	43.8	28.7	48.1
Time purging began (24-hour clock)	16:10	11:50	11:20	17:10	13:20	13:25
Conductivity after 10 minutes µS/cm	877	1086	1037	1482	1021	1290
Temperature °C	17.4	18.0	17.7	18.2	16.6	16.7
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	914	1107	1111	1484	1044	1309
Time to reach final conductivity (min)	5	5	5	5	5	5
Temperature °C	16.1	16.7	16.7	17.6	16.3	16.0
pH (on site) (±0.01)	8.01	6.83	6.86	7.86	6.67	6.95

Sample collectors: 445 / CTB

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

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Venice Groundwater Monitoring Field Data Worksheet

NOTES: _____

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

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October 23, 2017 Project No.178-4199

Craig Giesmann, P.E., P.M.P.
Manager, Water Quality Environmental Services
Ameren Services

RE: MONITORING WELL REPAIRS AT THE VENICE ENERGY CENTER, MADISON COUNTY, ILLINOIS

Dear Mr. Giesmann,

Golder Associates Inc. (Golder) is pleased to present Ameren Services (Ameren) with this letter detailing the well re-development and surface completion repairs for monitoring wells MW-11 and MW-11D at the Venice Energy Center (VEC) in Madison County, Illinois. This letter contains the well development forms (Attachment A) and a photo log (Attachment B).

For the well re-development, Golder used an inertial pump with a surge block ring to surge and purge the wells and a stainless steel bailer to surge and remove sediment from the bottom of the wells. Development was deemed completed when field parameters (pH, specific conductivity, and temperature) were within 10 percent difference for three consecutive measurements and turbidity of the water was below 10 Nephelometric Turbidity Unit (NTU).

For the well protective cover repair, Golder subcontracted Bulldog Drilling to provide a crew to remove the damaged surface completion and install new protective covers. Well repair activities were done under the direct supervision of a Golder Engineer. After removing the damaged covers, new protective covers were installed in concrete to a depth of 2.5 feet below ground surface. New gasketed steel lids and protective covers were installed. A high visibility flag and fiberglass pole were installed with the surface completion for each well. A 3M Passive Electronic Marker System (EMS) XR/iD ball marker was placed between the two wells at coordinates 2446742.2 feet East, 14049907.0 feet North (Illinois State Plane West) at a depth of 44 inches below ground surface.

Golder appreciates this opportunity to provide hydrogeological and engineering support services to Ameren. If you have any questions or comments regarding the information provided please call our office at (636) 724-9191.

GOLDER ASSOCIATES INC.

Mark N. Haddock, P.E., R.G.
Principal and Senior Consultant

Jeffrey S. Ingram, R.G.
Staff Geologist

Ryan J. Feldmann
Geological Engineer

Attachments or Enclosures:

Attachment A – Well Development Forms

Attachment B – Photo Log

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ATTACHEMENT A - Well Development Forms

Electronic Filing: Received, Clerk's Office 09/28/2020

Golder Associates WELL DEVELOPMENT/PURGING FORM

Project Ref: Ameren - Venice EC **Project No.:** 178-4199

Location MW-11

Monitored By: RJF Date 9-27-17 Time 1015

Well Piezometer Data

10' Screen

Depth of Well (from (top of PVC) or ground)	29.26	feet
Depth of Water (from (top of PVC) or ground)	22.00	feet
Radius of Casing	2	inches
	—	feet
Casing Volume	—	cubic feet
	18.811	gallons

(29.26-22)(0.163) = 1.183
(12)(1.469) = 17.628
18.811

Development / Purging Discharge Data

Purging Method: Waterra

Start Purging Date 9-27-17 Time 1018

Stop Purging Date 9-28-17 Time 1154

Monitoring

Date	Time	Volume Discharge (gals)	Temp (°C)	pH	Spec.Cond. µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Redox Potential (+/- mV)	WL (ft TOC)	Appearance of Water and Comments
9-27	1030	15	15.33	6.93	1345	>1000	64.7	-40.8	25.40	very brown + cloudy; silts at bott of well
	1042	30	15.02	6.76	1347	>1000	43.3	6.6	26.75	very brown + cloudy
	1053	45	15.15	6.63	1354	>1000	38.9	32.2	22.72	" " "
	1102	60	14.97	6.74	1357	>1000	40.2	31.9	22.34	" " "
	1112	65	15.64	6.81	1299	>1000	119.4	34.9	22.48	" " "
	1221	80	15.91	6.80	1307	>1000	70.1	72.3	23.41	" " "
	1232	100	14.96	6.63	1332	>1000	48.3	86.7	26.36	" " "
	1242	115	14.99	6.59	1339	>1000	34.2	89.0	25.41	" " "
	1249	140	15.04	6.65	1321	>1000	72.1	90.0	26.03	" " "
	1426	170	16.22	6.43	1355	649	134.6	139.6	25.42	cloudy / white
	1445	185	15.23	6.46	1276	>1000	35.8	143.3	26.52	very cloudy + brown;
	1451	200	15.09	6.24	1330	967	30.3	148.1	27.02	cloudy (< than above)
	1458	210	15.01	6.42	1325	771	32.1	130.8	27.2	cloudy w/ sand particles
	1505	220	14.87	6.46	1327	520	64.9	121.0	26.2	cloudy (< than before)
	1511	230	15.02	6.48	1350	712	72.6	118.3	27.3	cloudy w/ minimal sand grains
	1518	235	15.26	6.57	1316	129	48.2	112.2	23.18	cloudy + slightly brown
	1523	240	15.31	6.62	1354	150	45.1	107.0	24.13	cloudy
	1529	250	14.98	6.58	1365	>1000	26.9	108.7	22.41	"
	1550	255	15.98	6.80	1340	342	63.4	93.1	22.06	"
	1621	257.5	16.02	6.82	1310	222	64.8	105.5	22.33	"
	1625	260	15.74	6.56	1331	221	54.1	119.7	22.64	"
	1632	262	15.87	6.68	1335	483	64.0	113.3	22.48	"
	1639	262	16.61	6.90	1259	587	112.9	104.1	22.39	"
	1709	Stopped Development for day +90 to dump tanks								
9-28	1042	290	17.93	6.54	1167	21.5	71.7	200.7	22.67	clear
	1052	292.5	16.86	6.42	1166	23.1	55.0	197.0	22.73	clear
	1057	294	15.57	6.25	1132	15.6	51.2	200.8	22.98	clear

T.D. after development = 29.22 ft btoc

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Golder Associates WELL DEVELOPMENT/PURGING FORM

Project Ref: Ameren - Venice EC **Project No.:** 178-4199

Location MW-11

Monitored By: RJF Date 9-28-17 Time 1106

Well Piezometer Data

(circle one)

Depth of Well (from top of PVC or ground)	29.20	feet
Depth of Water (from top of PVC or ground)	22.13	feet
Radius of Casing	2	inches
	—	feet
Casing Volume	—	cubic feet
	18.811	gallons

Development / Purging Discharge Data

Purging Method: waterra

Start Purging Date 9-27-17 Time 1018

Stop Purging Date 9-28-17 Time 1154

Monitoring

Date	Time	Volume Discharge (gals)	Temp (°C)	pH	Spec.Cond. (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Redox Potential (+/- mV)	WL (ft TOC)	Appearance of Water and Comments
9-28	1106	300.0	15.29	6.17	1137	15.3	35.8	204.3	22.97	clear
	1113	305.0	15.28	6.24	1135	14.0	30.7	200.9	23.01	clear
	1122	307.5	15.32	6.40	1128	13.4	27.1	193.2	23.02	clear
	1134	310	15.45	6.54	1129	12.0	26.6	186.0	23.09	clear
	1144	312.5	15.42	6.58	1131	10.9	24.2	183.9	23.14	clear
	1154	318.5	15.44	6.63	1130	9.70	25.6	180.5	23.08	clear

Electronic Filing: Received, Clerk's Office 09/28/2020

Golder Associates WELL DEVELOPMENT/PURGING FORM

Project Ref: Ameren - Venice EC **Project No.:** 178-4199

Location MW-11D

Monitored By: RJF/JS Date 9-27-17 Time 0842

Well Piezometer Data

5' screen

(circle one)

Depth of Well (from top of PVC or ground) 49.04 feet

Depth of Water (from top of PVC or ground) 26.31 feet

Radius of Casing 2 inches

feet

0.163 · (49.04 − 26.31) = 3.71

Casing Volume cubic feet

14.0 gal gallons

1.469(7) = 10.283

Development / Purging Discharge Data

Purging Method Waterra

Start Purging Date 9-27-17 Time 0848

Stop Purging Date Time

Monitoring 10% <10

Date	Time	Volume Discharge (gals)	Temp (°C)	pH	Spec.Cond. (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Redox Potential (+/- mV)	WL (ft TOC)	Appearance of Water and Comments
9-27	0854	15	15.23	6.85	1540	113	9.7	-7.0	26.70	slightly cloudy, bad odor
	0902	25	14.83	6.22	1535	63.1	8.18	-67.4	26.67	slightly cloudy
	0907	40	14.67	6.30	1539	15.1	10.7	-75.6	26.70	clear
	0918	50	15.94	6.68	1538	246	1.18	-85.6	26.80	slightly cloudy
	0932	60	15.06	6.83	1543	37.1	9.0	-87.4	26.49	clear
	0939	75	14.84	6.70	1538	13.8	12.1	-95.2	26.51	clear
	0945	90	15.42	6.74	1538	12.5	23.5	-94.3	26.39	clear
	0951	100	15.02	6.95	1536	8.00	22.9	-98.1	26.37	clear

TD after Dev't: 49.52 ft

ATTACHEMENT B - PHOTO LOG

Project Title: Venice Energy Center – Well Development and Surface Repairs	
PHOTO 1 MW-11 prior to re-development and surface completion repairs.	
PHOTO 2 Location of wells prior to work beginning.	

PHOTO 3 Wells prior to concrete being place for surface completion.	
PHOTO 4 Wells with new surface completion and high-visibility flags.	

PHOTO 5 Close up of new well surface completion while concrete is curing.	

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 10/23/17

River Level: 14.45 Ft @ 0800 feet 235kcfs

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)	✓	✓	✓	✓	✓	✓
Casing and concrete pad in good condition (note any deficiency)	✓	✓	✓	✓	✓	✓
Internal piping unobstructed and in good condition (note any deficiency)	✓	✓	✓	✓	✓	✓
Water Level (±0.01 feet, from top of casing mark)	18.6	18.6	17.0	17.6	38.6	39.6
Total Well Depth (±0.01 feet)	29	47.8	25.3	47	49.3	51
Time purging began (24-hour clock)	13:45	13:35	14:10	14:20	15:20	14:45
Conductivity after 10 minutes µS/cm	923	1123	1131	711	999	815
Temperature °C	16.4	16.4	17.3	16.7	17.2	16.4
Conductivity after 15 minutes (µS/cm)	933	1124	1144	750	1000	835
Temperature °C	16.3	16.4	16.9	16.4	16.8	16.1
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)						
Temperature °C	6.78	7.01	6.56	7.10	7.43	7.24
pH (on site) (±0.01)	↓	↓	↓	↓	↓	↓

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)		✓	no sign			
Casing and concrete pad in good condition (note any deficiency)		✓	✓			
Internal piping unobstructed and in good condition (note any deficiency)		✓	✓			
Water Level (±0.01 feet, from top of casing mark)	40	22.5	19.5	30.5	19.6	18.4
Total Well Depth (±0.01 feet)	69	43	41.0	44	29	49
Time purging began (24-hour clock)	15:00	11:20	11:00	15:50	13:00	13:15
Conductivity after 10 minutes µS/cm	1017	1289	1032	[illegible]	1057	1295
Temperature °C	16.4	15.6	15.8	16.6	16.4	15.5
Conductivity after 15 minutes (µS/cm)	1019	1227	1005	1725	1061	1287
Temperature °C	16.1	15.7	15.8	16.3	16.3	15.8
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)						
Temperature °C	16.1	15.7	15.8	16.3	16.3	15.8
pH (on site) (±0.01)	7.98	6.79	6.94	7.13	6.79	6.95

Sample collectors: Carl B + Shawn S.

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 2/12/18

River Level: _____ feet

(DUP)

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)	No Sample		no Sample			
Casing and concrete pad in good condition (note any deficiency)			Sample			
Internal piping unobstructed and in good condition (note any deficiency)			no sample			
Water Level (±0.01 feet, from top of casing mark)	28.4	28.6	25.2	29	44	47.2
Total Well Depth (±0.01 feet)	28.9	48.0	25.6	47.2	49	51.2
Time purging began (24-hour clock)	:__	13:15	:__	13:50	14:25	14:45
Conductivity after 10 minutes µS/cm		1241	no water	915	1026	931
Temperature °C		15.0		15.3		14.8
Conductivity after 15 minutes (µS/cm)		1243		913		
Temperature °C		15.7		15.5	15.6	
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm					1028	
Time to reach final conductivity (min)		1330		1405	1440	took 1500 after Sample's filled.
Temperature °C					15.7	
pH (on site) (±0.01)	dry well	7.14	dry well	7.40	7.49	7.23

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)		OK	ok			
Casing and concrete pad in good condition (note any deficiency)		OK	ok			
Internal piping unobstructed and in good condition (note any deficiency)		OK	ok			
Water Level (±0.01 feet, from top of casing mark)	48.4	28.6	26.3'	39.5	26.7	29.8
Total Well Depth (±0.01 feet)	64.5	43.1	41.5'	44.1	29.2	49.4
Time purging began (24-hour clock)	:	10:45	11:05	15:30	12:35	12:55
Conductivity after 10 minutes µS/cm	1179	1115	1363	1794	1244	1636
Temperature °C	15.3	15.3	14.9	15.0		15.2
Conductivity after 15 minutes (µS/cm)	1179			1779		1637
Temperature °C	15.3	1045		15.1		15.2
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm		1120	1329			
Time to reach final conductivity (min)	1520	1100	11:20	1545	1250	1310
Temperature °C		15.4	15.0			
pH (on site) (±0.01)	7.96	6.82	6.82	7.51	6.79	7.09

Sample collectors: _____

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 05/01/2018

River Level: 15.43 feet

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	17.2	16.9	15.4	16.0	36.4	38
Total Well Depth (±0.01 feet)	23.2	47.9	25.3	47	49.1	51
Time purging began (24-hour clock)	14:05	13:45	14:20	14:30	15:10	14:50
Conductivity after 10 minutes µS/cm	1059	1324	978	779	967	823
Temperature °C	16.7	17.0	17.0	16.8	17.7	16.9
Conductivity after 15 minutes (µS/cm)	1075	1342	1025	779	985	843
Temperature °C	16.5	16.4	16.9	16.6	17.4	16.7
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)	15	15	15	15	15	15
Temperature °C						
pH (on site) (±0.01)	6.88	6.99	6.40	7.28	7.53	7.23

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	38.2	20.5	17.5	28.5	17.9	16.8
Total Well Depth (±0.01 feet)	68.6	43.3	41.4	44	29	49
Time purging began (24-hour clock)	15:00	11:30	11:05	15:45	12:45	13:10
Conductivity after 10 minutes µS/cm	1107	1181	1257	1442	1166	1521
Temperature °C	17.3	17.8	17.0	18	16.5	16.1
Conductivity after 15 minutes (µS/cm)	1140	1203	1288	1458	1139	1522
Temperature °C	16.3	17.1	16.8	17.7	16.2	16.1
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)	15	15	15	15	15	15
Temperature °C						
pH (on site) (±0.01)	8.02	6.90	6.93	8.32	6.61	6.53

Sample collectors: SMS/CJD

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Electronic Filing: Received, Clerk's Office 09/28/2020

Venice Groundwater Monitoring Field Data Worksheet

Sample Date: 27 / Aug / 2018

River Level: 11.60 feet

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	17.5	19.0	18.2	18.8	36.0	39.5
Total Well Depth (±0.01 feet)	27.5	47.7	25.0	47.0	49.0	51.2
Time purging began (24-hour clock)	13:40	14:00	14:15	14:35	15:50	14:55
Conductivity after 10 minutes µS/cm	1138	1219	1138	775	1089	816
Temperature °C	17.7	18.6	18.0	17.0	18.4	17.7
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	1135	1252	1160	778	1125	838
Time to reach final conductivity (min)	15	15	15	15	15	15
Temperature °C	16.5	17.2	16.8	16.9	17.2	16.6
pH (on site) (±0.01)	6.69	7.08	6.56	7.38	7.44	7.22

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)					✓	✓
Casing and concrete pad in good condition (note any deficiency)					✓	✓
Internal piping unobstructed and in good condition (note any deficiency)					✓	✓
Water Level (±0.01 feet, from top of casing mark)	40.0	18.3	21.1	30.0	18.4	19.6
Total Well Depth (±0.01 feet)	68.6	41.4	43.0	43.8	29.0	48.6
Time purging began (24-hour clock)	15:20	10:50	11:20	16:00	13:00	13:20
Conductivity after 10 minutes µS/cm	1124	1237	1276	1885	881	1464
Temperature °C	17.1	17.9	17.0	17.1	18.7	17.0
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	1128	1267	1276	1784	950	1479
Time to reach final conductivity (min)	15	15	15	15	~~16.4~~ 15	15
Temperature °C	16.9	16.9	16.6	17.0	16.4	16.7
pH (on site) (±0.01)	7.96	6.89	6.82	7.52	6.79	6.98

Sample collectors: SMS, CJB

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Electronic Filing: Received, Clerk's Office 09/28/2020

Venice Groundwater Monitoring Field Data Worksheet

NOTES: _____

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

Venice Groundwater Monitoring Field Data Worksheet

Sample Date: 11/05/19

River Level: _____ **feet**

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	10.0	10.8	10.0	9.8	30	32
Total Well Depth (±0.01 feet)	28.4	48	25	47.1	49	52
Time purging began (24-hour clock)	13:15	13:45	14:25	14:05	15:30	15:00
Conductivity after 10 minutes µS/cm	767	1127	812	1117	59.6	756
Temperature °C						
Conductivity after 15 minutes (µS/cm)	777	1065	800	1112		762
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	777	1065	800	1112	60.1	762
Time to reach final conductivity (min)						
Temperature °C	16.5	15.4	15.4	15.4	12.1	15.3
pH (on site) (±0.01)	6.91	7.02	6.61	6.68	9.01	7.28

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	32	14.5	11.6	21.4	9.4	11.0
Total Well Depth (±0.01 feet)	~~68~~	43	41	44	29	49
Time purging began (24-hour clock)	15:05	11:00	10:30	15:50	12:45	12:50
Conductivity after 10 minutes µS/cm	1050	1321	1325	1987	734	1410
Temperature °C					~~temp~~	
Conductivity after 15 minutes (µS/cm)	1036	1306	1331	1986	731	1456
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	1036	1306	1331	1986	731	1456
Time to reach final conductivity (min)						
Temperature °C	15.3	15.5	15.8	15.8	17.1	15.0
pH (on site) (±0.01)	8.07	6.81	6.89	7.27	6.80	6.94

Sample collectors: SMS / CJB

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 02/04/2019

River Level: 10.3 **feet**

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)	✓	✓	These		✓	✓
Casing and concrete pad in good condition (note any deficiency)	✓	✓	are	below	✓	✓
Internal piping unobstructed and in good condition (note any deficiency)	✓	✓	grand	level	✓	✓
Water Level (±0.01 feet, from top of casing mark)	17.9	18.8	14.2	19.0	34	39
Total Well Depth (±0.01 feet)	29.0	48.3	22.0	47.0	49	52
Time purging began (24-hour clock)	10:25	10:45	11:10	11:25	15:30	15:00
Conductivity after 10 minutes µS/cm	896	1177	mud	858	1110	798
Temperature °C	16.2	15.9		16.2	16.3	15.7
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	901	1173	1061	840	1121	807
Time to reach final conductivity (min)	15	15		15	15	15
Temperature °C	16.2	15.9	16.5	16.2	16.2	15.6
pH (on site) (±0.01)	6.86	6.99	7.61	7.13	7.44	7.21

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

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Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)	✓	✓	✓	✓	✓	✓
Casing and concrete pad in good condition (note any deficiency)	✓	✓	✓	✓	✓	✓
Internal piping unobstructed and in good condition (note any deficiency)	✓	✓	✓	✓	✓	✓
Water Level (±0.01 feet, from top of casing mark)	39			29	17.5	19.5
Total Well Depth (±0.01 feet)	68			44	29	49
Time purging began (24-hour clock)	15:15	13:20	13:00	16:00	14:00	14:15
Conductivity after 10 minutes µS/cm	937	1175	1260	1937	867	1351
Temperature °C	16.1	17.8	17.6	16.0	16.7	16.0
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	957	1190	1291	1947	890	1364
Time to reach final conductivity (min)	15	15	15	15		15
Temperature °C	15.6	17.1	16.8	16.0	16.1	15.7
pH (on site) (±0.01)	8.02	6.92	6.98	7.39	6.74	6.96

Sample collectors: _____

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Electronic Filing: Received, Clerk's Office 09/28/2020

Venice Groundwater Monitoring Field Data Worksheet

NOTES: _____

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

Electronic Filing: Received, Clerk's Office 09/28/2020

Venice Groundwater Monitoring Field Data Worksheet

Sample Date: 09 / 10 / 2019

River Level: 17 feet

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)			Wells			
Casing and concrete pad in good condition (note any deficiency)				7		
Internal piping unobstructed and in good condition (note any deficiency)		~~48.0~~	sink. '19			
Water Level (±0.01 feet, from top of casing mark)	14.3	13.8	12.9	13.1	29.8	33.9
Total Well Depth (±0.01 feet)	29	48	22.5	48	50	51.2
Time purging began (24-hour clock)	1400:	14:10	1430:	1440:	15:45	15:00
Conductivity after 10 minutes µS/cm	774	740	775	1093	1000	728
Temperature °C	18	16.6	19.0	16.1	19.0	17.5
Conductivity after 15 minutes (µS/cm)	783	736	763	1108	1073	735
Temperature °C	16.4	15.4	16.9	15.8	17.7	16.9
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)						
Temperature °C						
pH (on site) (±0.01)	7.04	6.97	6.95	6.68	7.40	7.27

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Electronic Filing: Received, Clerk's Office 09/28/2020

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	34.2	15.3	12.8	24	12.6	12.6
Total Well Depth (±0.01 feet)	68.6	42.7	41.3	44	29.10	48.9
Time purging began (24-hour clock)	15:10	11:30	11:00	16:10	1302	13:10
Conductivity after 10 minutes µS/cm	694	1200	1029	1392	925	520
Temperature °C	17.5	17.7	18.6	17.6	16.6	16.4
Conductivity after 15 minutes (µS/cm)	725	1243	1169	1500	927	522
Temperature °C	17.6	16.5	17.0	17.1	16.2	16.2
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)						
Temperature °C						
pH (on site) (±0.01)	6.15	6.77	6.79	7.39	6.81	7.11

Sample collectors: _____

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

NOTES: _____

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

Electronic Filing: Received, Clerk's Office 09/28/2020

APPENDIX C
FINAL COVER SITE INSPECTION REPORTS
2017-2019 MONITORING PERIOD

Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 09/01/2017

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: Cloudy 70 degrees

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		✓		
8. Is there any erosion or sloughing of embankment slopes?		✓		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?	✓			
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature: Nancy A Monga Date: 09/01/2017

Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 12/13/2017

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: Sunny, 40degrees

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		✓		
8. Is there any erosion or sloughing of embankment slopes?		✓		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?	✓			
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature: Nancy J Morgan Date: 12/13/2017

Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 03/28/2018

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: Rainy, 50 degrees

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		✓		
8. Is there any erosion or sloughing of embankment slopes?		✓		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?	✓			
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item #	Additional Comment(s)
	North drain functioning really well for all the rain yesterday
	South drain is not draining. See picture below. The system has been checked and
	Replacement parts have been ordered.

Item #	Corrective Actions Taken Since Last Report

Inspector Signature: Nancy J Moy Date: 03/28/2018

North side of Ash Pond looking North



North side of Ash Pond looking South



South side of Ash Pond looking North



South drain



Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 06/20/2018

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: Rainy, 70 degrees

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		✓		
8. Is there any erosion or sloughing of embankment slopes?		✓		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?	✓			
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

South Drain replacement parts have been ordered, but not yet arrived.

Inspector Signature: Nancy J. Mazz Date: 06/20/2018

North side of Ash Pond looking North



North side of Ash Pond looking South





South side of Ash Pond looking South



Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 09/20/2018

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: Sunny, 80 degrees

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		✓		
8. Is there any erosion or sloughing of embankment slopes?		✓		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?	✓			
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

South drain has been repaired and appears to be functioning normally.

Inspector Signature: Nancy J Mays Date: 09/18/2018

North side of Ash Pond looking North



North side of Ash Pond looking South



Electronic Filing: Received, Clerk's Office 09/28/2020



South side of Ash Pond looking South



Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 12/18/2018

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 45 degrees, sunny

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		✓		
8. Is there any erosion or sloughing of embankment slopes?		✓		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?	✓			
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature: Nancy J Morg Date: 12/18/2018

Electronic Filing: Received, Clerk's Office 09/28/2020





Electronic Filing: Received, Clerk's Office 09/28/2020





Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 03/27/2019

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 60 degrees F, sunny

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	✓			
2. Are "No Trespassing" signs posted?			✓	
3. Is there evidence of trespassing?		✓		
COVER & VEGETATION				
4. Is cover in acceptable condition?	✓			
5. Is vegetation in acceptable condition?	✓			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		✓		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?				
8. Is there any erosion or sloughing of embankment slopes?				
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			✓	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		✓		
11. Are drainage channels in acceptable condition?	✓			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		✓		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		✓		
14. If so is the flexible membrane damaged?			✓	
PUMP STATION				
15. Are the pump station inlets free of debris?	✓			
16. Are there any structural deficiencies at the pump station?		✓		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature: Nancy J Morgan, PE PMP Digitally signed by Nancy J Morgan, PE PMP Date: 2019.03.28 10:41:15 -05'00' Date: 03/28/2019



North Pump Station looking north.



North Pump Station looking south.



South Pump Station looking north.



South Pump Station looking south.

Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 6/24/19

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 78°F, cloudy

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			
5. Is vegetation in acceptable condition?	X			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		X		
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		X		
14. If so is the flexible membrane damaged?			X	
PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item #	Additional Comment(s)
	Top of fence near barbed wire is in need of minor repair at both Pump Stations. See attached picture.
	More gravel is needed on the South Pump Station to help prevent erosional damage. See attached picture.

Item #	Corrective Actions Taken Since Last Report
	No outstanding actions noted.

Inspector Signature: Julianne Epplin Date: 6/2419



North Pump Station, facing north.



Top of fence near barbed wire is in need of minor repair at both Pump Stations.



North Pump Station, facing south.



South Pump Station, facing north.



South Pump Station, corrective action needed to prevent erosional damage.



South Pump Station, facing south.

Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 9/11/19

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 85°F, sunny

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			
5. Is vegetation in acceptable condition?	X			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		X		
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		X		
14. If so is the flexible membrane damaged?			X	
PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item # Additional Comment(s)

_____ *Additional gravel is needed at two locations at the South Pump Station to help prevent further erosional damage. See attached pictures.*

Item # Corrective Actions Taken Since Last Report

_____ *Fence was repaired at both pump stations.*

_____ *Gravel was placed at the South Pump Station in one area, but additional gravel is still need as noted above.*

Inspector Signature: Julianne Epplin Date: 9/11/19



North Pump Station, facing north.



North Pump Station, facing south.



South Pump Station, facing north.



South Pump Station, facing south.



South Pump Station, corrective action needed to prevent further erosional damage.



South Pump Station, corrective action needed to prevent further erosional damage.

Ameren Missouri

Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 12/3/19

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 41°F, partly cloudy

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			*The cover is in acceptable condition, except where there is ongoing temporary construction related to the removal and replacement of Structure 161. This work has disturbed the soil profile and has impacted the vegetation.*
5. Is vegetation in acceptable condition?	X			*The vegetation is in acceptation condition except where ongoing temporary construction related to the removal and replacement of Structure 161 has disturbed the soil profile. The area will need to be reseeded as soon as possible. See attached photo.*
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		*Ongoing temporary construction related to the removal and replacement of Structure 161 has disturbed the soil profile and the area will need to be reseeded as soon as possible.*
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?	X			*Ongoing temporary construction related to the removal and replacement of Structure 161 has disturbed the soil profile.*
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?	X			*Ongoing temporary construction related to the removal and replacement of Structure 161 has exposed the flexible membrane.*
14. If so is the flexible membrane damaged?	X			*Replacement of Structure 161 required piercing the membrane and sealing the cap against the foundation using a boot design. See attached photo.*

PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item # Additional Comment(s)

_____ Replacement of Structure 161 required piercing the membrane and sealing the cap against the foundation using a boot design. This construction has disturbed the soil profile and the area will need to be reseeded as soon as possible.

Item # Corrective Actions Taken Since Last Report

_____ *Gravel was placed at the South Pump Station to help prevent further erosional damage. The area appeared to be adequately covered with gravel and signs of erosion were not observed at the time of the inspection.*

See attached photos below.

Inspector Signature: Julianne Epplin Date: 12/3/19



North Pump Station, facing north.



North Pump Station, facing south.



South Pump Station, facing north.



South Pump Station, facing south.



Replacement of Structure 161 required piercing the membrane and sealing the cap against the foundation using a boot design.



Ongoing temporary construction related to the removal and replacement of Structure 161 has disturbed the soil profile and the area will need to be reseeded as soon as possible.

Electronic Filing: Received, Clerk's Office 09/28/2020

Ameren
MISSOURI

August 20, 2019

CERTIFIED MAIL 7019 0140 0000 4005 2698

Mr. William E. Buscher, P.G.
Manager, Hydrogeology and Compliance Unit
Groundwater Section
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Re: Ameren Missouri – Venice Energy Center
Venice Power Station Ash Pond 2 and 3 Post Closure Care Project
Structure 161 Replacement

Dear Mr. Buscher,

Ameren Missouri (Ameren) plans to remove and replace the Cahokia-Roxford Transmission Line Structure 161, which is currently located within the capped Venice Ash Basin. The existing steel lattice tower will be replaced with a steel monopole in order to increase ground clearance as part of Ameren's response plan to the North American Electric Reliability Corporation's (NERC) Alert FAC-008 to meet the National Electrical Safety Code (NESC) requirements and to meet anticipated tie-in requirements for the proposed new Gateway Substation. In November 2019, Ameren plans to drill and pour the new concrete foundation and the actual steel monopole will be installed in spring 2020. The existing steel lattice tower is a four legged steel H-pile foundation and will be cut off just above the final cover and pipe boot, leaving the final cover untouched. See Figures 1 and 2 below.

The replacement of Structure 161 within the capped Venice Ash Basin will damage the final cover. Attached are drawings showing the monopole foundation and penetration details. Replacement of the structure will require piercing the geomembrane and sealing the cap against the foundation using a pipe boot design. Photographs of the repair will be documented as described below.

According to Section 2.1, Final Cover Maintenance in the Post Closure Care Plan prepared by Aquaterra in November 2012, Ameren plans to repair any tears, rips, punctures or other damage to the flexible membrane. Any incidental damage to the cover system from heavy equipment used in construction will also be repaired.



Figure 1: Existing steel lattice Structure 161. Ameren plans to replace this structure with a steel monopole.

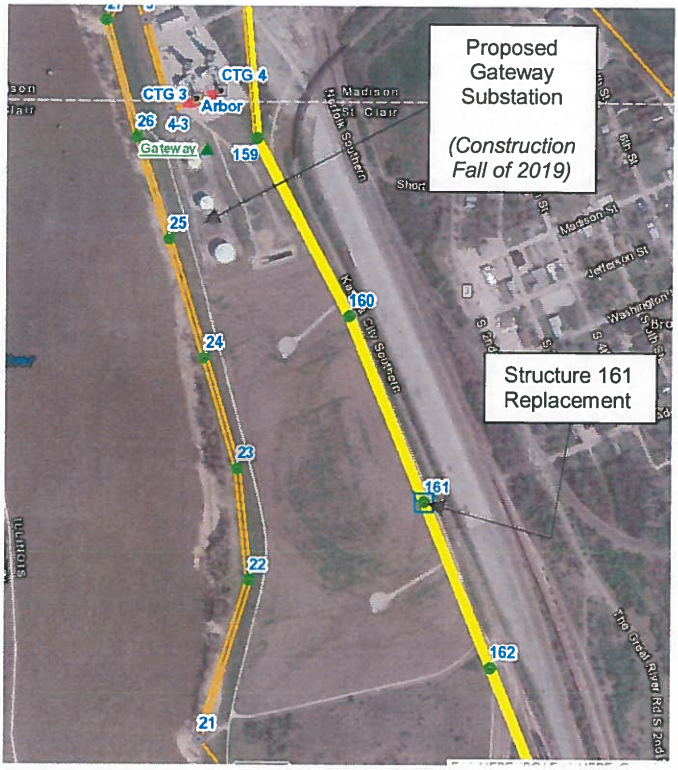


Figure 2: Location of Structure 161 within the sealed Venice Ash Basin. The structure replacement is anticipated to damage the final cover at this location. Any damage to the final cover will be repaired per the Post Closure Care Plan.

Any areas needing repair will be documented on the quarterly inspection forms. Also, any repairs to the final cover will be documented in the annual report, and the report will include the type of repair, surface area repaired, repair methods and materials, and photographic documentation of the repaired area(s).

I recently discussed these plans with Mr. Lynn Dunaway of your staff. Please contact me at 314.554.3143 if there are any questions or concerns regarding the structure replacement.

Sincerely,

Julianne Epplin

Julianne Epplin, PMP, PWS, CE
Environmental Scientist
Ameren Missouri
Jepplin2@ameren.com
314.554.3143

cc: C. Giesmann
N. Morgan
M. Wagstaff
M. Kohlbusch

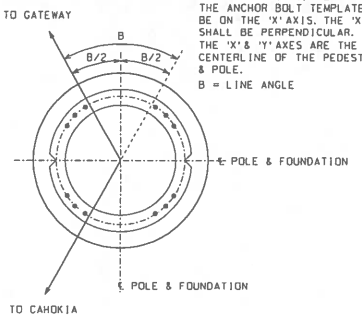
Attachments

Electronic Filing: Received, Clerk's Office 09/28/2020

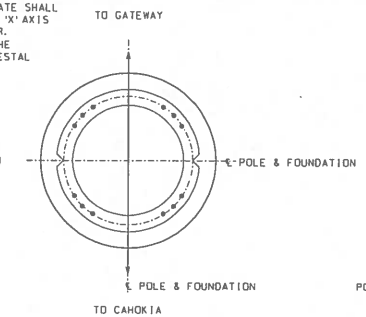
STEEL POLE
PIER FOUNDATION SUMMARY TABLE
CAHOKIA-GATEWAY-4593

FOUNDATION NUMBER	POLE TYPE	POLE HEIGHT (FT)	LINE ANGLE, B			EXISTING GROUND ELEV	TOP OF CONCRETE (T.O.C.)	PIER DIA. (FT)	PIER PROJ. (FT)	PIER EMBEDMENT (FT)	TOTAL PIER LENGTH (FT)	VERTICAL REBAR	TIES			NUMBER OF ANCHOR BOLTS	ANCHOR BOLT DETAIL NUMBER	ANCHOR BOLT CIRCLE (IN)	ANCHOR BOLT EMBEDMENT (IN)	ANCHOR BOLT PROJECTION (IN)	TOTAL BOLT LENGTH (IN)	THEORETICAL CONCRETE VOLUME (CY)	SOIL BORING DESCRIPTION	COMMENTS
			LEFT ANGLE	TANGENT	RIGHT ANGLE								T1 TIES @ 6"	T2 TIES @ 18"	TOTAL TIES									
C-158	EPHAV-DE	135			76.8386°	422.1	425.1	10.0	3.0	42.0	45.0	34 #14	21 #5	24 #5	45	20	1	91.75	110.25	12.75	123	131	NO BORING	
C-159A	EPHAV-DE	135	75.1599°			425.5	428.5	11.0	3.0	55.0	58.0	39 #18	23 #5	32 #5	55	48	2	105.00	112.50	13.50	126	205	NO BORING	
C-161	EPTD2C	150		0°		433.2	436.2	9.0	3.0	39.0	42.0	31 #14	21 #5	22 #5	43	20	1	77.25	107.50	12.50	120	99	NO BORING	

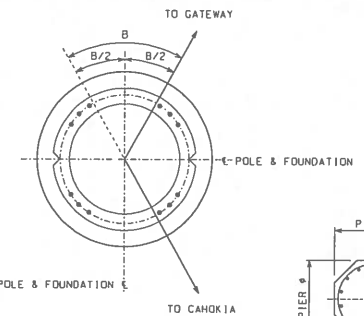
NOTE:
FOR FOUNDATIONS, THE "V" NOTCH IN THE ANCHOR BOLT TEMPLATE SHALL BE ON THE 'X' AXIS. THE 'X' AXIS SHALL BE PERPENDICULAR. THE 'X' & 'Y' AXES ARE THE CENTERLINE OF THE PEDESTAL & POLE.
B = LINE ANGLE



LEFT ANGLE DETAIL

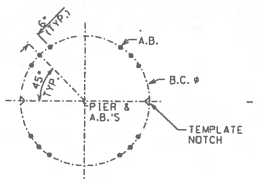


TANGENT DETAIL

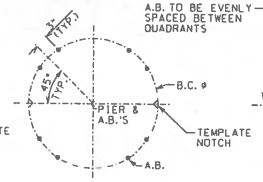


RIGHT ANGLE DETAIL

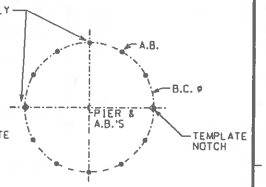
FOUNDATION & POLE ORIENTATION PLANS
N.T.S.



DETAIL 1
FOR ODD NUMBER DIVISIONS OF ANCHOR BOLT PLACEMENTS



DETAIL 2
FOR EVEN NUMBER DIVISIONS OF ANCHOR BOLT PLACEMENTS

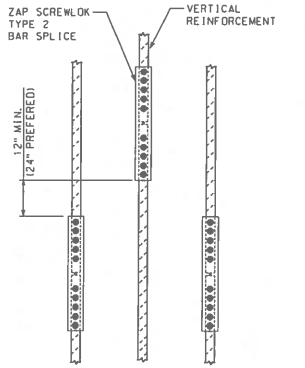


DETAIL 3
FOR EVEN NUMBER DIVISIONS OF ANCHOR BOLT PLACEMENTS

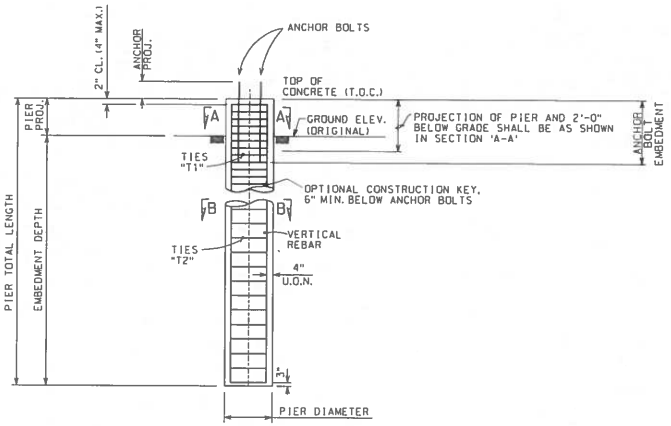


OCTAGONAL PIER OPTION CIRCULAR PIER OPTION

NOTES:
1. ALL WORK TO BE DONE IN ACCORDANCE WITH LATEST REVISION OF AMEREN SPECIFICATION TX-1160.
2. CONCRETE TO REACH A MINIMUM COMPRESSIVE STRENGTH OF f'_c = 4500 PSI @ 28 DAYS.
3. YIELD STRENGTH OF REINFORCING TO BE fy=60,000 psi (fy=60,000 psi FOR TIES).
4. REINFORCING STEEL IS EQUALLY SPACED UNLESS OTHERWISE NOTED.
5. ALL TIE LAPS (3B BAR DIAMETER MINIMUM) SHALL BE 180 DEGREES APART ALONG THE LENGTH OF THE PIERS.
6. AS A MINIMUM, ALL TIES SHALL BE TIED OFF TO ALTERNATING REINFORCING BARS.
7. PROVIDE A ¾" CHAMFER ON ALL EXPOSED EDGES.
8. REINFORCING CAGES SHALL BE PROVIDED A MINIMUM OF 1'-6" LONGER THAN THEORETICALLY REQUIRED, UNLESS OTHERWISE NOTED. EXTRA LENGTH OF THE CAGE SHALL BE SUPPLIED WITH TIES AT THE "T1" TIE SPACING. THESE EXTRA TIES ARE INCLUDED IN THE FOUNDATION SUMMARY TABLE.
9. IF ROCK IS ENCOUNTERED AT A DIFFERENT ELEVATION THAN NOTED (± 1'), DRILLING SHALL STOP AND A STRUCTURAL ENGINEER FROM AMEREN SHALL BE CONTACTED FOR FURTHER GUIDANCE.
10. MECHANICAL SPLICES TO BE LOCATED 2' OR GREATER BELOW ANCHOR BOLT CAGE.
11. CORRUGATED METAL PIPE MAY BE USED AS PERMANENT CASING FOR THE UPPER SECTION PIER. A FLOWABLE MATERIAL SHALL BE PLACED BETWEEN THE SOIL AND THE CORRUGATED METAL PIPE. HOWEVER, CORRUGATED METAL PIPE SHALL BE CUT OFF AT GROUND LEVEL AND REMOVABLE CIRCULAR SMOOTH STEEL FORMS SHALL BE USED TO FORM THE PIER PROJECTION. THE USE OF PERMANENT CASING SHALL BE LIMITED TO 10' BELOW GRADE.
12. IF PROJECTION FORM IS LARGER THAN DESIGN PIER DIAMETER BY MORE THAN 1'-0", CONTACT AMEREN ENGINEER FOR INSTRUCTIONS ON EXTRA REINFORCEMENT REQUIREMENTS.
13. ALL CONCRETE POURS SHALL BE MONOLITHIC. USE THE CONSTRUCTION KEY DETAIL ONLY WHEN A COLD JOINT IS UNAVOIDABLE DUE TO AN EMERGENCY.

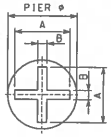


MECHANICAL SPLICE OPTION
(INSTALL SPLICE PER MANUFACTURERS INSTRUCTIONS) SEE NOTE 10 FOR LOCATION



FOUNDATION ELEVATION
N.T.S.

SECTION 'A-A'



SECTION 'B-B'
(OPTIONAL)

CONSTRUCTION KEY DETAIL
(REQUIRED FOR ALL POURS THAT ARE NOT MONOLITHIC)

CONSTRUCTION KEY TABLE			
PIER DIA.	DIM. A	DIM. B	DEPTH OF KEY
6'-0" OR 6'-6"	3'-6"	1'-2"	0'-8"
7'-0" OR 7'-6"	4'-0"	1'-4"	0'-8"
8'-0" OR 8'-6"	4'-6"	1'-6"	0'-8"
9'-0" OR 9'-6"	5'-0"	1'-8"	0'-8"
10'-0" OR 10'-6"	5'-6"	1'-10"	0'-8"
11'-0" OR 11'-6"	6'-0"	2'-0"	0'-8"
12'-0" OR 12'-6"	6'-6"	2'-0"	0'-8"

REFERENCE DRAWINGS:
POLE OUTLINE DRAWINGS _____
LOAD TREE DRAWINGS _____
PIER FOUNDATION SUMMARY TABLE DRAWINGS _____

PRELIMINARY
FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION

REV	PROJ ID	DATE	DRWN	Rvw	APPD

LINE CONSTRUCTION - 345 KV
POLE FOUNDATIONS
DRILLED PIERS

CAHOKIA - GATEWAY

Ameren | 683035 | REV 0

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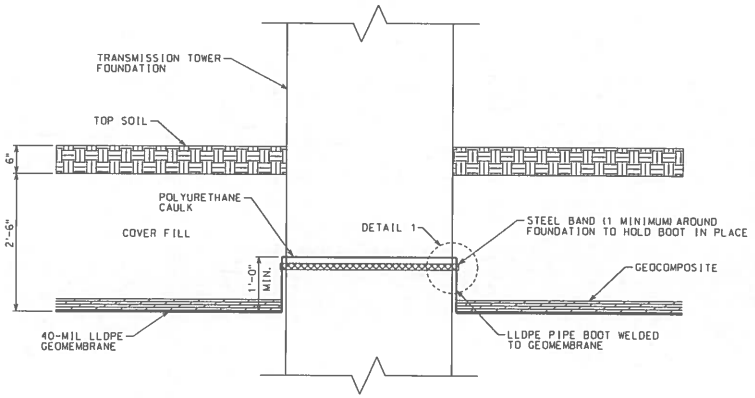
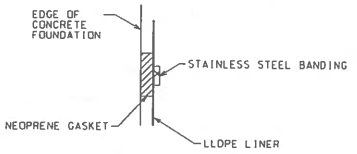
PRINTED BY: C55228
TIME: 11/21/2018 8:40:05 AM



TRANSMISSION TOWER 161 PENETRATION DETAIL



DETAIL 1

GENERAL NOTES:

1. SPECIAL CARE SHALL BE TAKEN WHEN CUTTING INTO THE EXISTING GEOMEMBRANE.
2. INSTALL LINER PER MANUFACTURER INSTRUCTIONS.

REFERENCE DRAWINGS:

ASH POND CLOSURE 7824-Y-502164
FOUNDATION PIER TABLE 683035

PRELIMINARY
FOR BIDDING PURPOSES ONLY
<< NOT FOR CONSTRUCTION <<

REV	PROJ ID	DATE	DRWN	RVW	APPD
0	J5959414	11/29/18	ACW	NOT	

FIRST ISSUE

LINE CONSTRUCTION - 345 KV
TOWER 161

CAHOKIA-GATEWAY

Ameren

683095

REV 0

SCALE RATIO =

FILE: c:\pw_working\projectwise\c59228\d0205960\683095.dgn
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APPENDIX D
STATISTICAL OUTPUT (ON CD)

APPENDIX D1
OUTLIER ANALYSIS RESULTS

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Antimony, dissolved, mg/L
Location: MW-10

Mean of all data: 0.00160
Standard Deviation of all data: 0.000845
Largest Observation Concentration of all data: Xn = 0.00390
Test Statistic, high extreme of all data: Tn = 2.72
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW-11

Mean of all data: 0.000831
Standard Deviation of all data: 0.000587
Largest Observation Concentration of all data: Xn = 0.00230
Test Statistic, high extreme of all data: Tn = 2.50
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.00161
Standard Deviation of all data: 0.00123
Largest Observation Concentration of all data: Xn = 0.00430
Test Statistic, high extreme of all data: Tn = 2.19
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Antimony, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00103
Standard Deviation of all data: 0.000750
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 2.63
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00109
Standard Deviation of all data: 0.000705
Largest Observation Concentration of all data: Xn = 0.00280
Test Statistic, high extreme of all data: Tn = 2.43
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW-3

Mean of all data: 0.000840
Standard Deviation of all data: 0.000504
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.30
T Critical of all data: Tcr = 2.66

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Antimony, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000813
Standard Deviation of all data: 0.000616
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.55
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/22/2013	0.00300	False		1

Antimony, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00137
Standard Deviation of all data: 0.00105
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.46
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Antimony, dissolved, mg/L

Location: MW-6

Mean of all data: 0.000789
Standard Deviation of all data: 0.000864
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 4.87
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Antimony, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00104
Standard Deviation of all data: 0.000651
Largest Observation Concentration of all data: Xn = 0.00280
Test Statistic, high extreme of all data: Tn = 2.71
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00127
Standard Deviation of all data: 0.00114
Largest Observation Concentration of all data: Xn = 0.00570
Test Statistic, high extreme of all data: Tn = 3.88
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.00570	False		1

Antimony, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00117
Standard Deviation of all data: 0.000990
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.87
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW-10

Mean of all data: 0.0174
Standard Deviation of all data: 0.0119
Largest Observation Concentration of all data: Xn = 0.0520
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.0520	False		1

Arsenic, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00543
Standard Deviation of all data: 0.00547
Largest Observation Concentration of all data: Xn = 0.0290
Test Statistic, high extreme of all data: Tn = 4.31
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.0290	False		1

Arsenic, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.0122
Standard Deviation of all data: 0.00816
Largest Observation Concentration of all data: Xn = 0.0340
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00704
Standard Deviation of all data: 0.00846
Largest Observation Concentration of all data: Xn = 0.0450
Test Statistic, high extreme of all data: Tn = 4.49
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.0450	False		1

Arsenic, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.0209
Standard Deviation of all data: 0.00712
Largest Observation Concentration of all data: Xn = 0.0430
Test Statistic, high extreme of all data: Tn = 3.11
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.0430	False		1

Arsenic, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00586
Standard Deviation of all data: 0.00806
Largest Observation Concentration of all data: Xn = 0.0430
Test Statistic, high extreme of all data: Tn = 4.61
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/17/2010	0.0430	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00573
Standard Deviation of all data: 0.00716
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 5.07
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.0420	False		1

Arsenic, dissolved, mg/L

Location: MW-5

Mean of all data: 0.0735
Standard Deviation of all data: 0.0760
Largest Observation Concentration of all data: Xn = 0.690
Test Statistic, high extreme of all data: Tn = 8.11
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2010	0.690	False		1

Arsenic, dissolved, mg/L

Location: MW-6

Mean of all data: 0.0749
Standard Deviation of all data: 0.0178
Largest Observation Concentration of all data: Xn = 0.123
Test Statistic, high extreme of all data: Tn = 2.70
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/20/2002	0.0150	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00455
Standard Deviation of all data: 0.00292
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.87
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00504
Standard Deviation of all data: 0.00646
Largest Observation Concentration of all data: Xn = 0.0350
Test Statistic, high extreme of all data: Tn = 4.64
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/17/2010	0.0350	False		1

Arsenic, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00799
Standard Deviation of all data: 0.00853
Largest Observation Concentration of all data: Xn = 0.0380
Test Statistic, high extreme of all data: Tn = 3.52
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/28/2009	0.0380	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.0785
Standard Deviation of all data: 0.0494
Largest Observation Concentration of all data: Xn = 0.278
Test Statistic, high extreme of all data: Tn = 4.04
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.278	False		1

Barium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.187
Standard Deviation of all data: 0.0334
Largest Observation Concentration of all data: Xn = 0.286
Test Statistic, high extreme of all data: Tn = 2.96
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2013	0.286	False		1

Barium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.221
Standard Deviation of all data: 0.0484
Largest Observation Concentration of all data: Xn = 0.292
Test Statistic, high extreme of all data: Tn = 1.46
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.0680	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.212
Standard Deviation of all data: 0.0542
Largest Observation Concentration of all data: Xn = 0.324
Test Statistic, high extreme of all data: Tn = 2.07
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.358
Standard Deviation of all data: 0.0550
Largest Observation Concentration of all data: Xn = 0.460
Test Statistic, high extreme of all data: Tn = 1.86
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.186
Standard Deviation of all data: 0.0586
Largest Observation Concentration of all data: Xn = 0.273
Test Statistic, high extreme of all data: Tn = 1.49
T Critical of all data: Tcr = 2.70

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.172
Standard Deviation of all data: 0.0550
Largest Observation Concentration of all data: Xn = 0.286
Test Statistic, high extreme of all data: Tn = 2.06
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.0761
Standard Deviation of all data: 0.0167
Largest Observation Concentration of all data: Xn = 0.112
Test Statistic, high extreme of all data: Tn = 2.15
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2018	0.0190	False	-1	

Barium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.307
Standard Deviation of all data: 0.0412
Largest Observation Concentration of all data: Xn = 0.395
Test Statistic, high extreme of all data: Tn = 2.13
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.251
Standard Deviation of all data: 0.0735
Largest Observation Concentration of all data: Xn = 0.373
Test Statistic, high extreme of all data: Tn = 1.66
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.111
Standard Deviation of all data: 0.0172
Largest Observation Concentration of all data: Xn = 0.196
Test Statistic, high extreme of all data: Tn = 4.94
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.196	False		1

Barium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.153
Standard Deviation of all data: 0.0253
Largest Observation Concentration of all data: Xn = 0.203
Test Statistic, high extreme of all data: Tn = 1.98
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Boron, dissolved, mg/L

Location: MW-10

Mean of all data: 18.6
Standard Deviation of all data: 2.13
Largest Observation Concentration of all data: Xn = 22.2
Test Statistic, high extreme of all data: Tn = 1.67
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-11

Mean of all data: 1.41
Standard Deviation of all data: 1.95
Largest Observation Concentration of all data: Xn = 7.83
Test Statistic, high extreme of all data: Tn = 3.29
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	7.83	False		1

Boron, dissolved, mg/L

Location: MW-11D

Mean of all data: 9.65
Standard Deviation of all data: 5.67
Largest Observation Concentration of all data: Xn = 23.5
Test Statistic, high extreme of all data: Tn = 2.44
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Boron, dissolved, mg/L

Location: MW-2

Mean of all data: 3.37
Standard Deviation of all data: 3.13
Largest Observation Concentration of all data: Xn = 14.0
Test Statistic, high extreme of all data: Tn = 3.41
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/11/2007	14.0	False		1

Boron, dissolved, mg/L

Location: MW-2D

Mean of all data: 3.61
Standard Deviation of all data: 1.97
Largest Observation Concentration of all data: Xn = 8.01
Test Statistic, high extreme of all data: Tn = 2.23
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-3

Mean of all data: 0.639
Standard Deviation of all data: 0.584
Largest Observation Concentration of all data: Xn = 3.94
Test Statistic, high extreme of all data: Tn = 5.66
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/19/2004	3.94	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Boron, dissolved, mg/L

Location: MW-3D

Mean of all data: 5.95
Standard Deviation of all data: 1.98
Largest Observation Concentration of all data: Xn = 8.24
Test Statistic, high extreme of all data: Tn = 1.16
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-5

Mean of all data: 3.67
Standard Deviation of all data: 1.86
Largest Observation Concentration of all data: Xn = 7.46
Test Statistic, high extreme of all data: Tn = 2.03
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-6

Mean of all data: 4.22
Standard Deviation of all data: 0.729
Largest Observation Concentration of all data: Xn = 6.17
Test Statistic, high extreme of all data: Tn = 2.68
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Boron, dissolved, mg/L

Location: MW-6D

Mean of all data: 4.44
Standard Deviation of all data: 0.531
Largest Observation Concentration of all data: Xn = 5.60
Test Statistic, high extreme of all data: Tn = 2.19
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-8

Mean of all data: 0.712
Standard Deviation of all data: 0.313
Largest Observation Concentration of all data: Xn = 2.03
Test Statistic, high extreme of all data: Tn = 4.22
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	2.03	False		1

Boron, dissolved, mg/L

Location: MW-9

Mean of all data: 0.672
Standard Deviation of all data: 0.179
Largest Observation Concentration of all data: Xn = 1.07
Test Statistic, high extreme of all data: Tn = 2.25
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2001	0.100	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cadmium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.000517
Standard Deviation of all data: 0.0000913
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 5.29
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00100	False		1

Cadmium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000552
Standard Deviation of all data: 0.000155
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.89
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00100	False		1

Cadmium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00117
Standard Deviation of all data: 0.000510
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 1.63
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cadmium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00111
Standard Deviation of all data: 0.00104
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000984
Standard Deviation of all data: 0.000391
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.60
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00110
Standard Deviation of all data: 0.000995
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cadmium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000594
Standard Deviation of all data: 0.000198
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.05
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.0325
Standard Deviation of all data: 0.271
Largest Observation Concentration of all data: Xn = 2.31
Test Statistic, high extreme of all data: Tn = 8.43
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	2.31	False		1

Cadmium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00164
Standard Deviation of all data: 0.00249
Largest Observation Concentration of all data: Xn = 0.0203
Test Statistic, high extreme of all data: Tn = 7.48
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/1998	0.0203	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cadmium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000547
Standard Deviation of all data: 0.000148
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 3.06
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	0.00100	False		1

Cadmium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.000707
Standard Deviation of all data: 0.000558
Largest Observation Concentration of all data: Xn = 0.00310
Test Statistic, high extreme of all data: Tn = 4.29
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	0.00310	False		1

Cadmium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000863
Standard Deviation of all data: 0.000464
Largest Observation Concentration of all data: Xn = 0.00220
Test Statistic, high extreme of all data: Tn = 2.88
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chloride, dissolved, mg/L

Location: MW-10

Mean of all data: 52.5
Standard Deviation of all data: 23.1
Largest Observation Concentration of all data: Xn = 94.0
Test Statistic, high extreme of all data: Tn = 1.79
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-11

Mean of all data: 17.3
Standard Deviation of all data: 7.21
Largest Observation Concentration of all data: Xn = 41.5
Test Statistic, high extreme of all data: Tn = 3.35
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/22/2013	41.5	False		1

Chloride, dissolved, mg/L

Location: MW-11D

Mean of all data: 38.4
Standard Deviation of all data: 11.2
Largest Observation Concentration of all data: Xn = 57.3
Test Statistic, high extreme of all data: Tn = 1.68
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**
Confidence Level: 95% **Number of Outliers: One Outlier**
Transform: None

Chloride, dissolved, mg/L
Location: MW-2

Mean of all data: 15.5
Standard Deviation of all data: 3.16
Largest Observation Concentration of all data: Xn = 23.0
Test Statistic, high extreme of all data: Tn = 2.36
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW-2D

Mean of all data: 15.9
Standard Deviation of all data: 4.02
Largest Observation Concentration of all data: Xn = 27.0
Test Statistic, high extreme of all data: Tn = 2.75
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW-3

Mean of all data: 20.1
Standard Deviation of all data: 4.80
Largest Observation Concentration of all data: Xn = 33.0
Test Statistic, high extreme of all data: Tn = 2.69
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/27/2014	33.0	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chloride, dissolved, mg/L

Location: MW-3D

Mean of all data: 36.5
Standard Deviation of all data: 7.57
Largest Observation Concentration of all data: Xn = 48.1
Test Statistic, high extreme of all data: Tn = 1.53
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-5

Mean of all data: 17.1
Standard Deviation of all data: 9.15
Largest Observation Concentration of all data: Xn = 39.2
Test Statistic, high extreme of all data: Tn = 2.41
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-6

Mean of all data: 27.5
Standard Deviation of all data: 2.80
Largest Observation Concentration of all data: Xn = 33.3
Test Statistic, high extreme of all data: Tn = 2.08
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chloride, dissolved, mg/L

Location: MW-6D

Mean of all data: 32.8
Standard Deviation of all data: 5.85
Largest Observation Concentration of all data: Xn = 46.2
Test Statistic, high extreme of all data: Tn = 2.28
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-8

Mean of all data: 60.2
Standard Deviation of all data: 27.6
Largest Observation Concentration of all data: Xn = 147.
Test Statistic, high extreme of all data: Tn = 3.13
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/22/2017	147.	False		1

Chloride, dissolved, mg/L

Location: MW-9

Mean of all data: 75.2
Standard Deviation of all data: 29.6
Largest Observation Concentration of all data: Xn = 146.
Test Statistic, high extreme of all data: Tn = 2.39
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00104
Standard Deviation of all data: 0.000849
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.49
T Critical of all data: Tcr = 2.71

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00400	False		1

Chromium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000778
Standard Deviation of all data: 0.000560
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.97
T Critical of all data: Tcr = 2.70

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00300	False		1

Chromium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00131
Standard Deviation of all data: 0.00181
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 4.81
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.0100	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00158
Standard Deviation of all data: 0.00526
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 7.50
T Critical of all data: Tcr = 3.03

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0410	False		1

Chromium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000783
Standard Deviation of all data: 0.000583
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.81
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00300	False		1

Chromium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.000749
Standard Deviation of all data: 0.000678
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 4.80
T Critical of all data: Tcr = 2.95

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00400	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000850
Standard Deviation of all data: 0.000632
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.40
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00300	False		1

Chromium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00225
Standard Deviation of all data: 0.00814
Largest Observation Concentration of all data: Xn = 0.0630
Test Statistic, high extreme of all data: Tn = 7.47
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/26/2001	0.0630	False		1

Chromium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00102
Standard Deviation of all data: 0.000918
Largest Observation Concentration of all data: Xn = 0.00420
Test Statistic, high extreme of all data: Tn = 3.47
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/30/2004	0.00420	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000783
Standard Deviation of all data: 0.000691
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 4.66
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00400	False		1

Chromium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00135
Standard Deviation of all data: 0.00379
Largest Observation Concentration of all data: Xn = 0.0329
Test Statistic, high extreme of all data: Tn = 8.32
T Critical of all data: Tcr = 3.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/21/2004	0.0329	False		1

Chromium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000993
Standard Deviation of all data: 0.00211
Largest Observation Concentration of all data: Xn = 0.0184
Test Statistic, high extreme of all data: Tn = 8.24
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/29/2005	0.0184	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cobalt, Dis, mg/L

Location: MW-10

Mean of all data: 0.000967
Standard Deviation of all data: 0.000524
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 1.97
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-11

Mean of all data: 0.000603
Standard Deviation of all data: 0.000206
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.92
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-11D

Mean of all data: 0.000621
Standard Deviation of all data: 0.000376
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 3.67
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.00200	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cobalt, Dis, mg/L

Location: MW-2

Mean of all data: 0.00168
Standard Deviation of all data: 0.00248
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 2.96
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00900	False		1

Cobalt, Dis, mg/L

Location: MW-2D

Mean of all data: 0.000609
Standard Deviation of all data: 0.000210
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.86
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-3

Mean of all data: 0.00306
Standard Deviation of all data: 0.00166
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.37
T Critical of all data: Tcr = 2.66

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cobalt, Dis, mg/L

Location: MW-3D

Mean of all data: 0.000563
Standard Deviation of all data: 0.000168
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.60
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-5

Mean of all data: 0.000703
Standard Deviation of all data: 0.000750
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 5.73
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Cobalt, Dis, mg/L

Location: MW-6

Mean of all data: 0.000750
Standard Deviation of all data: 0.000761
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 5.59
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cobalt, Dis, mg/L

Location: MW-6D

Mean of all data: 0.000594
Standard Deviation of all data: 0.000198
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.05
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-8

Mean of all data: 0.00232
Standard Deviation of all data: 0.000852
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.14
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Cobalt, Dis, mg/L

Location: MW-9

Mean of all data: 0.000946
Standard Deviation of all data: 0.00125
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 4.04
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/07/2011	0.00600	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00147
Standard Deviation of all data: 0.00162
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.02
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.00800	False		1

Copper, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00107
Standard Deviation of all data: 0.000933
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.14
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	0.00400	False		1

Copper, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.000636
Standard Deviation of all data: 0.000313
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 4.36
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.00200	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00228
Standard Deviation of all data: 0.00262
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 4.48
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0140	False		1

Copper, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000563
Standard Deviation of all data: 0.000168
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.60
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00157
Standard Deviation of all data: 0.00312
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 5.27
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	0.0180	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Copper, dissolved, mg/L
Location: MW-3D

Mean of all data: 0.000734
Standard Deviation of all data: 0.000458
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.77
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW-5

Mean of all data: 0.00284
Standard Deviation of all data: 0.0163
Largest Observation Concentration of all data: Xn = 0.140
Test Statistic, high extreme of all data: Tn = 8.42
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/26/2001	0.140	False		1

Copper, dissolved, mg/L
Location: MW-6

Mean of all data: 0.00259
Standard Deviation of all data: 0.0109
Largest Observation Concentration of all data: Xn = 0.0850
Test Statistic, high extreme of all data: Tn = 7.59
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0850	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000719
Standard Deviation of all data: 0.000400
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 3.20
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.00200	False		1

Copper, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00171
Standard Deviation of all data: 0.00590
Largest Observation Concentration of all data: Xn = 0.0520
Test Statistic, high extreme of all data: Tn = 8.53
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0520	False		1

Copper, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00197
Standard Deviation of all data: 0.0104
Largest Observation Concentration of all data: Xn = 0.0930
Test Statistic, high extreme of all data: Tn = 8.75
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0930	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cyanide, total, mg/L

Location: MW-10

Mean of all data: 0.00184
Standard Deviation of all data: 0.00129
Largest Observation Concentration of all data: Xn = 0.00690
Test Statistic, high extreme of all data: Tn = 3.92
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	0.00690	False		1

Cyanide, total, mg/L

Location: MW-11

Mean of all data: 0.00194
Standard Deviation of all data: 0.00242
Largest Observation Concentration of all data: Xn = 0.0136
Test Statistic, high extreme of all data: Tn = 4.81
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	0.0136	False		1

Cyanide, total, mg/L

Location: MW-11D

Mean of all data: 0.0168
Standard Deviation of all data: 0.0173
Largest Observation Concentration of all data: Xn = 0.0660
Test Statistic, high extreme of all data: Tn = 2.85
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	0.0660	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cyanide, total, mg/L

Location: MW-2

Mean of all data: 0.00164
Standard Deviation of all data: 0.00131
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.57
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW-2D

Mean of all data: 0.00201
Standard Deviation of all data: 0.00186
Largest Observation Concentration of all data: Xn = 0.00830
Test Statistic, high extreme of all data: Tn = 3.39
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	0.00830	False		1

Cyanide, total, mg/L

Location: MW-3

Mean of all data: 0.00164
Standard Deviation of all data: 0.00137
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.44
T Critical of all data: Tcr = 2.66

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cyanide, total, mg/L

Location: MW-3D

Mean of all data: 0.00194
Standard Deviation of all data: 0.00192
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 3.67
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	0.00900	False		1

Cyanide, total, mg/L

Location: MW-5

Mean of all data: 0.00542
Standard Deviation of all data: 0.00245
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 3.10
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2010	0.0130	False		1

Cyanide, total, mg/L

Location: MW-6

Mean of all data: 0.00183
Standard Deviation of all data: 0.00134
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.36
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Cyanide, total, mg/L

Location: MW-6D

Mean of all data: 0.00156
Standard Deviation of all data: 0.000954
Largest Observation Concentration of all data: Xn = 0.00250
Test Statistic, high extreme of all data: Tn = 0.986
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW-8

Mean of all data: 0.00177
Standard Deviation of all data: 0.00121
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW-9

Mean of all data: 0.00186
Standard Deviation of all data: 0.00124
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.53
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L

Location: MW-10

Mean of all data: 0.608
Standard Deviation of all data: 0.205
Largest Observation Concentration of all data: Xn = 0.850
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-11

Mean of all data: 0.329
Standard Deviation of all data: 0.112
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 3.42
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	0.710	False		1

Fluoride, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.495
Standard Deviation of all data: 0.157
Largest Observation Concentration of all data: Xn = 0.760
Test Statistic, high extreme of all data: Tn = 1.68
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L

Location: MW-2

Mean of all data: 0.271
Standard Deviation of all data: 0.0783
Largest Observation Concentration of all data: Xn = 0.550
Test Statistic, high extreme of all data: Tn = 3.57
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/07/2011	0.550	False		1

Fluoride, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.267
Standard Deviation of all data: 0.0903
Largest Observation Concentration of all data: Xn = 0.500
Test Statistic, high extreme of all data: Tn = 2.59
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-3

Mean of all data: 0.215
Standard Deviation of all data: 0.0609
Largest Observation Concentration of all data: Xn = 0.330
Test Statistic, high extreme of all data: Tn = 1.89
T Critical of all data: Tcr = 2.66

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.323
Standard Deviation of all data: 0.128
Largest Observation Concentration of all data: Xn = 0.640
Test Statistic, high extreme of all data: Tn = 2.48
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-5

Mean of all data: 0.370
Standard Deviation of all data: 0.118
Largest Observation Concentration of all data: Xn = 0.660
Test Statistic, high extreme of all data: Tn = 2.46
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-6

Mean of all data: 0.600
Standard Deviation of all data: 0.107
Largest Observation Concentration of all data: Xn = 0.830
Test Statistic, high extreme of all data: Tn = 2.15
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Fluoride, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.300
Standard Deviation of all data: 0.133
Largest Observation Concentration of all data: Xn = 0.570
Test Statistic, high extreme of all data: Tn = 2.04
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-8

Mean of all data: 0.458
Standard Deviation of all data: 0.147
Largest Observation Concentration of all data: Xn = 0.840
Test Statistic, high extreme of all data: Tn = 2.59
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	<0.00500	True	-1	

Fluoride, dissolved, mg/L

Location: MW-9

Mean of all data: 0.386
Standard Deviation of all data: 0.111
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	0.710	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Iron, dissolved, mg/L

Location: MW-10

Mean of all data: 1.56
Standard Deviation of all data: 1.80
Largest Observation Concentration of all data: Xn = 6.59
Test Statistic, high extreme of all data: Tn = 2.80
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	6.59	False		1

Iron, dissolved, mg/L

Location: MW-11

Mean of all data: 0.164
Standard Deviation of all data: 0.423
Largest Observation Concentration of all data: Xn = 1.73
Test Statistic, high extreme of all data: Tn = 3.71
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	1.73	False		1

Iron, dissolved, mg/L

Location: MW-11D

Mean of all data: 18.6
Standard Deviation of all data: 3.08
Largest Observation Concentration of all data: Xn = 22.6
Test Statistic, high extreme of all data: Tn = 1.29
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	5.67	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Iron, dissolved, mg/L

Location: MW-2

Mean of all data: 0.129
Standard Deviation of all data: 0.492
Largest Observation Concentration of all data: Xn = 3.83
Test Statistic, high extreme of all data: Tn = 7.53
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	3.83	False		1

Iron, dissolved, mg/L

Location: MW-2D

Mean of all data: 16.5
Standard Deviation of all data: 2.40
Largest Observation Concentration of all data: Xn = 20.7
Test Statistic, high extreme of all data: Tn = 1.76
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW-3

Mean of all data: 1.66
Standard Deviation of all data: 1.44
Largest Observation Concentration of all data: Xn = 4.93
Test Statistic, high extreme of all data: Tn = 2.27
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Iron, dissolved, mg/L

Location: MW-3D

Mean of all data: 5.22
Standard Deviation of all data: 2.99
Largest Observation Concentration of all data: Xn = 13.7
Test Statistic, high extreme of all data: Tn = 2.84
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	13.7	False		1

Iron, dissolved, mg/L

Location: MW-5

Mean of all data: 0.719
Standard Deviation of all data: 0.604
Largest Observation Concentration of all data: Xn = 2.31
Test Statistic, high extreme of all data: Tn = 2.64
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW-6

Mean of all data: 19.2
Standard Deviation of all data: 5.82
Largest Observation Concentration of all data: Xn = 30.5
Test Statistic, high extreme of all data: Tn = 1.94
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Iron, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.548
Standard Deviation of all data: 0.191
Largest Observation Concentration of all data: Xn = 0.929
Test Statistic, high extreme of all data: Tn = 1.99
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW-8

Mean of all data: 0.434
Standard Deviation of all data: 2.30
Largest Observation Concentration of all data: Xn = 15.5
Test Statistic, high extreme of all data: Tn = 6.52
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	15.5	False		1

Iron, dissolved, mg/L

Location: MW-9

Mean of all data: 16.8
Standard Deviation of all data: 4.54
Largest Observation Concentration of all data: Xn = 24.5
Test Statistic, high extreme of all data: Tn = 1.69
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.0390	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00236
Standard Deviation of all data: 0.00141
Largest Observation Concentration of all data: Xn = 0.00350
Test Statistic, high extreme of all data: Tn = 0.809
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00250
Standard Deviation of all data: 0.00168
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.71

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00309
Standard Deviation of all data: 0.00140
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 2.08
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00162
Standard Deviation of all data: 0.00182
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 5.16
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2001	0.0110	False		1

Lead, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00282
Standard Deviation of all data: 0.00117
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 1.87
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00176
Standard Deviation of all data: 0.00180
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 3.47
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.00800	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00239
Standard Deviation of all data: 0.00148
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 1.76
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00137
Standard Deviation of all data: 0.00136
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00289
Standard Deviation of all data: 0.00239
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 3.81
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/28/2009	0.0120	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00253
Standard Deviation of all data: 0.00188
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.00800	False		1

Lead, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00171
Standard Deviation of all data: 0.00201
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 4.63
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/28/2006	<0.0110	True		1

Lead, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00226
Standard Deviation of all data: 0.00191
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 4.58
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/28/2006	<0.0110	True		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW-10

Mean of all data: 1.32
Standard Deviation of all data: 0.651
Largest Observation Concentration of all data: Xn = 2.50
Test Statistic, high extreme of all data: Tn = 1.80
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-11

Mean of all data: 0.144
Standard Deviation of all data: 0.296
Largest Observation Concentration of all data: Xn = 1.24
Test Statistic, high extreme of all data: Tn = 3.72
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	1.24	False		1

Manganese, dissolved, mg/L

Location: MW-11D

Mean of all data: 2.97
Standard Deviation of all data: 0.520
Largest Observation Concentration of all data: Xn = 4.01
Test Statistic, high extreme of all data: Tn = 2.00
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.908	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW-2

Mean of all data: 0.182
Standard Deviation of all data: 0.282
Largest Observation Concentration of all data: Xn = 1.28
Test Statistic, high extreme of all data: Tn = 3.90
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	1.28	False		1

Manganese, dissolved, mg/L

Location: MW-2D

Mean of all data: 1.08
Standard Deviation of all data: 0.168
Largest Observation Concentration of all data: Xn = 1.36
Test Statistic, high extreme of all data: Tn = 1.67
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.611	False	-1	

Manganese, dissolved, mg/L

Location: MW-3

Mean of all data: 0.852
Standard Deviation of all data: 0.319
Largest Observation Concentration of all data: Xn = 1.41
Test Statistic, high extreme of all data: Tn = 1.74
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Manganese, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.334
Standard Deviation of all data: 0.138
Largest Observation Concentration of all data: Xn = 0.745
Test Statistic, high extreme of all data: Tn = 2.97
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.745	False		1

Manganese, dissolved, mg/L

Location: MW-5

Mean of all data: 1.17
Standard Deviation of all data: 0.581
Largest Observation Concentration of all data: Xn = 2.53
Test Statistic, high extreme of all data: Tn = 2.33
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-6

Mean of all data: 2.52
Standard Deviation of all data: 0.550
Largest Observation Concentration of all data: Xn = 3.63
Test Statistic, high extreme of all data: Tn = 2.02
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Manganese, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.186
Standard Deviation of all data: 0.0632
Largest Observation Concentration of all data: Xn = 0.309
Test Statistic, high extreme of all data: Tn = 1.94
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-8

Mean of all data: 0.617
Standard Deviation of all data: 0.122
Largest Observation Concentration of all data: Xn = 0.836
Test Statistic, high extreme of all data: Tn = 1.80
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-9

Mean of all data: 0.756
Standard Deviation of all data: 0.117
Largest Observation Concentration of all data: Xn = 1.07
Test Statistic, high extreme of all data: Tn = 2.68
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Nickel, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00250
Standard Deviation of all data: 0.00176
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 3.13
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.00800	False		1

Nickel, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00443
Standard Deviation of all data: 0.00310
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.79
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00265
Standard Deviation of all data: 0.00272
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 3.07
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/22/2013	0.0110	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nickel, dissolved, mg/L

Location: MW-2

Mean of all data: 0.0115
Standard Deviation of all data: 0.0125
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 3.09
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/27/2007	0.0500	False		1

Nickel, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00128
Standard Deviation of all data: 0.000888
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.06
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00400	False		1

Nickel, dissolved, mg/L

Location: MW-3

Mean of all data: 0.0187
Standard Deviation of all data: 0.0177
Largest Observation Concentration of all data: Xn = 0.0800
Test Statistic, high extreme of all data: Tn = 3.47
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/1997	0.0800	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nickel, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00170
Standard Deviation of all data: 0.00137
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 3.87
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/06/2017	0.00700	False		1

Nickel, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00581
Standard Deviation of all data: 0.00827
Largest Observation Concentration of all data: Xn = 0.0329
Test Statistic, high extreme of all data: Tn = 3.28
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/26/2001	0.0329	False		1

Nickel, dissolved, mg/L

Location: MW-6

Mean of all data: 0.0110
Standard Deviation of all data: 0.0130
Largest Observation Concentration of all data: Xn = 0.0470
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nickel, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00150
Standard Deviation of all data: 0.00105
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.32
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00500	False		1

Nickel, dissolved, mg/L

Location: MW-8

Mean of all data: 0.0135
Standard Deviation of all data: 0.0148
Largest Observation Concentration of all data: Xn = 0.117
Test Statistic, high extreme of all data: Tn = 7.01
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	0.117	False		1

Nickel, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00803
Standard Deviation of all data: 0.0105
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 3.14
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/27/2007	0.0410	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nitrate nitrogen, dissolved, mg/L

Location: MW-10

Mean of all data: 2.26
Standard Deviation of all data: 3.82
Largest Observation Concentration of all data: Xn = 16.9
Test Statistic, high extreme of all data: Tn = 3.83
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	16.9	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-11

Mean of all data: 8.31
Standard Deviation of all data: 11.7
Largest Observation Concentration of all data: Xn = 55.6
Test Statistic, high extreme of all data: Tn = 4.04
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	55.6	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-11D

Mean of all data: 2.42
Standard Deviation of all data: 7.60
Largest Observation Concentration of all data: Xn = 44.0
Test Statistic, high extreme of all data: Tn = 5.47
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/07/2011	44.0	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Nitrate nitrogen, dissolved, mg/L
Location: MW-2

Mean of all data: 4.41
Standard Deviation of all data: 4.14
Largest Observation Concentration of all data: Xn = 15.0
Test Statistic, high extreme of all data: Tn = 2.55
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW-2D

Mean of all data: 1.60
Standard Deviation of all data: 2.38
Largest Observation Concentration of all data: Xn = 10.0
Test Statistic, high extreme of all data: Tn = 3.53
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	10.0	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW-3

Mean of all data: 3.27
Standard Deviation of all data: 4.46
Largest Observation Concentration of all data: Xn = 14.2
Test Statistic, high extreme of all data: Tn = 2.45
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nitrate nitrogen, dissolved, mg/L

Location: MW-3D

Mean of all data: 1.53
Standard Deviation of all data: 2.28
Largest Observation Concentration of all data: Xn = 11.2
Test Statistic, high extreme of all data: Tn = 4.25
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	11.2	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-5

Mean of all data: 1.65
Standard Deviation of all data: 2.36
Largest Observation Concentration of all data: Xn = 11.4
Test Statistic, high extreme of all data: Tn = 4.14
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	11.4	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-6

Mean of all data: 1.12
Standard Deviation of all data: 1.44
Largest Observation Concentration of all data: Xn = 6.00
Test Statistic, high extreme of all data: Tn = 3.39
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	6.00	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Nitrate nitrogen, dissolved, mg/L
Location: MW-6D

Mean of all data: 1.42
Standard Deviation of all data: 2.64
Largest Observation Concentration of all data: Xn = 14.6
Test Statistic, high extreme of all data: Tn = 4.98
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	14.6	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW-8

Mean of all data: 2.39
Standard Deviation of all data: 2.82
Largest Observation Concentration of all data: Xn = 10.0
Test Statistic, high extreme of all data: Tn = 2.70
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW-9

Mean of all data: 1.21
Standard Deviation of all data: 1.98
Largest Observation Concentration of all data: Xn = 9.27
Test Statistic, high extreme of all data: Tn = 4.07
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	9.27	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00566
Standard Deviation of all data: 0.00353
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.08
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00596
Standard Deviation of all data: 0.00343
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.71

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00477
Standard Deviation of all data: 0.00511
Largest Observation Concentration of all data: Xn = 0.0250
Test Statistic, high extreme of all data: Tn = 3.96
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.0250	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Selenium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00493
Standard Deviation of all data: 0.00349
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.17
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00415
Standard Deviation of all data: 0.00359
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.35
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00500
Standard Deviation of all data: 0.00334
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.20
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Selenium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00477
Standard Deviation of all data: 0.00399
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 2.82
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.0160	False		1

Selenium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00495
Standard Deviation of all data: 0.00450
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 2.90
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0180	False		1

Selenium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00443
Standard Deviation of all data: 0.00379
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.26
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019 **LT Multiplier: x 0.50**

Confidence Level: 95% **Number of Outliers: One Outlier**

Transform: None

Selenium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00524
Standard Deviation of all data: 0.00353
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.35
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00495
Standard Deviation of all data: 0.00365
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.20
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00472
Standard Deviation of all data: 0.00402
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 2.56
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Silver, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00102
Standard Deviation of all data: 0.00147
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.75
T Critical of all data: Tcr = 2.71

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/25/2016	0.00800	False		1

Silver, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000981
Standard Deviation of all data: 0.00126
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.98
T Critical of all data: Tcr = 2.70

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00600	False		1

Silver, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.000903
Standard Deviation of all data: 0.00127
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 4.81
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00700	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Silver, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00108
Standard Deviation of all data: 0.00183
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 4.87
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2010	0.0100	False		1

Silver, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00127
Standard Deviation of all data: 0.00135
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.51
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/29/2016	0.00600	False		1

Silver, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00150
Standard Deviation of all data: 0.00177
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 2.54
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Silver, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00123
Standard Deviation of all data: 0.00154
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 3.76
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/25/2016	0.00700	False		1

Silver, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00111
Standard Deviation of all data: 0.00116
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.36
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00500	False		1

Silver, dissolved, mg/L

Location: MW-6

Mean of all data: 0.000826
Standard Deviation of all data: 0.000907
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 4.60
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00500	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Silver, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00172
Standard Deviation of all data: 0.00205
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.57
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00118
Standard Deviation of all data: 0.00148
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.25
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00600	False		1

Silver, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000978
Standard Deviation of all data: 0.00142
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.95
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00800	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Sulfate, dissolved, mg/L

Location: MW-10

Mean of all data: 853.
Standard Deviation of all data: 208.
Largest Observation Concentration of all data: Xn = 1100.
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	<0.100	True	-1	

Sulfate, dissolved, mg/L

Location: MW-11

Mean of all data: 90.1
Standard Deviation of all data: 76.9
Largest Observation Concentration of all data: Xn = 383.
Test Statistic, high extreme of all data: Tn = 3.81
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	383.	False		1

Sulfate, dissolved, mg/L

Location: MW-11D

Mean of all data: 462.
Standard Deviation of all data: 220.
Largest Observation Concentration of all data: Xn = 927.
Test Statistic, high extreme of all data: Tn = 2.11
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Sulfate, dissolved, mg/L

Location: MW-2

Mean of all data: 41.9
Standard Deviation of all data: 49.3
Largest Observation Concentration of all data: Xn = 287.
Test Statistic, high extreme of all data: Tn = 4.97
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	287.	False		1

Sulfate, dissolved, mg/L

Location: MW-2D

Mean of all data: 43.2
Standard Deviation of all data: 48.8
Largest Observation Concentration of all data: Xn = 181.
Test Statistic, high extreme of all data: Tn = 2.82
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	181.	False		1

Sulfate, dissolved, mg/L

Location: MW-3

Mean of all data: 74.0
Standard Deviation of all data: 57.1
Largest Observation Concentration of all data: Xn = 230.
Test Statistic, high extreme of all data: Tn = 2.73
T Critical of all data: Tcr = 2.64

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	230.	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Sulfate, dissolved, mg/L

Location: MW-3D

Mean of all data: 171.
Standard Deviation of all data: 97.2
Largest Observation Concentration of all data: Xn = 638.
Test Statistic, high extreme of all data: Tn = 4.81
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	638.	False		1

Sulfate, dissolved, mg/L

Location: MW-5

Mean of all data: 109.
Standard Deviation of all data: 72.2
Largest Observation Concentration of all data: Xn = 340.
Test Statistic, high extreme of all data: Tn = 3.20
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/10/2014	340.	False		1

Sulfate, dissolved, mg/L

Location: MW-6

Mean of all data: 10.8
Standard Deviation of all data: 8.74
Largest Observation Concentration of all data: Xn = 34.9
Test Statistic, high extreme of all data: Tn = 2.76
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Sulfate, dissolved, mg/L

Location: MW-6D

Mean of all data: 257.
Standard Deviation of all data: 71.4
Largest Observation Concentration of all data: Xn = 417.
Test Statistic, high extreme of all data: Tn = 2.24
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L

Location: MW-8

Mean of all data: 128.
Standard Deviation of all data: 23.7
Largest Observation Concentration of all data: Xn = 186.
Test Statistic, high extreme of all data: Tn = 2.47
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/29/2016	45.2	False	-1	

Sulfate, dissolved, mg/L

Location: MW-9

Mean of all data: 180.
Standard Deviation of all data: 63.3
Largest Observation Concentration of all data: Xn = 365.
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	365.	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW-10

Mean of all data: 1680.
Standard Deviation of all data: 195.
Largest Observation Concentration of all data: Xn = 2130.
Test Statistic, high extreme of all data: Tn = 2.30
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-11

Mean of all data: 762.
Standard Deviation of all data: 435.
Largest Observation Concentration of all data: Xn = 2770.
Test Statistic, high extreme of all data: Tn = 4.61
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	2770.	False		1

Total Dissolved Solids, mg/L

Location: MW-11D

Mean of all data: 1280.
Standard Deviation of all data: 300.
Largest Observation Concentration of all data: Xn = 1730.
Test Statistic, high extreme of all data: Tn = 1.49
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	280.	False	-1	

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW-2

Mean of all data: 737.
Standard Deviation of all data: 233.
Largest Observation Concentration of all data: Xn = 1560.
Test Statistic, high extreme of all data: Tn = 3.52
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/24/2005	1560.	False		1

Total Dissolved Solids, mg/L

Location: MW-2D

Mean of all data: 757.
Standard Deviation of all data: 155.
Largest Observation Concentration of all data: Xn = 950.
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-3

Mean of all data: 730.
Standard Deviation of all data: 139.
Largest Observation Concentration of all data: Xn = 1130.
Test Statistic, high extreme of all data: Tn = 2.85
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2018	290.	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Total Dissolved Solids, mg/L
Location: MW-3D

Mean of all data: 570.
Standard Deviation of all data: 86.1
Largest Observation Concentration of all data: Xn = 750.
Test Statistic, high extreme of all data: Tn = 2.08
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L
Location: MW-5

Mean of all data: 764.
Standard Deviation of all data: 205.
Largest Observation Concentration of all data: Xn = 1320.
Test Statistic, high extreme of all data: Tn = 2.71
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2018	50.0	False	-1	

Total Dissolved Solids, mg/L
Location: MW-6

Mean of all data: 504.
Standard Deviation of all data: 99.2
Largest Observation Concentration of all data: Xn = 1040.
Test Statistic, high extreme of all data: Tn = 5.40
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/30/2004	1040.	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Total Dissolved Solids, mg/L

Location: MW-6D

Mean of all data: 690.
Standard Deviation of all data: 163.
Largest Observation Concentration of all data: Xn = 960.
Test Statistic, high extreme of all data: Tn = 1.65
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-8

Mean of all data: 734.
Standard Deviation of all data: 133.
Largest Observation Concentration of all data: Xn = 1030.
Test Statistic, high extreme of all data: Tn = 2.22
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-9

Mean of all data: 912.
Standard Deviation of all data: 191.
Largest Observation Concentration of all data: Xn = 1400.
Test Statistic, high extreme of all data: Tn = 2.56
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Zinc, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00622
Standard Deviation of all data: 0.00987
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 4.23
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0480	False		1

Zinc, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00691
Standard Deviation of all data: 0.0105
Largest Observation Concentration of all data: Xn = 0.0490
Test Statistic, high extreme of all data: Tn = 4.03
T Critical of all data: Tcr = 2.71

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0490	False		1

Zinc, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00742
Standard Deviation of all data: 0.0108
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 3.95
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0500	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Zinc, dissolved, mg/L

Location: MW-2

Mean of all data: 0.0145
Standard Deviation of all data: 0.0577
Largest Observation Concentration of all data: Xn = 0.454
Test Statistic, high extreme of all data: Tn = 7.61
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.454	False		1

Zinc, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00624
Standard Deviation of all data: 0.00882
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 4.73
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0480	False		1

Zinc, dissolved, mg/L

Location: MW-3

Mean of all data: 0.0110
Standard Deviation of all data: 0.0181
Largest Observation Concentration of all data: Xn = 0.108
Test Statistic, high extreme of all data: Tn = 5.35
T Critical of all data: Tcr = 2.96

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/08/2008	0.108	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Zinc, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00715
Standard Deviation of all data: 0.0117
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 3.67
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0500	False		1

Zinc, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00669
Standard Deviation of all data: 0.00924
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.69
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/1998	<0.0500	True		1

Zinc, dissolved, mg/L

Location: MW-6

Mean of all data: 0.0165
Standard Deviation of all data: 0.0603
Largest Observation Concentration of all data: Xn = 0.478
Test Statistic, high extreme of all data: Tn = 7.66
T Critical of all data: Tcr = 3.04

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/1998	0.478	False		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Zinc, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00597
Standard Deviation of all data: 0.0107
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 3.37
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0420	False		1

Zinc, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00716
Standard Deviation of all data: 0.0115
Largest Observation Concentration of all data: Xn = 0.0720
Test Statistic, high extreme of all data: Tn = 5.64
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/17/2011	0.0720	False		1

Zinc, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00680
Standard Deviation of all data: 0.00852
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 5.07
T Critical of all data: Tcr = 3.12

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/21/2004	<0.0500	True		1

Based on Grubbs one-sided outlier test

Venice

Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/10/2019
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Based on Grubbs one-sided outlier test

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APPENDIX D2
TEST DESCRIPTIONS

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MANAGES

Groundwater Data Management and Evaluation Software

Software Manual Product ID #1012581

Software Manual, February 2010

EPRI Project Manager
K. Ladwig

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10
STATISTICAL ANALYSIS

Stand-Alone Statistical Tests

Statistical Evaluation Report

The Statistical Evaluation Report is comprised of a series of subreports as described below.

User Selections:

- One location.
- Sample date range for data selection.
- Interval length: the length of the averaging period in months (1,2,3,4, or 6).
- One parameter.
- Non-detect processing: multiplier between 0 and 1.
- One-sided confidence $(1-\alpha)$ level – 0.90, 0.95 or 0.99.
- Limit type: used in the statistical overview to determine exceedances.

Mann-Kendall Trend and Seasonal Analysis Tests

The Mann-Kendall test for trend is insensitive to the presence or absence of seasonality. The test is non-parametric and does not assume any type of data distribution. Nonetheless, two forms of the test are provided in MANAGES, one ignoring data seasonality even if it is present, and one considering data seasonality. In the test, the null hypothesis, H_0, is that the Sen trend is zero, and the alternate hypothesis, H_a, is that the trend is non-zero.

In general, the Mann-Kendall test considering seasonality indicates a larger range for allowable Sen estimate of trend when seasonality is actually present than the range indicated by the test performed ignoring seasonality.

In the Mann-Kendall Trend Analysis, available in under the Statistical Evaluation Report and in the Statistical Procedure for Detection Monitoring, and Mann-Kendall Seasonal Analysis, found under the Statistical Evaluation Report, MANAGES first calculates the Sen slope and the upper and lower confidence limits of the Sen slope, and then determines whether the Sen slope is statistically significant. Slope is statistically significant if it is non-zero.

Mann-Kendall Test for Sen Slope Significance – a two-sided, non-parametric method for data sets as small as 10, unless there are many tied (e.g., equal, NDs are treated as tieds) values (Gilbert, 1987; p. 208)	
Indicator Function $\mathrm{sgn}(x_{ij} - x_{jk})$	= 1 if $(x_{ij} - x_{jk}) > 0$ = 0 if $(x_{ij} - x_{jk}) = 0$ = -1 if $(x_{ij} - x_{jk}) < 0$ where $x_{i1}, x_{i2}, \ldots, x_{in}$ are the time ordered data (n_i is total of data in the i-th season).
Mann-Kendall Statistic, S_i	$= \sum_{k=1}^{n_i-1} \sum_{j=k+1}^{n_i} \mathrm{sgn}(x_{ij} - x_{jk})$
Variance of S_i $VAR(S_i)$	$VAR(S_i) =$ $\frac{1}{18}\left\{ n_i(n_i-1)(2n_i+5) - \sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(2t_{ip}+5) - \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(2u_{iq}+5) \right\}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(t_{ip}-2) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(u_{iq}-2)}{9n_i(n_i-1)(n_i-2)}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)}{2n_i(n_i-1)}.$ The variable g_i is the number of tied groups (equal-valued) data in the i-th season, t_{ip} is the number of tied data in the p-th group for the i-th season, h_i is the number of sampling times (or time periods) in the i-th season that contain multiple data, u_{iq} is the number of multiple data in the q-th time period in the i-th season, and n_i is the number of data values in the i-th season.

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Test Statistic, Z	If $S' = \sum_{i=1}^{K} S_i$, where K is the number of seasons, then the test statistic Z is computed as: $$Z = \begin{cases} \dfrac{S'-1}{[VAR(S')]^{1/2}} & \text{iff } S' > 0 \\ 0 & \text{iff } S' = 0 \\ \dfrac{S'+1}{[VAR(S')]^{1/2}} & \text{iff } S' < 0 \end{cases}$$ Where "iff" is an acroym meaning: if-and-only-if. A positive Z value means an upward trend and a negative Z value means a negative trend.
Hypothesis Test: H_0 = no trend H_a = trend present This is a two-sided test at the α significance level.	Accept the null hypothesis H_0 of no trend if $\lvert Z \rvert \leq Z_{1-\alpha/2}$ Reject the null hypothesis H_0 if $\lvert Z \rvert > Z_{1-\alpha/2}$ where $Z_{1-\alpha/2}$ is obtained from Table A1 in Gilbert (1987; p. 254).

Kruskal-Wallis Analysis (Test for Seasonality)

To perform the Kruskal-Wallis test for data seasonality, data points are first segmented according to season (Gilbert, 1987). The null hypothesis, H_0, is that all seasons have the same mean value. The alternative hypothesis, H_a ,is that at least one season has a mean larger or smaller than the mean of at least one other season. Montgomery et al. (1987) provide additional information on groundwater data seasonality. This is a two-sided, non-parametric test.

In MANAGES, the Kruskal-Wallis Test for Seasonality is found under Data Review // Non-Parametric Methods // Kruskal-Wallis Analysis. It determines whether the seasonal means for the specified parameter at the specified location are statistically the same.

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	or $Z_i \geq SCL$.

Outlier Tests

Outlier tests are useful in detecting inconsistencies of measurement within a data set. An outlier is defined as an observation that appears to deviate markedly from other values of a sample set. There are many possible reasons for the presence of an outlier, including 1) the presence of a true but extreme value from a single population, resulting from random variability inherent in the data; 2) an improper identification of the underlying distribution describing the population from which the sample set comes from; 3) the occurrence of some unknown event(s) such as a spill, creating a mixture of two or more populations; 4) a gross deviation from prescribed sampling procedures or laboratory analysis; 5) a transcription error in the data value or data unit of measurement.

USEPA (1989; p. 8-11) states that the purpose of a test for outliers is to determine whether or not there is statistical evidence that an observation that appears extreme does not fit the distribution of the rest of the data. If an observation is identified as an outlier, then steps need to be taken to determine whether it is the result of an error or a valid extreme observation. If a true error, such as in transcription, dilution, or analytical procedure, can be identified, then the suspect value should be replaced with its corrected value. If the source of the error can be determined but no correction is possible, then the observation is deleted and the reason for deletion is reported along with any statistical analysis. If no source of error can be documented, then it must be assumed that the observation is a true but extreme value of the data set. If this is the case, the outlier observation(s) must not be altered or excluded from any statistical analysis. Identification of an observation as an outlier but with no error documented could be used to suggest resampling to confirm the value (USEPA, 1989; p. 8-13).

The outlier tests provided in MANAGES are based on either the single outlier test of Grubbs (1969), which is used by USEPA (1989; pp. 8-10 to 8-13) or the single outlier test of Dixon (1951, 1953), which is used by USEPA (2000; pp. 4-24) and by ASTM (1998). The outlier tests assume the data come from a normal distribution. Only one outlier, either an extreme low or an extreme high, can be detected during a single analysis of a data set. Additional outliers can be detected by temporarily removing a previously detected outlier from a data set and then repeating the test on the remaining, reduced, data set. During each pass of the outlier test, the sample mean, standard deviation, and sample size used in the test statistics are computed using only the data remaining in the set. The process can be continued until there is either an insufficient amount of data remaining (a minimum of 3 values) or when no additional outliers are found. When using MANAGES, the user will be asked how many outliers are to be checked and it will then automatically perform all of the recursive calls and data reductions with the Grubbs or Dixon routine. When done, a report can be generated that will show each outlier marked with a flag indicating the sequential order in which the outliers were identified.

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Critical values used in the one-sided Grubbs test are taken directly from those in Grubbs and Beck (1972) for sample sizes smaller than 147 observations. Critical values for sample sizes larger than 147 were generated numerically using a Monte Carlo routine, where each sampling event was simulated 100,000 times. Sample sizes ranging from 148 to 5,000 where used and then their resultant test statistic T_n curve fitted at specific significance levels. By this method, it was possible to match Grubbs results to at least four significant digits for corresponding tabulated values.

Critical values used in the one-sided Dixon outlier test are taken directly from tables given in Dixon (1951), Dixon (1953; page 89), and USEPA (2000; p. A-5, Table A-3). The critical values were then curve fitted for every sample size between 3 and 25 as a function of the significance level. By this method, it was possible to match Dixon's results to at least four significant digits for corresponding tabulated values. Note that the Dixon test assumes the data are either normally or lognormally distributed. Hence, sample sizes can only range between 3 and 25, inclusive. Dixon never developed an outlier test for sample sizes larger than 25.

User Selections:

- One or up to 100 locations: a separate test is performed for each location.
- One or up to 100 parameters: a separate test is performed for each parameter.
- Evaluation date range.
- Confidence $(1-\alpha)$ level: 0.90, 0.95 or 0.99.
- Non-detect processing: multiplier between 0 and 1.
- Data transformation option: none and log (base e).
- Number of outliers: one, two, first 5%, first 10%. Selecting any option other than one causes MANAGES to rerun the test, with outliers from prior tests removed, until either no outliers are detected or the specified number of outliers are detected.

Technical Details

Grubbs Outlier Test – The Grubbs outlier test determines whether there is statistical evidence that an observation does not fit the remaining data (USEPA, 1989; p. 8-11). This significance test looks at either the highest or the lowest observation in normal samples.	
The number of observations taken during a specified scoping period; n	*n*

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Mean of the observed data during the scoping period; $\overline{X}$	$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$ where X_i is the i-th observation.
Standard deviation of observed data; S_x.	$S_x = \sqrt{\frac{1}{(n-1)}\sum_{i=1}^{n}(X_i - \overline{X})^2}$
Test statistics: T_l & T_n	Sort the data into ascending order, then compute the statistics $T_l = (\overline{X} - X_l)/S_x$ $T_n = (X_n - \overline{X})/S_x$ where X_l is the smallest value of the n observations and X_n is the largest value of the n observations.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Grubbs single, one-sided test of either an extreme low outlier : X_l *is an outlier if* $T_l \geq T_{cr(1-\alpha,n)}$ or an extreme high outlier: X_n *is an outlier if* $T_n \geq T_{cr(1-\alpha,n)}$. The function $T_{cr(1-\alpha,n)}$ is the critical value, given in Grubbs and Beck (1972; Table 1) and USEPA (1989; p. B-11, Table 8) . Note that the critical value assumes that the mean and standard deviation are computed from the sample being tested.

Dixon Outlier Test – The Dixon outlier test determines whether there is statistical evidence that an extreme observation does not fit the remaining data (USEPA, 2000; p. 4-24 and ASTM D6312, 1998). This significance test looks at both the highest and the

lowest observations in a sample data set. However, the routine will only perform the outlier tests if several conditions are first satisfied. For example, the Dixon outlier algorithm checks the distribution of the sample data for both normality and lognormality using the Shapiro-Wilk W-test. The outlier routine will not proceed with a data set if the W-test fails. In addition, the Dixon outlier test is limited to a minimum of 3 and a maximum sample size n of 25 data values.	
The number of observations taken during a specified scoping period; n	Number of observations, n, where $3 \le n \le 25$.
Sorting the sample data	Sort the data into ascending order, with the minimum data value $X_{(1)}$ first and the maximum data value $X_{(n)}$ last. Use the natural log of the data values if data are lognormally distributed, i.e., $X_{(j)} = Ln[X_{(j)}]$.
Goodness-of fit tests	After temporarily excluding either the minimum or maximum value of the data set, the Shapiro-Wilk's W-test is used to determine if the remaining $n-1$ values are normally or lognormally distributed. If not, the Dixon outlier test can't be used.
Test statistic, T_s, for the minimum data value	Compute the T_s test statistic for $X_{(1)}$ as an outlier: $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}}$ *for* $14 \le n \le 25.$
Test statistic, T_s, for the maximum data value	Compute the T_s test statistic for $X_{(n)}$ as an outlier:

	$T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}}$ *for* $14 \le n \le 25$.
Critical value T_c	USEPA (2000; p. A-5, Table A-3) lists the critical values of the Dixon test as a function of sample size for a one-sided extreme value test at the significance levels α of 0.1, 0.05, and 0.01.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Dixon's single, one-sided test for statistical evidence of either an extreme low-valued outlier: $X_{(1)}$ *is an outlier if* $T_s \ge T_c$ or an extreme high-valued outlier: $X_{(n)}$ *is an outlier if* $T_s \ge T_c$. The function T_c is the critical value, given in Dixon (1953; page 89) and USEPA (2000; p. A-5, Table A-3). Note that the critical value assumes that the data are either normally or lognormally distributed.

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Other Statistical Calculations Used in MANAGES

Sen Estimate of Slope

The Sen estimate of slope is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed (Gilbert, 1987). The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar days. Sen's estimate of slope is a non-parametric estimator of trend. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. In contrast, linear regression and other least squares estimators of slope are significantly more sensitive, and more likely to give erroneous slope indications, even when only a few outlier values are present.

When data averaging is not activated, the Sen slope is calculated using individual data points and actual sampling dates. When data averaging is activated, multiple data points within each specified season period are reduced to one data point by arithmetic averaging over each of the season periods. These averaged values are then assigned to the day that corresponds to the middle of that season's period.

The approximate lower and upper confidence limits for the Sen slope can also be calculated using normal theory (Gilbert, 1987). It should be noted that confidence limits for the Sen slope are not necessarily symmetrical about the estimated slope since ranked values of slope are used in the calculation.

MANAGES calculates Sen slope in the Sen Slope Overlay Graph, Statistical Summary reports and in the two Mann-Kendall tests performed under the Statistical Evaluation Report.

Sen's Estimate of Slope – two-sided, non-parametric method that calculates the trend of a single data series. It is less sensitive to outliers and non-detect values than linear regression (Gilbert, 1987; p. 217).	
Slope, Q	$= \frac{x_{i'} - x_i}{i' - i}$ where $X_{i'}$ and x_i are data values at times i' and i, respectively, and where $i'>i$. Typically, i' and i are expressed in units of either days for trend analysis or years for seasonal analysis.
N′	Number of unique data point pairs that can be made for the observations in the data set, for $i'>i$. For n monitoring events, N′ is given as: N′ = n(n-1)/2

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Sen's Slope Estimate	Sen's slope estimator = median slope $= Q_{[(N'+1)/2]}$ if N' is odd $= \frac{1}{2}(Q_{[N'/2]} + Q_{[(N'+2)/2]})$ if N' is even where the Q values have first been ranked from smallest to largest.
$Z_{1-\alpha/2}$	Statistic for the cumulative normal distribution (Gilbert, 1987; p. 254) for the two-sided, α significance level.
Variance estimate of the Mann-Kendall S Statistic, VAR(S)	VAR(S) $= \frac{1}{18}\left[n(n-1)(2n+5) - \sum_{p=1}^{g} t_p(t_p-1)(2t_p+5)\right]$ where g is the number of tied groups, t_p is the number of data in the pth group, and n is the number of data values.
C_α	$= Z_{1-\alpha/2}\sqrt{VAR(S)}$
Sen's Slope , a two-sided test at the α significance level	$M_1 = \frac{(N'-C_\alpha)}{2}$ $M_2 = \frac{(N'+C_\alpha)}{2}$ Lower limit of confidence interval is the M_1-th largest slope, and upper limit of confidence interval is the (M_2+1)-th largest of the N′ ordered slope estimates.

Coefficient of Skewness for Normality

The coefficient of skewness is another measure for data normality (Gilbert, 1987). MANAGES provides the value of the coefficient of skewness in the Statistical Evalueation Report, Statistical Overview. Additional information on data normality is given by Montgomery, et al. (1987).

Exhibit 17

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GEOTECHNOLOGY INC
FROM THE GROUND UP

September 20, 2017

Mr. Paul Mauer
Illinois Department of Natural Resources
Office of Water Resources
One Natural Resources Way, 2nd Floor
Springfield, Illinois 62702-1271

Re: Permit Status Change Request
Fly Ash Pond and Closed Ash Pond
Meredosia Power Station
Meredosia, Illinois
Geotechnology, Inc. Project No. J024917.03

Dear Mr. Mauer:

Geotechnology, Inc. (Geotechnology), on behalf of Ameren Missouri, is requesting a permit change status at the referenced site to de-classify the embankments at the Fly Ash Pond and Closed Ash Pond as abandoned dams. A liquefaction analysis performed by Geotechnology is included as an attachment and summarized herein with additional information as discussed in our April 21, 2017 phone call.

The energy center site consists of the decommissioned Meredosia Power Station in Meredosia, Illinois. The Closed Ash Pond does not have an engineered bottom liner and has a soil cap of unknown thickness. The Fly Ash Pond does not have an engineered bottom liner and is scheduled be graded and capped in 2017-2018 construction seasons. The designed cap utilizes ClosureTurf, which is a geosynthetic system that meets the Subtitle D technical requirements and has been tentatively approved by the IEPA for installation.

The embankments at the capped Fly Ash Pond and Closed Ash Pond are currently not Illinois Department of Natural Resources – Office of Water Resources (IDNR) permitted dams. Upon modification of the dams, they would fall under the jurisdiction of IDNR. Based on conversations with IDNR, the following guidelines[1] summarize required documentation for consideration to abandoned a dams:

[1] GUIDELINES FOR PREPARATION OF APPLICATIONS FOR PERMITS FROM: *Illinois Department of Natural Resources, Office of Water Resources, Illinois Department of Natural Resources, Office of Mines and Minerals;* AND FOR REVIEW AND APPROVAL FROM: *United States Department of Labor, Mine Safety and Health Administration, Illinois Environmental Protection Agency;* FOR THE DESIGN, CONSTRUCTION MAINTENANCE AND INSPECTION OF DAMS AND IMPOUNDMENTS AT UNDERGROUND AND SURFACE COAL MINES IN ILLINOIS; *July 2004*

1. Classify the existing condition of the impounded material with respect to its fluid nature;

2. Analyze the liquefaction potential of the impounded material and the related stability of the containing dam;

3. Design the final surface configuration for the impoundment to preclude the potential for re-saturation of the impounded material, especially from any surface water impounding characteristics and the erosion potential of the surface material; and

4. Establish a follow-up inspection schedule to ensure the proposed plans have been effective and include record drawings of any closure modifications.

Each of these IDNR requested items are addressed below:

1. Geotechnology performed liquefaction analysis of the impounded material within Fly Ash Pond and Closed Ash Pond. The complete report is attached for your reference.

   In summary, six – approximately 25 feet deep cone penetration test (CPT) soundings were performed in the Closed Ash Pond and eight- approximately 25 feet CPT soundings were performed in the Fly Ash Pond. Direct push samples from the impounded ash were collected to a depth of approximately 24 feet in the Closed Ash Pond and approximately 24 feet in the Fly Ash Pond.

   The CPT data indicates interbedded layers of material that respond to CPT advancement similar to clay, silty clay, silty sand, and sand in the Fly Ash Pond and interbedded layers of sand and silty sand in the Closed Ash Pond. The interbedded nature of the CPT data interpretation is to be expected in an uncontrolled waste product such as fly ash. The laboratory testing indicates the sampled material in the Fly Ash Pond was fine grained in nature having approximately 98 and 99 percent passing the #200 sieve. The sampled material in the Closed Ash Pond indicates the material is coarser in nature with approximately 4 percent passing the #200 sieve.

   Geotechnology analyzed the CPT data for liquefaction potential and dynamic (post liquefaction) settlement utilizing a design PGA of 0.08g and an earthquake magnitude of 7.5. The analysis incorporated the results of the laboratory tests to refine the fines content within the soundings.

   Based on the liquefaction results there were not potentially liquefiable layers identified within the impounded ash.

2. See response for item 1 for the analysis of the liquefaction potential of the impounded material.

   The stability of the embankments for the Fly Ash Pond was analyzed by Geotechnology prior to the design of the ash pond capping project and approved by the IEPA in 2017 as a stable configuration that does not allow ponding of storm water. The Closed Ash Pond was reported closed with a soil cap in the 1970s.

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3. The final surface configuration for the impoundments were designed to prevent re-saturation of the impounded material by using a cap system. The Closed Ash Pond uses a soil cap that is graded to drain to a storm water collection system. The Fly Ash Pond cap system is a ClosureTurf cap which includes a HDPE geomembrane (supergripnet), geotextile, turf, sand infill, and a storm water collection system. This cap system is scheduled to be constructed in 2018. Surface grades were designed to prevent ponding of storm water and reduce erosion potential of the surface material. The Fly Ash Pond design was submitted and approved by the IEPA in 2017.

4. As part of the ash pond closure process, a post-closure plan was prepared that includes an inspection schedule of the ash pond caps and the storm water collection systems. The post-closure plan was submitted and approved by the IEPA in 2017.

Based on this additional information, Geotechnology requests, on behalf of Ameren Missouri, that the embankments at Fly Ash Pond and Closed Ash Pond be de-classified and removed from regulatory jurisdiction.

* * * * * *

The following reports are made part of and complete this letter:

Geotechnical Exploration, Meredosia Fly Ash Pond and Closed Ash Pond, Liquefaction Analysis, Meredosia, Illinois, dated June 29, 2017

* * * * * *

If you have any questions or require additional information, please contact the undersigned at (314) 997-7440.

Very truly yours,

GEOTECHNOLOGY, INC.

Anna M Saindon, P.E., R.G., Ph.D.
Project Manager

AMS/MSR:ams/jsj/ccg

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APPENDIX A

LIQUEFACTION ANALYSIS REPORT

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GEOTECHNOLOGY INC
FROM THE GROUND UP

GEOTECHNICAL EXPLORATION
MEREDOSIA FLY ASH POND AND CLOSED ASH POND
LIQUEFACTION ANALYSIS
MEREDOSIA, ILLINOIS

Prepared for:

AMEREN MISSOURI
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Geotechnology Project No. J024917.03

September 20, 2017

St. Louis, MO
Fairview Heights, IL
Overland Park, KS
Memphis, TN
geotechnology.com

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GEOTECHNOLOGY INC
FROM THE GROUND UP

September 20, 2017 J019896.07

Mr. Mike Wagstaff
Ameren Missouri
11149 Lindbergh Business Court
St. Louis, Missouri 63123

GEOTECHNICAL EXPLORATION
MEREDOSIA FLY AND CLOSED ASH PONDS
LIQUEFACTION ANALYSIS
HUTSONVILLE, ILLINOIS

Dear Mr. Wagstaff:

The report includes our understanding of the project, site conditions, conclusions and/or recommendations, and support data as listed in the Table of Contents.

It has been our pleasure to provide geotechnical services to you, and we would welcome the opportunity to provide other services during the course of the project. Please contact us if you need further information or clarification about this document.

Very truly yours,

GEOTECHNOLOGY, INC.

Brian J. Sanders, P.E.*
Senior Engineer

Craig K. Kaibel, P.E.
Geotechnical Manager

BJS/CKK/AMS:bjs/ccg

Copies submitted: (2) + pdf

LICENSED PROFESSIONAL ENGINEER
CRAIG K KAIBEL
062-061432
9/20/2017
STATE OF ILLINOIS

* Licensed in Missouri

J024917.03

GEOTECHNICAL EXPLORATION
MEREDOSIA FLY ASH POND AND CLOSED ASH POND
LIQUEFACTION ANALYSIS
MEREDOSIA, ILLINOIS

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J024917.03

GEOTECHNICAL EXPLORATION
MEREDOSIA FLY ASH POND AND CLOSED ASH POND
LIQUEFACTION ANALYSIS
MEREDOSIA, ILLINOIS

SECTION I – PROJECT INFORMATION

AUTHORIZATION

Our services were authorized by the issuance of Ameren Energy PO 793018, dated June 6, 2017 to Geotechnology, Inc.

PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to evaluate the liquefaction potential of the impounded material in the Fly Ash Pond and the Closed Ash Pond at the Meredosia Site. Briefly, services consisted of site reconnaissance, performing fourteen Cone Penetrometer Test (CPT) soundings, two direct push borings, engineering analyses, and preparation of this report. Important information prepared by The Geoprofessional Business Association (GBA) for studies of this type is presented in Appendix A for your review.

PROJECT AND SITE DESCRIPTION

The project site is at the decommissioned Meredosia Power Station in Meredosia, Illinois. Ameren is proposing to declassify the Fly Ash Pond and the Closed Ash Pond in accordance with guidelines issued by the Illinois Department of Natural Resources – Office of Water Resources (IDNR-OWR). We understand that the Closed Ash Pond does not have a bottom liner and has a soil cap of unknown thickness. The Fly Ash Pond does not have a bottom liner and is scheduled be graded and capped in 2018 construction seasons. The designed cap utilizes ClosureTurf, which is a geosynthetic system that meets the Subtitle D technical requirements and has been approved by the IEPA for installation.

SECTION II - FIELD EXPLORATION AND LABORATORY TESTING

Geotechnology performed fourteen seismic CPT soundings, designated as C-01 through C-08 (Fly Ash Pond) and O-01 through O-06 (Closed Ash Pond). The CPT sounding locations were selected and located in the field by a representative from Geotechnology. The CPT soundings were advanced by Geotechnology, using a 20-ton, track-mounted Vertek direct-push rig. The soundings were advanced to termination depths of approximately 25 feet below land surface (bls) in both the Fly Ash Pond and the Closed Ash Pond. Direct push samples from the impounded ash were collected to a depth of approximately 24 feet in each pond.

Geotechnology performed CPT testing in general accordance with ASTM D5778. The data were collected using a 15-square-centimeter end area, tri-axial geophone, seismic

piezometric cone with a saturated, porous filter ring at the u_2 pore pressure location (i.e., behind the tip). The cone was advanced to the predetermined termination depth or cone refusal at a rate of approximately 20 +/- 5 millimeters per second. The cone resistance, sleeve friction, pore pressure, shear strength, normalized soil behavior type (SBTn), and standard penetration test (SPT) N60 values are presented in Appendix B. Seismic cone penetration tests (SCPT) were performed in each sounding at approximately 3-foot depth intervals to collect shear wave velocity data. Shear wave velocity measurements versus depth at these locations are presented in Appendix C. The fines content was determined on select direct push samples using the percent passing the #200 sieve test and the results are included in Appendix D.

An engineer from Geotechnology observed the CPT data collection process. Unless noted on the CPT logs, the lines designating the changes between various strata represent approximate boundaries. The stratification given on the CPT logs, or described herein, is for use by Geotechnology in its analyses and should not be used as the basis of design or construction cost estimates without Geotechnology's written approval.

The CPT soundings and related information depict subsurface conditions only at the specific locations and times where the soundings were conducted. The passage of time could result in changes in conditions, interpreted to exist, at the locations where CPT was conducted.

SECTION III – SUBSURFACE CONDITIONS

STRATIGRAPHY

We understand the stratigraphy within the ash ponds consists of fly ash to depths of approximately 25 feet in the Fly Ash Pond and approximately 25 feet in the Closed Ash Pond. The CPT data indicates interbedded layers of material that respond to CPT advancement similar to clay, silty clay, silty sand, and sand in the Fly Ash Pond and interbedded layers of sand and silty sand in the Closed Ash Pond. The interbedded nature of the CPT data interpretation is to be expected in an uncontrolled waste product such as fly ash. The laboratory testing indicates the sampled material in the Fly Ash Pond was fine grained in nature having approximately 98 and 99 percent passing the #200 sieve. The sampled material in the Closed Ash Pond indicates the material is coarser in nature with approximately 4 percent passing the #200 sieve.

GROUNDWATER

We understand that the groundwater within the ash ponds is typically perched in nature. Based on the CPT data, groundwater (i.e.,hydrostatic pressure) in the Fly Ash Pond appears to range from depths of approximately 15 to 17 feet below the ground surface. In the Closed Ash Pond, the groundwater (i.e., hydrostatic pressure) appears to range from depths of approximately 26 to 29 feet below the ground surface. Groundwater levels might vary over time due to the effects of seasonal variation in precipitation, recharge, stage of the Illinois River, or other factors not evident at the time of exploration.

SECTION IV – LIQUEFACTION ANALYSIS

Geotechnology analyzed the CPT data for liquefaction potential and dynamic (post-liquefaction) settlement using the CLiq software. CLiq utilizes the analysis method published by Idriss and Boulanger in 2008 and updated in 2014. Based on ASCE 7-10, a design PGA of 0.08g and an earthquake magnitude of 7.5 where used in this analysis. The analysis incorporated the results of the laboratory tests to refine the fines content within the soundings. Based on the liquefaction analysis, it does not appear that the ash ponds have potentially liquefiable layers, i.e. where the calculated factor of safety (F.O.S) is less than 1.0, under the analyzed seismic loading. Liquefaction analysis results for each CPT sounding to the depths pushed are presented in Appendix E.

Geotechnology, Inc. performed seismic and static stability analysis of the embankments and impounded ash. This stability analysis was submitted to the Illinois Department of Natural Resources (IDNR) and approved in 2017. The Closed Ash Pond was reported closed with a soil cap in the 1970s.

Liquefaction Potential Index (LPI[1]) indices are all less than 0, which indicates a **very low risk of liquefaction**. LPI attempts to predict the potential of liquefaction to cause damage to surface features and provide a measure of the severity of liquefaction and has a scale of 0 to 20. *For reference an LPI of 0 indicates a very low liquefaction risk and a LPI of less than 5 indicates a low risk of liquefaction*.

The fluidity of the impounded material was also considered. The elevated or perched groundwater conditions suggest that some level of saturation of the impounded material is possible, especially if the Illinois River is at flood stage. The fines content determined from laboratory testing indicates the impounded material will behave similarly to silts and clays. As such, when saturated, the impounded material would potentially be less fluid than a similarly placed sand material.

SECTION V – CONCLUSIONS

Based on the results of the liquefaction analysis and the seismic and static stability analysis performed by Geotechnology, Inc., it is Geotechnology's opinion that there is a very low risk of surface manifestation of liquefaction or damage to the Fly Ash Pond and Closed Ash Pond embankments during a seismic event.

[1] David Kun Li, C Hsein Juang, Ronald D. Andrus, *Liquefaction Potential Index: A Critical Assessment Using Probability Concept* Journal of GeoEngineering, Vol.1, No.1, August 2006, pp. 11-24,

SECTION VI - LIMITATIONS OF REPORT

This report has been prepared on behalf of, and for the exclusive use of, the client for specific application to the named project as described herein. If this report is provided to other parties, it should be provided in its entirety with all supplementary information. In addition, the client should make it clear that the information is provided for factual data only, and not as a warranty of subsurface conditions presented in this report.

Geotechnology has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions. The recommendations and conclusions contained in this report are professional opinions. The report is not a bidding document and should not be used for that purpose.

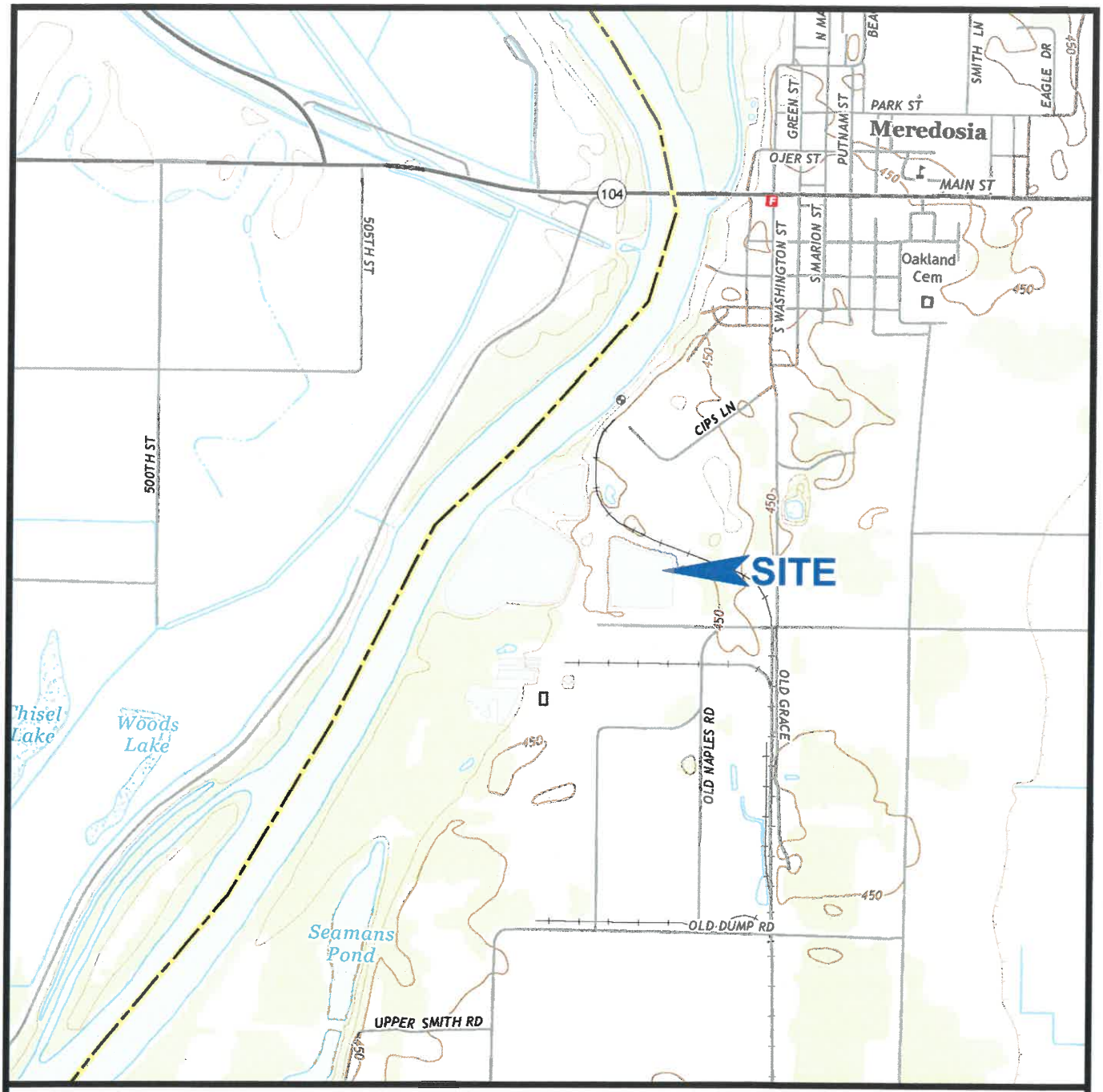
Our scope of service for this phase of the project did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors noted or unusual or suspicious items or conditions observed are strictly for the information of our client. Our scope of service did not include an assessment of the effects of flooding and erosion of creeks or rivers adjacent to or on the project site.

The analyses, conclusions, and recommendations contained in this report are based on the data obtained from the subsurface exploration. The field exploration methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Consequently, subsurface conditions may vary gradually, abruptly, and/or nonlinearly between sample locations and/or intervals.

The conclusions or recommendations presented in this report should not be used without Geotechnology's review and assessment if the nature, design, or location of the facilities is changed, if there is a substantial lapse in time between the submittal of this report and the start of work at the site, or if there is a substantial interruption or delay during work at the site. If changes are contemplated or delays occur, Geotechnology must be allowed to review them to assess their impact on the findings, conclusions, and/or design recommendations given in this report. Geotechnology will not be responsible for any claims, damages, or liability associated with any other party's interpretations of the subsurface data or with reuse of the subsurface data or engineering analyses in this report.

The recommendations included in this report have been based in part on assumptions about variations in site stratigraphy that may be evaluated further during earthwork and foundation construction. Geotechnology should be retained to perform construction observation and continue its geotechnical engineering service using observational methods. Geotechnology cannot assume liability for the adequacy of its recommendations when they are used in the field without Geotechnology being retained to observe construction.

"Important Information about This Geotechnical-Engineering Report" published by the Geotechnical Business Council (GBC) of the Geoprofessional Business Association (GBA) is included as Appendix A. That document discusses some other limitations, as well as ways to manage risk associated with subsurface conditions.



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

Drawn By: WAH	Ck'd By: BSS	App'vd By: CKK
Date: 6-27-17	Date: 9-26-17	Date: 9-20-17

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Ash Pond
Liquefaction Analysis
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.03	PLATE 1



NOTES

1. Plan adapted from an August 23, 2015 aerial photograph courtesy of Google Earth and drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. CPT soundings were located in the field with reference to existing site features and are shown approximate only.

LEGEND

● CPT Sounding Location

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: BJS	App'vd By: CKK
Date: 6-27-17	Date: 9-20-17	Date: 9-20-17

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Ash Pond
Liquefaction Analysis
Meredosia, Illinois

AERIAL PHOTOGRAPH OF SITE AND CPT SOUNDING LOCATIONS

Project Number J024917.03	PLATE 2

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APPENDIX A

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL-ENGINEERING REPORT

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

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problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

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APPENDIX B

CPT SOUNDING LOGS, INTERPRETATIONS, AND ESTIMATIONS

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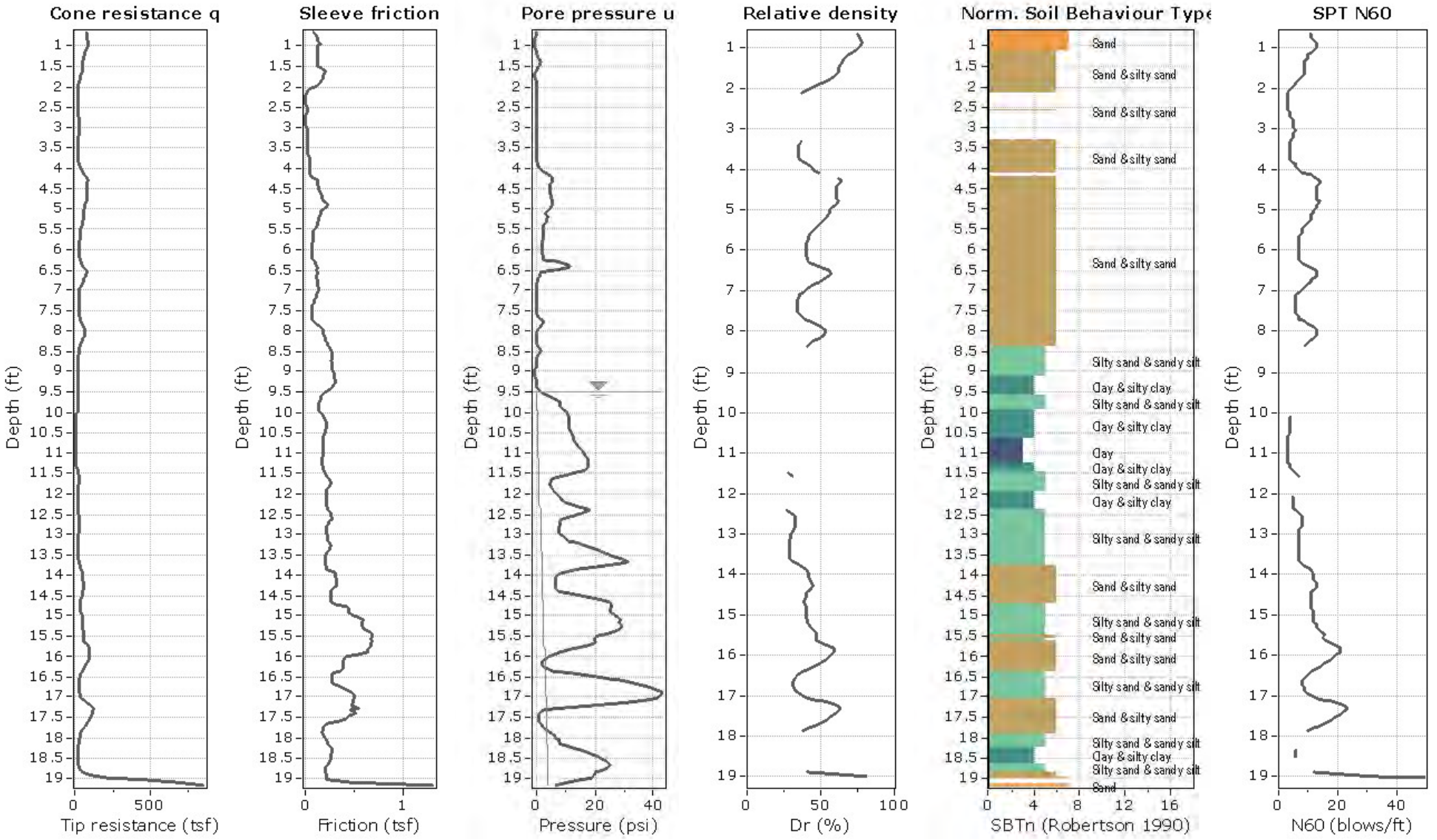
Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C01
Total depth: 19.17 ft, Date: 6/20/2017
Coords: lat 39.81785° lon -90.57078°
Cone Type: 15cm2
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C02
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Coords: lat 39.816763° lon -90.569358°
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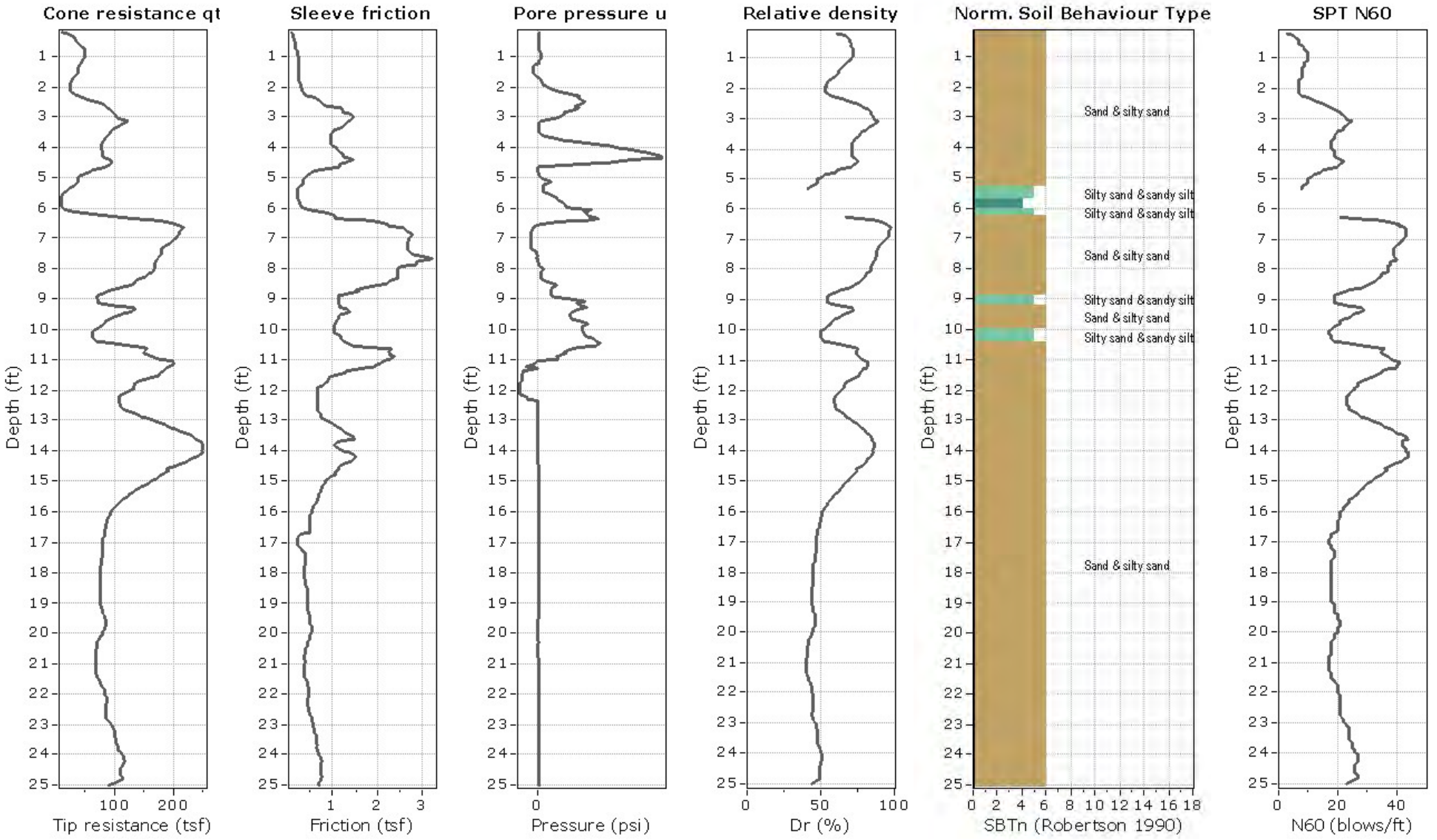
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C03
Total depth: 27.76 ft, Date: 6/6/2017
Coords: lat 39.816228° lon -90.572783°
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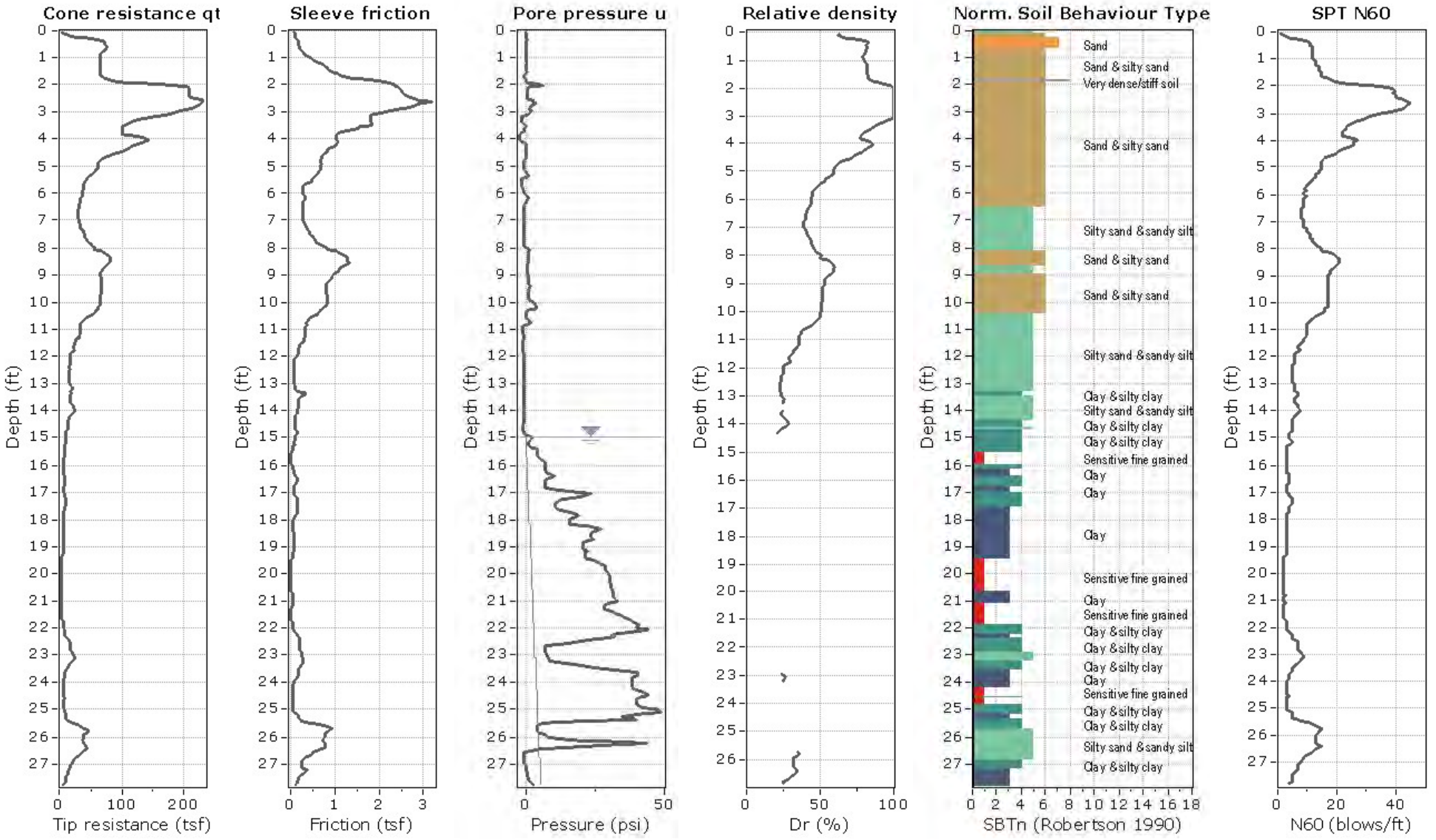
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C04
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Coords: lat 39.816732° lon -90.57602°
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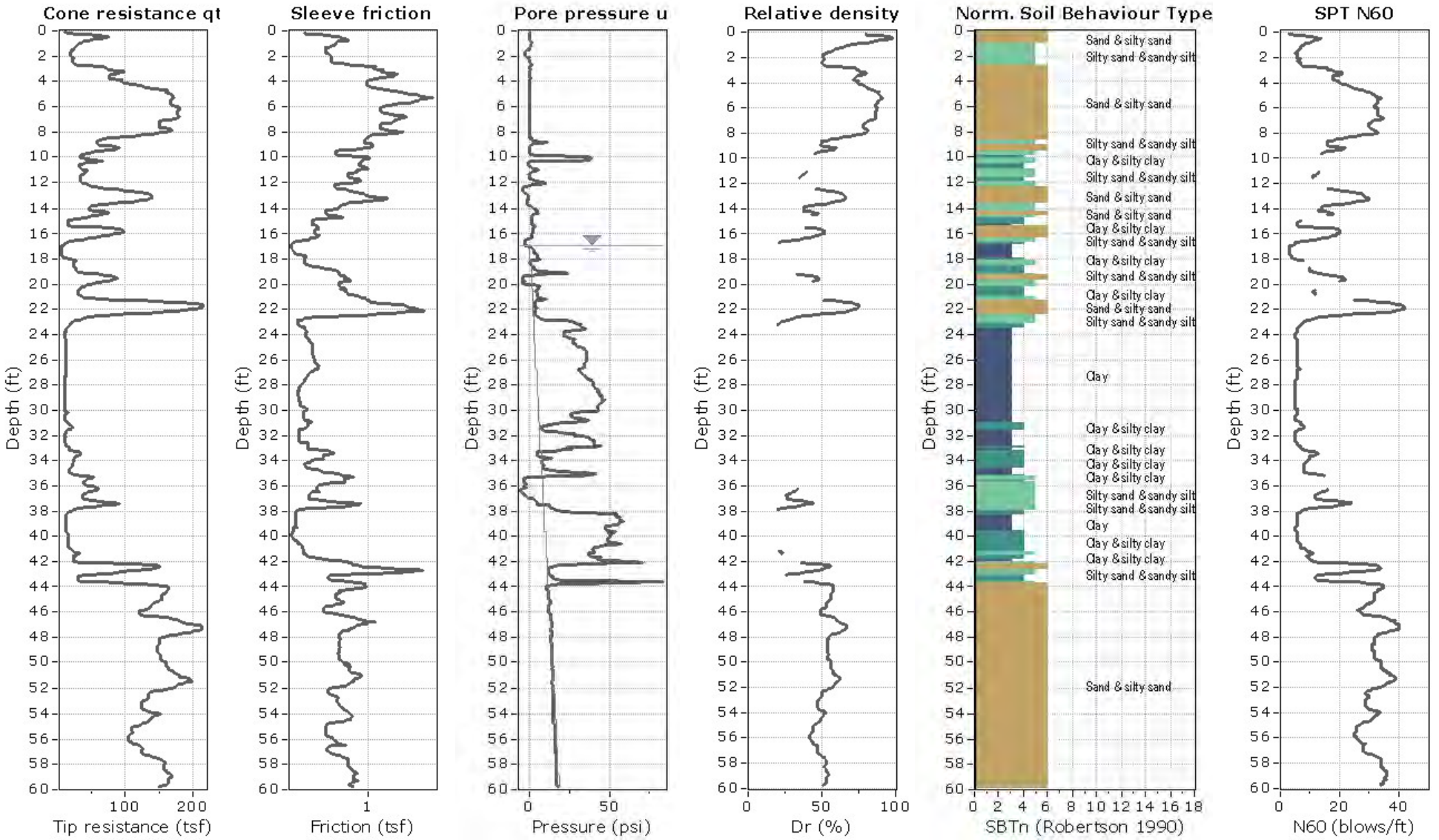
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C05
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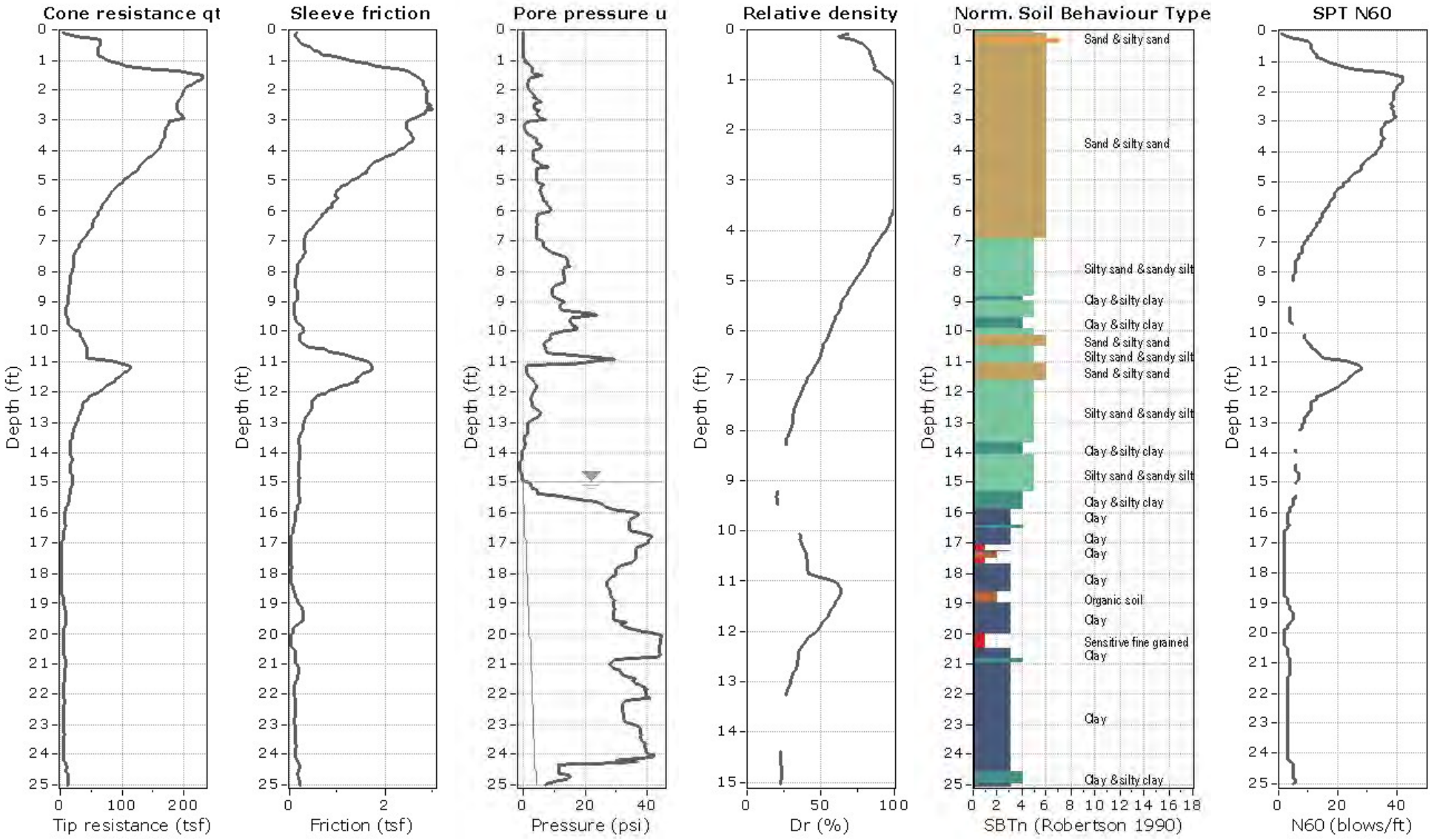
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C06
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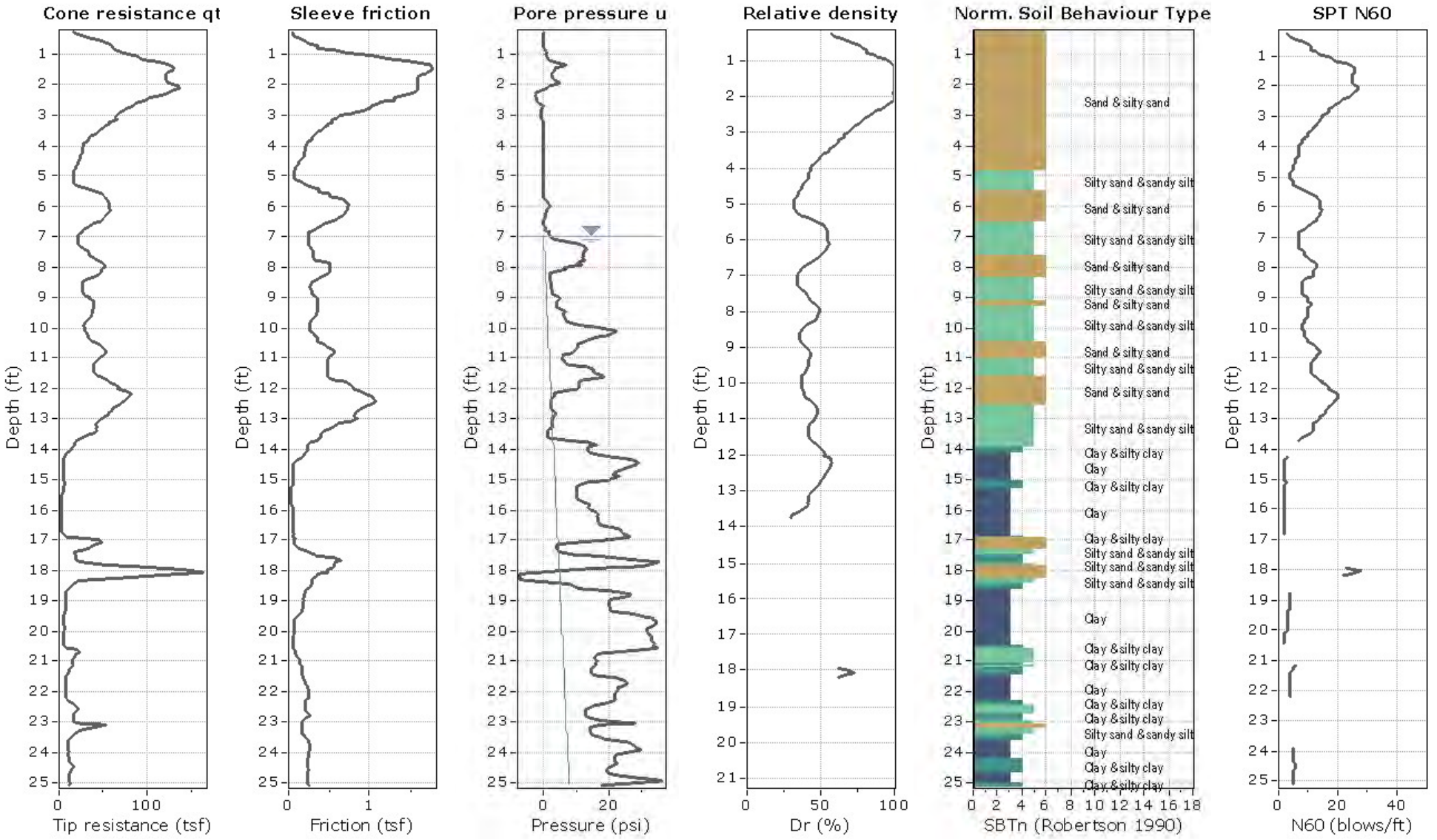

Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

C07
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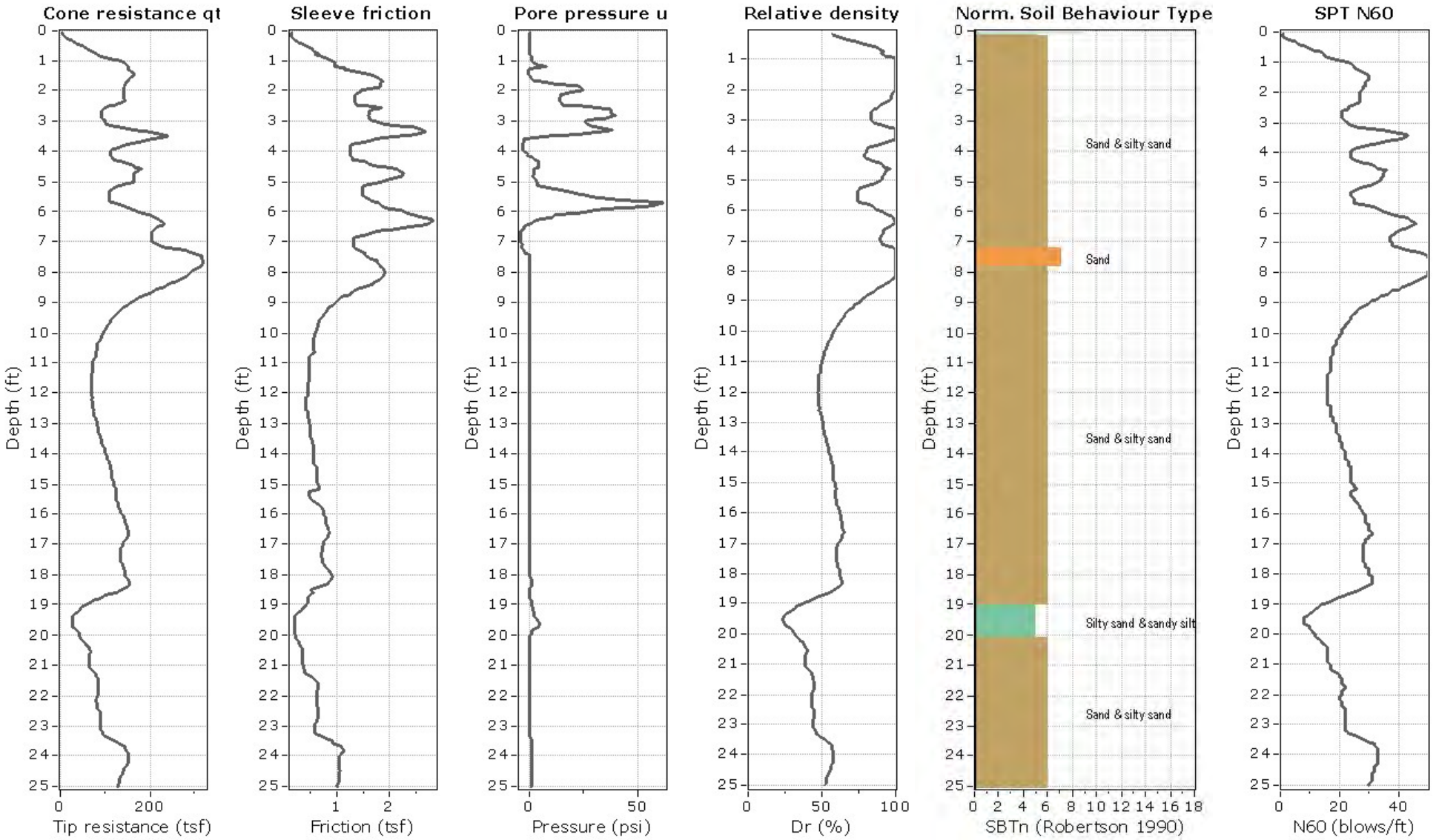

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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

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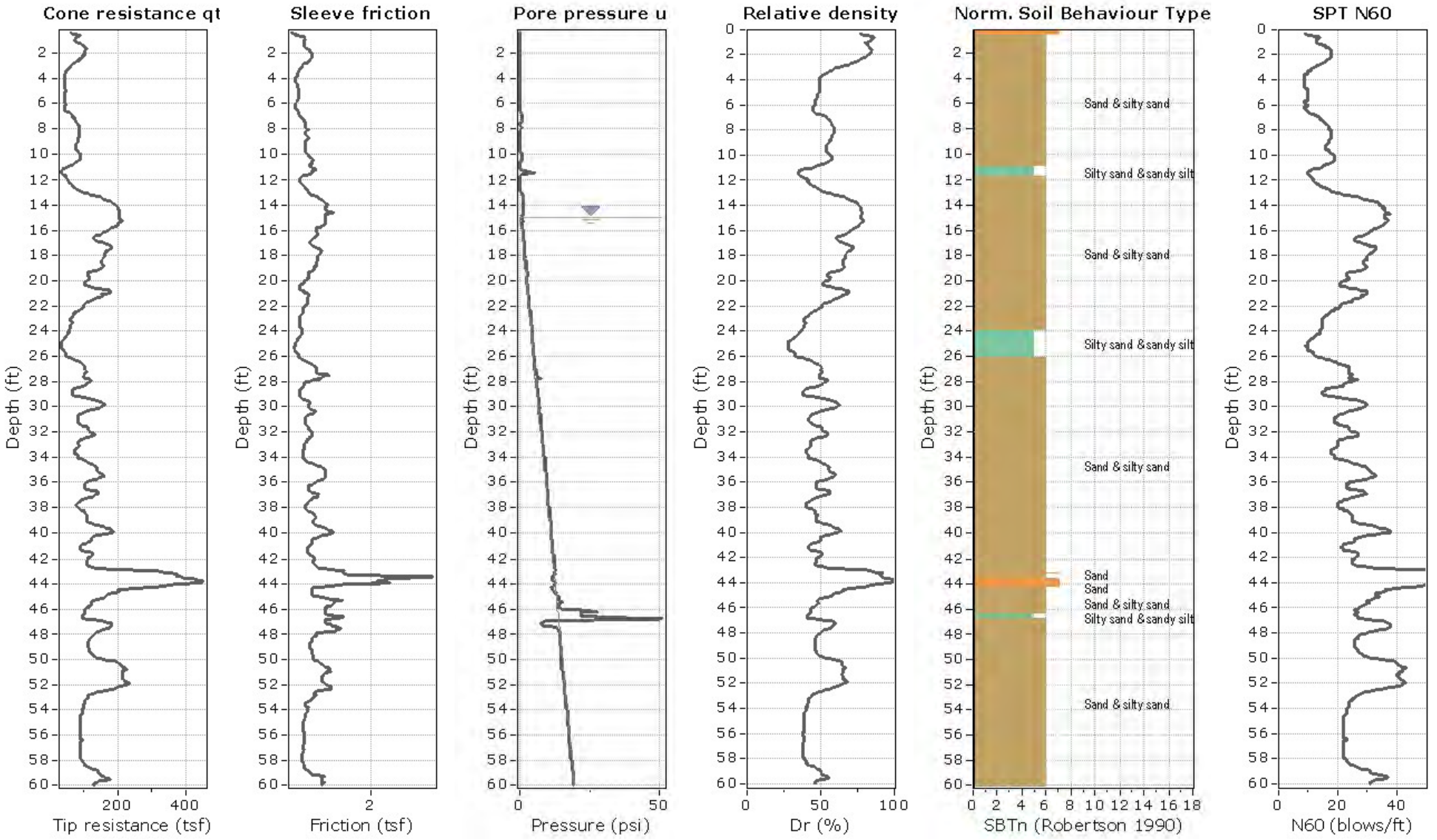

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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

O01
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Coords: lat 39.818205° lon -90.56809°
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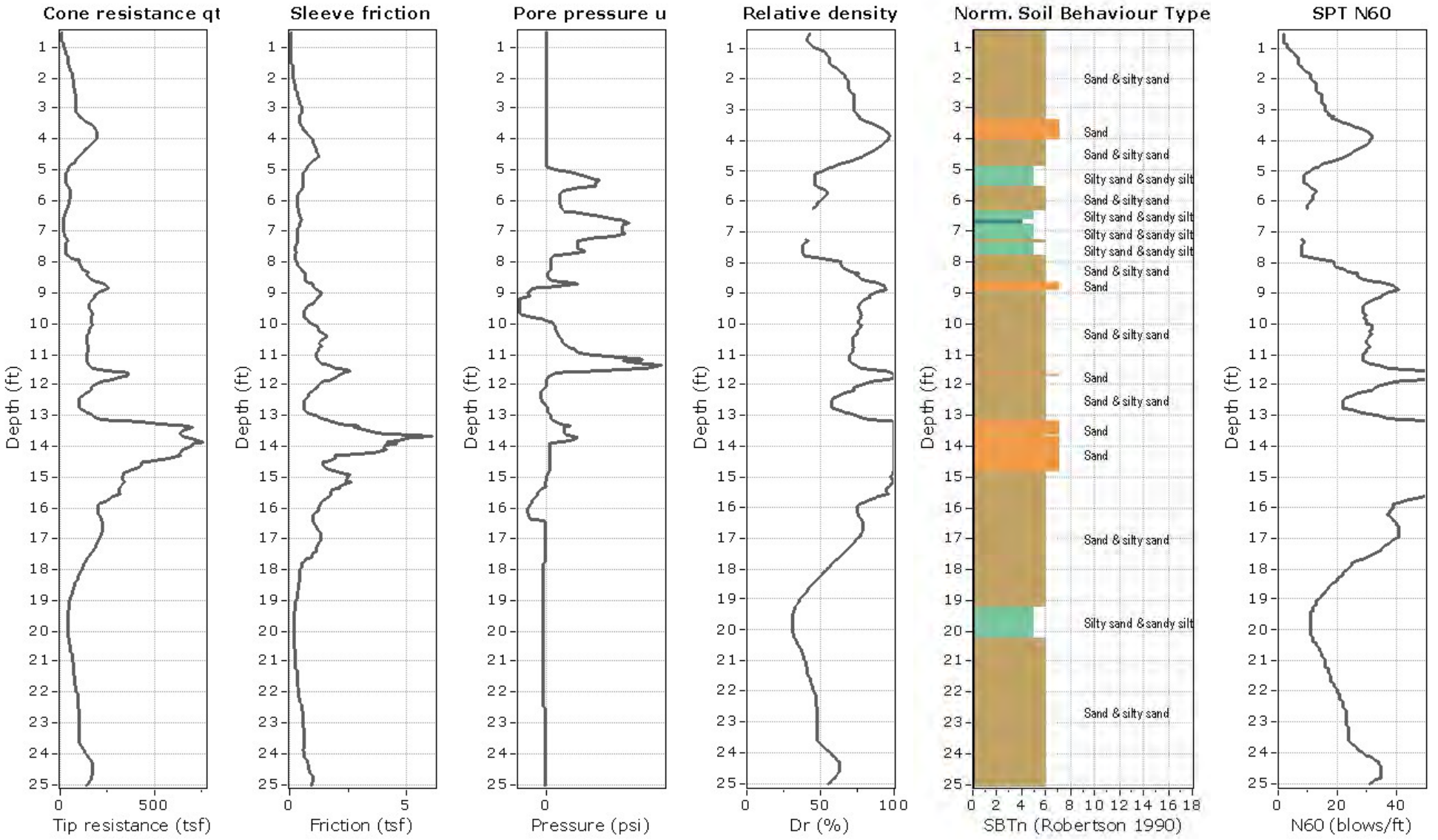

Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

O02
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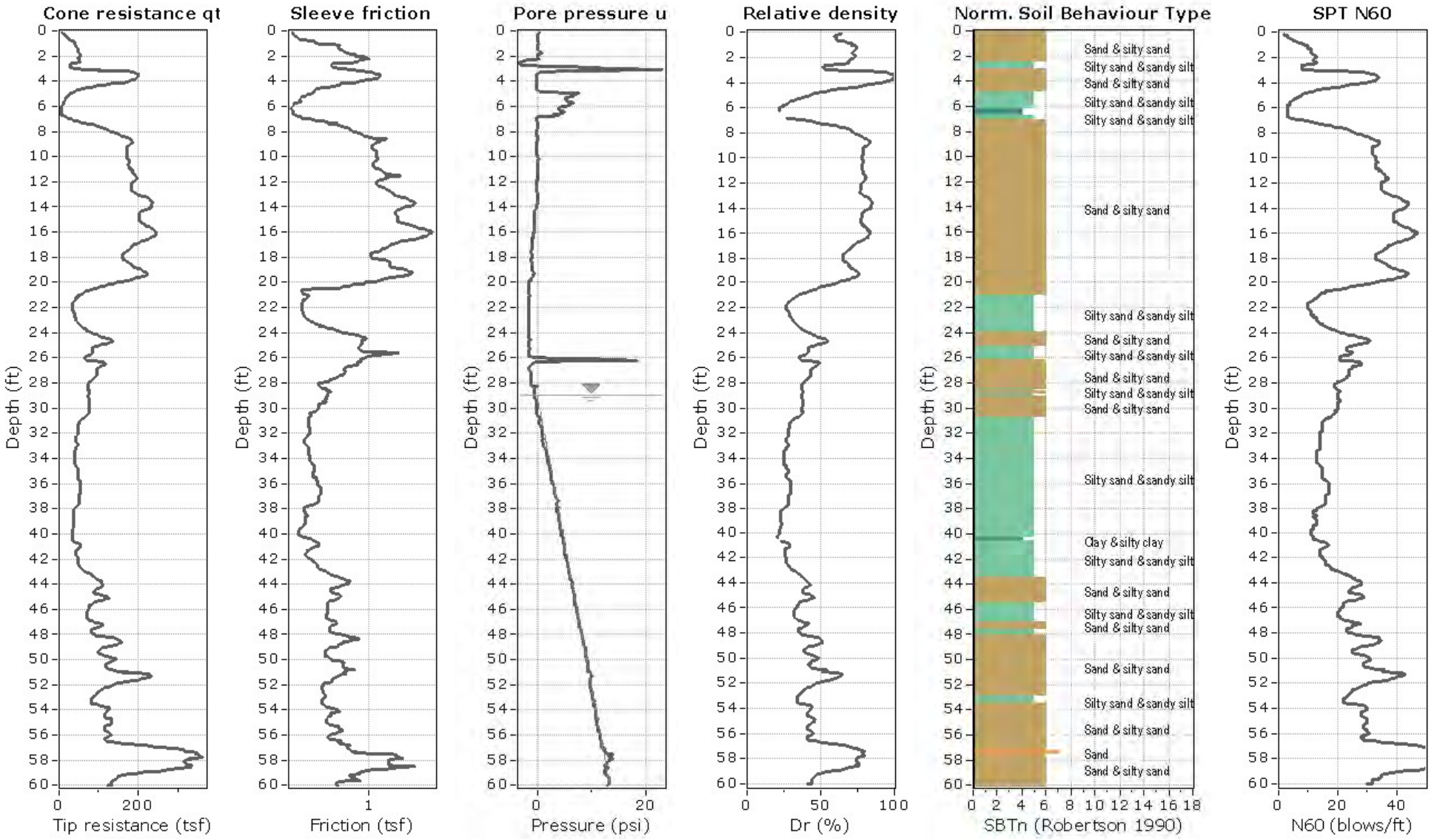

Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

O03
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Coords: lat 39.815937° lon -90566513°
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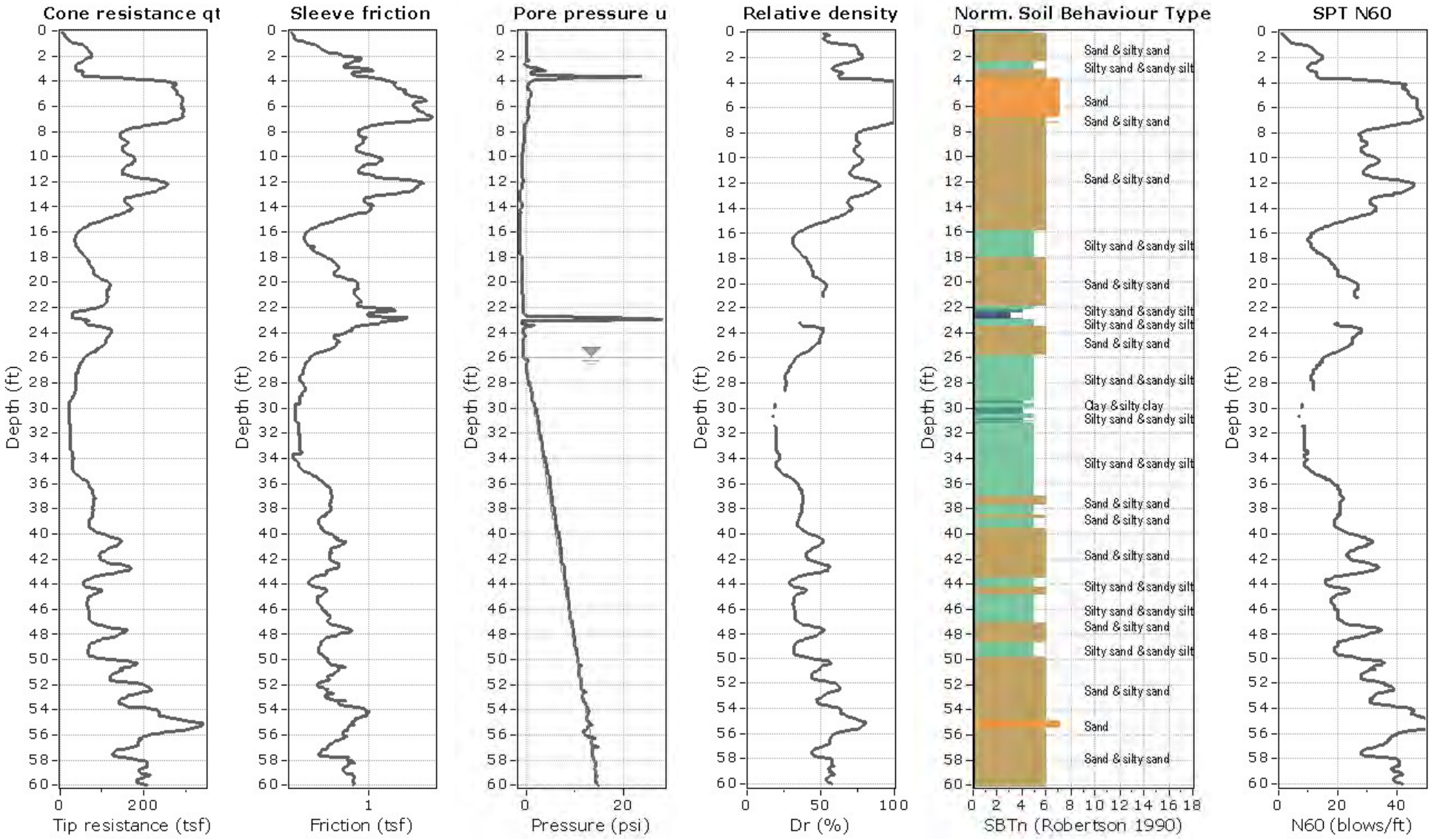
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

O04
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Coords: lat 39.81632° lon -90.568385°
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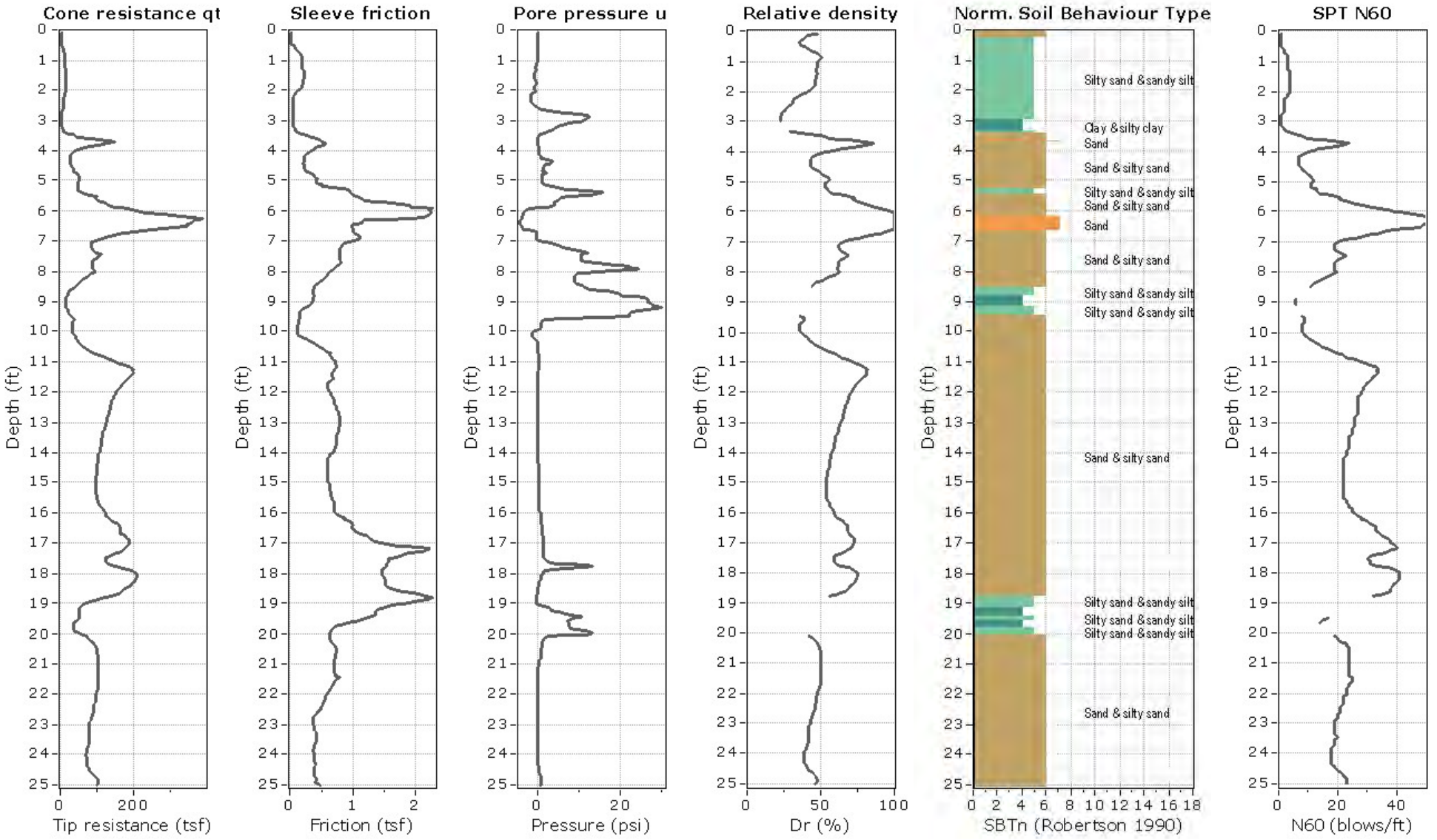
Cone Operator: DWJ



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Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

O05
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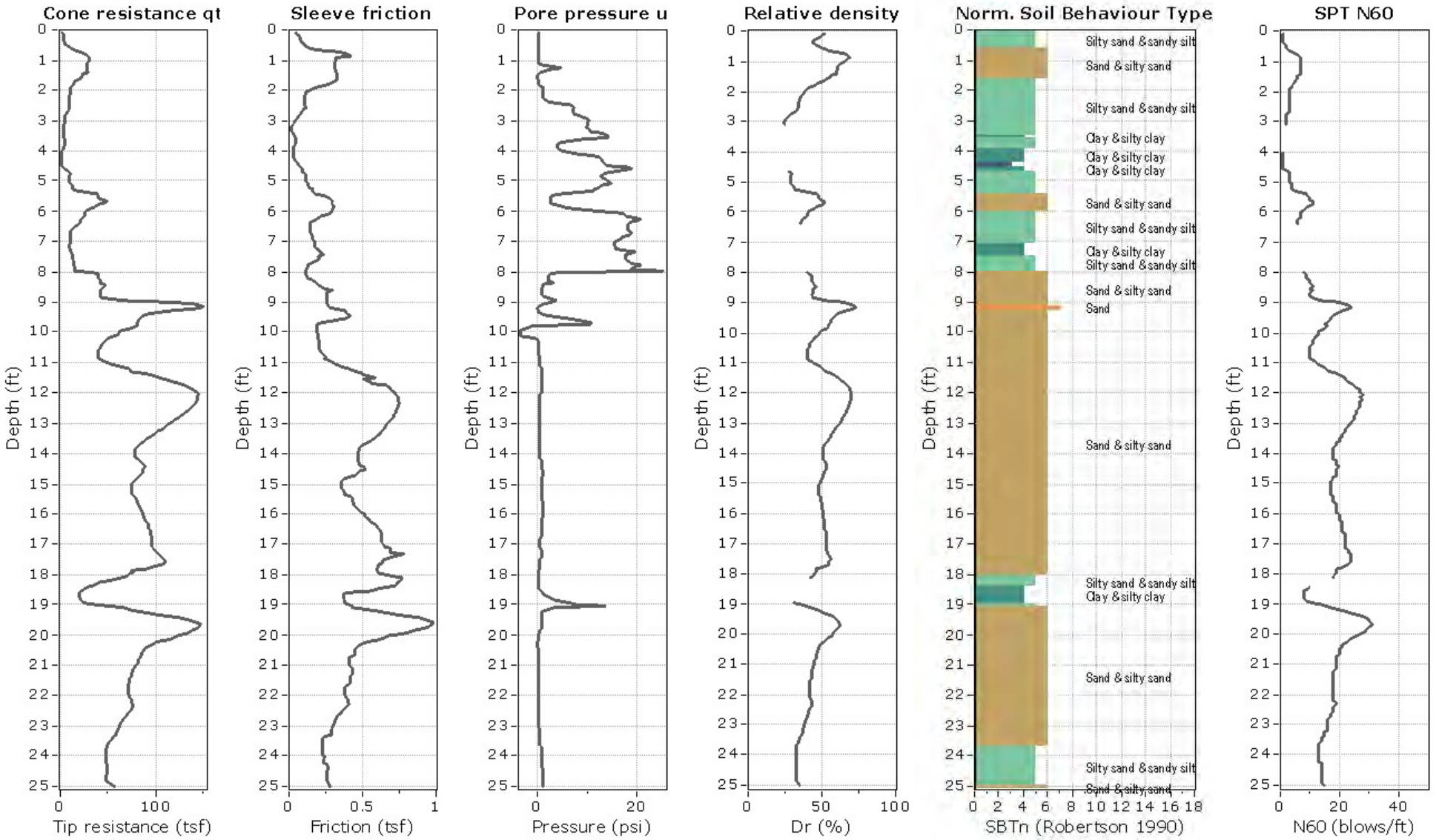
Coords: lat 39.816532° lon -90.582468°
Cone Type: 15cm2
Cone Operator: DWJ



Geotechnology, Inc
11816 Lackland Road
St. Louis, Missouri
http://www.geotechnology.com

Project: **Meridosia Ash Pond**
Location: **Meridosia, IL**

O06
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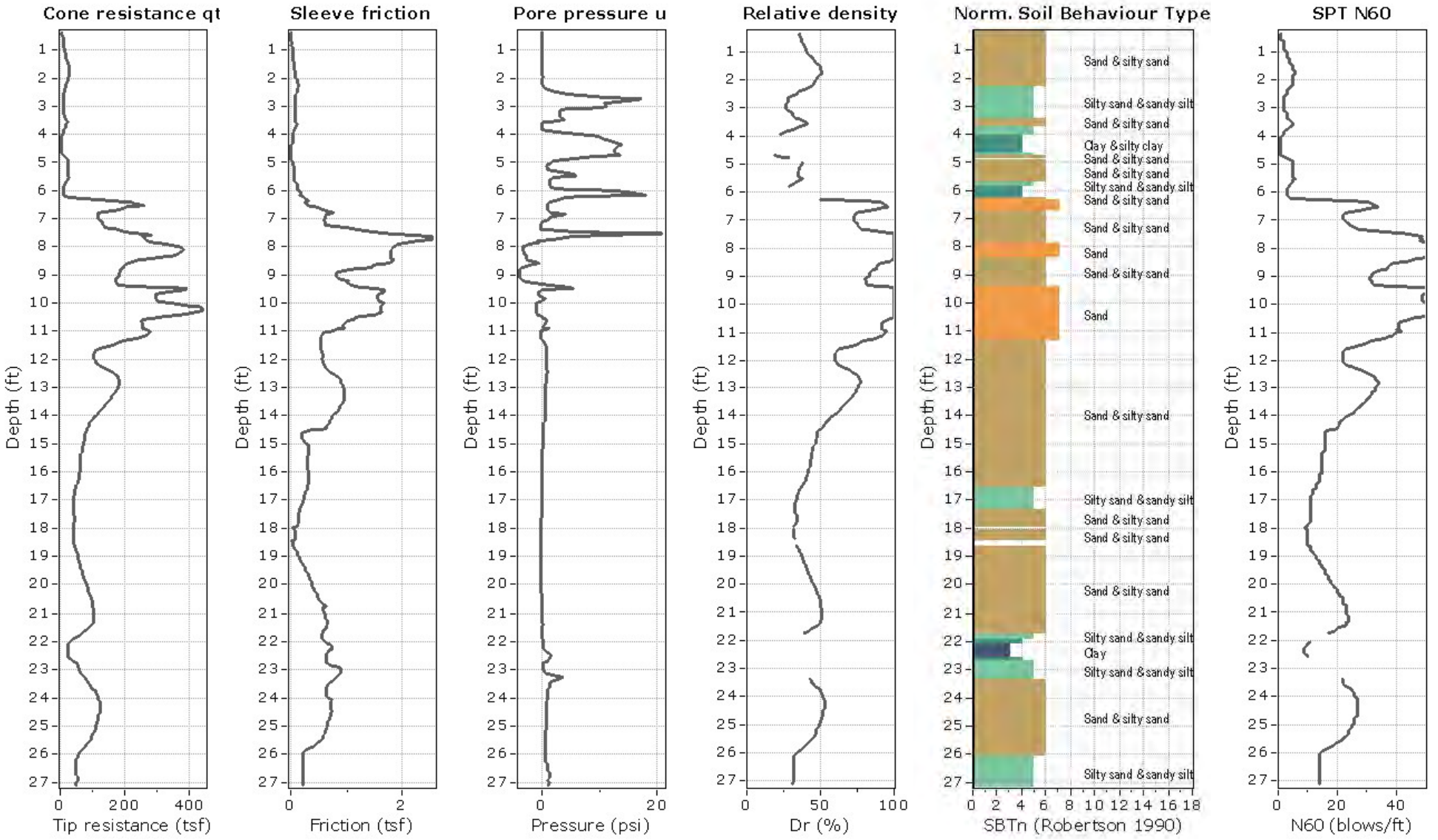

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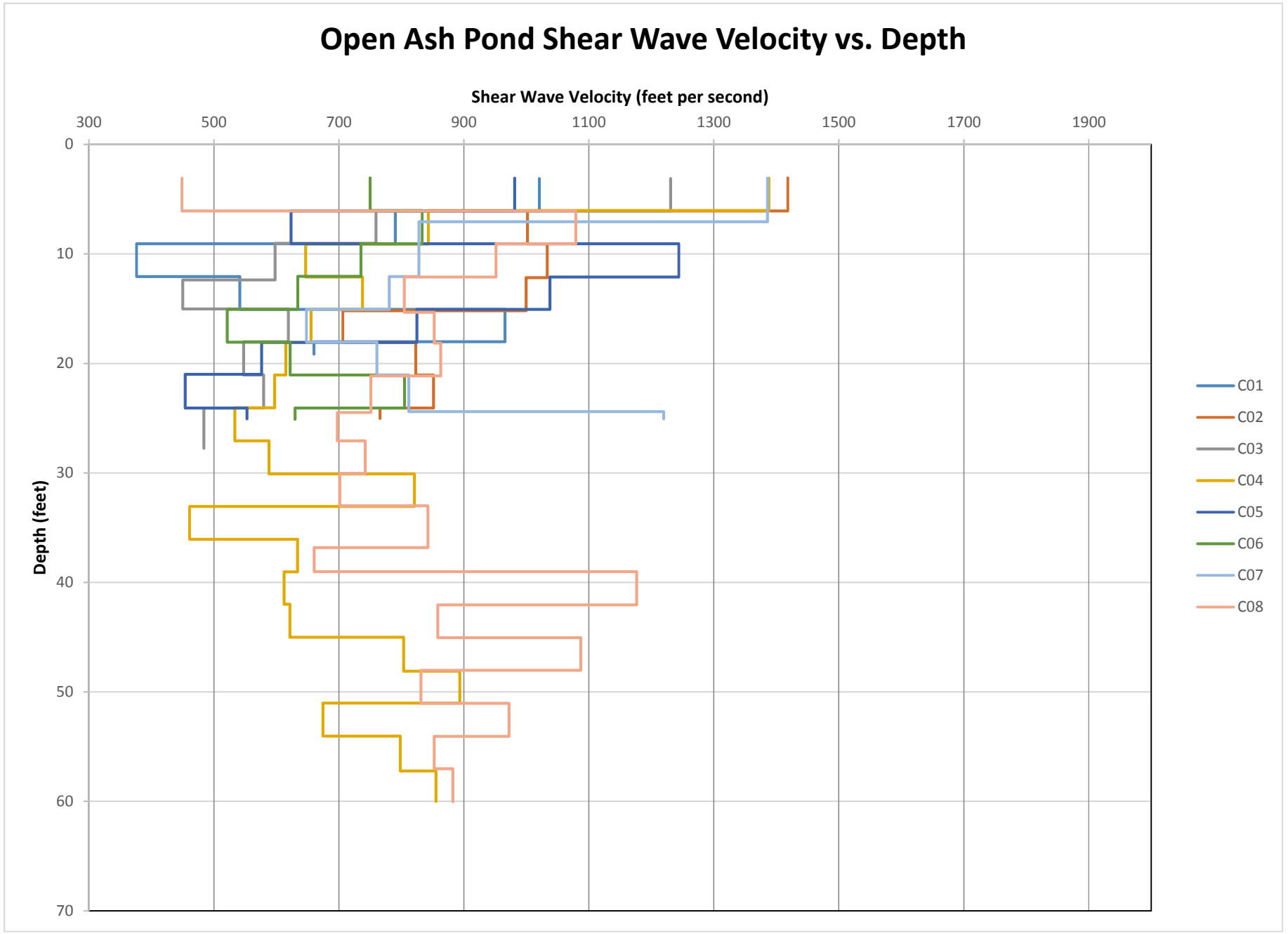
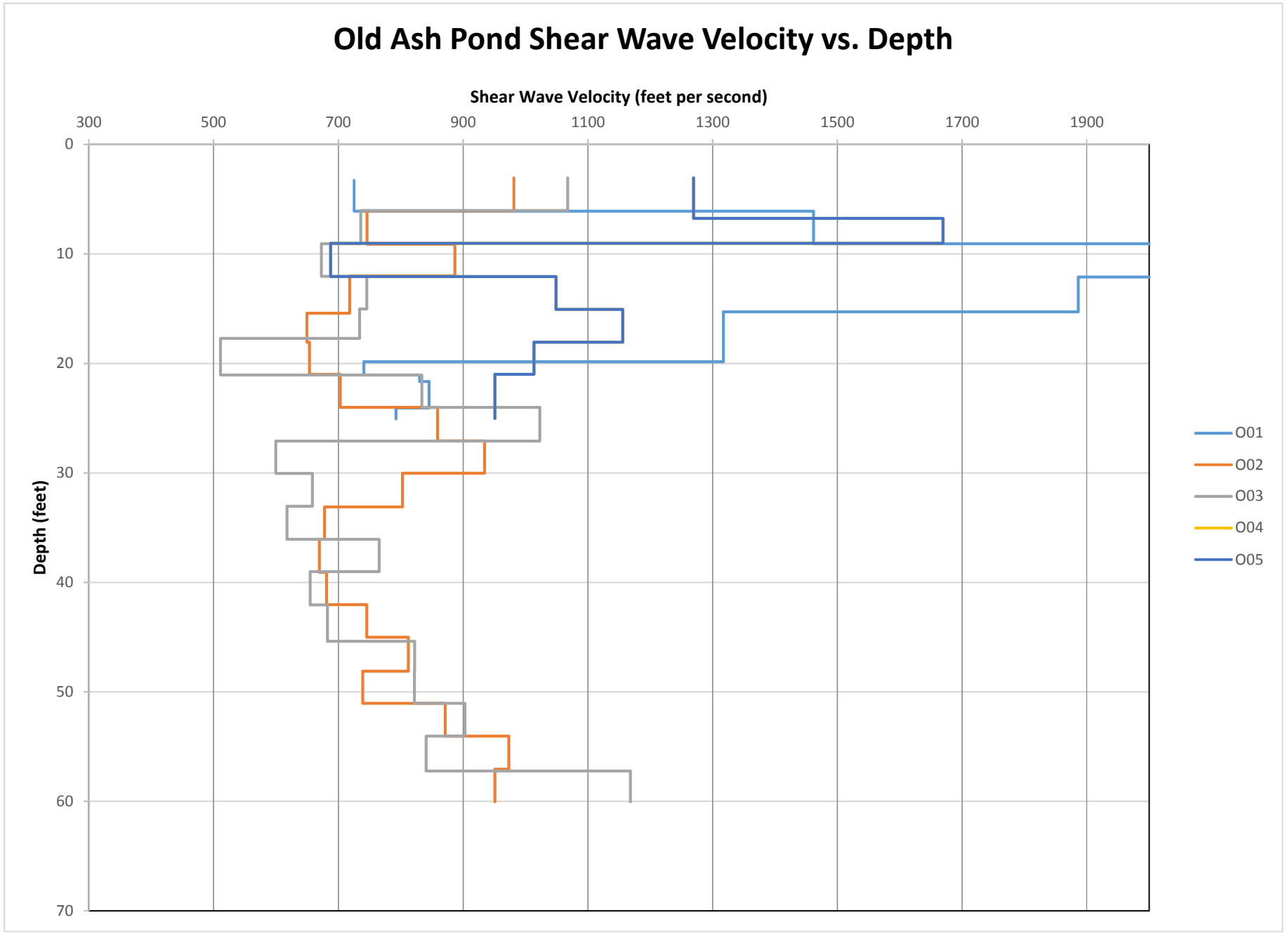
APPENDIX C

SHEAR WAVE VELOCITY RESULTS


Open Ash Pond Shear Wave Velocity vs. Depth
Shear Wave Velocity (feet per second)
300
500
700
900
1100
1300
1500
1700
1900
Depth (feet)
0
10
20
30
40
50
60
70
C01
C02
C03
C04
C05
C06
C07
C08


Old Ash Pond Shear Wave Velocity vs. Depth
Shear Wave Velocity (feet per second)
300
500
700
900
1100
1300
1500
1700
1900
Depth (feet)
0
10
20
30
40
50
60
70
O01
O02
O03
O04
O05

APPENDIX D

LABORATORY TEST RESULTS

PERCENT FINES (ASTM D 1140)

GEOTECHNOLOGY INC
FROM THE GROUND UP

DATE	PROJECT NAME	PROJECT NO.:
June 16, 2017	Meridosia Ash Pond Liquefaction Analysis	J024917.03

Balance Used: BA- 17 Oven Used: OV- 9

Test Method: [x] Method A [ ] Method B Soaking length (min.) ____ Dry Mass determined: [ ] Directly [ ] From water content of Spec.

Boring No.	Sample No.	Depth (ft)	Sieve No. Used SV-200-	Visual Identification (Color, Group Name & Symbol)	Tare Number / Tare Mass (g)	Initial Dry Mass of Soil (g)	Dry Mass of Soil after Washing & Shaking over 75 μm Sieve (g)	% Passing 75 μm Sieve (%)
005A		12-16			KS-9 / 110.74	118.19	113.78	3.7
005A		20-24			KS-13 / 110.92	123.57	118.68	4.0
C01A		8-12			KS-10 / 115.05	78.54	1.38	98.2
C01A		16-20			KS-12 / 110.89	107.75	0.85	99.2

REMARKS

Tested By: AT Date: 06/16/17

Calculated By: AB Date: 06/19/17

Checked By: EG Date: 06/19/17

Electronic Filing: Received, Clerk's Office 09/28/2020

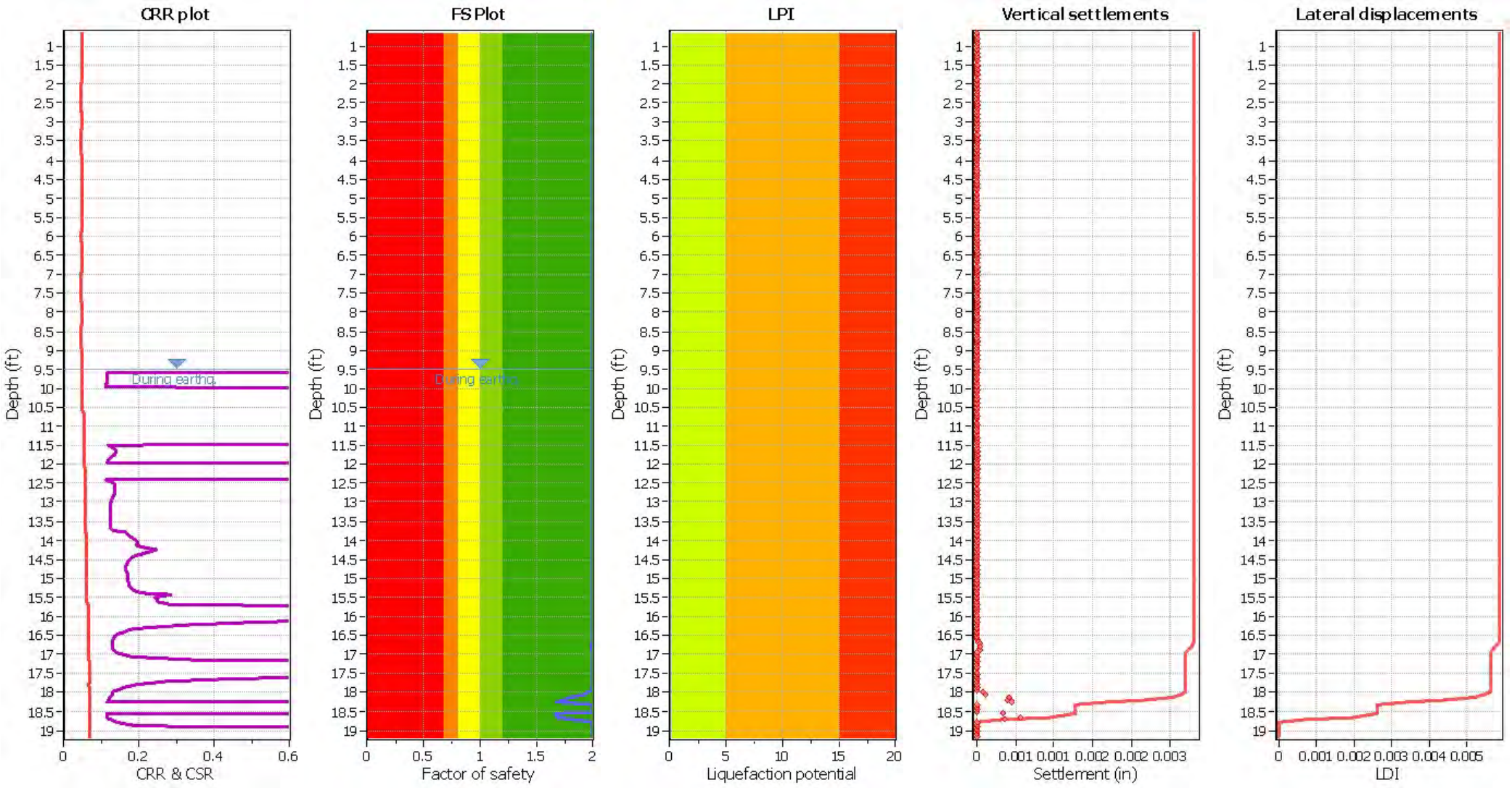
APPENDIX E

LIQUEFACTION ANALYSIS RESULTS

This software is licensed to: Geotechnology, Inc.

CPT name: C01

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	9.50 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.50 ft	Fill height:	N/A	Limit depth:	25.00 ft

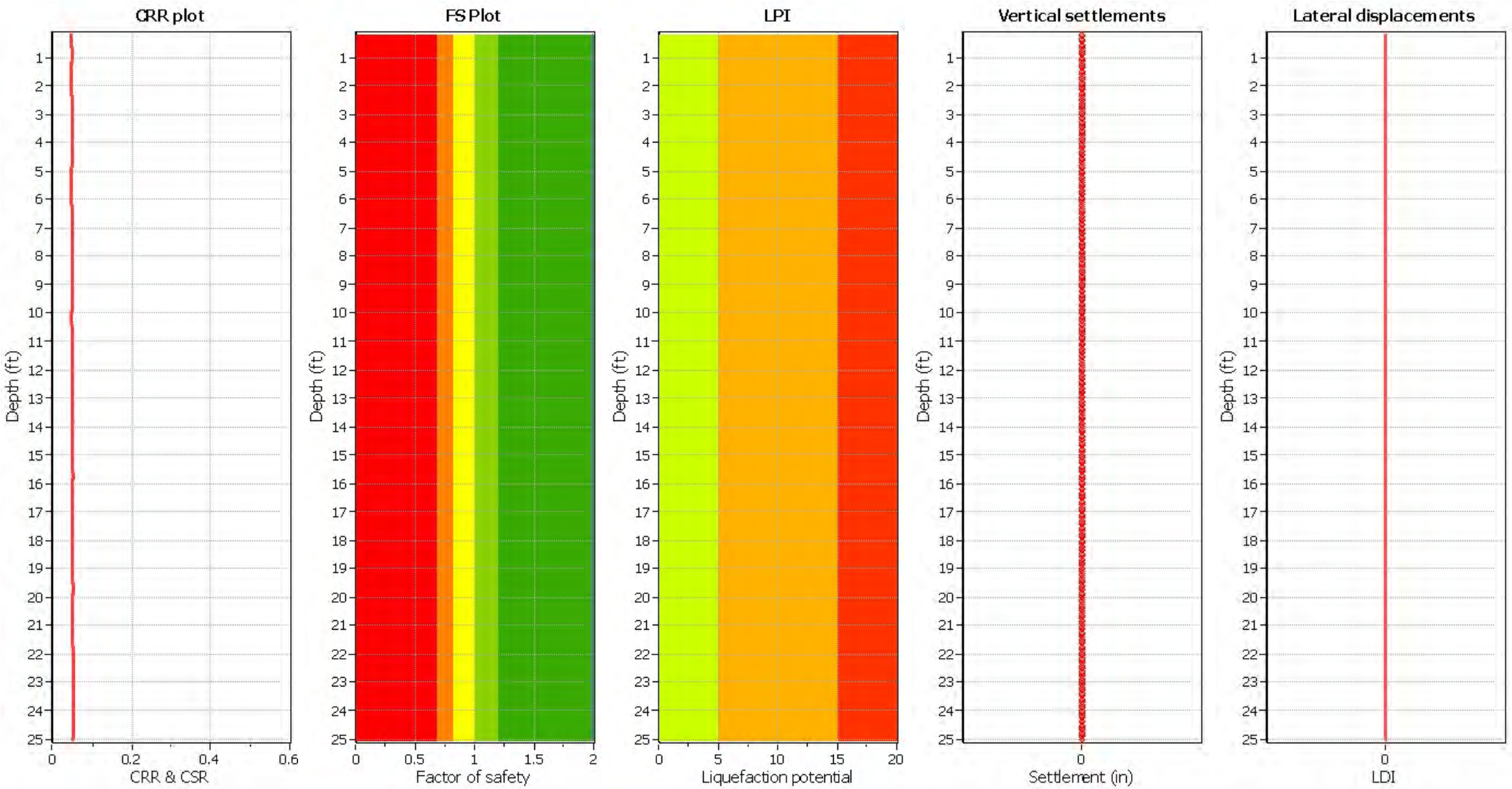
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	30.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	30.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

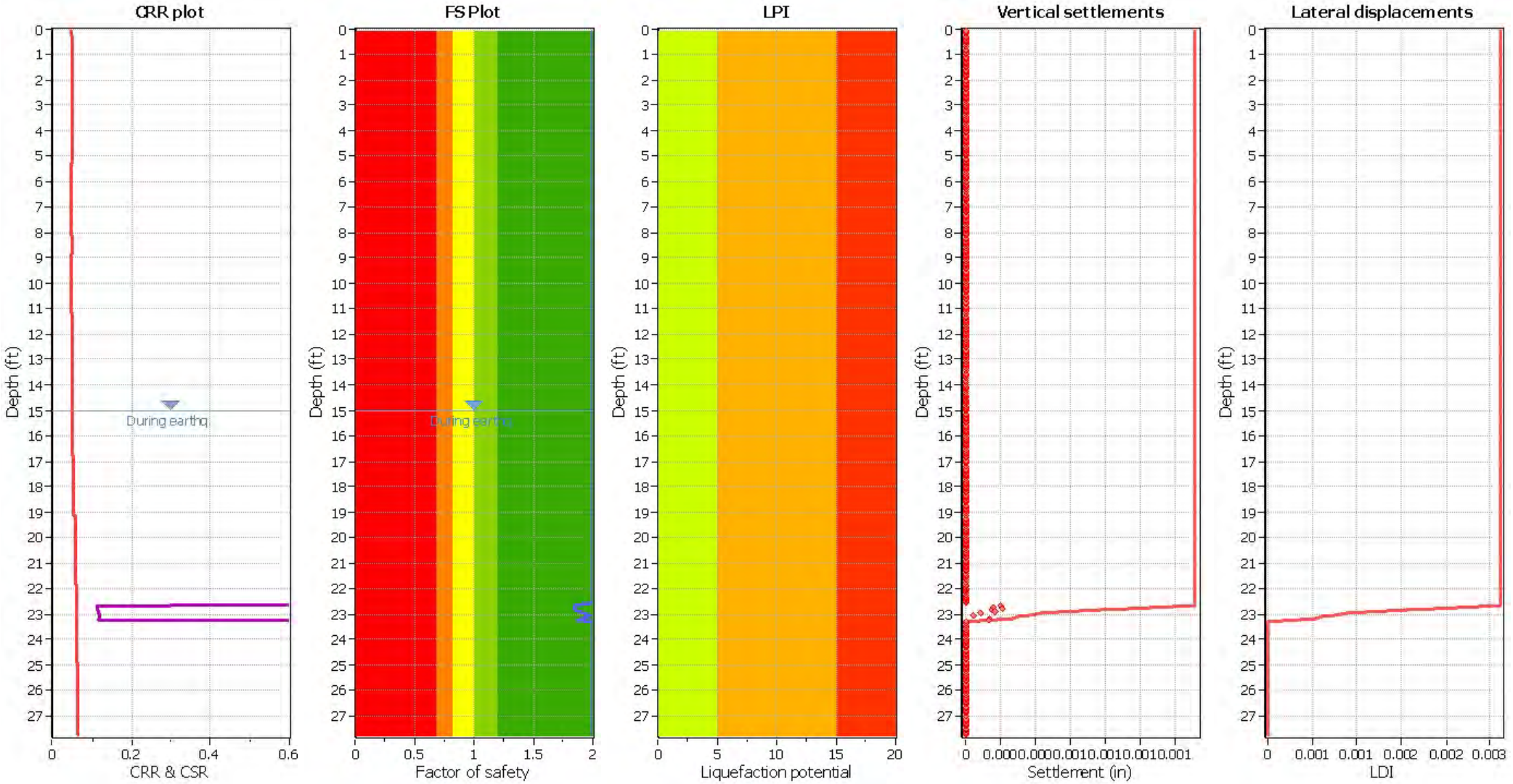
LPI color scheme

- Very high risk
- High risk
- Low risk

This software is licensed to: Geotechnology, Inc.

CPT name: C03

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

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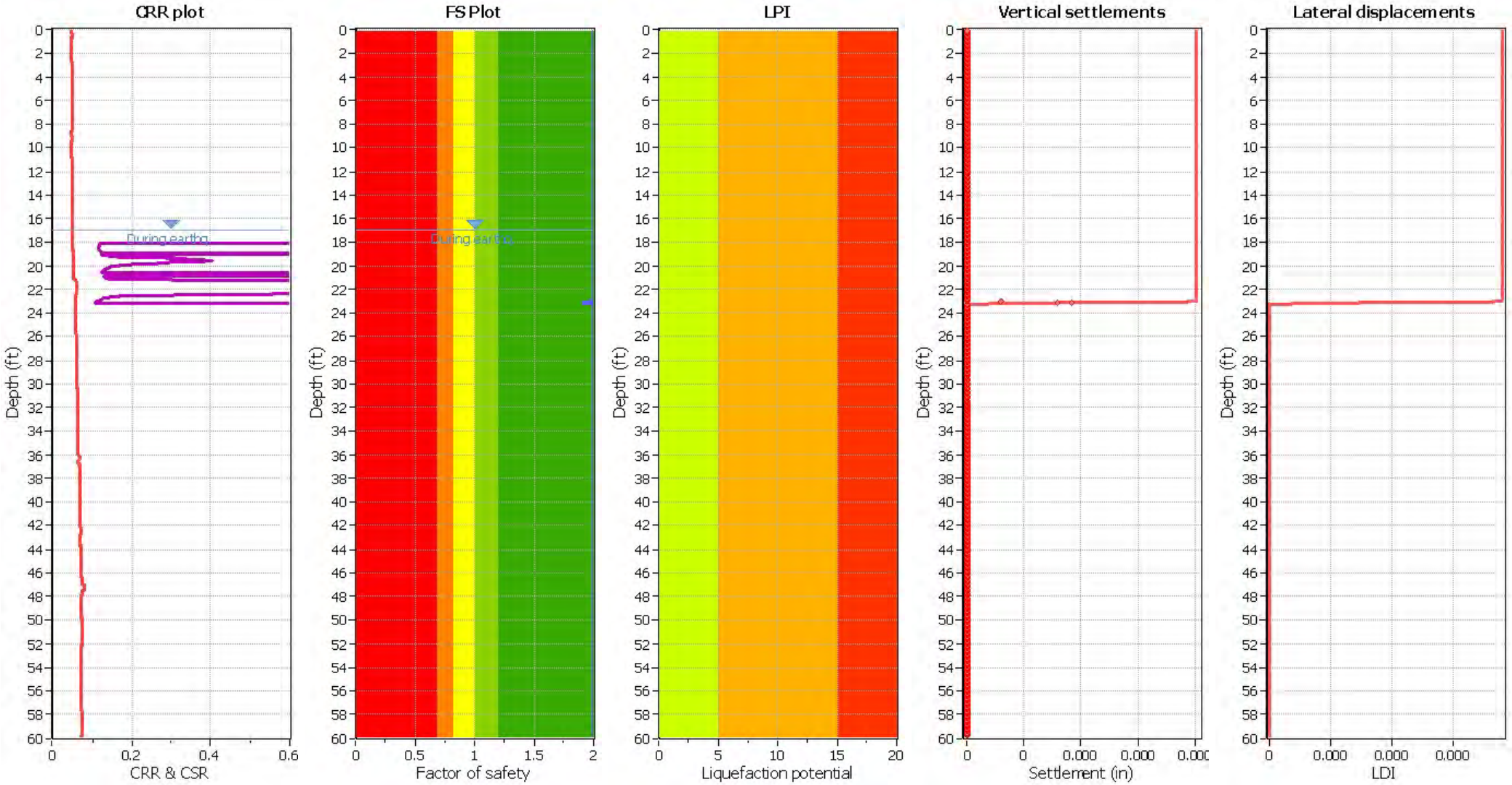
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	17.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

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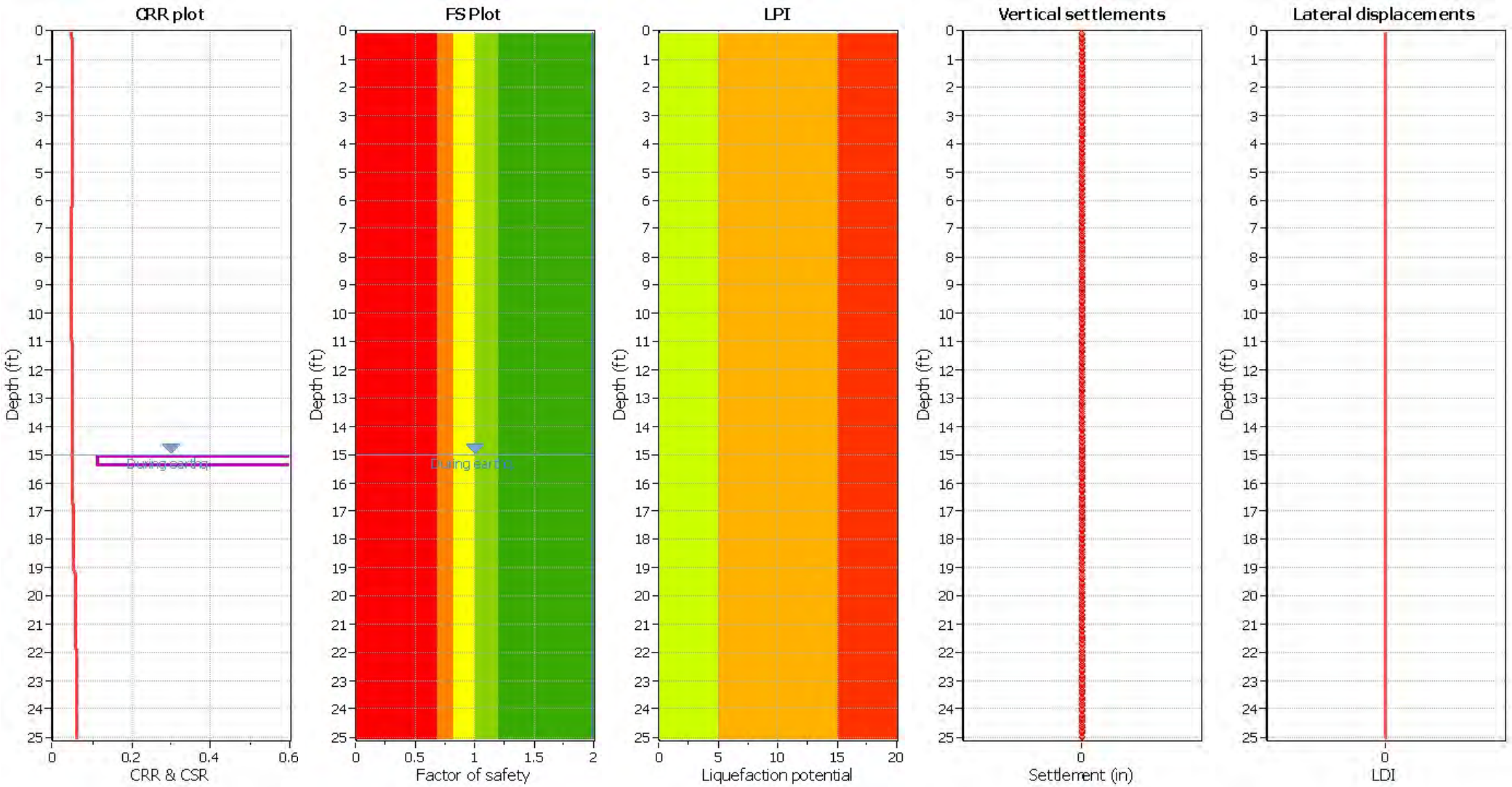
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

This software is licensed to: Geotechnology, Inc.

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

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LPI color scheme

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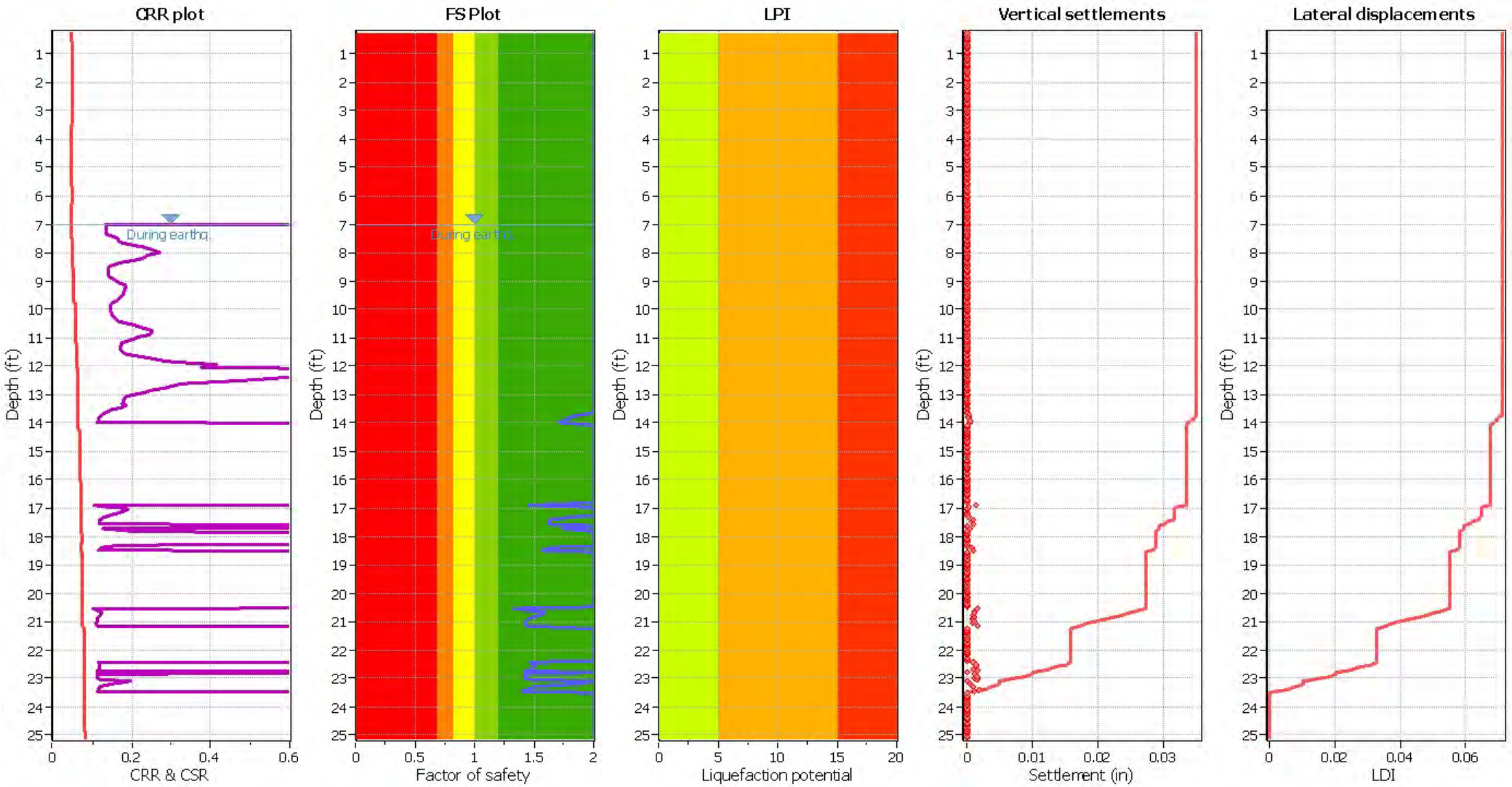
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

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- Liquefaction and no liq. are equally likely
- Unlike to liquefy
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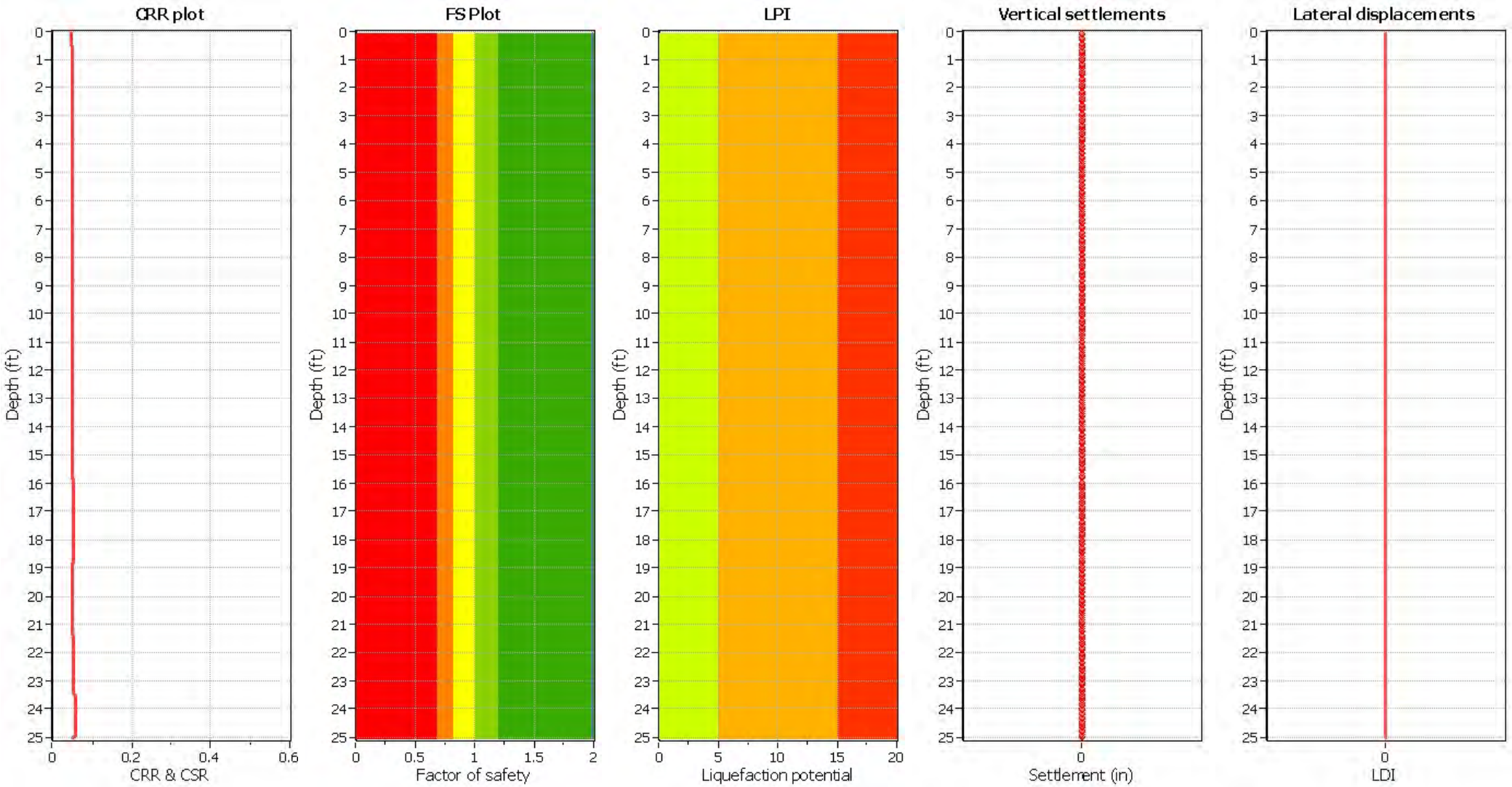
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

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LPI color scheme

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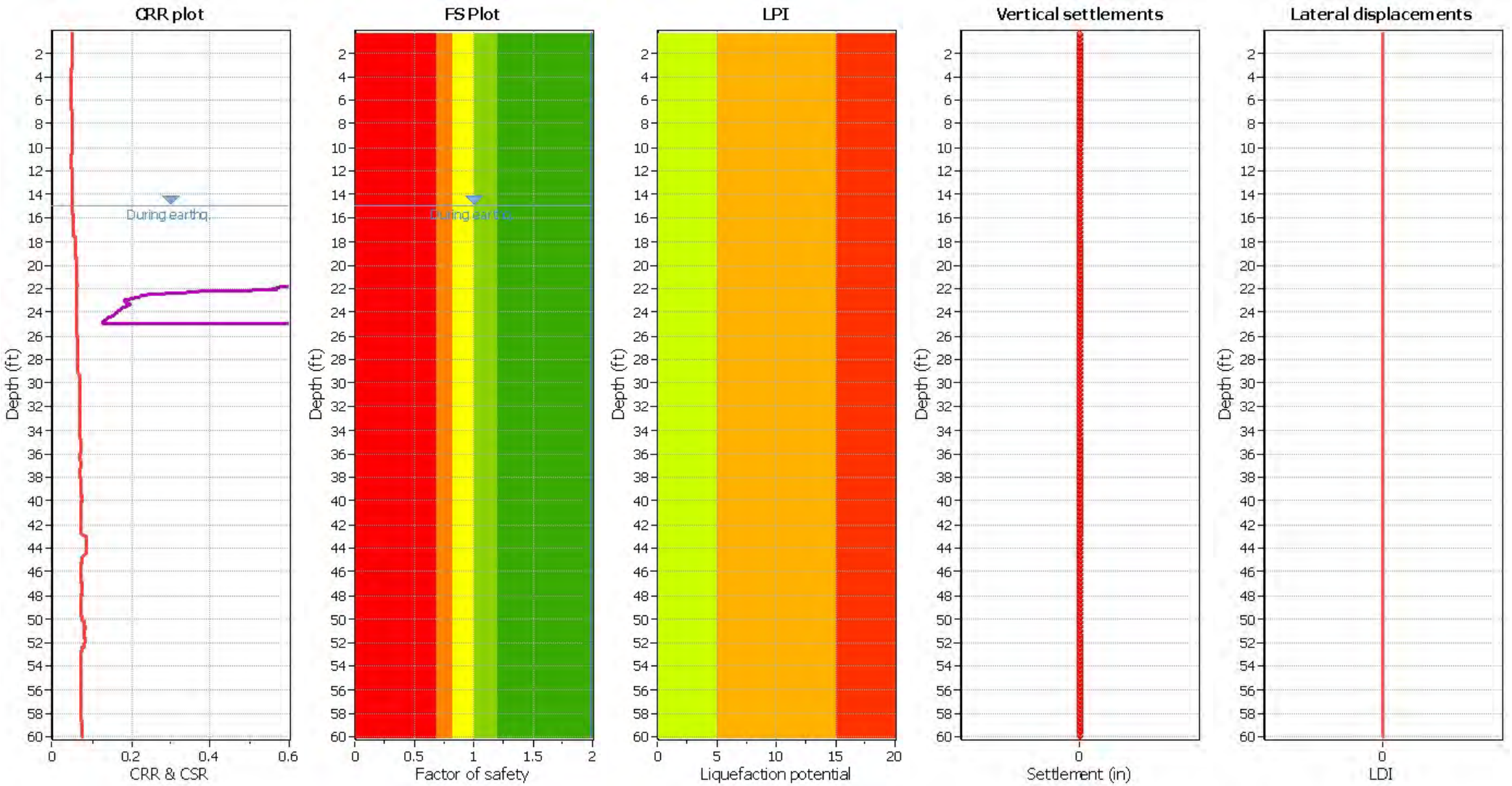
Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

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LPI color scheme

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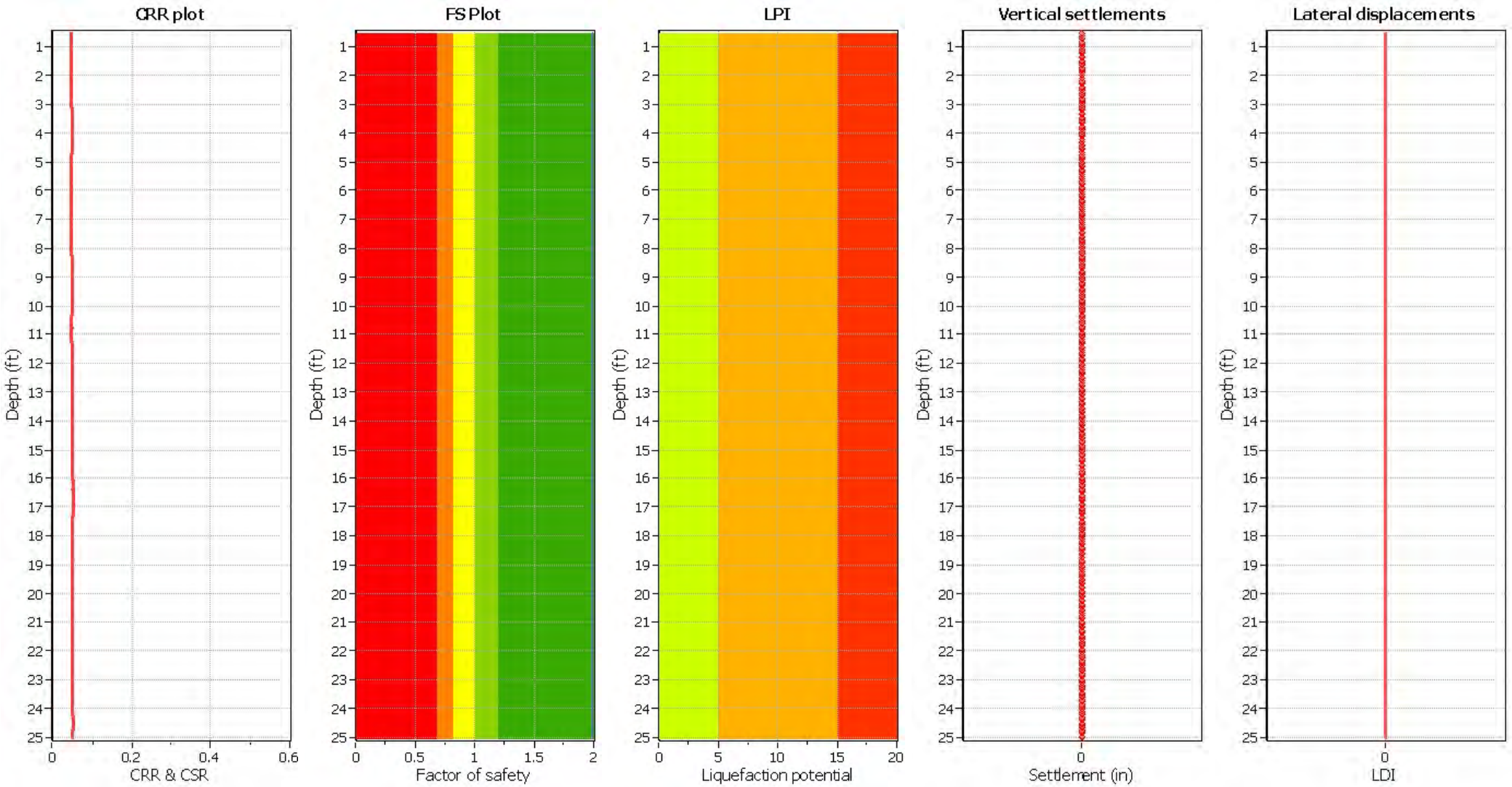
Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

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LPI color scheme

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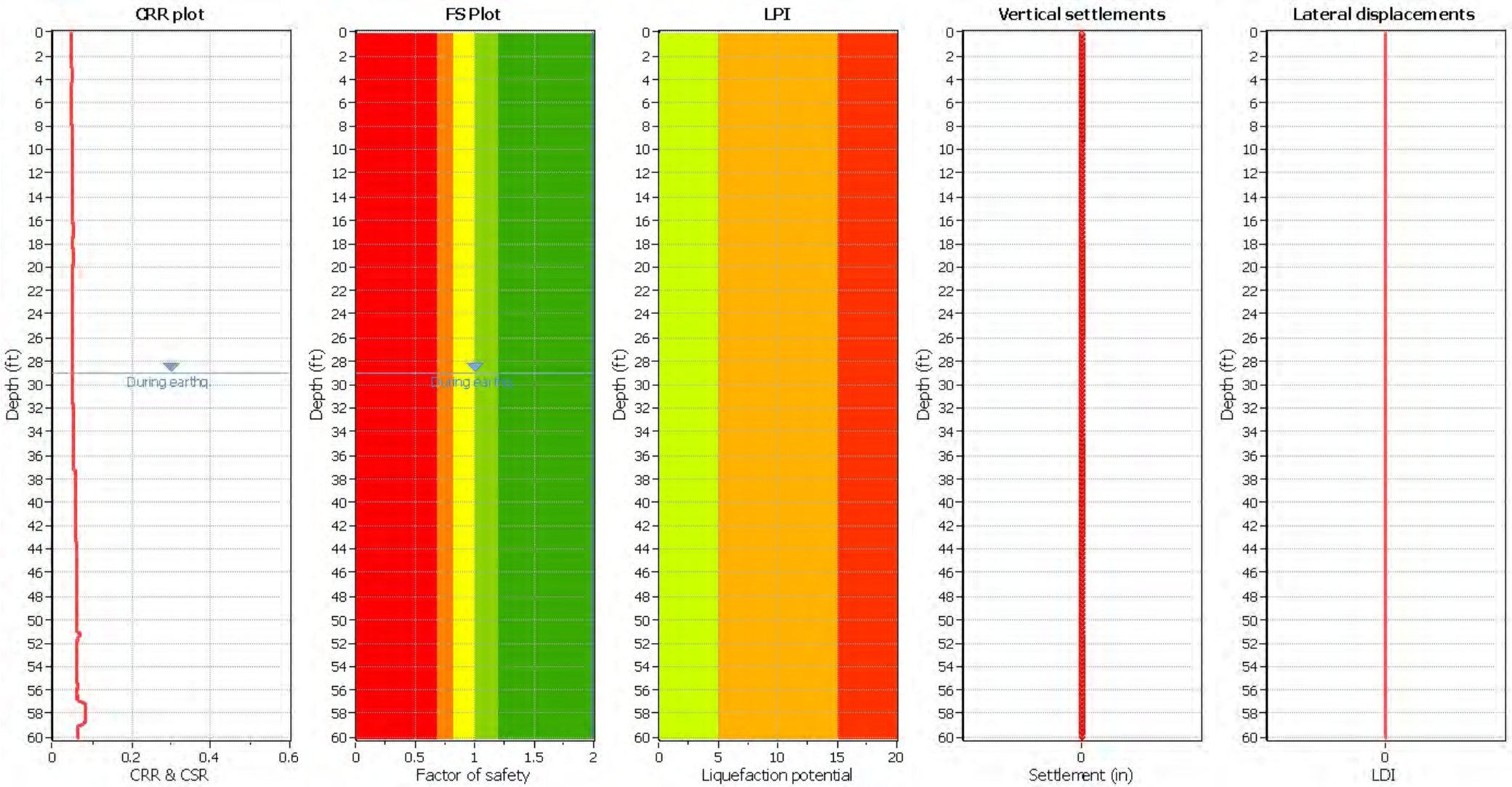
Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	29.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	29.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

- Almost certain it will liquefy
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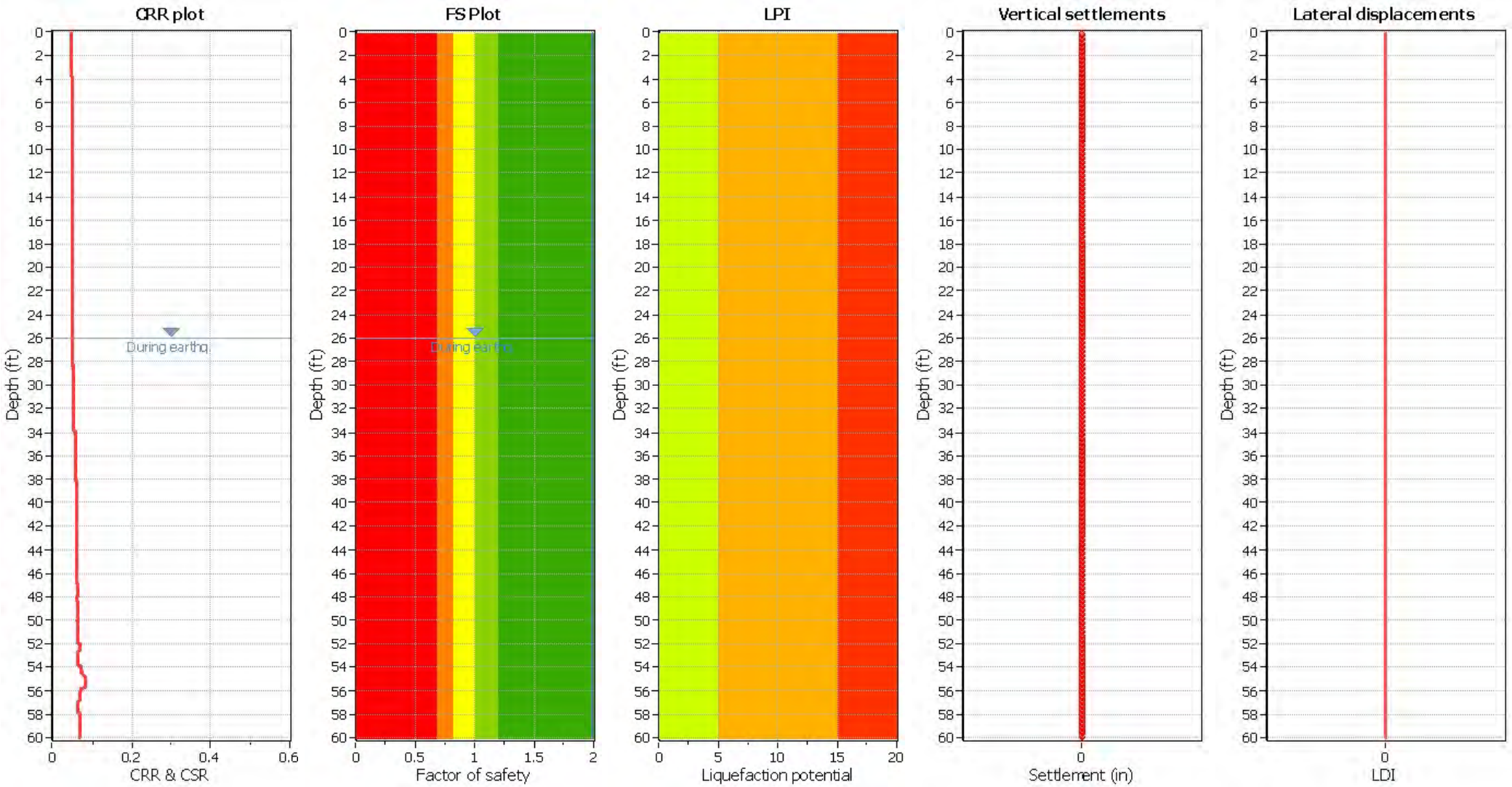
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	26.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	26.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
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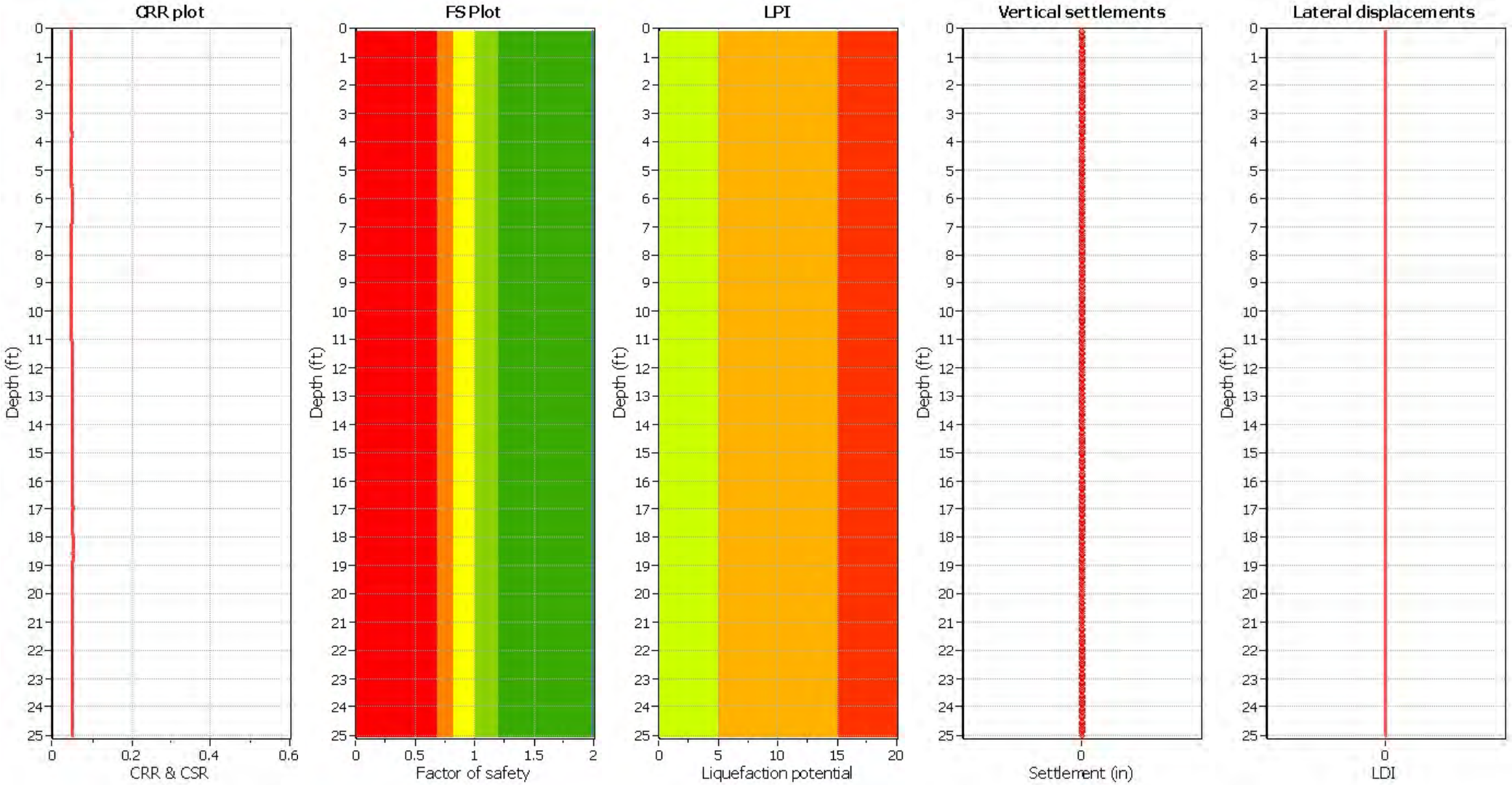
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

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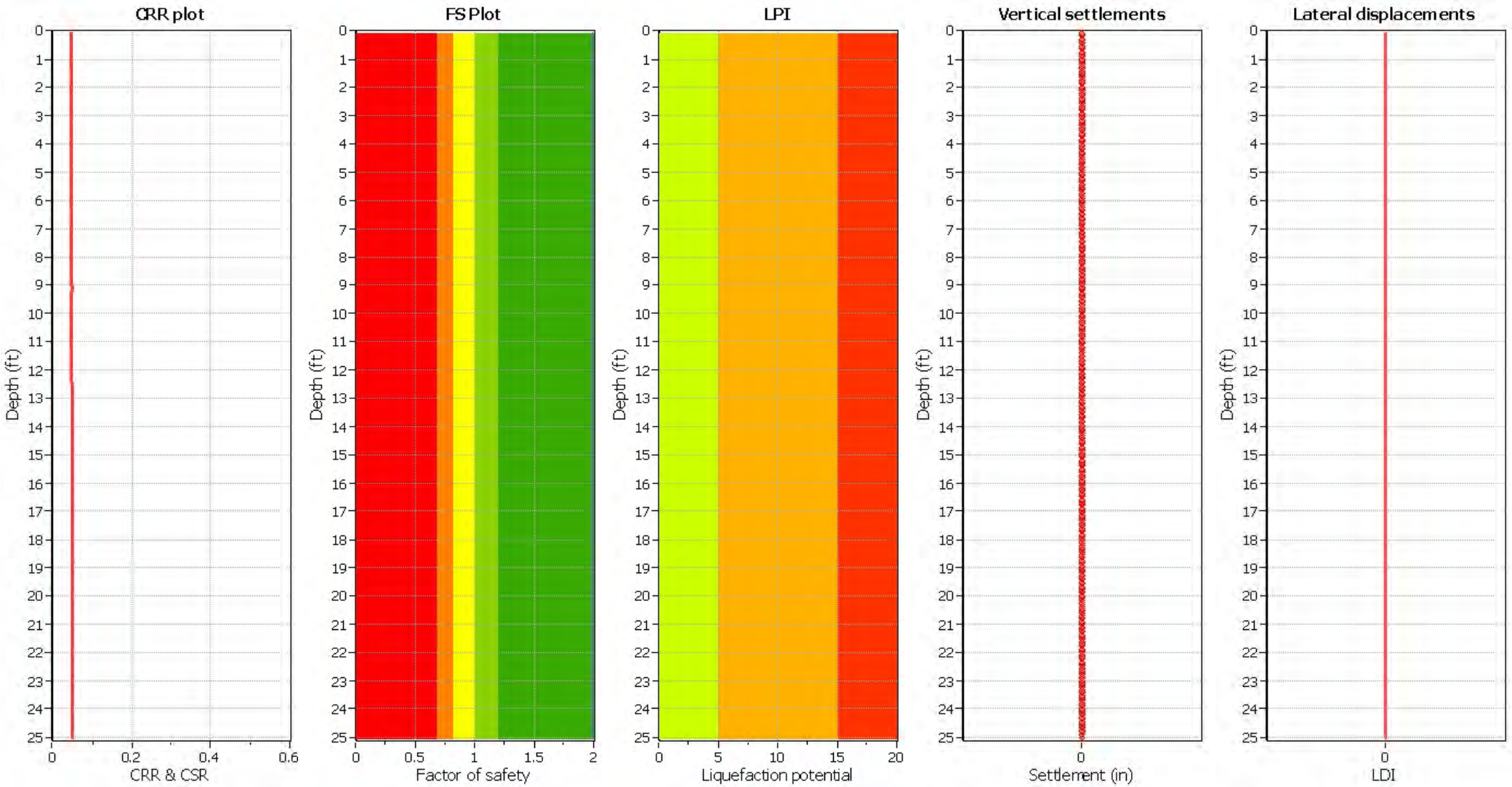
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

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LPI color scheme

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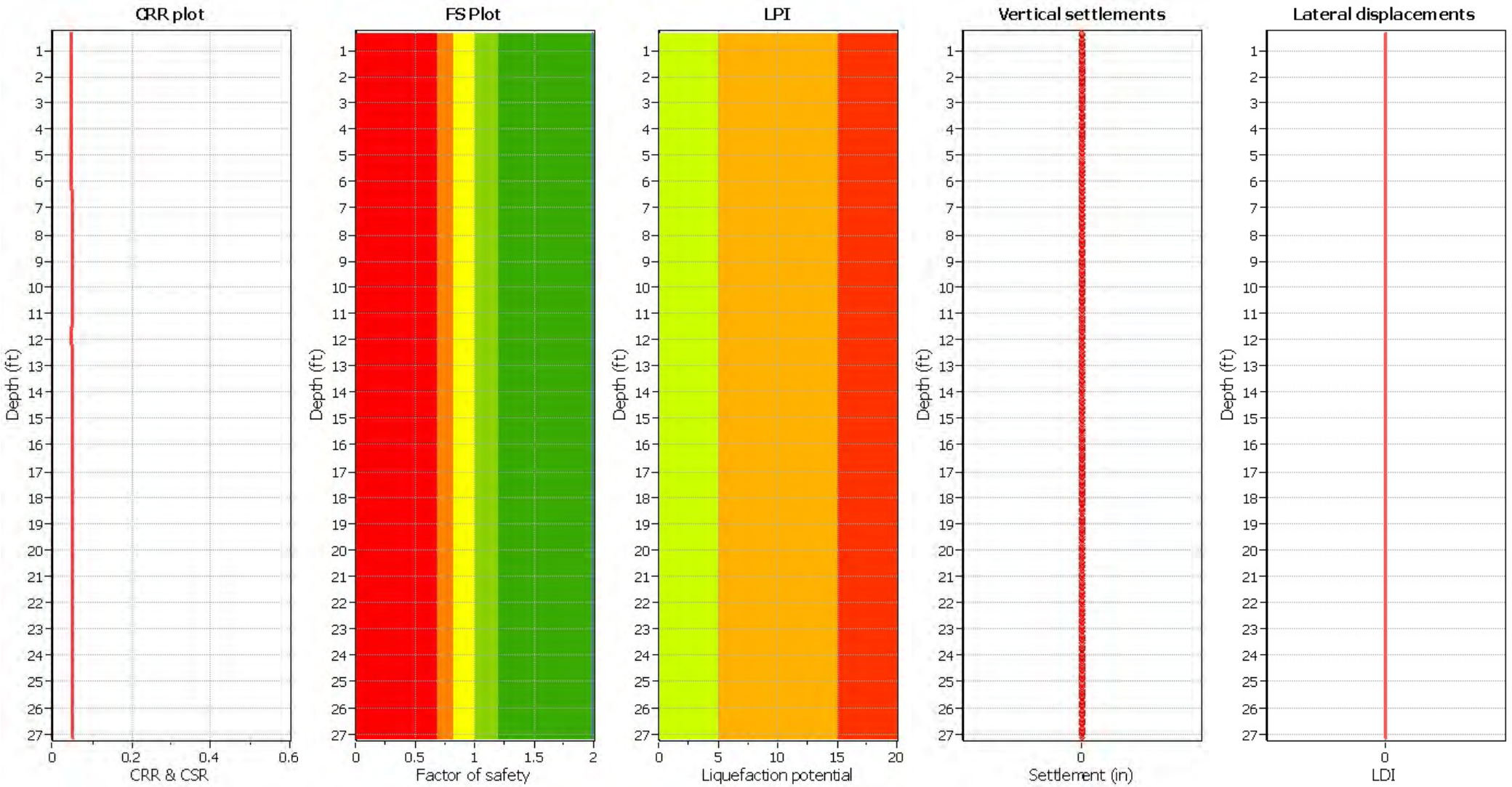
- High risk
- Low risk

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	25.00 ft

F.S. color scheme

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- Liquefaction and no liq. are equally likely
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LPI color scheme

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- High risk
- Low risk

Electronic Filing: Received, Clerk's Office 09/28/2020

Exhibit 18

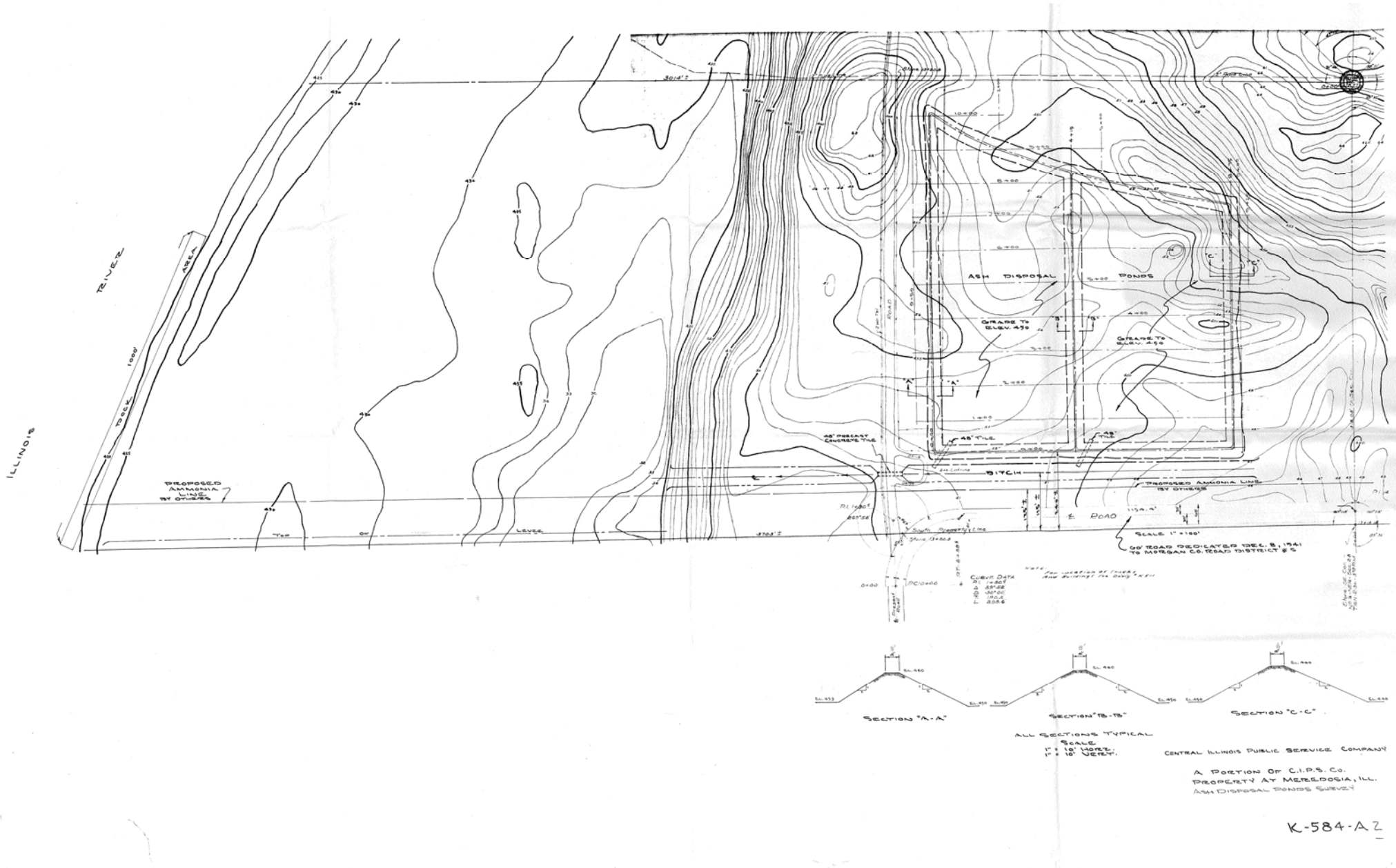
ILLINOIS
RIVER
DOCK
1000'
PROPOSED AMMONIA LINE BY OTHERS
ASH DISPOSAL PONDS
GRADE TO ELEV. 470
GRADE TO ELEV. 455
48" PRECAST CONCRETE TILE
48" TILE
DITCH
PROPOSED AMMONIA LINE BY OTHERS
ROAD
SCALE 1" = 100'
60' ROAD DEDICATED DEC. 8, 1941 TO MORGAN CO. ROAD DISTRICT # 6
CURVE DATA
SECTION "A-A"
SECTION "B-B"
SECTION "C-C"
ALL SECTIONS TYPICAL
SCALE
1" = 10' HORIZ.
1" = 10' VERT.
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
A PORTION OF C.I.P.S. CO. PROPERTY AT MERIDOSIA, ILL.
ASH DISPOSAL PONDS SURVEY
K-584-A2

Exhibit 19

MD 2019 COR LTR 0003

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Illinois Department of
Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

JB Pritzker, Governor
Colleen Callahan, Director

April 12, 2019

SUBJECT: Meredosia Power Station Ash Pond Dams
Permit DS2017058 – IL50707, IL50708 and IL50709

Mr. Matthew Frerking
AmerenEnergy Medina Valley Cogen LLC
11149 Lindberg Business Ct.
St. Louis, MO 63123

Dear Mr. Frerking:

We are in receipt of your March 11, 2019 submittal of as-built drawings for the referenced permit. Our review indicates the work was completed in accordance with the permit. The construction portion of that permit is considered complete.

Subsequent to issuance of the permit you submitted a report by Geotechnology Inc. of the Geotechnical Exploration and Liquefaction Analysis for the Fly Ash Pond and the Closed Fly Ash Pond at the site. The fly ash pond was partially modified under the referenced permit. The conclusion of the report is that the material placed in each impoundment is no longer able to act as a fluid.

As a result of the physical modifications and considering the conclusion of the investigation the status of the impoundments is:

Bottom Ash Pond – IL50707 – A portion of the embankment has been removed. The structure is no longer capable of impoundment and does not meet the definition of a dam under the Part 3702 rules.

Fly Ash Pond – IL50708 – The investigation shows that the material within the structure is no longer capable of acting as a fluid. By definition, the structure is no longer intended to provide impoundment and is not considered to be a dam.

Old Ash Pond – IL50709 - The investigation shows that the material within the structure is no longer capable of acting as a fluid. By definition, the structure is no longer intended to provide impoundment and is not considered to be a dam.

MD 2019 COR LTR 0003

As of this date, there are no structures at the Meredosia Power Station which are jurisdictional under the Part 3702 rules. No further reporting will be required and access by Department staff for inspection of the structures is no longer required. Should the Fly Ash Pond or Old Ash Pond be modified such that they are again able to impound water or other fluid material, the Department will again exercise jurisdiction under the Part 3702 rules.

Any questions or concerns may be directed to gina.kramer@illinois.gov or (217) 785-1661.

Sincerely,

Gina S. Kramer

Gina S. Kramer, P.E.
Dam Safety Engineer

GSK:cjp